جامعة الإمارات العربية المتحدة
United Arab Emirates University
UAEU

الإمارات تبتكر
UAE INNOVATES

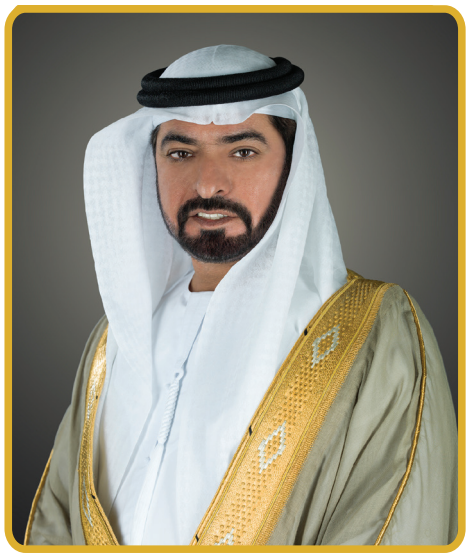
أسبوع جامعة الإمارات العربية المتحدة للابتكار
أسبوع الإمارات للابتكار

UAEU INNOVATION WEEK
UAE INNOVATION WEEK

UAEU Annual Research and Innovation Conference 2015

Program and Abstracts

24 - 25 November 2015
Al Ain, United Arab Emirates



Under the Patronage of His Excellency
Sheikh Hamdan Bin Mubarak Al Nahayan
Minister of Higher Education & Scientific Research,
Chancellor of UAEU

The UAEU Organize the

UAEU Annual Research and Innovation Conference 2015

November 24-25, 2015
F3 Building, UAEU University
Al Ain, United Arab Emirates

Table of Contents

منتزه جامعة الإمارات للعلوم و الابتكار
UAEU SCIENCE & INNOVATION PARK

واحة العقول
AN OASIS OF MINDS

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Conference Goals

Conference Description and Goals:

The Research & Innovation Conference 2015 is organized by the Division of Research and Graduate Studies at the UAEU and will be a two-day conference which will be held on November 24th and 25th at the Crescent and F3 buildings. The conference is likely to offer an interdisciplinary forum in various disciplines including, Health and Life Sciences; Engineering, IT, and Physical Sciences; Education, Humanities, and Social Sciences; and Business, Economics, and Law.

The goals of the conference are to:

- bring together UAEU Faculty, Graduate and Undergraduate Students in order to share their latest research findings on a variety of research topics and become familiar with other research projects conducted by their colleagues at the University

- Provide a platform to strengthen collaborations in scientific research and innovation between the university and the various institutions/industry within the UAE

- Disseminate the recent scientific advancements made by the UAEU researchers to the community at large and define the role of the university as a launching platform for scientific research and innovation in the country

Program outline

UAEU Annual Research and Innovation Conference 2015

Program Outline

Day 1: Tuesday, November 24th 2015 (*Venue: F3 Building)

Time	Description
08:00	Welcome Reception & Registration
09:00	Opening Remarks by H.E. Dr. Ali Rashid Al Noaimi, UAEU Vice-Chancellor
09:20	Keynote Address: Promoting Innovation Through Research by Professor. Wayne Patterson, Professor of Computer Science, Howard University, USA
10:00	Poster Presentations: Faculty/Students (Ground Floor)
11:00-17:00	Oral Presentations: Faculty/Students • Session 1: Public Health/Medicine (Room: 40) • Session 2: Microbiology/Immunology (Room: 134) • Session 3: Genetics/Cancer (Room: 234) • Session 4: Diabetes/Neuroscience (Room: 136) • Session 5: Food/Agriculture (Room: 110) • Session 6: Humanities/Social Sciences (Room: 238) • Session 7: Education (Room: 236)

***Note: Registration, Opening remarks and Keynote address will be in the Auditorium, Crescent Building.**

Day 2: Wednesday, November 25th 2015 (Venue: F3 Building)

Time	Description
08:00	Welcome Reception & Registration
09:00	Keynote Address: Strengthening Scholarly Research Through Graduate Programs by Professor Joseph C. Shields, Vice President for Research & Creative Activity and Dean of the Graduate College, Ohio University, USA
09:40	Poster Presentations: Faculty/Students (Ground Floor)
11:00 - 17:00	Oral Presentations: Faculty/Students • Session 1: Transportation/GIS (Room: 134) • Session 2: Materials/Structure (Room: 136) • Session 3: Energy/Heat Transfer (Room: 40) • Session 4: Climate/Environment (Room: 110) • Session 5: Mathematics (Room: 236) • Session 6: Business (Room: 234)

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Poster Presentations (**Venue:** F3 Building, Ground Floor)

Chair: Dr. Ahmed Al-Marzouqi (10:00- 11:00)

Abstract #	Abstract Title	Presenter	Session
1	The Effect of Ginger Powder on Blood Glycaemia, Blood Lipidemia and Body Composition on Adults at Risk for Cardiovascular Diseases: A controlled, randomized, single blind, parallel-design study	Dana Alkhatib	1
2	Validation of Photographic Food Atlas (Abu Dhabi Food Atlas) in Food Portion Size Estimation	Noura Al Shamisi	1
3	Nutrition Support Knowledge Among Health Care Professionals	Ruqaya Al Shamsi	1
4	The effect of Feature Selection: An approach for Predicting ICU Patient Deterioration	Noura AlNuaimi	1
5	A prospective study on traffic-related injuries among the youth in the Al Ain city	Fikri Abu-Zidan	1
6	Epidemiology and risk factors of hand injuries in the United Arab Emirates	Fikri Abu-Zidan	1
7	Diabetes in Emirati Adolescents in UAE: role of lifestyle?	Syed M Shah	1
8	The Disturbances of Slow Wave Conduction Proximal and Distal to the Ileal End-To-End Anastomosis Following Ileocystoplasty	Fayez T Hammad	1
9	A highly efficient model for data entry in electronic health record systems	Muhammad Jawad Hashim	1
10	Interaction of Fatigue Microcracks with Microstructure of Bone	Sahar Mohsin	1
11			
12	Evaluation and implementation of behavioral and educational tools that improves the patients' intentional and unintentional non-adherence to cardiovascular medications in family medicine clinics	Alia Hareb	1

Abstract #	Abstract Title	Presenter	Session
13	A prospective study on the use of warfarin in the United Arab Emirates	Baraa Ibrahim	1
14	Photo-protection of light sensitive drugs in the presence of cyclodextrins	Soleiman Hisaindee	1
15	The effects of human population movements to malaria spread in Kenya	Alya Saif Al Shehhi, Basma Ali Al Shehhi	1
16	Ineterplay of cytokines IL-17, IFN- gamma and IL123 in autoimmune type 1 diabetes	Mariam Al Shamsi	2
17	Immune responses to bacterial infections in immunodeficient hosts are enhanced by recombinant IFNγ-expressing Salmonella Typhimurium strain and correlate with strong activation of macrophage effectors	Ashraf Al-Sbiei	2
18	Genipin Mitigates Cisplatin Induced Nephrotoxicity via Suppression of Oxidative Stress, Inflammation and Cell Death Pathways	Eglal Al Khatim Mahgoub	2
19	Mathematical modeling of the Mers-Corona in United Arab Emirates	Abdessamad Tridane	2
20	Characterization of sequences at the 5' end of the MMTV genome in genomic RNA export and packaging	Shaima Akhlaq	2
21	Highlights of recent protein complex detection methods	Nazar Zaki	3
22	Transcriptional regulation of insulin signaling pathway by Mediator complex in liver	Suraiya Ansari	3
23	The putative DNA repair protein IRC20 acts as a chromatin remodeling enzyme	Deena Jalal	3
24	Electrical Characteristics of biological materials such as cells and DNA Using microfluidic channel	Minas Hussein	3
25	Identification of Aldose Reductase Inhibitors using Molecular Docking and Simulations	Ranjit Vijayan	3
26	Molecular dynamics simulations of protein-phytochemical interactions	Asma Ahmad Alhaddad	3
27	The Role of Estrogen Signaling Pathway on Mouse Gastric Stem Cell Homeostasis	Aysha Mohamed Alkaabi	3

Abstract #	Abstract Title	Presenter	Session
28	Obesity increases cancer growth by enhancing the activity of tumor-promoting myeloid cells	Basel al-Ramadi	3
29	Acute systemic exposure to metallic nanoparticles induces hepatotoxicity and NLRP3 inflammasome-mediated inflammation	Basel K. al-Ramadi	3
30	Using RNA-Sequencing in Muscle and Fat Biopsies from Cancer Patients with Early Cachexia Reveals Novel Mechanisms	Amal Al Haddad	3
31	Characterization of the Anti-Cancer Properties of Indigenous Medicinal Plant Extracts	Sameera M. Balhamar	3
32	Molecular Targets of Manuka Honey in Human Breast Cancer	Sarah Saif Al-Qubaisi	3
33	Functional Analysis of Parathyroid Hormone-Like Hormone in the Mouse Stomach	Dhanya Vijay	3
34	Expression of Parathyroid Hormone-Like Hormone Receptor in Normal and Cancerous Stomach	Dhanya Vijay	3
35	Rhus coriaria induces senescence and autophagic cell death in breast cancer cells through a mechanism involving p38 and ERK1/2 activation	Halima Ali Al Samri	3
36	The effect of diabetes mellitus on the recovery of renal dysfunction following reversal of 24-hr unilateral ureteral obstruction in the rat	Fayez T Hammad	4
37	Amelioration of Type 1 diabetes by the cholinergic anti-inflammatory pathway in the MLD-STZ model	Maria J. Fernandez-Cabezudo	4
38	Reduced Glomerular Size-Selectivity in late Streptozotocin-Induced Diabetes in Rats	Omran Bakoush	4
39	Inhibition of Glycolipid Transferase Attenuates Diabetes Induced Retinal Tissue Injury in a Murine Model of Type 1 Diabetes	Rajesh Mohanraj	4
40	A clinical audit on diabetes care in patients with type 2 diabetes in Al-Ain, United ArabEmirates	Khoula Moh Basahel	4
41	Repetitive transcranial magnetic stimulation (rTMS) protocols induced changes in cortical gene expression in a rat model of stroke	Milos Ljubisavljevic	4
42	Multiple targeting approach with histamine H3 receptor antagonists as novel and promising antiepileptic drugs	Bassem Sadek	4

Abstract #	Abstract Title	Presenter	Session
43	Neuroprotective effect of nerolidol against neuroinflammation and oxidative stress induced by rotenone	Emdadul Haque	4
44	Intrastriatal injection of human wild-type α-synuclein induces endogenous α-synuclein phosphorylation and accelerates MPTP neurotoxicity	Emdadul Haque	4
45	Curcumin Potentiates Human A7-Nicotinic Acetylcholine Receptors	Eslam Gaber El Nebrisi	4
46	Isoenzyme and antioxidant status in relation to flowering in different varieties of date palm (Phoenix dactylifera L.) of United Arab Emirates	Abdul J. Cheruth	5
47	Phytochemical investigation and in vitro free radical scavenging activities of leaf extracts of Calligonum comosum	Abdul J. Cheruth	5
48	Analyzing Consumers' Preferences and Willingness to Pay for the Local Food Products in United Arab Emirates	Safdar Muhammad, Ahmed Al Junaibi	5
49	Camel meat balls fortified with black cumin seed and oil, Evaluation of quality and storage stability	Sajid Maqsood	5
50	Somatic embryogenesis in Haloxylon persicum - an endangered tree species suited for landscapes in UAE	Shyam S. Kurup	5
51	Drying of dates at Bisr stage of date fruit development	Ahlam Abdullah Al-Hammadi	5
52	Tolerance to soil salinity by Micromonospora halophytica capable of producing 1-aminocyclopropane-1-carboxylic acid (ACC) deaminase	Khaled Abbas El-Tarabily	5
53	Archaeological fieldwork at two hilltop sites in Oliveira de Azeméis (Portugal)	Adriaan De Man	6
54	Examining Medical Students Extra-curricula Research through the Lens of Transformative Learning Theory	Margaret Elzubeir	7
55	Post Graduate Medical Education in the United Arab Emirates: Guidelines on a Code of Ethics and Professional Conduct for Trainees	Tahra AlMahmoud	7
56	How we develop high quality single best answer multiple choice questions	Tahra AlMahmoud	7
57	Informed Consent Education in a Multicultural Medical Environment: Clinical Clerks' perspectives	Tahra AlMahmoud	7

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 1: Public Health/Medicine (**Venue:** F3 Building, Room 40)
Chair: Dr. Omran Bakhoush (11:00- 13:00)
Chair: Dr. Iain Blair (14:00- 15:30)

Abstract #	Time	Abstract Title	Presenter
58	11:00	Eating more fruits and vegetables exert a positive health effects on obese Emirati patients by decreasing their waist circumference and attenuating associated.	Salah Gariballa
59	11:15	Trauma research in UAE: Lessons learned	Fikri Abu-Zidan
60	11:30	Risk Factors for Type 2 Diabetes in Native Emirati Adolescents	Syed M Shah
61	11:45	Falls from windows in children: assessment of newspaper reporting of incidents and risk factors in the United Arab Emirates	Hanan Mansour Al-Marzouqi
62	12:00	Patient satisfaction and waiting time at hospitals in the UAE	Haleema Al Hammadi
63	12:15	Impact of the "Skills for Change" Program on Nutrition Knowledge and Physical Activity levels of Adults with Type 2 Diabetes	Habiba I. Ali
64	12:30	Prevalence of the Metabolic Syndrome and Its Component Factors among Female Students at United Arab Emirates University	Maysm Nezar Mohamad
65	12:45	Accurate analysis of vitamin D in humans	Iltaf Shah
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
66	14:00	Population Model for Thalassemia with Premarital Screening and Education Factor	Sehjeong Kim
67	14:15	Myocardial Ischemia/Reperfusion Injury: Role Of Galectin-3	Suhail Al-Salam
68	14:30	Long Term Visual and Refractive Outcomes Following Surface Ablation Techniques in a Large population for Myopia Correction	Tahra AlMahmoud
69	14:45	Inhibition of mTOR Increases the Severity of Lung Inflammation in Mice Infected with Influenza A Virus	Ahmed Deemas Alsuwaidi
70	15:00	The mTOR Inhibitor Sirolimus Suppresses Thymocyte Respiration	Suleiman Al-Hammadi
71	15:15	Chronic pulmonary effects of nose-only water-pipe smoke (Shisha) exposure in mice	Abderrahim Nemmar

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 2: Microbiology/Immunology (**Venue:** F3 Building, Room 134)

Chair: Dr. Gulfaraz Khan (11:00- 13:00)

Chair: Dr. Eyad Elkord (14:00- 15:00)

Abstract #	Time	Abstract Title	Presenter
72	11:00	Autoimmune Diabetes: Roles of Interferon-gamma and interleukin -17	Eric PK Mensah-Brown
73	11:15	The role of B cells and their preclinical infiltration to the CNS in spontaneous relapsing-remitting experimental autoimmune encephalomyelitis (RR-EAE) mice	Zakeya Nasser Al Rasbi
74	11:30	Serologic Immunity to Childhood Vaccine-Preventable Diseases in the United Arab Emirates	Lolowa A. Al Mekaini
75	11:45	Long range interactions (LRIs) between U5 and Gag sequences maintaining flexibility in embedded energy of the base paired nucleotides are required for Mason-Pfizer monkey virus (MPMV) genomic RNA packaging	Rawan Mohammed Kalloush
76	12:00	Optimization of DNA extraction from archival formalin-fixed human brain tissues for the detection of Epstein-Barr virus by PCR	Asma Hassani
77	12:15	Nano-vesicles secreted by Epstein-Barr virus-immortalized cells carry viral small RNAs (EBERs)	Gulfaraz Khan
78	12:30	Exosomes isolated from Epstein-Barr virus infected cells induce apoptosis in the recipient cells via the extrinsic pathway	Waqar Ahmed
79	12:45	NDM-7 carbapenemase producer Enterobacteriaceae isolated in the Arabian Pensinsula	Agnes Sonnevend-Pal
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
80	14:00	Superimposed resistance mechanisms causing multi-drug resistance in the strains of the first pan-drug resistant Klebsiella pneumoniae outbreak in the UAE	Tibor Pal
81	14:15	Mathematical modeling of the imported Communicable diseases in the United Arab Emirates	Abdessamad Tridane
82	14:30	A Novel System for Sensing and Monitoring the Temperature of Vaccines	Waseem Arshad
83	14:45	Microalgae Lipid Content and Cell Quantification Using Electrical Parameters	Leena Saqer, COE

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 3: Genetics/Cancer (**Venue:** F3 Building, Room 234)

Chair: Prof. Bassam Ali (11:00- 13:00)

Chair: Dr. Farah Mustafa (14:00- 15:45)

Abstract #	Time	Abstract Title	Presenter
84	11:00	The Molecular and Cellular Basis of Monogenic Disorders in UAE	Bassam Ali
85	11:15	Epigentic regulation mechanisms links early developmental environment with growth and metabolism	Starling Emerald Bright David
86	11:30	Compound heterozygous MPDZ mutations are the underlying cause of mild non-progressive communicating hydrocephalus	Nesreen K. Al-Jezawi
87	11:45	New Mutation in TECRL gene is associated with lethal Catecholaminergic polymorphic ventricular tachycardia	Elhadi H. Aburawi
88	12:00	Optimal Control Approach in a Delayed Mathematical Tumour Model with Immuno-Chemotherapy	Fathalla A. Rihan
89	12:15	Markers for human T regulatory cells in health and cancer: New insights	Eyad Elkord
90	12:30	Mechanistic insights into bacterial therapy of tumors: Implications for cancer immunotherapy	Basel al-Ramadi
91	12:45	Growth and Differentiation of Gastric Stem Cells on 3D Biodegradable Scaffolds	Yaser E. Greish
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
92	14:00	MCJ protein is a novel prognostic factor for responsiveness to chemotherapy in human breast cancer	Maria J. Fernandez-Cabezudo
93	14:15	Anti-breast cancer activities of Rhus coriaria (Sumac): A Preclinical study	Rabah Iratni
94	14:30	Akt2 knock-down reveals its contribution to human lung cancer cell proliferation, growth, motility, invasion and endothelial cell tube formation	Samir Attoub
95	14:45	Developing Polyclonal Antibodies Targeting a Novel Growth-Related Protein in Pancreatic Cancer	Amal Al Haddad
96	15:00	The Molecular Functions of the Chromatin Modifier Fun30	Zeina Al Natour
97	15:15	Frondoside A Potentiates the Effects of Conventional Therapeutic Agents in Acute Leukemia	Fatma H. Sajwani
98	15:30	Manuka Honey Inhibits Cellular Growth, Metastasis and Angiogenic Capacity of Human and Murine Breast Cancer	Mezoon M. Al Dhaheri

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 4: Diabetes/Neuroscience (**Venue:** F3 Building, Room 136)
Chair: Prof. Chris Howarth (11:00- 13:00)
Chair: Prof. Safa Shehab (14:00- 14:45)

Abstract #	Time	Abstract Title	Presenter
99	11:00	Molecular and cellular basis of the effect of Incretins in diabetes mellitus	Ernest Adeghate
100	11:15	Different pattern of mRNA expression in sinoatrial node from Goto-Kakizaki type 2 diabetic rat	Frank Christopher Howarth
101	11:30	Behavioral and functional morbidities among patients with obesity referred for Bariatric Surgery	Ossama Tawakol Osman
102	11:45	The Role of Glutamate signalling in Diabetic Neuropathy	Nadia Hussain
103	12:00	Different pattern of mRNA expression in sinoatrial node from streptozotocin-induced diabetic rat	Zannatul Ferdous
104	12:15	The role of the uninjured nerve in the development of peripheral neuropathic pain	Safa Shehab
105	12:30	Infantile postnatal exposure to lead (Pb) enhances tau expression in the cerebral cortex of aged mice: relevance to AD	Abdu Adem
106	12:45	Long-term effects of repeated prefrontal cortex transcranial direct current stimulation (tDCS) on food craving in young adults	Milos Ljubisavljevic
Lunch Break			
107	14:00	Disease-modifying effect of B-vitamins on brain atrophy and cognitive decline in MCI is enhanced by omega-3 fatty status	Abderrahim Oulhaj
108	14:15	Anticonvulsant and Procognitive Properties of the non-imidazole histamine H3 receptor antagonist DL77 in Various Experimental Models	Ali Saad
109	14:30	Brain parenchymal TNF-α and IL-1β induction in experimental pneumococcal meningitis	Johann Braun

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 5: Food/Agriculture (**Venue:** F3 Building, Room 110)
Chair: Dr. Shyam Kurup (11:00- 13:00)
Chair: Dr. Firas Abu elsaman (14:00- 14:45)

Abstract #	Time	Abstract Title	Presenter
110	11:00	Economic Analysis of Demand for Food Import in the UAE: Major Drivers Pattern and Growth over Last Five Decades	Berhanu A. Degefa
111	11:15	Investigating the Antimicrobial Activities of Camel Milk and its Fermented Product against Foodborne Pathogens	Mutamed Ayyash
112	11:30	Seedling and Cuttings Production for Hydroponics Using Different Substrates	Moustafa Fadel
113	11:45	Study on the convenient fertilization for the enhancement of quality of mango fruits under different environmental conditions	Ola Abd El Satar Abd El Haliem
114	12:00	The First Baseline Date for the United Arab Emirates (UAE) Indigenous Essential Oil-Bearing Species from the Amaranthaceae Plant Family	Suzan Marwan Shahin
115	12:15	Physico-chemical and Rheological Characteristics of Yoghurt Produced from Mixtures of Cow and Camel Milk	Ahlam Abdullah Al-Hammadi
116	12:30	Studies on Evaluating Novel Native Plant Species for Sustainable Landscape Management Practices in Abu Dhabi Emirate	Mubarak Mohammed Jaber Alkhaili
117	12:45	Growth promotion of Salicornia bigelovii by a polyamine-producing isolate of Micromonospora chalcea in the United Arab Emirates	Khaled El-Tarabily
Lunch Break			
118	14:00	Transcriptome Analysis Reveals Genes Commonly Regulated by Biotic and Abiotic Stresses in Arabidopsis	Synan AbuQamar
119	14:15	Identification of Arabidopsis Candidate Genes in Response to Biotic and Abiotic Stresses Using Comparative Microarrays	Salma Omar Al Ameri
120	14:30	Development of a sustainable organic farming system using beneficial bacteria to reduce dependency on agrochemicals in the UAE	Asma H. M. Alsedeeri

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 6: Humanities/Social Sciences (**Venue:** F3 Building, Room 238)

Chair: Dr. Maryem Al-Swaidi (11:00- 13:00)

Chair: Dr. Ali Shehadeh (14:00- 14:45)

Abstract #	Time	Abstract Title	Presenter
121	11:00	Intergenerational Conflict in Arab Families: Salient Issues and Scale Development	Timothy M Daly
122	11:15	Morphosyntactic Development in Emirati Arabic	Dimitrios Ntelitheos
123	11:30	Mate Selection for Marriage in Contemporary Emirati Society	Aqil Kazim
124	11:45	Investigating L2 Learners Metalinguistic Awareness in Problem-solving Domain: A Psycholinguistic View	Hosni Mostafa El-dali
125	12:00	Armenian Merchants in Arab world in the 19th century	Yehia Mohamed Mahmoud Ahmed
126	12:15	Using RSA to unravel the neural structure of the language network	Sami Boudelaa
127	12:30	المكونات اللسانية التداولية في أفكار ابن جني (392 هـ)	Mohammed Adeel Abdelaziz Ali
128	12:45	منهج الآلوسي في استعمال الكليات النحوية في توجيه الأحكام الفرعية : آيات الأحكام نموذجاً	Emad Ahmad Suliman Zapin
Lunch Break			
129	14:00	أدب الرحلات في المشهد الأدبي الإماراتي المعاصر "الجزائر حبيبتي" لأحمد راشد ثاني أنموذجاً	Rasheed Bu Shoair
130	14:15	أدبيّة الرحلة وإشكاليّة التجنيس: دراسة نظريّة في ضوء المنهج الشكلانيّ	Shafiq Alreqeb
131	14:30	مسند الإمام أبي حنيفة - دراسة وتحقيق Musnad of Imam Abu Hanifa study and investigation	Abdulazeez Shakir Hamdan

UAEU Annual Research and Innovation Conference 2015

Program Details

Tuesday, November 24th 2015

Session 7: Education (**Venue:** F3 Building, Room 236)

Chair: Dr. Mohamed Shapan (11:00- 13:00)

Chair: Dr. Shaikah Altenaiji (14:00- 16:15)

Abstract #	Time	Abstract Title	Presenter
132	11:00	Participatory Education: Insights from Biogeography, Phenomenology and Sun Tzu' Art of War	Nihel Chabrak
133	11:15	A Targeted Role for L1 in L2 Vocabulary Acquisition with Mobile Learning Technology	Daniel Baxter Jackson III
134	11:30	Deployment of Technology Innovations in Teaching and Learning :A Comparative Study	Enas Said Abulibdeh AbdarRahman Al-Mekhlafi
135	11:45	Attitudes Toward and Images of Children with Disabilities	Hala Elhoweris
136	12:00	Reshaping UAEU Students Perceptions toward Private Sector Employment	Ali Ibrahim
137	12:15	The academic effect of integrating iPad technology in teaching 3rd-grade primary school students with dyslexia, English as a Second Language (ESL) reading, spelling and writing skills.	Elazab Mohamed Elshazly
138	12:30	Teacher resistance to educational change in the United Arab	Wafaa El Zaatari
139	12:45	The Impact of Classroom Density on Teachers' Performance And Students' Achievement In Al-Ain Schools: Perspective of Teachers And Students	Saif Saeed Almanei
Lunch Break			
140	14:00	The Effect of the Utilization of Webquest on Students' Reading Comprehension Performance	Aisha Saeed Alshamsi AbdarRahman Al-Mekhlafi
141	14:15	Development and Validation of Instrument to Assess Scientific Inquiry Practices in the United Arab Emirates' Secondary School Curriculum	Hassan Tairab
142	14:30	A College-Wide Assessment Management System in an Integrated Medical Curriculum	Sami Shaban
143	14:45	United Arab Emirates ICT Penetration as Indicator of an Information Society. A Case Study of ICT Penetration and Usage Among United Arab Emirates University Students	Yazid Benchabane & Ahmed Bello Abubakar
144	15:00	Storytelling for Children	Eman Rabiah
145	15:15	Arabic Vocabulary Acquisition through Exploration	Fatmah Al Ramsi
146	15:30	Game-Based Learning: Requirements and Challenges	Heba Ismail
147	15:45	A Game-Based Learning Software Model	Shamsa Abdulla Salem Ali
148	16:00	Modeling and Virtualization of Emirati	Aysha Al Neyadi

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Poster Presentations (**Venue:** F3 Building, Ground Floor)

Chair: Dr. Ahmed Al-Marzouqi (10:00- 11:00)

Abstract #	Abstract Title	Presenter	Session
149	Developing innovative eco-friendly parking facility at UAEU campus as a part of UAEU strategy plan of 2017-2021	Amany Alkinde	1
150	New Urbanism as a tool to revive Sharjah neighborhoods local parks	Rana H. Abdulla Al Thawabta	1
151	Mapping the changes and degradations of the mangrove forests between 1990-2015 in the Emirates of Abu Dhabi UAE using satellite data	Mazoun Al Alawi	1
152	Integration of a Vicon Camera System for Indoor Swarm of a Parrot AR Drones	Shaima Abdulwahab Al Habsi	1
153	Designing an Eye Partner-Assisted Scanning Keyboard	Zeenat S AlKassim	1
154	The Impact of Dubai's Architectural Wonders on the Daily Indigenous Performance in The Light of Cultural Modernity and Urban Space	Zulfat Salahudeen Al Kassim	1
155	Sustainable Heat Treatment	Basel Alsayyed Ahmad	2
156	Fabrication of low cost H2S gas sensor using CuO nanoparticles	Ayah Faeik Salim Abu Hani	2
157	CO2 absorption sing fabricated polymeric flat sheet membrane	Dalal Mohamed Al Mansoori	2
158	Carbon dioxide capture and separation technologies	Mayar Kamel	4
159	Electronic Properties of BixSb2−xTe3 as a potential thermoelectric material	Musab Asad, Ahmed Benkraouda	2
160	Nanoparticles Decorated Graphene-oxide based Sensor for Glucose Detection	Namat Bashir	2
161	Electronic properties of ZnO nanorods: A first-principles investigation within the LDA, GGA and modified Becke–Johnson exchange potential	A. A. Altelbani	2

Abstract #	Time	Abstract Title	Presenter
162	Methyl cinnamate-CyD Inclusion Complexes	Sulafa Abed Halim	2
163	Hierarchical Control Strategy for Ocean Wave Energy Converters	Addy Wahyudie	3
164	Design of Ocean Hydraulic Wave Energy Converters	Addy Wahyudie	3
165	Automated Solar Powered Electric Car	Saman Shanaei	3
166	Balloon operated pumping machine	Lama F. Allan	3
167	A method of harvesting the acoustic energy	Mohammed Muneer Lajam	3
168	Open top chambers to study the effects of elevated level carbon dioxide under field conditions	Mohammed A. Salem	3
169	Debye Bio Quantification	Mahmoud Al Ahmad	3
170	Recent development in hemodynamics: FSI	Hashem M. AlArgha	3
171	Enhancing heat transfer from hot fluids by interfacing them with immiscible high thermal conductivity liquids	Salah Al Omri	3
172	Development of a Novel Photovoltaic-Phase Change Materials Water Heating System	Hamza Alnoman	3
173	Hydrodynamic focusing in a microfluidic device with four-microchannel intersection	Manea Hamad Saeed Musabbeh Al Rayssi	3
174	Thermal properties Measurements of (MWCNT –Water) Nanofluid	Emad Elnajjar	4
175	Improving Numerical Forecasting in the Gulf Area by Assimilating Doppler Radar Radial Winds	M.N. Anwar	4

Abstract #	Time	Abstract Title	Presenter
176	The Impact Of CO2 Enrichment On The Growth Of Important Plant Species	Abdulla Y. A. Almarzooqi	6
177	On Reliability-Enhanced Quantum Cellular Automata (QCA) Designs	Latifa Hamad	6
178	Solvatochromic behavior and DFT calculations of Fuchsin	M. A. Rauf	6
179	Group algebras whose groups of normalized units have exponent 4	Victor Bovdi	6
180	Fabrication and characterization of graphene oxide based field effect transistors for glucose-sensor applications	Khadija Said	6
181	Numerical Solvers for Problems in Bioinformatics Using Finite Differences approaches	Saoud Faisal Mohammed Badaam	5
182	Comparing university research across disciplines. An application of the Harzing's (2014) individual annual h-index in comparing faculty research performance across different colleges in a single university	James C Ryan	5
183	Senior Exhibition Management System (SEMS)	Sara Rashed Suwaidan	5

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 1: Transportation/GIS (**Venue:** F3 Building, Room 134)
Chair: Dr. Khalid Hussein (11:00- 13:00)

Chair: Prof. Yaser Hawas (14:00- 15:30)

Abstract #	Time	Abstract Title	Presenter
184	11:00	Modeling airport employees commuting mode choice at Dubai International Airport	Khaula Abdulla Alkaabi
185	11:15	FlyNet: Deployment of Connected UAVs for Monitoring, Target Detection and Tracking	Abderrahmane Lakas
186	11:30	A Histogram-Based Model for Road Traffic Characterization in VANET	Hesham El-Sayed
187	11:45	Compressive Sensing Framework for Narrow-band Interference Mitigation in OFDM Cooperative Communications	Imad Barhumi
188	12:00	Security Issues in Smart Power Grid Networks Related to Smart Meters	Khaled Shuaib
189	12:15	VIN Utilization for Improved Vehicular Sensing	Najah Abu Ali
190	12:30	UAV Tracking Moving Targets Using On -Board UWB ISAR Radar Sensor	Liren Zhang
191	12:45	A VANET Algorithm for Real-Time Urban Traffic Network Route Guidance	Yaser Hawas
Lunch Break			
192	14:00	Spatio-Temporal and Hazard Mapping of Earthquake in UAE (1984-2012): Remote Sensing and GIS Application	M. M. YagoubS
193	14:15	Mapping Urban Morphology Changes due to Special Economic Zones in Dubai Using Landsat Archival Data	Naeema Alhosani
194	14:30	Use of Landsat data to create a time-series of sand dune fields maps in Abu Dhabi Emirate	Nazmi Saleous
195	14:45	Mapping Abu Dhabi landscape change (vegetation) during 1993-2014	Yazan Jamal
196	15:00	Remote Sensing and GIS for detecting and counting palm trees	Salem Issa
197	15:15	GIS-Based Offshore Wind Farm Site Selection	Jasem Al Mazrouei

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 2: Materials/Structure (**Venue:** F3 Building, Room 136)
Chair: Dr. Basim Abu-Jdayil (11:00- 13:00)
Chair: Dr. Ahmed Hassan Noor (14:00- 16:30)

Abstract #	Time	Abstract Title	Presenter
198	11:00	Optimization of High Performance Structures in Automotive Systems	Basel Alsayyed Ahmad
199	11:15	Date Pits and Date Palm Wood-Based Heat Insulator Composites	Basim Abu-Jdayil
200	11:30	Microencapsulation Of Phase Change Material	Yasir Rashid
201	11:45	Preparation and Characterization of Ag- and Cu-doped TiO2 Nanomaterials	Haya A.R. Ahmed
202	12:00	Experimental Investigation of KEVLAR KM2Plus Nano-Reinforced Laminated composite Properties	Omar Gamal Ayad Ashfakur Rahman
203	12:15	Self-cleaning superhydrophobic polymeric powder coatings for solar panels	Riham Mohamed Sorkatti Abu Bakr
205	12:45	RC Airplane Design- Build –Fly (AIAA Mock Competition)- Learned Lessons	Rabih Tahouf
Lunch Break			
206	14:00	On Shape Memory Alloy Materials	Raghed alhousari
207	14:15	The fabrication of PVDF composite nanofibers and their application in oil-water separation	Zinab Ahmed Al Haddad
208	14:30	Preliminary in vitro evaluation of novel Ca-deficient hydroxyapatite-polymer composites for potential bone filling applications	Amani Al Yafeai
209	14:45	The amorphization of a metallic alloy	Fathalla Hamed
210	15:00	Investigating Magnetic Properties of Ferrite Nanoparticles	Ihab Obaidat
211	15:15	Performance assessment of modern multi-story buildings under near-field earthquakes including the verification of shear failure modes	Bashir Almurad
212	15:30	Effect of Washers on the Response of Bolted Composite Connections	Omnia Ragab AbouEl-Hamd
213	15:45	Self-compacting concrete incorporating ceramic waste powder	Sama Tarek Sayed Taha Aly
214	16:00	Vulnerability of High-rise Buildings with Severe Irregularity under Diverse Earthquake Scenarios	Sayed Khalifa
215	16:15	Towards Self-recovering Construction Schedules: an Artificial Intelligence Approach	Youssef Abduljalil

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 3: Energy/Heat Transfer (**Venue:** F3 Building, Room 40)

Chair: Dr. Ala Raef Al-Haj Hussein (11:00- 13:00)

Chair: Dr. Mohammad Hamdan (14:00- 17:00)

Abstract #	Time	Abstract Title	Presenter
216	11:00	The impact of Emirati household occupants on energy consumption; exploratory investigation	Amna Al Ameri
217	11:15	Design and Modeling of Hollow-Based Energy Harvester	Areen Allataifeh
218	11:30	Contact angle and IFT measurements at elevated temperatures and pressures for evaluating wettability in a selected carbonate reservoir in the UAE	Jassim Abubacker
219	11:45	Large Scale Photovoltaic Field Model Identification for Fault Detection and Diagnosis Using Heuristic Evolutionary Algorithm	Zahi M. Omer
220	12:00	A Remotely Controlled Video Surveillance System Powered by Solar Tracker	Latifa Ahmed Al Dhaheri
221	12:15	Nanotechnology in the service of Oil Industry: Using abundant natural nanoparticles for Enhanced Oil Recovery	Maitha Jumaa Hamad AlKaabi
222	12:30	Modelling and control of Bridgeless PFC modified SEPIC Rectifier with Multiplier Cell	Abbas Fardoun
223	12:45	A Low Complexity Algorithm for Mode-Selection of OFDM Relaying Systems	Hanan Al-Tous
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
224	14:00	Buildings Retrofitting and Energy Efficiency Optimization Strategies in the UAE Context	Kheira Anissa Tabet Aoul
225	14:15	In-Situ Performance Measurement of Green Wall System in UAE	Mahmoud A. Haggag
226	14:30	A Microstrip Probe Based On Electromagnetic Energy Tunneling for Extremely Small and Arbitrarily Shaped Dielectric Samples	Rashad Ramzan
227	14:45	Bistable composite laminates for morphing and energy harvesting applications	Samir Emam
228	15:00	Dielectric Sensing based on Energy Tunneling in Wire-loaded Microstrip Cavities	Muhammad Omar
229	15:15	Evaluation of Yearly Cooling Performance of Phase Change Materials Integrated into PV Systems in Extremely Hot Weather Conditions	Ahmed Hassan
230	15:30	Microfluidic System for Multi-Target Cell Separation	Saud Khashan
231	15:45	Concentrated photovoltaic (CPV) system and its cooling by using phase change material (PCM)	Ali Hasan Shah
232	16:00	Modeling Effect of Cerebral Aneurysms Size Through Numerical Analysis	Hashem AlArgha
233	16:15	Numerical validation of cooling performance of phase change materials integrated into heat sinks for electronics cooling	Shaimaa Mohamed Abu Ayyan
234	16:30	Investigating flow field and energy separation in counter-flow vortex tube via 3D computation fluid dynamics	Youssef Elkassem
235	16:45	Advanced Window Systems: Design and Performance Test of A Hybrid Photoluminescene-Photovoltaic Building Technology	Daniel Efurosibina Attoye

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 4: Climate/Environment (**Venue:** F3 Building, Room 110)

Chair: Dr. Rezaul Chowdhury (11:00- 13:00)

Chair: Dr. Sabir bin Muzaffar (14:00- 16:45)

Abstract #	Time	Abstract Title	Presenter
236	11:00	Options for Maintaining a Sustainable Fishery Production against Climate Change Conditions in the United Arab Emirates	Eihab Fathelrahman
237	11:15	Effects of global climate change on agriculture	Mohammed A. Salem
238	11:30	Climate Change and Food Security: The Effects of Long Term Elevated Solar Ultraviolet–B (UV-B) Radiation on the Agricultural Sustainability in the United Arab Emirates (UAE)	Rahaf Ajaj
239	11:45	Modelling the Ecological Impact of Climate Change in Hot Regions – Environmental Prospects for the UAE	David L. Thomson
240	12:00	Biological impacts of climate change in hot regions - are warm-water fish already living above their optimal temperatures?	Alya AlHammadi
241	12:15	The ecological impacts of climate change in hot regions – is our biodiversity particularly vulnerable in the UAE?	Obaid Ali Al Shamsi
242	12:30	Rising temperatures in hot regions – how many species would be able to survive in the United Arab Emirates?	Sounak Ghosh
243	12:45	Importance of Sampling and Sample Preparation in Slake Durability Test	Abdulkarim Ahmed Owain Alali
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
244	14:00	Greywater reuse in arid climates through the water sensitive urban design system	Rezaul Chowdhury
245	14:15	Transient behavior of the CO2 absorption in porous polymeric hollow fiber membrane contactors	Nayef Ghasem
246	14:30	Absorption of CO2 from natural gas using aqueous ammonia solutions and regeneration using hollow fiber membrane contactors	Abdul Rahim Nihmiya
247	14:45	Evaluation of a dual-purpose process for the treatment of desalination reject brine and capture of CO2	Ameera F. Mohammad
248	15:00	Effect of Supercritical CO2 Treatment on Date Pits for Lead Ions Removal	Haliemeh Sweidan
249	15:15	Waste Management of Emirates Steel By-products through Carbonation Process	Suhaib Hameedi
250	15:30	Assessment of the Effectiveness of Different Freshwater Microalgae Strains for Phenol Removal	Mustafa Nabil
251	15:45	An Initial Assessment of Desert Plants' Potentials for Carbon Sequestration	Taoufik Ksiksi
252	16:00	A novel combined "Enzymatic-Advanced Oxidation Process" approach for efficient degradation of aromatic pollutants	Aysha Hamad Al Neyadi
253	16:15	Absorption of CO and CO2 Molecules on Graphene: Ab-initio Analysis	Nacir Tit
254 - A	16:30	Portable analyzer for continuous monitoring of sulfur dioxide in gas stream based on amperometric detection and stabilized gravity-driven flow	Sayed A.M. Marzouk
254 - B	16:45	Smart Safety System inside Vehicles	Shahrazad Abu Ghazleh

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 5: Mathematics/Physics (**Venue:** F3 Building, Room 236)

Chair: Dr. Nafaa Chbili (11:00- 13:00)

Chair: Dr. Salah Nasri (14:00- 15:15)

Abstract #	Time	Abstract Title	Presenter
255	11:00	Polynomial Type Oil-Vinegar Signature Cryptosystem	Adama Diene
256	11:15	Oxygen vacancy cluster in rutile TiO2: GGA+U study and extrapolation correction	Xiaoping Han
257	11:30	Geometry of Quasiconformal Groups	Jianhua Gong
258	11:45	Mutually unbiased bases	Kanat Abdukhalikov
259	12:00	An efficient numerical algorithm for solving fractional higher-order nonlinear integro-differential equations	Qasem M. Al-Mdallal
260	12:15	All-optical switches, unidirectional flow, and logic gates with discrete solitons in waveguide arrays	Usama Al Khawaja
261	12:30	On the pricing financial derivatives in illiquid markets	Youssef El-Khatib
262	12:45	An Efficient Method For Solving Fractional Boundary Value Problems	Muhammed Syam
Lunch Break			
263	14:00	GMRES Method for Solving discretized Incompressible Navier-Stokes Equations	Nabila Azzam
264	14:15	Series Solutions of Multi-Term Fractional Differential Equations	(Mohammed Khier) Ibrahim Al Srihin
265	14:30	Modified Taylor series solution of initial value problems with singularities	Ghada Janem
266	14:45	On the Geometry Of Fuchsian Groups	Hala Alaqad
267	15:00	geometric integration of Hamiltonian systems	Hebatallah Sakaji

UAEU Annual Research and Innovation Conference 2015

Program Details

Wednesday, November 25th 2015

Session 6: Business (**Venue:** F3 Building, Room 234)

Chair: Prof. Abdulnasser Hatemi (11:00- 13:00)

Chair: Dr. Peter Oyelere (14:00- 16:30)

Abstract #	Time	Abstract Title	Presenter
268	11:00	Portfolio Selection: A New Approach	Prof. Abdulnasser Hatemi
269	11:15	The Impact of Global Uncertainty, Equity and Commodity Shocks on GCC Stock Markets: Evidence from Quantile Regression Analysis	Chiraz Labidi
270	11:30	Social Media impact on Innovation in an emerging smart city	Maher Shirah
271	11:45	Impact of Leadership Styles on Virtual Team Performance in the UAE Government Sector	Ananth Chiravuri
272	12:00	Pricing Beliefs: Empirical Evidence from the Implied Cost of Deposit Insurance for Islamic Banks	Jocelyn Grira
273	12:15	Becoming a Knowledge Economy the Case of Qatar UAE and 17 Benchmark Countries	Osiris J Parcero
274	12:30	Foreign Direct Investmet Regulation Versus Labor Market Regulation: a Political Economy Approach	Louis Jaeck
275	12:45	Individual and contextual antecedents of career decidedness: The mediating role of career adaptability	Mohamed Al Waqfi
Lunch Break			

Abstract #	Time	Abstract Title	Presenter
276	14:00	Performance of start-ups in the Aviation industry: The case of Etihad versus Air Arabia Airlines	Peter Oyelere
277	14:15	How to embed innovation in Emirati public sector organisations – A student contribution to the "Year of Innovation 2015"	Thomas Ahrens
278	14:30	Identification and Influence of Social Cohesion on FDI Flows: Evidence from Middle Income Countries	Wasseem Mina
279	14:45	Perceptions of Audit Quality: Towards developing a regulatory framework for audits of SMEs in the UAE	Ahmad Odeh
280	15:00	The Relative Risk Performance of the Islamic Sukuks over the Conventional Bonds: New Evidence from Value at Risk Approach	Mariam Aldhaheri
281	15:15	A Framework on the Determinants of e-government Services Quality in UAE	Mohamed Alahmed
282	15:30	Work Engagement Antecedents and Consequences Across Generations in the United Arab Emirates	Nahla Abdulla Fadhlani
283	15:45	Attracting and Retaining Emirati Jobseekers in the UAE's Cultural Tourism Sector: a case study of the tour guide profession	Yousif Alobeidli
284	16:00	The diffusion of innovative devices in the corporate governance realm in the UAE	Amira Bouka
285	16:15	Happiness and Migration in Germany	Marina-Selini Katsaiti

AbstractS

The Effect of Ginger Powder on Blood Glycaemia, Blood Lipidemia and Body Composition on Adults at Risk for Cardiovascular Diseases: A controlled, randomized, single blind, parallel-design study

Dana Hasan Mustafa Alkhatib and Ayesha Salem Al Dhaheri
College of Food and Agriculture, UAEU

Recently 42% of the population in the United Arab Emirates (UAE) was diagnosed with metabolic syndrome (MetS), while the prevalence of the MetS in the Gulf Cooperation Council Countries (GCC) is 10-15% higher than in the most developed countries, with generally higher prevalence rates for women. Recent studies proved that ginger may have an effect in reducing the metabolic syndrome factors as well as the cardiovascular diseases risk factors. More studies proved the anti-lipidemic, anti-oxidative, anti-Inflammatory and antitumor effects of ginger; therefore it could be used for the management and prevention of the MetS problems. Objectives: To measure the effect of ginger powder on fasting blood glucose (FBG), hemoglobin (Hb), hemoglobin A1c (HbA1c), triglycerides (TG), high density lipoprotein (HDL), low density lipoprotein (LDL), blood pressure (BP), waist circumference (WC) and body composition in participants at risk for cardiovascular diseases. Methodology: The study is a controlled, randomized, single blind, parallel-design study. 60 participants who are at risk for cardiovascular diseases were randomly distributed into 2 treatment groups, the first group was the ginger powder group while the second group was a placebo-control (corn starch) group. 3 grams per day of each treatment was ingested by the participants for 12 weeks. Results: 42 participants continued the study from both groups (21 ginger group, 21 placebo group) , a total of 18 males and 24 females. There was a significant improvement in Hb and WC levels (P-value <0.05), while there was a trend to the improvement of HbA1c and diastolic blood pressure levels for the ginger group compared to the placebo group. Conclusion: Ginger powder has a significant effect on improving Hb and WC levels, while it has a trend toward the improvement of HbA1c and diastolic blood pressure for individuals at risk for cardiovascular diseases.

Validation of Photographic Food Atlas (Abu Dhabi Food Atlas) in Food Portion Size Estimation

Noura K. Al Shamsi[1], Hessa S. Al Darei[1], Nada Jaber, Najoua El Mesmoudi[1], Mohammed El Sadig[2], and Habiba I. Ali[1]

[1] *Department of Nutrition and Health, College of Food and Agriculture;* [2] *Institute of Public Health, College of Medicine and Health Sciences UAEU*

Objective: Food portion estimation is an important element in self-reports of dietary intakes. The main objective of this study was to evaluate the accuracy of photographic food atlas developed for Abu Dhabi (Abu Dhabi Food Atlas) in estimating food portions consumed. Design: Two observational studies were conducted to test the validity of Abu Dhabi photographic food atlas as a tool to quantify food portion size by comparing with weighed foods. Study 1 involved estimation of food eaten on the previous day and Study 2 involved estimation of food portion size eaten on the same day. Setting: Family homes, UAEU residential halls, and UAEU educational campus. Subjects: 197 participants 18 years of age and older participated in the study. Statistical Analyses: Data were analyzed using the Statistical Package for Social Sciences (SPSS), version 21.0. Descriptive statistics, paired t-tests, and linear regression models were used. P value <0.05 was considered significant. Results**:** There were significant differences between amount estimated and amounts consumed for 8 out of the 13 food items tested in Study 1. In study 2, there were significant differences between amount estimated and amounts consumed for 5 out of the 10 food items tested. This indicates 50-61.5% of the food items tested were either underestimated or overestimated. The only 2 factors related to errors in food portion estimation were educational level for "fattoush" ($p<0.045$) and gender for soup ($P<0.049$). Conclusions: Eight- food portion size food photographs presented in the Abu Dhabi Food Atlas was not a highly reliable tool for food portion estimation. Reducing the number of food photographs in the food atlas from 8 to 3 portion sizes may improve food portion estimation. This project was supported by the United Arab Emirates University Zayed Center for Health Sciences, Grant #: ZCHS -8-2014.

Nutrition Support Knowledge among Health Care Professionals

Ruqaiya Moosa Al Balushi, Rubina Sabir, Ruqaya S. Al Shamsi, Noura S. Al Ketbi, and Sheikha H. Al Ameri
Department of Nutrition and Health, College of Food and Agriculture, UAEU

Background/Purpose: Hospital malnutrition and its complications is a major concern worldwide. Reduced involvement of dietitians in patients nutritional care may be one of the contributing factors1. The most common cause for insufficient nutrition practice is lack of nutritional knowledge among health care professionals 2. There is lack of data about the level of knowledge about nutrition support among health care professionals in UAE. Objectives: • To evaluate and compare the nutritional knowledge of physicians, nurses and dietitians in Tawam hospital. • To compare practice and attitudes of physician, nurses & dietitians towards nutritional screening and assessment. Method: Cross-sectional study. Sample total 48 (17 physicians, 24 Nurses and 7 Dietitians). An online questionnaire survey was adopted from literature, Results and Discussion: Dietitians had significantly higher nutrition knowledge scores than physicians and nurses. Significantly lower percentage of physicians reported following a regular nutritional assessment, and felt patients should have nutritional status screening at admission. Dietitians demonstrated greater health knowledge than nurses. There was no significant relationship between nutrition knowledge score and years of experience. Conclusions and Recommendations: The significantly higher nutrition knowledge scores of dietitians compared to nurses and physicians suggests hospitals should involve and consult dietitians in nutrition assessment & monitoring. A large multicenter study involving other UAE hospitals is required. Nutrition support curriculums should be developed in medical and nursing schools.

The effect of Feature Selection: An approach for Predicting ICU Patient Deterioration

Noura AlNuaimi, Mohammad M Masud, and Farhan Mohammed
College of Information Technology, UAEU

The frequently requested laboratory tests for monitoring and/or diagnosis patients at the intensive care unit (ICU) create a need to reduce unnecessary laboratory tests. Therefore, medical professional would be able to decrease the observation time and take an early treatment to avoid any risk at the ICUs. Our proposed technique has several contributions first, we use the laboratory test results to predict patient deterioration. Second, we identify most important medical laboratory tests using state-of-the-art feature selection techniques, and finally, our approach helps reducing redundant medical laboratory tests. Thus, healthcare professional can focus on the most important laboratory tests to assist them. Methods: In our approach we use the laboratory test results to build two models to predict patient deterioration by building our own datasets. Then, we compare the features selection from the two datasets, namely, the average dataset and count dataset, to highlight the best 10 features chosen by the two approaches. After that, we identify the common laboratory tests between the two approaches. Results: The result of the top ten selected features from average dataset allows us to build a model using decision tree J48. This model shall allow medical professional to predict the status of a patient in the ICUs as follows:

50440 <= 20.757143: 1 (772.0/22.0)
50440 > 20.757143
| 50177 <= 25.923077
| | 50060 <= 0
| | | 50112 <= 138.333333
| | | | 50383 <= 28.155556
| | | | | 50112 <= 110.470588
| | | | | | 50399 <= 1.204545: 0 (5.0)

For example, if the laboratory test (name: PTT, ID 50440, LONIC: 3173-2) result value is <= 20.757143, then the probability is very high (772.0/22.0~ 97.2%) that the patient is going to die (class:1). This model has 78.6897 % overall accuracy. Our approach ranked six laboratory tests namely with their Logical Observation Identifiers Names and Codes (LONIC): UREA N 3094-0, CREAT 2160-0, INR(PT) 34714-6, PTT 3173-2, PT 5964-2 and GLUCOSE 2345-7.

A prospective study on traffic-related injuries among the youth in the Al Ain city

Michal Grivna, Hani O. Eid-Trauma Group, Hani O. Eid-Trauma Group, and Fikri Abu-Zidan
College of Medicine and Health Sciences, UAEU

Background Traffic-related injuries are the largest cause of premature morbidity and leading cause of death among the youth in the UAE. Those injuries are relatively neglected. Our aim was to study epidemiology, risk factors and outcome of hospitalized injured patients 15-24 years in order to give recommendations for prevention. Methods We prospectively studied all youth patients with traffic-related injuries admitted to Al Ain or Tawam Hospitals, Al-Ain City, or who died after arrival to the hospital, during an 18 months period. Demography, location and time of injury, other body region, severity, hospital and intensive care unit (ICU) stay were analyzed. Results 333 patients having a mean age of 20 years (SD 2.5) were studied. 87.1% were males and 71.5% were UAE nationals. The most common location for injury was highway and street (82.8%) followed by off-road (7.2%). Majority of injured patients (69.6%) were drivers or front-seat passengers, followed by back seat passengers (15.6%), motorcyclists (8.7%) and pedestrians (4.5%). Rollover was most often crash mechanism (29.7%), followed by front crash (29.4%) and side-angle (16.2%). 15% of patients were ejected from the car during rollover crash. Evening (18-24) was the most common time of the day (33.5%) and Sunday the most common day of the week (20.1%) when crash occurred. 19.8% of the patients were admitted to the ICU. Median Glasgow Coma Scale was 15 (Range 3-15), Injury Severity Score 5 (1-41), Revised Trauma Score 12 (7-12) and median total hospital stay was 3 (Range 1-73). 9 (2.7%) patients died. Conclusions Young UAE-national males are at a higher risk of being injured at traffic. Rollover crash was frequent with high risk of ejection. Promotion of traffic safety and enforcement of safety legislation is necessary.

Epidemiology and risk factors of hand injuries in the United Arab Emirates

Michal Grivna, Hani O. Eid-Trauma Group, and Fikri Abu-Zidan
College of Medicine and Health Sciences, UAEU

Background: Hand injuries are common in young people having significant burden on the victims, their families, and societies. We aimed was to study epidemiology, risk factors and outcome of hospitalized patients with hand injuries in order to give recommendations for prevention. Methods: We prospectively studied all trauma patients having hand injuries admitted to Al Ain Hospital for more than 24 hours, or died after arrival to the hospital during 3 years. Demography, location and time of injury, other injured regions, severity of injury, hospital and ICU stay, and outcome were analyzed. Results: 296 patients having a mean age of 30.5 years were studied. The annual incidence of hospitalization was 15.4/100 000 person per year. 91.9% were males and 62.5% from the Indian subcontinent. The most common location for injury was work (53.4%), followed by road (24.7%) and home (13.2%). Injury from road traffic crash was the most common mechanism (26%), followed by machinery (25.7%) and heavy objects (14.9%). Patients injured at home were younger ($p<0.0001$) and had more females ($p<0.0001$). Conclusions: Males from the Indian subcontinent are at a higher risk of having hand injuries especially at work, while UAE nationals by traffic or at home. Safety education and programs, use of personal protective equipment including gloves, and proper enforcement of the safety guidelines could reduce hospitalizations and disability of hand injuries.

Diabetes in Emirati Adolescents in UAE: role of lifestyle?

Syed Mahboob Shah[1], Fatima Al Maskari[1], Ayesha S. Al Dhaheri[2], Juma Al Kaabi[1], and Mukesh M Agarwal[1]
[1] College of Medicine and Health Sciences; [2] Department of Nutrition and Health, College of Science, UAEU

Objective: The UAE has one of the highest prevalence of type 2 Diabetes (T2D) in adults worldwide, however few data is available on young-onset T2D. We aimed to determine the prevalence of pre-diabetes and diabetes and its early-life modifiable correlates in adolescents aged 12 to 18 years in Al Ain, Abu Dhabi Emirates. Methods: In a school-based cross-sectional study a random sample of 1,220 adolescents aged 12 to 18 years selected in Al Ain, UAE. Fasting plasma glucose, lipids, BMI, waist circumference, and blood pressure were measured. Nutrition and lifestyle variables were also obtained. Fasting blood glucose after overnight fast of at least 8 hours was used to define Pre-diabetes (≥100-125 mg/dL) and diabetes (≥126 mg/dL). We used International Obesity Task Force classification to estimate overweight and obesity. Results: The mean age was 15.2 ± 1.8 years. The prevalence (per 1000) of physician diagnosed with type 1 diabetes (on insulin injections) was 1.64 (95% CI, 0.15-4.47). The prevalence of T2D and pre-diabetes were 8.20 (95% CI, 3.91-14.02) and 82.79 (95% CI, 67.98-98.9) per 1000, respectively. Compared to female, a higher proportion of male had general obesity (23.3% vs 13.7%) and abdominal obesity (17.5% vs 3.6%). The prevalence of pre-diabetes and diabetes (combined) was higher in male 125.21 (95% CI, 67.98) as compared to female 57.28 (95% CI, 40.26-77.08) and the difference was significant ($p<0.001$). In a multivariate model, participants reporting moderate level of metabolic equivalent (MET) physical activity were less likely to have prediabetes and diabetes (adjusted odds ratio (aOR)=0.49, 95% CI, 0.27-0.91) compared to their counterparts with mild level of MET. Abdominal obesity (aOR=2.47, 95% CI 1.41-4.34) and male gender (aOR=1.93, 95% CI, 1.19-3.14) were also significantly associated with prediabetes and diabetes after adjustment for age. A positive family history of diabetes was not associated with pre-diabetes and diabetes (aOR=1.02, 95% CI, 0.65-1.60, p 0.928) in study adolescents. Conclusion: This study underscores the need for regular screening of prediabetes and young-onset type 2 diabtes in youth and to address the early-life modifiable risk factors such as central adiposity and physical activity.

THE DISTURBANCES OF SLOW WAVE CONDUCTION PROXIMAL AND DISTAL TO THE ILEAL END-TO-END ANASTOMOSIS FOLLOWING ILEOCYSTOPLASTY

Fayez T Hammad[1], W J Lammers[2], J B W Rietbergen[3], B Stephen[2], and Loay Lubbad[1]
[1] *Department of Surgery*; [2] *Department of Physiology, College of Medicine and Health Sciences, UAEU;* [3] *Department of Urology, St Franciscus Gasthuis , Rotterdam, the Netherlands*

Introduction: End-to-end intestinal anastomosis is routinely performed in the course of managing several gastrointestinal diseases but there is no information on the possible short- or long-term effects of this procedure on the conduction of the electrical impulses in the vicinity of the anastomosis except for the fact that the slow wave will no longer propagate across the anastomosis. In the course of an ileocystoplasty project, we accidently discovered the presence of major conduction abnormalities of the slow wave in the region of the anastomosis following the surgery. Methods: In a rat model (n=8) of ileocystoplasty, an approximately 1 cm segment of terminal ileum was isolated (6-10 cm proximal to the cecum) and anastomosed to the bladder. The intestinal continuity was restored by an ileal end-to-end anastomosis and the animals were allowed to recover. After 1 day, 1 week or 1 month, the rats were again anaesthetized and the intestinal segment containing the anastomosis was isolated and positioned in a tissue bath where it was perfused with Tyrode. A 121-electrode array (11x11; 1 mm inter-electrode distance) was positioned at several locations proximal and distal to the anastomosis and recordings were performed from all 121 electrodes simultaneously. After the experiments, the signals were analyzed and propagation maps of the slow wave constructed. Results: One day post-operatively, there was no slow wave propagation in the peri-anastomotic area (>5 cm proximal and distal to the anatomosis). After one week, the quiescent area was reduced, especially proximal to the anastomosis and had disappeared after 1 month. In the absence of the slow waves, multiple spikes were often seen at higher frequencies than normal. The distal segment still showed conduction disturbances 1 month after surgery. Conclusion: End-to-end ileal anastomosis is followed by a relatively long period of absence of slow waves and the appearance of other electrical impulse propagation abnormalities which might explain the post-operative local paralytic ileus and the potential pseudo-obstruction related to it. Source of Funding: This research was supported by an individual grant, College of Medicine & Health Sciences, United Arab Emirates University.

A highly efficient model for data entry in electronic health record systems

Muhammad Jawad Hashim
College of Medicine and Health Sciences, UAEU

Background Electronic health records (EHR) systems are known to reduce physician productivity by increasing documentation time. The mean time from chart open to completion can increase significantly leading to user dissatisfaction and possible inaccurate documentation. In a 2005 systematic review, the mean increase in documentation time was 238%. We aimed to develop an EHR interface model for improving data entry by physicians. Methods Research ethics approval was obtained prior to start of the study (AAMDHREC ref. 13/103). Funding for this project was from a UAE University research grant (CMHS NP 15-32). An iterative method was used to design a user interface based on prior research and usability studies. By focusing on core tasks and simplifying input options, a basic framework for physician workflow was developed. Interdisciplinary approaches including innovations in other industries were considered as well. Results A keyboard-based, template system was developed as a highly-efficient method for data entry by physicians. The model avoids mouse or touch gestures completely. A set of numeric codes for frequently used commands and templates increases efficiency by utilizing the numeric keypad on the user keyboard. Further enhancements include text-to-speech feedback, enlarged text for data entry fields, predictive text and selection fields. The model is intended to provide customization of numeric codes as well as printed guides to improve on-screen navigation. Finally, user behavior patterns can help the system predict common patterns in workflow. Conclusions We have developed a prototype model for highly efficient data input in EHR for use by physicians. This model may improve productivity and patient care. Software development is planned to implement the model in the next phase of this UAEU funded research project.

INTERACTION OF FATIGUE MICROCRACKS WITH MICROSTRUCTURE OF BONE

Sahar Mohsin[1], Fergal O Brien[2], and Thomas Clive Lee[2]
[1] *Department of Anatomy, College of Medicine and Health sciences, UAEU;* [2] *Department of Anatomy, Royal College of Surgeons in Ireland, St Stephen's green, Dublin, Ireland*

Microdamage in bone occurs in the form of microcracks. Bone is an anisotropic structure, providing stress concentration sites for crack initiation, but also serves as barriers to crack propagation. The current study is focusing on the location and orientation of microcracks in relation to the secondary osteons. Bone samples from sheep radii were prepared and stained with alizarin for 16h to label preexisting damage. The specimens were placed in a bath of calcein and tested in cyclic fatigue under four point bending in an INSTRON 1341 fatigue-testing machine. The samples were tested at a frequency of 30 hertz under load control and at stress range of 100 MPa. Specimens were embedded in resin and were sectioned transversely and longitudinally using a diamond saw (Struers Miniton). The slides were examined using epifluoresence microscopy, their cross sectional areas obtained and microcracks identified and measured using the established criteria (Lee at al., 2000). Numerical crack density; Cr.Dn, surface crack density, Cr.S.Dn and mean crack length, Cr Le were calculated. Cracks in transverse sections were also described in terms of location i.e. in relation to osteons .Statistical analysis of the data was performed. Microcracks were characterized in seven grades, microcracks that: (I) did not meet an osteon (II) hit an osteon and stopped outright (III) hit osteon and deflected (IV) hit an osteon and penetrated the cement line (V) hit osteons at both ends of crack & stopped (VI) osteonal, within the osteon and (VI) which are pre-existing (PE) microcracks. CrDn and Cr.S.Dn were highest for the cracks, which did not meet osteons. Microcracks lengths obtained from longitudinal sections were compared with transverse sections and ratio between the two did not show a statistical difference. Majority of the cracks was formed in the interstitial bone and did not meet osteons. Osteons within the bone acted as a barrier to smaller cracks (less than 300µm) and microcracks greater than 400µm were found to penetrate the cement lines and cause failure. The results of this study shows that microstructure of bone may act as a barrier to crack growth.

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AN OASIS OF MINDS

Evaluation and implementation of behavioral and educational tools that improves the patients' intentional and unintentional non-adherence to cardiovascular medications in family medicine clinics

Alia Hareb and Abdulla Shehab
College of Medicine and Health Sciences, UAEU

Abstract: There are limited studies in the UAE that describe reasons and interventions deployed to resolve non-adherence to cardiovascular medications, in addition to the interventions to resolve them. Aims and Objectives: We aim to implement and evaluate behavioral and educational tools that resolve the reasons for non-adherence, and improve patient's adherence to their medications. Methods: In this prospective, controlled, cohort (pre and post) interventional study, we examined educational and behavioral tools to improve adherence. We recruited patients with cardiovascular diseases (n= 300) from three family medicine clinics in Al Ain, UAE. We assessed the patients' responses to a validated brief medication questionnaire (BMQ). Additionally, we measured glycosylated hemoglobin (HbA1c), low density lipoprotein - cholesterol (LDL-C) and blood pressure; before and after the interventions. Results: We reported a significant improvement in adherence pre- and post-interventions according to BMQ scores. All 'indication scores' for non-adherence significantly improved. The mean +/- SD score was 4.1 ±0.2 vs. 3.0 ±0.3; P =0.034 for non-adherence to current regimen; 1.8 ±0.4 vs. 0.9 ±0.1; P =0.027 indication of negative beliefs or motivational barriers (efficacy, bothersome side effects, other concerns); 1.6 ±0.1 vs. 0.8 ±0.1; P = 0.014 for indication of recall barrier; and 1.6 ±0.2 vs. 0.7 ±0.2; P = 0.019 for indication of access barrier all of which improved significantly from baseline vs. 12 months post-interventions, respectively. Mean post prandial blood glucose, HbA1c, and LDL, SBP, and DBP significantly ($p<0.01$) decreased post interventions. Conclusions: We have improved the management of cardiovascular conditions via improving the adherence to prescribed cardiovascular medications.

A prospective study on the use of warfarin in the United Arab Emirates

Baraa Ibrahim and Abdulla Shehab
College of Medicine and Health Sciences, UAEU

OBJECTIVES: The aims of this study were to evaluate adherence of patients and medical staff to warfarin guidelines and assess clinical outcome and predictors of treatment failure. METHODS: This cross-sectional survey involved out- and in-patient subjects receiving warfarin. Patient attentiveness, compliance, co-morbidities, complications, and international normalized ratio (INR) as well as adherence of medical staff to established warfarin treatment guidelines were recorded. RESULTS: One-hundred-sixty patients were recruited (mean ± SD age = 54 ± 1.3 years; 46% males; 77% overweight/obese). Indications for warfarin were atrial fibrillation (35%), deep vein thrombosis (28%), prosthetic heart valve (20%) and stroke or dilated cardiomyopathy (12%). "Warfarin booklets" were made available to 25% of the patients, and ~80% of the recipients reported inadequate understanding of its content. INR was strictly monitored in 23% of the patients; ~70% never received Information Leaflets; ~88% were unaware of warning labels; and ~58% were unaware that over-thecounter medications may affect warfarin. Therapeutic INR (2.9 ± 0.2; 76 days) was achieved in 73%; 20% had high INR (3.7 ± 0.1; 18.6 days) and 7% had low INR (1.6 ± 0.1; 16.7 days). Of the patients with high INR, 2.5% had major bleeding events. Of the patients with low INR, 5% had thromboembolic events. Poor compliance and co-morbidities were associated with adverse events (p=0.01). CONCLUSIONS: Attentiveness and adherence to warfarin treatment and monitoring guidelines are suboptimal among patients and medical staff. Novel strategies are necessary to alert patients, pharmacists and physicians on the seriousness of warfarin treatment failure.

Photo-protection of light sensitive drugs in the presence of cyclodextrins

Soleiman Hisaindee, Ahmed Abuibaid, Ahmad Al-Halabi, and Ahmad Al-Madhoon
College of Science, UAEU

Host-guest associations are a widely studied phenomenon which has found various applications stretching from nano-medicine to industries. The most common hosts are cyclodextrins (CD's), which are non-toxic semi natural products derived from starch. CD's behave as 'molecular baskets' and can accommodate guest molecules of a compatible size through non-covalent and reversible interactions. The host-guest interaction can be used to alter properties of the guest molecules such as solubility, volatility and reactivity. In the present research, we have investigated the inclusion of light sensitive drugs into CD's, with a view of providing photo-protection at the molecular level. The inclusion of one commercial drug into five different CD's have been studied by visible spectrophotometry and fluorescence. The stoichiometry and formation constants of the complexes have been determined using a modified Hilderbrand-Benesi equation and the mode of interaction has been established using NMR spectroscopy. The effect of UV-induced photo-degradation on the CD-drug inclusion is also presented.

The effects of human population movements to malaria spread in Kenya

Alya Saif Al Shehhi, Basma Ali Al Shehhi, and Sehjeong Kim
Department of Mathematical Sciences, College of Science, UAEU

Malaria is in infectious disease transmitted caused by parasites that can transmitted by mosquitoes. Malaria remains one of the major killers of humans worldwide, threatening the lives of more than one third of the world's population. In particular, Kenya in Africa is one of the malaria endemic countries. In fact, 25 million out of a population of 34 million Kenyans are at risk of malaria. Thus, reducing malaria morbidity and fatality rate is one of the country's major public health targets. Due to rapid urbanization in Kenya, informal urban settlements are expanded, and environmental degradation is accelerated, which leads to increase of malaria. Moreover, such urbanization has been causing a large volume of human population movements from place to place for work, education, or farming. This factor also contributes to the rapid malaria distribution in the whole country. Thus, We investigate types of human population movements in Kenya and their effects on the malaria spread to establish a strategy of prevention of malaria in Kenya.

Ineterplay of cytokines IL-17, IFN- gamma and IL123 in autoimmune type 1 diabetes

Mariam Al shamsi[1], Eric Mensah-Brown[2], Zakeya Al Rasbi[1], Allen Shahin[1], and Marwa Ibrahim[2]
[1] *Department of Microbiology & Immunology;* [2] *Department of Anatomy, College of Medicine and Health Sciences, UAEU*

Elements of the innate immune system, in particular proinflammatory cytokines and other mediators of inflammation, act both in priming and promoting aggressive adaptive immune response to self antigens leading to type 1 diabetes. The interplay between interleukin 17 (IL-17) and interferon gamma (IFN-gamma□) in promoting or inhibiting autoimmunity still remains unresolved. While the role of IFN-gamma□ remains controversial, studies also indicate that IL-17 might not always promote inflammation. Significantly, these cytokines have been shown to be both antagonistic and synergistic in action by different groups of researchers. We previously showed that both IL-23 and the Toll-like receptor agonist, Bacterial lipoproteins such as the synthetic structure S-(2,3-bis (palmitoyloxy)-2(2-RS)-propyl)-N-palmitoyl-®-Cys-(s)-Ser-(S)-Lys(4)-OH trihydrochloride (Pam3CSK4) enhance diabetogenesis with significant expression of IFN-gamma□. We examine here, the roles of IL-17 and IFN-□ in experimentally-induced diabetes using the multiple low doses of streptozotocin (MLD-STZ) model of disease induction in IL-17 and IFN-gamma□ deficient mice (KO) on C57Bl/6 background (WT). Both KO and WT mice developed delayed and sustained hyperglycemia, profuse mononuclear infiltration and reduced insulin content of islets accompanied by expression of several proinflammatory cytokines in pancreatic lymph nodes after 5 doses of STZ although IL-17 KO mice showed evidence of disease 7 – 10 days earlier. We also demonstrate here that unlike in the WT, while no enhancement of diabetes occurred in both IFN-□ and IL-17 KO mice after subdiabetogenic doses of STZ followed by IL-23, the absence of IL-17 did not abolish, but only reduced severity of disease after Pam3CSK4 enhancement of disease. We conclude that the absence of IFN-gamma□ prevented enhancement of diabetes by IL-23 and TLR2 agonist, but absence of IL-17 did not prevent enhancement of disease by Pam3CSK4. Interestingly, diabetogenesis was not abolished by the lack of either cytokines. Thus both IFN-gamma□ and IL-17 appear to play a role in this model of diabetes but while the former might be necessary for the initiation, the latter might be only necessary for disease severity.

Immune responses to bacterial infections in immunodeficient hosts are enhanced by recombinant IFNγ-expressing Salmonella Typhimurium strain and correlate with strong activation of macrophage effectors

Ashraf Al-Sbiei[1], Yassir A. Mohamed[1], Ghada Bashir[1], Samia Al-Ojali[1], Maria J. Fernandez-Cabezudo[2], and Basel K. al-Ramadi[1]

[1] *Department of Microbiology & Immunology*; [2] *Department of Biochemistry, College of Medicine and Health Sciences, UAEU*

Susceptibility to infection by the intracellular bacterial pathogen, Salmonella enterica serovar Typhimurium (S. typhimurium), is controlled by many genes of innate and adaptive immunity. One of the most critical genes is IFN-g and mice deficient in IFN-g synthesis are highly susceptible to Salmonella. Furthermore, mice deficient in MyD88, an adaptor that regulates TLR signaling, are also susceptible to Salmonella infection. In the current study, we compared immune responses in mice deficient in IFN-g or MyD88 with wild-type controls following infection with an attenuated strain of S. typhimurium (designated BRD509) or a recombinant derivative engineered to express murine IFN-g (GIDIFN). Infection studies with BRD509 or GIDIFN revealed that the latter strain was significantly less virulent in mice deficient in either IFN-g or MyD88 than BRD509 and correlated with decreased bacterial loads in systemic organs. Enhanced responsiveness was due to GIDIFN strain's ability to activate effector macrophages, as shown by increased synthesis of inflammatory cytokines and anti-microbial effector molecules, including nitric oxide (NO). Gene expression profiling by qPCR demonstrated stronger induction of key inflammatory modulators by GIDIFN in macrophages of immunodeficient animals. These findings suggest that immunotherapeutic approaches using attenuated bacterial strains expressing immunomodulatory genes is more efficacious and offers a superior safety profile even in severely immunodeficient hosts.

Genipin Mitigates Cisplatin Induced Nephrotoxicity via Suppression of Oxidative Stress, Inflammation and Cell Death Pathways

Eglal Al Khatim Mahgoub, Kamal Hassan, Shreesh Ojha, and Rajesh Mohanraj
Department of Pharmacology & Therapeutics, College of Medicine & Health Sciences, UAEU

Cisplatin (cis-diamminedichloroplatimun II and referred as CP here) is a coordination platinum complex and is most widely used and potent chemotherapeutic agent. However, side effects in normal tissues, particularly nephrotoxicity, limit its clinical usage. Herein, we have investigated the effects of a phytochemical – Genipin (GP) isolated from Gardenia flower (Gardenia jasminoides), which was reported to exert antioxidant and anti-inflammatory effects, in a mouse model of cisplatin-induced nephropathy. Cisplatin (CP) administration resulted in increased activity of superoxide generating enzyme NADPH oxidase, diminished superoxide dismutase (SOD) activity and glutathione (GSH) levels in the renal tissues. Further CP treatment also resulted in enhanced accumulation of lipid peroxidation product 4-hydroxynonenal (4-HNE) and 3-nitrotyrosine (3-NY) a marker for nitrative stress in the renal tissues. Further, CP also induced apoptosis in the renal tissues, revealed by increases in caspase-3/7 activity, DNA fragmentation, and terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) staining in the kidney sections and poly (ADP-ribose) polymerase [PARP] activity. Next, CP induced renal inflammation was characterized by elevated (tumor necrosis factor-alpha and interleukin-1beta levels) in the kidneys of mice, which was associated with marked histopathological damage and impaired renal function, assed by various biomarkers of renal injury such as blood urea nitrogen, creatinine, lipocalin-2, kidney injury molecule-1 (KIM-1) and cystatin-C. Treatment of mice with GP markedly attenuated the cisplatin-induced oxidative/nitrative stress, inflammation, and cell death in the kidney, and improved renal function. Thus, our results suggest that GP may represent a promising new protective strategy against cisplatin-induced nephrotoxicity.

Mathematical modeling of the Mers-Corona in United Arab Emirates

Abdessamad Tridane[1] and Abdulmajeed Al Khajeh[2]
[1] *Department of Mathematical Sciences;* [2]*Department of Biology, College of Science, UAEU*

The Middle East Respiratory Syndrome Coronavirus (MERS-CoV) is still considered as a potential threat to the public health in the Arabic peninsula as well as the rest of the world. This requires the health authorities, including in the UAE, to study the possible strategies to contain this disease should it become a pandemic. The aim of this work is to present, via mathematical models, the factor that might affect the spread of the disease in the UAE as well as a control strategy that helps reduce the burden of this communicable disease.

Characterization of sequences at the 5' end of the MMTV genome in genomic RNA export and packaging

Shaima Akhlaq[1], Rawan M. Kalloush[2], Pretty S. Phillip[2], Suriya J. Aktar[2], Lizna M. Ali[2], Jaquelin P. Dudley[3], Tahir A. Rizvi[2], and Farah Mustafa[1]

[1] *Department of Biochemistry;* [2] *Department of Microbiology & Immunology, College of Medicine and Health Sciences, UAEU;* [3] *Department of Molecular Biosciences, University of Texas, Austin, USA*

Nuclear export, dimerization, and packaging of genomic RNA are critical steps in retroviral life cycle that are interlinked. Consistent with this assumption, RNA packaging signals (psi) of some simple retroviruses have been shown to play an important role in nuclear export of gRNA. Similarly, in complex retroviruses such as human immunodeficiency virus (HIV), a second putative Rev responsive element (RRE) has been proposed at the 5' end of the viral genome that overlaps with psi and mutations within this region have been shown to affect both gRNA transport and packaging. Owing to the increasing similarities between complex retroviruses and mouse mammary tumor virus (MMTV), it has been hypothesized that a putative second 5' Rem responsive element (RmRE) could be present at the 5' end of the viral genome (in addition to the one at the 3' end), overlapping the psi and may play a role in both gRNA nuclear export and packaging. Furthermore, it has been speculated that the putative 5' RmRE should be present only in the unspliced RNA, thereby facilitating its specific nuclear export over the other mRNAs which would contain the 3' RmRE that should facilitate translation of all other mRNAs, including the unspliced RNA. To address this hypothesis, deletion and substitution mutations were introduced into the MMTV psi RNA. Specifically, the region between the major splice donor (mSD) and Gag ATG was targeted since this region should exclusively be present only in the unspliced RNAs. These full length wild type and mutant genomic constructs were tested in transient and stable transfections to determine their effect on packaging and nuclear export of full length mRNA and Gag proteins. Our preliminary data suggest defects in both RNA packaging and expression of Gag proteins in some of the mutants. Additional luciferase-based clones have been constructed to rule out the effect of the introduced mutations on the function of the viral Kozak sequences. If confirmed, these data should reveal that like HIV-1, MMTV contains an RNA structural element at the 5' end (additional RmRE) which helps regulate gene expression by facilitating the nuclear export and/or stability of the unspliced RNAs.

Highlights of recent protein complex detection methods

Nazar Zaki-, Elarbi Badidi

College of Information Technology, UAEU

Developing suitable methods for the identification of protein complexes from Protein-protein interaction (PPI) data remains an active research area in computational biology. The identification and characterization of protein complexes implicated are crucial to the understanding of the cellular functions under normal and abnormal physiological conditions. In this context, various computational approaches were introduced to complement high-throughput experimental methods which typically involve large biological datasets. However, experimental data is usually liable to contain a large number of spurious interactions. Therefore, it is essential to validate these interactions before exploiting them to predict protein complexes. Here we first introduce PE-measure, an algorithm assesses the reliability of the interaction data based on the concept of weighted clustering coefficient. Second, we introduce ProRank, a novel method for detecting protein complexes from PPI by using a protein ranking algorithm. ProRank quantifies the importance of each protein based on the interaction structure and the evolutionarily relationships between proteins in the network. A novel way of identifying essential proteins which are known for their critical role in mediating cellular processes and constructing protein complexes is also introduced and analyzed. The performances of ProRank is assessed using two PPI networks on two reference sets of protein complexes created from Munich Information Center for Protein Sequence, containing 81 and 162 known complexes, respectively. The performance of ProRank is also compared to some of the well-known protein complex prediction methods (ClusterONE, CMC, CFinder, MCL, MCode and Core) in terms of precision and recall. The results show that ProRank predicts more complexes correctly at a competitive level of precision and recall. An improved version of ProRank which considers the overlap of proteins in complexes is highlighted. The level of the accuracy achieved using ProRank and the improved version (ProRank+) in comparison to other recent methods for detecting protein complexes is a strong argument in favor of the proposed method.

Transcriptional regulation of insulin signaling pathway by Mediator complex in liver

Suraiya Ansari[1] and Randall Morse[2]
[1] *Department of Biochemistry, College of Medicine and Health Science, UAEU*; [2] *NY State Department of Health, Wadsworth Center, Albany, NY, USA*

A number of key transcription factors respond directly or indirectly to metabolic cues to rapidly alter gene expression programs governing metabolic homeostasis. Aberrant expression or function of transcriptional coregulators has been associated with malignant and metabolic disease development. A hallmark of diseases related to the disruption of normal coregulator function is the pleiotropic effect on animal physiology therefore coregulators have broad physiological and pathological functions that make them promising new drug targets. The work that we are currently pursuing is focused on one such coregulator, the Mediator complex. Mediator is a transcriptional coactivator complex required for regulated transcription initiation of protein encoding genes. Mediator comprises multiple protein subunits, one of which is Med15. Working with Med15 subunit of this complex, we identified specific involvement of this subunit in the transcriptional regulation of several genes involved in insulin signaling pathway in liver. We are currently working to determine the function and mechanism/s of Med15 action in insulin sensitivity in liver. Our efforts in his direction will lead to determination of the function of Med15 as a novel regulator of insulin signaling pathway and understanding of its potential role in insulin resistance. This research will also provide new insight onto the molecular mechanisms that underlie insulin resistance which still remains poorly understood.

The putative DNA repair protein IRC20 acts as a chromatin remodeling enzyme

Deena Jalal, Jisha Chalissery, and Ahmed H. Hassan Al-Marzouqi
Department of Biochemistry and Molecular Biology, College of Medicine and Health Sciences, UAEU

The repair of DNA double-strand breaks (DSBs) is crucial for maintaining genome stability. Cellular response to DSB damage includes mechanisms to halt the progression of the cell cycle and to restore the structure of the broken chromosome. DSB repair needs to take place within the complex organization of the chromatin, and this requires changes in chromatin adjacent to DSB sites. This is done through covalent histone modifications that alter histone-DNA contacts, as well as through the actions of ATP-dependent chromatin remodelers. Many chromatin remodelers have been shown to be involved in DSB repair, including the novel Snf2 homolog, IRC20. IRC20 has previously been reported to play a role in homologous recombination repair and thus crucial in maintaining genome integrity following a double strand break. Mutations in SHPRH, the human homolog of IRC20, has been shown to be involved in several cancers. The exact mechanism of function of IRC20 in DNA repair is yet to be revealed. Here we report the purification of IRC20 using a TAP technique under native expression conditions, and using a His-tag on a plasmid for overexpression in yeast. We have characterized some of the in vitro biochemical activities of IRC20 using the purified protein. We showed that it can bind to DNA and that it possesses ATPase and chromatin remodeling activities. Our results strongly suggest that IRC20 is a chromatin remodelling enzyme. Our findings provide insight into the role played by IRC20 during homologous recombination repair.

Electrical Characteristics of biological materials such as cells and DNA Using microfluidic channel

Minas Fayeq Hussein and Mahmoud F. Al Ahmad
Electrical Engineering Department, College of Engineering, UAEU

Microfluidic systems promise unique saving in time and cost, it used widely in biological and complex chemical fields. These microfluidic channels can be made of Silicon, Glass or PDMS (dimethylsiloxane). PDMS microfluidics type used mainly in biological studies especially, in cells and DNA. There are common fabrication methods of PDMS such as: Soft lithography, Embossing, Injection molding and Laser ablation. Soft lithography is one of the fundamental techniques that used mainly in biological studies especially for cells and DNA. In our research we are going to design a PDMS microfluidic device that meets our requirements. It will used mainly in studding the electrical characteristics of DNA and cells. An investigation of electrical properties of biological materials using microfluidic devices is given remarkable attentiveness. There are fundamental reasons behind that for instance, raising the awareness of the expected physiological effectuation that linked to absorption of electromagnetic fields by tissues. There are a lot of advantages behind the uses of this technology such as , saving time and cost , exhaustion of power, design alternation , elementary and tiny requirements for solvent. Studies of how electromagnetics energy reacts with tissues and measurements of electrical properties of biological materials provided important contribution in different area of physiology and biophysics sciences. Electrical field is used commonly in biological studies: it used for characterization purposes such as cell sorting(Magnetic sorting and Fluorescence activated cell sorter) , separation and counting. And it also used for manipulation purposes such as; cell lysis, electroporation or dielec-rophoresis. Patch clamp, impedance measurements and voltage or current detection are also techniques that integrated in microfluidic devices to determine electrical characteristics of cells. Based on recent researches, we are going to find new accurate techniques that can be used for the purpose of measuring several electrical characteristics such as Resistance, impedance, inductance, reactance, capacitance and other characteristics of biological materials such as DNA and cells.

Identification of Aldose Reductase Inhibitors using Molecular Docking and Simulations

Ranjit Vijayan and Priya Antony
Department of Biology, College of Science, UAEU

Hyperglycemia in diabetic patients results in a variety of complications including retinopathy, neuropathy, nephropathy and cardiovascular diseases. The role of the enzyme aldose reductase (AR) in these complications is well established. Due to minimal side-effects, chemicals derived from plants (phytochemicals) has gained considerable importance for the treatment of several ailments. In this study, a collection of phytochemicals from Zingiber officinale (ginger), Curcuma longa (turmeric) Allium sativum (garlic) and Trigonella foenum graecum (fenugreek) were evaluated for potential inhibitory effects on AR. Molecular docking was performed for lead identification and molecular dynamics (MD) simulations were performed to study the dynamic behaviour of these protein-ligand interactions. The phytochemials Gingerenones A, B and C, lariciresinol, quercetin and calebin A from these spices exhibited high docking score, binding affinity and sustained protein-ligand interactions in docking and simulation studies. Rescoring of protein ligand interactions at the end of MD simulations produced binding scores that were better than the initially docked conformations. Docking results, ligand interactions and predicted ADMET properties of these molecules were significantly better than commercially available AR inhibitors. Thus, these natural molecules from spices could be potent AR inhibitors.

Molecular dynamics simulations of protein-phytochemical interactions

Asma Ahmad Alhaddad, Ranjit Vijayan, Jawaher Sultan Mohammed Al Baloushi, Maryam Ahmed Geabel Al Shawi, and Hoor Khalid Ahmed Ibrahim Al Hosani
Department of Biology, College of Sciences, UAEU

Plants and plant-based products have been used for the treatment of ailments for centuries. However, the precise molecular mechanism underlying their mode of action is yet to be elucidated in many cases. Thus, chemicals from plants, or phytochemicals, are attractive leads for the development of new therapies for a range of illnesses including cancer, diabetes and neurological disorders. While traditional wet-lab experiments require a lot of time to set up and execute, in silico computational biology approaches are gaining widespread attention as a means to rapidly test hypotheses and to narrow down the candidate list of chemical molecules and protein targets. The objective of this project was to use molecular dynamics (MD) simulation to evaluate the stability of several protein-phytochemical complexes generated using in silico docking techniques in an earlier study. Simulations were able to produce a short list of candidate molecules and targets that could be subjected to further studies.

The Role of Estrogen Signaling Pathway on Mouse Gastric Stem Cell Homeostasis

Aysha Mohamed Alkaabi[1], Sherif M. Karam[2], and Asma A. Al Menhali[1]
[1] Department of Biology, College of Science; [2] Department of Anatomy, College of Medicine and Health Sciences, UAEU

The dynamics of the epithelial tissue lining the stomach wall involve continuous cellular proliferation, differentiation, and apoptosis to maintain homeostasis. The stem cells are key players in this process and are located in the isthmus region of the gastric glands. These cells have two distinct properties: self-renewal to maintain themselves and differentiation into various cell types, including surface mucous, mucous neck, parietal, zymogenic and enteroendocrine cells. Although several pathways controlling gastric stem cell proliferation and differentiation have been well studied, the estrogen signaling pathway is not fully understood. Estrogen exerts its physiological effects by binding to the Estrogen Receptors (ERs) alpha and beta. While estrogen therapy is used for breast cancer patients, its impact on their stomachs is poorly studied. This project aims to study the role of estrogen signaling pathway in the proliferation and differentiation of the well-established mouse gastric epithelial progenitor (mGEP) cell line. Our preliminary analysis using reverse transcription polymerase chain reaction (RT-PCR) and immunohistochemical methods showed that both ER alpha and beta are expressed in the mGEP cell line. This study will help in understanding the mechanism behind estrogen signaling activation and its impact on gastric stem cell homeostasis in a well-controlled in vitro system.

Obesity increases cancer growth by enhancing the activity of tumor-promoting myeloid cells

Suneesh Kaimala, Yassir A. Mohamed, Mohammed Ashraf Al-Sbiei, Ghada Bashir, Maria J. Fernandez-Cabezudo, and Basel K. al-Ramadi
College of Medicine and Health Sciences, UAEU

More than 60% of the UAE population is overweight or obese. Obesity is a metabolic disorder characterized by a state of chronic inflammation. Although the effect of obesity-associated inflammation on the host immune system is well known, its consequences on diseases like cancer is less studied. Successful growth of cancer cells hinges on developing mechanisms to evade host immunosurveillance, particularly within the tumor microenvironment. Different myeloid cell populations play crucial roles in controlling tumor growth, such as tumor-promoting MDSCs (myeloid-derived suppressor cells) and tumor-regulating TAMs (tumor-associated macrophages). In the current study, we used a diet-induced obese mouse model to investigate the effect of obesity-induced chronic inflammation on growth of cancer. To this end, 8 weeks old male C57BL/6J mice were fed with high fat (60% kCal fat; HFD) or control (10% kCal fat; CD) diet for a period of 4-6 months. Subsequently, B16.F1 melanoma cells were implanted subcutaneously and tumor growth was followed for 4 weeks. Compared to mice on CD, the HFD group had increased serum levels of fasting glucose and leptin but, surprisingly, also exhibited significant enhancement in tumor growth. To gain insight into the underlying mechanisms, we carried out comprehensive phenotypic and functional analyses on highly purified myeloid cells from the tumor microenvironment. Flow cytometric analysis revealed that compared to CD mice, tumors of HFD group had higher ratios of MDSCs but lower of TAMs. Gene expression analysis by real-time PCR of purified granulocytic MDSCs showed increased Arginase but decreased iNOS, TGFβ and TNFα expression levels in HFD compared to CD group, suggesting that MDSCs from HFD tumors are more suppressive. Similarly, gene expression analysis in TAMs showed reduced levels of pro-inflammatory markers, including IL1β and S100A9, in HFD group tumors. Collectively, our findings suggest that obesity-induced alterations in intratumoral myeloid cells result in a microenvironment that effectively supports the growth of cancer cells and protect them against host anti-tumor immune responses.

Acute systemic exposure to metallic nanoparticles induces hepatotoxicity and NLRP3 inflammasome-mediated inflammation

Khalil B. Ramadi[1], Yassir A. Mohamed[1], Mohammed Ashraf Al Sbiei[1], Saeeda Al Marzooqi[2], Ghada Bashir[1], Dhanya Sarawathiamma[1], Abderrahim Nemmar[3], Maria J. Fernandez-Cabezudo[4], Yousef Haik[5], and Basel K. al-Ramadi[1]

[1] Department of Medical Microbiology & Immunology; [2] Department of Pathology; [3] Department of Physiology; [4] Department of Biochemistry, College of Medicine and Health Sciences; [5] Department of Mechanical Engineering, COE, UAEU

Nanoparticles (NP) are increasingly being commercialized for use in biomedicine. Given their inorganic metal makeup, NP were initially thought to be biologically inert. Recent evidence, however, has demonstrated that chronic exposure to NP made of inorganic metal oxides may have deleterious effects on physiological function. In this study, we investigated the acute phase response (up to 24 hours) after intraperitoneal administration of composite inorganic NP (dose range 1-20mg/kg) in a murine model by determining NP biodistribution and monitoring changes in hematological and inflammatory parameters as well as serum levels of organ toxicity indicators. Our findings indicate that systemic exposure (≥2mg/kg) is associated with acute liver injury due to preferential accumulation of NP in this organ. Moreover, administration of NP at a dose of as low as 1 mg/kg led to neutrophil recruitment into the peritoneal cavity (mean of 3.2 ± 3.1% in controls and 31.2 ± 5.3% in NP-injected mice) and the activation of proinflammatory cytokine production, including TNF-α, IL-1β, IFN-γ and S100A9. Histological analysis of liver tissue following NP administration revealed evidence of dose-dependent hepatocyte necrosis, a mild to moderate increase in sinusoidal Kupffer cells, and lobular granulomas. At the level of target tissue, NP deposition in the liver led to a significant upregulation in gene expression of S100A9, an endogenous danger signal recognition molecule of phagocytes. The extent of hepatoxicity and proinflammatory cytokine activation was significantly attenuated in mice deficient in the NLRP3 inflammasome, implicating this innate immune system recognition receptor in the response to NP.

Using RNA-Sequencing in Muscle and Fat Biopsies from Cancer Patients with Early Cachexia Reveals Novel Mechanisms

Amal H.I. Al Haddad[1], Khatijah Parekh[1], Eman Al-Azwani[2], Yasmin Mahamoud[2], Farouk Safi[1], Haytham Elsalhat[3], Joel A. Malik[4], Thomas E. Adrian[1]

[1] College of Medicine and Health Sciences, UAEU; [2] Genomics Core, Weill Cornell Medical College, Qatar ; [3] Department of Surgery, Al Noor Hospital, UAE; [4] Department of Genetic Medicine, Weill Cornell Medical College, Qatar

Background: Cachexia causes one third of cancer–related deaths and contributes to that of many others. Despite extensive research, the mechanisms of cancer cachexia are poorly understood. Identification of early changes in gene expression in the major cachexia target tissues will improve the understanding of its mechanisms. Methods: We investigated the entire transcriptome, using next generation sequencing to identify altered expression of genes in muscle and fat from cancer patients. Samples of rectus abdominis muscle and visceral fat were collected at surgery from patients exhibiting 5-10% weight loss prior to surgery, compared with stable-weight patients. Also, selected differentially expressed genes were confirmed using real-time RT-PCR. Results: In muscle, 30 genes showed highly significant change in expression (25 down and 5 up: $P<0.0005$ - $P<0.00001$, FDR 0.2). The 25 downregulated genes included 7 involved with metabolism (5 mitochondrial); 4 with signaling; 4 with ubiquitination; and 3 with intracellular trafficking. Multiple genes involved in glycogen metabolism were downregulated, correlating with the lack of glycogen, muscle weakness, and fatigue; characteristic of cachexia. The 5 upregulated genes include 2 involved with calcium signaling and 2 with cell matrix interactions. Expression of genes previously thought to be important in cachexia, including several inflammatory cytokines, was not significantly different. FBXO32, which encodes atrogin-1, upregulated in an in vitro cachexia model, was actually downregulated. No transcripts for the dermicidin gene, which codes for proteolysis-inducing factor, were detected. Expression of myostatin and its receptor (ACTR2B) were significantly decreased, possibly reflecting end organ adaptation to tumor produced myostatin. In visceral fat, expression of 6 genes were downregulated and 10 upregulated with high statistical significance ($P<0.001$-0.0002). Several of these encode metabolic enzymes. Of genes in fat previously implicated with cachexia, such as hormone sensitive lipase and adipose tissue triglyceride lipase, were unchanged. In contrast, leptin was significantly downregulated and the zinc-α-2-glycoprotein was significantly upregulated as expected. Conclusions: These studies explain some documented evidence in cachexia pathogenesis, highlight ambiguous data from animal models, and reveal unexpected changes in gene expression that underlie the pathophysiology of the cachectic state in cancer.

Characterization of the Anti-Cancer Properties of Indigenous Medicinal Plant Extracts

Sameera M. Balhamar[1], Neena G. Panicker[1], Shaima Akhlaq[1], Rehman Najeeb[2], Javid Hussain[2], Ahmed Al-Harrasi[2], and Farah Mustafa[1]

[1] *Department of Biochemistry, College of Medicine and Health Sciences, UAEU;*

[2] *University of Nizwa, Oman*

Introduction: Indigenous plant species historically used for their medicinal properties are a tremendous source for bringing newer and safer drugs to the market. A concerted effort is needed to characterize their medicinal potential and identify new molecules that could be exploited by modern medicine. The current study was undertaken to study the anti-cancer properties of several local medicinal plants being collected by The University of Nizwa, Oman. Towards this end, we have acquired a number of plant extracts that are being screened for their anti-cancer properties and mechanism of action. Methods: Extracts from five native plant species were tested on three classical cancer cell lines, including two breast cancer, MCF-7 and MDA-MB-231, and a cervical cancer cell line, HeLa. A normal cell line, MCF-10A, was added to determine the effect of the extracts on normal cells. The cell proliferation assay, MTT, was used to study the effect of the various extracts on the growth of the cancer cell lines in a dose-dependent manner. The Promega Glo Assays were used to confirm the effect of the effective extracts on cell proliferation and the mechanism of action was analyzed by testing the activities of various caspase granzymes using other Glo assays. Western Blotting was used to confirm the results. Results: Test of the plant extracts using the MTT assay revealed that some of them had strong anti-proliferative activity that was consistently observed for all cell types tested, though some extracts had a more potent effect on breast cancer cells than HeLa and vice versa. The Promega Glo Proliferation Assay further confirmed the anti-proliferative activity of the extracts. Test of different caspase enzymes revealed that many of the extracts were killing via inducing apoptosis. Currently, Western blotting is being used to confirm these findings and explore the mechanism of action further. Conclusions and Future Plans: Our studies have resulted in the characterization of the anti-cancer potential of five indigenous plants. We have acquired two individual components from these extracts as well as several derivatives and plan to characterize their anti-neoplastic potential, hopefully enlarging the arsenal of new molecules available to fight cancer.

Molecular Targets of Manuka Honey in Human Breast Cancer

Sarah Saif Rashid Ahmed Al.Qubaisi[1], Yassir A. Mohamed[1], Maria J. Fernandez Cabezudo[2], and Basel K. al-Ramadi[1]

[1] *Department of Microbiology and Immunology;* [2]*Department of Biochemistry, College of Medicine and Health Sciences, UAEU*

The medicinal properties of Manuka honey have been extensively studied, particularly in terms of its wound healing and antimicrobial activities. We have previously demonstrated that Manuka honey also has anti-cancer properties against a variety of cancer cell types in vitro as well as in preclinical cancer models. The cellular targets of the anti-cancer activity of Manuka honey, however, remain unknown. For the present study, we selected the triple-negative human breast cancer cell line, MDA-MB-231, to investigate susceptibility to Manuka honey and to identify the potential signaling pathways affected. MDA-MB-231 cancer cells are known to constitutively express activated STAT3 transcription factor. This is due to mutations in upstream tyrosine kinases that effectively maintain STAT3 in a phosphorylated, and thus activated, form. These cells are also known to secret IL-6 constitutively, thus creating a positive feedback loop that drives their proliferation and survival. Our findings demonstrate that treatment with Manuka honey led to inhibition of STAT3 tyrosine phosphorylation in a concentration and time-dependent manner. Inhibition of STAT3 activity was observed as early as 15 minutes after cell co-culture with as little as 1% solution of Manuka honey. Importantly, treatment with Manuka honey also led to decreased IL-6 production. As a consequence, we observed a reduction in the level of anti-apoptotic proteins, including survivin and Bcl-2, and an increased release of cytochrome-c, ultimately leading to the death of cancer cells. Heat-treatment of Manuka honey abolished its effect on STAT3 phosphorylation and cytocidal capacity. In conclusion, our findings identify novel targets affected by treatment with Manuka honey in triple negative human breast cancer cells. The influence of the blockade of this pathway on other types of human cancers remains to be investigated.

Functional Analysis of Parathyroid Hormone-Like Hormone in the Mouse Stomach

Asma Al-Menhali[1], Dhanya Vijay[1], Shaikha Al Shamsi[2], and Sherif M. Karam[2]
[1] Department of Biology, College of Science; [2] Department of Anatomy, College of Medicine and Health Sciences, UAEU

Recent gene expression microarray analysis of the mouse stomach identified parathyroid hormone-like hormone (Pthlh) as a potential new gastric growth factor. Pthlh is expressed widely in different tissues and has been described to orchestrate some key cellular events, such as cell proliferation and differentiation. Although Pthlh has been found to be highly expressed in gastric cancer, its normal function in the stomach has not been studied yet. Our previous work using genetically engineered reporter mouse revealed that the acid-secreting parietal cells express Pthlh based on immunohistochemical analysis. In addition to creating a pathogen-free environment through the production of acid, parietal cells are found to produce several growth factors. Because of their strategic position at the vicinity of the stem cells, parietal cells are also thought to play an important role in maintaining normal cell proliferation and differentiation program in the gastric gland. While it is known that parietal cell loss is associated with gastric carcinogenesis, it is unknown how parietal cells mediate normal cellular homeostasis in the gastric gland. The gastrin hormone of the stomach is known to be a critical regulator of acid secretion as well as cellular proliferation and differentiation. Since gastrin receptors are expressed in parietal cells, one hypothesis is that the proliferation effect of hypergastrinemia is due to gastrin stimulation of growth factor(s) from parietal cells. The overall objective of this project is to examine the physiological role of Pthlh in the stomach with a special emphasis on epithelial cell proliferation and differentiation. We have recently generated a new genetically engineered mouse model with specific deletion of Pthlh in the parietal cells by crossing two different mice: floxed Pthlh mouse (from Andrew Karaplis, McGill University, Canada) and HK-Cre mouse (from Jeff Gordon and Jason Mills, Washington University School of Medicine, USA). Our initial findings indicate a decrease in the overall body weight of Pthlh knockout mice during their postnatal development. We have started to examine the phenotype of these Pthlh-deficient mice by using immunohistochemistry and RT-PCR analysis. Collectively, this project will reveal the unknown Pthlh function in the normal mouse stomach. It will also determine whether Pthlh is a potential mediator of gastrin growth factor activity in the stomach.

Expression of Parathyroid Hormone-Like Hormone Receptor in Normal and Cancerous Stomach

Asma A. Al Menhali[1], Dhanya Vijay[1], Frank Branicki[2], and Sherif M. Karam[3]
[1] Department of Biology, College of Science, UAEU; [2] Department of Surgery; [3] Department of Anatomy, College of Medicine and Health Sciences, UAEU

The gastric stem cell plays a fundamental role in stomach homeostasis by maintaining normal rates of cell proliferation and differentiation. This perpetual role of stem cells is supported by many key molecular signaling pathways. Although the structure and secretory function of the gastric gland have been well studied, the pathways controlling stem cell proliferation and differentiation are not fully understood. It is generally accepted that cross-talks between epithelial and mesenchymal tissues regulate cell proliferation/differentiation through a number of secreted factors. The growth factor parathyroid hormone-like hormone (Pthlh) is expressed in different organs during development and adulthood, orchestrating key cellular events, including cell proliferation and differentiation. Unsurprisingly, imbalanced Pthlh gene regulation leads to the development of cancer in some organs. The aim of this study is to find the expression pattern of Pth1h receptor in normal as well as transformed gastric tissues. Immunihistochemical as well as polymerase chain reaction (PCR) analyses on mouse gastric mucosa showed expression of the receptor in the three different regions of the stomach: the forestomach, the corpus and the antrum. To find wether Pthlh receptor is altered during gastric carcinogenesis, tissues obtained from consented gastric cancer patients undergoing gastrectomy were processed for immunohistochemistry using a monoclonal anti-Pthlr antibody. Our results demonstrated over-expression of Pth1r in precancerous and cancerous gastric mucosal tissues. These data suggest that Pthlh and its receptor are essential members of the signaling pathways involved in control of stem cell proliferation and gastric carcinogenesis and, therefore, Pthlr could represent a new biomarker for early detection of gastric cancer. (This study is supported by grants from UAEU and Terry Fox Foundation).

Rhus coriaria induces senescence and autophagic cell death in breast cancer cells through a mechanism involving p38 and ERK1/2 activation

Halima Ali Al Samri and Khawlah Najib Athamneh
Department of Biology, College of Science, UAEU

Here, we investigated the anticancer effect of Rhus coriaria on three breast cancer cell lines. We demonstrated that Rhus coriaria ethanolic extract (RCE) inhibits the proliferation of these cell lines in a time- and concentration-dependent manner. RCE induced senescence and cell cycle arrest at G1 phase. These changes were concomitant with upregulation of p21, downregulation of cyclin D1, p27, PCNA, c-myc, phospho-RB and expression of senescence-associated β-galactosidase activity. No proliferative recovery was detected after RCE removal. Annexin V staining and PARP cleavage analysis revealed a minimal induction of apoptosis in MDA-MB-231 cells. Electron microscopy revealed the presence of autophagic vacuoles in RCE-treated cells. Interestingly, blocking autophagy by 3-methyladenine (3-MA) or chloroquine (CQ) reduced RCE-induced cell death and senescence. RCE was also found to activate p38 and ERK1/2 signaling pathways which coincided with induction of autophagy. Furthermore, we found that while both autophagy inhibitors abolished p38 phosphorylation, only CQ led to significant decrease in pERK1/2. Finally, RCE induced DNA damage and reduced mutant p53, two events that preceded autophagy. Our findings provide strong evidence that R. coriaria possesses strong anti-breast cancer activity through induction of senescence and autophagic cell death, making it a promising alternative or adjunct therapeutic candidate against breast cancer.

The effect of diabetes mellitus on the recovery of renal dysfunction following reversal of 24-hr unilateral ureteral obstruction in the rat

Fayez T Hammad[1], Omran Bakoush[2], and Loay Lubbad[1]
[1] *Department of Surgery;* [2] *Department of Internal Medicine, College of Medicine and Health Sciences, UAEU*

The effect of diabetes mellitus on the recovery of renal dysfunction following reversal of 24-hr unilateral ureteral obstruction in the rat Fayez T. Hammad, Omran Bakoush, Loay Lubbad Introduction: Following reversal of relatively short periods of unilateral ureteral obstruction (UUO), renal functional parameters such as renal blood flow (RBF), glomerular filtration rate (GFR), urinary volume (UV), total (UNaV) and fractional (FENa) excretion of sodium ultimately recover within a certain time frame. Diabetic nephropathy is characterized by morphological and hemodynamic changes in the nephron. Hence, it is possible that the ability of the diabetic kidney to recover, following insults such as ureteric obstruction, is impaired. Thus, the aim of this study was to examine the renal functional changes following reversal of UUO in diabetic rats. Methods: Diabetes mellitus (DM) was induced by intraperitoneal injection of streptozotocin in 8 weeks old male rats which then received daily insulin for 3 months to maintain blood glucose level between 18-25 mM. All diabetic rats and age-matched controls underwent reversible 24-hour left UUO. The renal functions of the right and left kidneys were studied using clearance techniques, 3 hours (Group N-1 and D-1), 7 days (Group N-2 and D-2) and 30 days (Group N-3 and D-3) following reversal of UUO. Group N-1, N-2 and N-3 were normal rats whereas group D-1, D-2 and D-3 were diabetic rats. The right non-obstructed kidney was used as a control for the left obstructed kidney. Results: In group N-1, GFR and RBF of the left kidney were 30% and 52% of the right kidney, respectively (P0.05 for all (Table 1). Conclusions: In this model, 24-hr reversible UUO caused alteration in all renal parameters shortly after reversal. Compared to normal animals, in diabetic animals, although, there was a trend in some of the parameters to deteriorate more significantly shortly after the reversal, all parameters returned back to baseline by 30 days post-reversal similar to normal subjects. Table-1: The percentage of the left to right kidney for each parameter in all the groups. The results are expressed as percentages (mean ± SEM). N; normal and D: diabetic group Group GFR-L/R RBF-L/R UV-L/R UNaV-L/R FENa-L/R N-1 30±5 52±9 204±37 168±33 232±64 N-2 74±11 86±9 106±17 112±27 144±21 N-3 94±9 92±6 101±9 84±10 92±5 D-1 19±4 38±6 108±27 129±43 359±99 D-2 71±10 98±13 91±10 87±20 123±20 D-3 96±12 91±14 109±23 103±19 112±22 Source of Funding: This research was supported by an individual grant, College of Medicine & Health Sciences, United Arab Emirates University.

Amelioration of Type 1 diabetes by the cholinergic anti-inflammatory pathway in the MLD-STZ model

Junu A. George[1], Ghada Bashir[2], Mohammed M. Qureshi[1], Yassir A. Mohammed[2], Basel K. al-Ramadi[2], and Maria J. Fernandez-Cabezudo[1]

[1] *Department of Biochemistry;* [2] *Department of Microbiology and Immunology, CMHS, UAEU*

Type I diabetes (T1D) is an autoimmune disease that results from a deficiency in the production of insulin due to a strong inflammatory immune response and T cell-mediated damage of pancreatic b-cells. The cholinergic anti-inflammatory pathway is a physiological mechanism that connects the central nervous system with the immune system via the vagus nerve and controls the release of pro-inflammatory cytokines. We have previously shown that inhibition of acetylcholinesterase (AChE), the major enzyme responsible for the hydrolysis of acetylcholine, leads to increased cholinergic pathway activation and modulates the inflammatory response to bacterial infection. In this study, we investigated the potential of regulating the inflammatory response in a model of T1D through the administration of paraoxon, a potent inhibitor of AChE. Hyperglycemia was induced using a well-characterized regimen of multiple low doses of streptozotocin (MLD-STZ). We demonstrate that pretreatment with paraoxon prevented the development of hyperglycemia in STZ-treated C57BL/6 mice. This correlated with a significant reduction in T cell infiltration into the pancreatic islets and the preservation of the structure and functionality of the b -cells. Gene expression analysis of pancreatic tissue demonstrated that increased peripheral cholinergic activity prevented the loss of insulin production induced by STZ administration. This was associated with a marked reduction in pro-inflammatory cytokines, including IL-1b and IL-6 in the pancreas and peripheral lymphoid tissue. Further analysis using intracellular cytokine staining demonstrated that paraoxon pretreatment led to a significant shift in STZ-induced immune response from a predominantly disease-causing Th17 cells to protective Th1 cells. Our results provide mechanistic evidence for the modulation of murine T1D by the cholinergic anti-inflammatory pathway.

Reduced Glomerular Size-Selectivity in late Streptozotocin-Induced Diabetes in Rats

Loay Lubbad and Omran Bakoush
College of Medicine and Health Sciences, UAEU

Micro-albuminuria is an early manifestation of diabetic nephropathy. We aimed to investigate the functional changes in the glomerular filter in long-term induced type-1 diabetes in rats. Methods: We examined glomerular permeability in 15 male Wistar rats with at least three months of streptozotocin (STZ)-induced diabetes (blood glucose ~20 mM) and in age-matched control rats. The changes in glomerular permeability were assessed by determining the glomerular sieving coefficients (θ) for FITC-Ficoll (molecular radius 20–90 Å), using size exclusion HPLC. Results: The values of θ for FITC-Ficoll of macromolecular size > 50 Å were significantly increased in STZ-diabetic rats compared to the age-matched controls. The sieving coefficients for FITC-Ficoll < 50 Å tended to be lower in diabetic rats than in controls. According to the two-pore model, there is a primarily increase in macromolecular transport through large pores in the glomerular filter of diabetic rats associated with loss of small-pore area. Conclusion: Deterioration in size selectivity due to an increase in the number of large pores is the main cause of the observed functional change after three months of induced experimental diabetes. The contribution of the dysfunction in charge selectivity is likely negligible in diabetic kidney disease.

Inhibition of Glycolipid Transferase Attenuates Diabetes Induced Retinal Tissue Injury in a Murine Model of Type 1 Diabetes

Rajesh Mohanraj[1], Kamal Hassan[1], and Subroto Chatterjee[2]
[1] *Department of Pharmacology & Therapeutics, College of Medicine & Health Sciences, UAEU;* [2] *Department of Pediatrics, Johns Hopkins School of Medicine, Johns Hopkins University, Baltimore, USA*

Glycosphingolipids (GSLs) are a group of plasma membrane lipids, prominent for their complex and diverse glycan head groups. Lactosylceramide (LacCer) is a GSL that serves as core substrate in the metabolism of downstream glycosylated GSLs. Over the past decade the functions of LacCer in health diseases have begun to emerge, which includes its mitogenic properties in vascular smooth muscle cells, pro-inflammatory actions in human endothelial cells etc. LacCer synthesis is governed by the enzyme GalT-V (LacCer synthase) and it's over activation has been tied with the pathogenesis of cardiac hypertrophy and atherosclerosis. However, its precise role in the pathogenesis of diabetic retinal tissue injury is not known and hence this forms the premise of our study. Induction of diabetes resulted in significant increase in the LacCer levels and GalT-V activity in the retinal tissues. Further increased NADPH oxidase activity, diminished SOD activity, GSH content and elevated lipid peroxide (4-Hydroxynonenal) accumulation were noted in the diabetic retinas. Similar trend was observed with the levels of pro-inflammatory cytokines (TNF-alpha, IL-1beta and MCP-1) and adhesion molecules (ICAM-1 and VCAM-1) in the diabetic retinas. Further, higher degree of apoptosis was observed in the diabetic retinal tissues as revealed by TUNEL staining, Caspase 3 and poly (ADP-ribose) polymerase [PARP] activities. The above phenotypic changes observed in the diabetic retinal tissues were diminished when these animals were treated with GalT-V inhibitor. Further studies are in progress to understand the molecular mechanisms purported for the role of LacCer in the pathogenesis of diabetic retinopathy.

A clinical audit on diabetes care in patients with type 2 diabetes in Al-ain, United ArabEmirates

Khoula Moh Basahel and Abdulla Shehab
College of Medicine and Health Sciences, UAEU

OBJECTIVES: To implement a prospective interventional clinical audit to evaluate the current clinical practice and the effect of standard interventions on the management of type 2 diabetes (T2DM). METHODS: 254 patients with T2DM where recruited in a specialized diabetes care center in Al-Ain, UAE. The diabetes care components were audited before (baseline) and after (3 and 6 months) implementation of Institute of Clinical System Improvement (ICSI) guidelines. Data was compared against international guidelines to achieve target goals of normoglycemia, blood pressure (BP), and low density lipoprotein-cholesterol (LDL-C). We measured changes in mean scores of patient satisfaction level regarding diabetes care at similar intervals, by validated Patient Satisfaction Questionnaire (PSQ-18). RESULTS: We observed a significant reduction in fasting blood glucose (FBG; mean± SD; 9.3 ± 0.03 vs 7.4 ± 0.3mmol/l; P=0.03), and HbA1c (8.7 ± 0.02 vs 8.1 ± 0.02 %; P=0.04) levels after 6 months compared with baseline. Patients who achieved target FBG and HbA1c levels improved significantly (45.7 vs 81.1%; P=0.03), and (40.1 vs 73.6%; P=0.04), respectively. The LDL-C levels improved, though this was not statistically significant. Patients achieving target of BP control improved significantly (SBP 142±7.6 and DBP 95±6.2 vs SBP 136±8.2 and DBP 87±5.8 mmHg;P=0.05). CONCLUSIONS: The results of this interventional audit were generally positive and emphasized the feasibility of improving the current clinical practice. Our individualized approach has helped us to achieve a better target in glycemic and BP control as well as patient satisfaction. Further research is needed to understand the long-term impact of our structured approach to improve the quality of T2DM care in the UAE.

Repetitive transcranial magnetic stimulation (rTMS) protocols induced changes in cortical gene expression in a rat model of stroke

Milos Ljubisavljevic, Asma Javid, Joji Oommen, Khatija Parekh, Thomas Adrian, Safa Shehab, and Nico Nagelkerke
College of Medicine and Health Sciences, UAEU

Repetitive Transcranial Magnetic Stimulation (rTMS) is now proposed in treatment of stroke in humans. Nevertheless, the data remain controversial in terms of optimal stimulation parameters and the mechanisms of rTMS long-term effects. We examined the effects of different rTMS protocols on changes in gene expression in rat cortices after acute ischemic-reperfusion brain injury. The stroke was induced by middle cerebral artery occlusion (MCAO) with subsequent reperfusion. Changes in the expression of 96 genes were examined using low-density expression arrays comparing it after MCAO alone and MCAO with 1Hz, 5Hz, continuous (cTBS) and intermittent (iTBS) theta-burst rTMS. rTMS over the lesioned hemisphere was given for two weeks (with a 2-day pause) in a single daily session and a total of 2400 pulses. MCAO alone induced significant upregulation in the expression of 44 genes and downregulation in 10. Two weeks of iTBS induced significant increase in the expression of 52 genes. There were no down-regulated genes. Other rTMS protocols induced negligible (cTBS) or had no effects (1 and 5 Hz) on changes in gene expression. Up-regulated genes included those involved in angiogenesis, inflammation, injury response and cellular repair, structural remodeling, neuroprotection, neurotransmission and neuronal plasticity. The results show that long-term rTMS in acute ischemic-reperfusion brain injury induces complex changes in gene expression that span multiple pathways, which generally promote the recovery. The results also show that induced changes critically depend on the rTMS frequency and pattern. The results further underlines the premise that one of the benefits of rTMS application in stroke may be to prime the brain, enhancing its potential to cope with the injury and to rewire. This could augment its potential to favorably respond to rehabilitation, and to restore some of the loss functions. Further studies are needed to underpin the mechanisms of rTMS modulation of gene expression and the eventual role of final products of gene activity in recovery after ischemic brain injury.

Multiple targeting approach with histamine H3 receptor antagonists as novel and promising antiepileptic drugs

Bassem Sadek[1], Johannes Stephan Schwed[2], Nadia Khan[1], Dhanasekaran Subramanian[1], Lilia Weizel-Biocenter[3], Miriam Walter-Biocenter[3], and Holger Stark[2]

[1] Department of Pharmacology and Therapeutics, College of Medicine & Health Sciences, UAEU; [2] Institute of Pharmaceutical and Medicinal Chemistry, Heinrich Heine University, Duesseldorf, Germany; [3] Institute of Pharmaceutical Chemistry, Goethe University, Frankfurt, German

Epilepsy is a chronic disorder of the brain and characterised by an enduring predisposition to generate recurrent epileptic seizures and by the neurobiological, cognitive, psychological and social consequences of this condition. For medical therapy different antiepileptic drugs (AEDs) are in use, but are hampered in clinical use by either having an effectiveness within a maximum of 60- 80% of all patients or diverse unwanted side effects like headache, nausea, and cognitive impairment. Central histamine was found to play an important role in epilepsy, and especially the third histamine receptor subtype (H3R) has by neurotransmitters modulating abilities raised hopes for novel AEDs. Pitolisant (Wakix®), a non-imidazole H3R antagonist/inverse agonist submitted to EMA for market authorisation, was found to be effective in different in-vitro and in-vivo animal seizure models and also in photosensitivity epilepsy in human patients. Safinamide (Xadago®), a recently marketed anti-parkinson MAO B inhibitor, was primarily designed as an AED and was shown to have good affinity at voltage-gated Na+ and Ca++ channels as well as good inhibitory potency on glutamate release. As a multi-targeting or polypharmacological approach we combined the pharmacophore elements of H3R antagonist to that of safinamide or phenytoin with different spacer moieties. All newly developed ligands showed moderate to good affinity at hH3R (pKi values between 7.36 and 8.21) with good selectivity profile among the other histamine receptor subtypes tested (hH1R and hH4R, pKi values < 5). The ligands were further characterized in vivo in different seizure models in rats using chemical-induced (pentylenetetrazole (PTZ)- or strychnine (STR)-induced seizure) or in maximum electroshock-induced seizure models (MES). The safinamide related derivatives with bulky elements showed significantly and dose-dependently reduced seizures or exhibited full protection in MES and PTZ convulsions model with some stereochemical preference for the R-configured isomer. Additional pharmacological profiling for the ligands is still needed to further investigate whether central neurotransmitters, e.g. GABA or glutamate, are modulated by the current promising class.

Neuroprotective effect of nerolidol against neuroinflammation and oxidative stress induced by rotenone

Hayate Javed, Sheikh Azimullah, Salema B. Abul Khair, Shreesh Ojha, and M. Emdadul Haque
College of Medicine and Health Sciences, UAEU

Parkinson's disease (PD) is a late-onset, progressive and neurodegenerative disorder of multifaceted pathogenesis. Besides the several therapeutic approaches, new drugs are needed in the treatment of PD. The aim of the present study was to investigate the neuroprotective effects of nerolidol (NRD) on rotenone-induced experimental model of PD in rats. Rotenone (ROT) was injected intraperitoneally 2.5 mg/kg b. wt. to male Wistar rats once daily for four weeks to mimic PD. The test compound, NRD was injected intraperitoneally 50 mg/kg b. wt. once daily for four weeks, 30 min prior to ROT administration. ROT challenge causes significant reduction in antioxidant enzymes (superoxide dismutase, catalase and glutathione) and enhances the levels of MDA (marker of lipid peroxidation) in the mid brain tissues. Additionally, proinflammatory cytokines (IL-1β, IL-6 and TNF-α) and inflammatory mediators (COX-2 and iNOS) were also increased in ROT challenged rats. Immunofluorescence staining of GFAP and Iba-1 revealed a significant increase in the number of activated astrocytes and microglia accompanied by significant loss of dopamine (DA) neurons in the substantia nigra pars compacta (SNc) and DA nerve fibers in striatum area in ROT treated rats. NRD also significantly prevented the DA neurons and DA nerve fibers from the ROT induced neurotoxicity. Moreover, NRD treatment significantly attenuates the deleterious effect of oxidative stress and inflammation caused by ROT administration. Furthermore, our results also showed a significant reduction in the activation of astrocytes and microglia when NRD is supplemented to ROT challenged rats. In summary, we demonstrated for the first time that NRD may serve as a potent neuroprotective agent in rats model of PD mediated by its anti-oxidative and anti-inflammatory activities.

Intrastriatal injection of human wild-type α-synuclein induces endogenous α-synuclein phosphorylation and accelerates MPTP neurotoxicity

Hayate Javed, Mustafa T Ardah, Omar El-Agnaf, and Emdadul Haque
College of Medicine and Health Sciences, UAEU

Parkinson's disease (PD) is the second most common progressive neurodegenerative disorder mostly affecting the individuals over the age of 60 years. The pathological hallmark of the disease includes intracellular aggregates of α-synuclein protein known as Lewy bodies and Lewy neurites. Recent studies have suggested that α-synuclein mediated pathology is propagated through cell to cell transfer similar to prion disease. Additionally, environmental toxin like 1-methyl, 4-phenyl, 1,2,3,6 tetrahydropyridine (MPTP) can cause PD like symptoms in animal model of PD. However, it is not clear whether α-synuclein and environmental toxin mediated toxicity are interconnected in the death of dopamine neurons. In the current study, we have combined the triggering effect of α-synuclein and MPTP in a single model system to develop the reproducible PD pathology closely related to human PD brain. Single intrastriatal injection of human wild type α-synuclein seed to male C57BL/6 mice showed significant induction of phosphorylated form (pS129) of endogenous α-synuclein in the substantia nigra par compacta (SNc), cortex and striatum. Interestingly, we did not observe such spreading effect of pS129 α-synuclein at the site of injection. MPTP challenge to human α-synuclein injected mice showed more co-localized dopaminergic neurons with pS129 α-synuclein and α-synuclein as compared to α-synuclein alone injected mice. Moreover, MPTP administration to human α-synuclein injected mice further enhanced the dopaminergic cell death in the SNc area. Additionally, human α-synuclein injection causes activation of astrocytes and microglia in mice brain, which is augmented by MPTP administration. Collectively, our data showed first time, exogenous human wild type α-synuclein inoculation in mice brain amplified the deleterious effect of MPTP induced neurodegeneration. Furthermore, our present PD model could be reliable and reproducible to study the PD pathogenesis and screening the drugs.

Curcumin Potentiates Human α7-Nicotinic Acetylcholine Receptors

Eslam Gaber El Nebrisi, Syed Mohammed Nurulain, and Murat Oz
Department of Pharmacology, College of Medicine and Health Sciences, UAEU

Curcumin, a polyphenolic compound isolated from the rhizomes of Curcuma longa (turmeric), has been shown to exhibit a wide range of pharmacological activities including treatments of Alzheimer's disease, and cystic fibrosis, and inflammation. Although mechanisms of these effects are largely unknown, several types of voltage-gated ion channels and transporters have been suggested to be involved in mediating pharmacological actions of curcumin. However, the effects of curcumin on ligand-gated ion channels have not been described earlier. In this study we have investigated the effect of curcumin application on the functional properties of human α7-nicotinic acetylcholine (nACh) receptors. cRNA encoding for homomeric human α7-nicotinic acetylcholine (nACh) receptors were expressed in Xenopus oocytes. Ion currents mediated by the activation of nACh receptors were recorded using two-electrode voltage clamp method. Our results indicated that curcumin caused a significant potentiation of nACh receptor-mediated ion currents. The effect of curcumin (0.1 to 10 μM) was reversible and gradually reached a steady-state level within 10 min application time. Maximal amplitudes of currents activated by 100 μM ACh were significantly enhanced by curcumin in a reversible and concentration-dependent manner. In earlier studies, agonists of α7 nACh receptors have been shown to have therapeutic effects on Alzheimer's disease and inflammation. Therefore, our results suggest that potentiation of α7 nACh receptors by curcumin can mediate some of its therapeutic actions in Alzheimer disease and inflammation.

Isoenzyme and antioxidant status in relation to flowering in different varieties of date palm (Phoenix dactylifera L.) of United Arab Emirates

Abdul Jaleel Cheruth[1], Gabriel A. Rabert[1], Shyam S. Kurup[1], Sreeramanan Subramaniam[2], and K. M. Gothandam[3]

[1] Department of Aridland Agriculture, College of Food and Agriculture, UAEU; [2] School of Biological Sciences, Universiti Sains Malaysia (USM), Malaysia; [3] School of Bioscience and Technology, VIT University, India

The present investigation was carried out to evaluate the status of various physiological aspects for the flower induction of Date palm. Date palm is cultivated in arid and semi-arid regions. The temperature requirements are important for determining growth, flowering and fruit maturation. Date palm species continues to exhibit a critical need to improve the quality and diversification. The Isoenzyme profiling and antioxidant metabolism in relation to flowering in date palm is a novel aspect. For the experiment there are three distinct varieties in date palms in UAE, viz., early, mid and late flowering palms were selected. Isoenzyme like peroxidase, non-enzymatic antioxidants like ascorbic acid, α-Tocopherol and reduced glutothione, and enzymatic antioxidants like Superoxide dismutase (SOD), catalase (CAT) and Ascorbate peroxidase (APX) were analysed. The results showed a significant variation between seasons (pre flowering, flowering, and post flowering) and also between the three date palms (early, mid, and late flowering varieties). Isoenzyme peroxidase, Antioxidants concentration varied in the time of flower induction. It was higher in the time of flower production and slightly lowered after the flowering and pre flowering stage. This study provides an insight into the possible roles of isoenzyme, antioxidants and in the activities of antioxidant enzymes in the regulation of flower development in date palm varieties.

Phytochemical investigation and in vitro free radical scavenging activities of leaf extracts of Calligonum comosum

Abdul Jaleel Cheruth[1], Karthishwaran Kandhan[1], Omar Wasfi Yousef Odeh[1], Abdulwahab Ali Saleh Obaid Saleh Ekaabi[1], Shyam S. Kurup[1], and Sabitha Sakkir[2]

[1] *Department of Aridland Agriculture, College of Food and Agriculture, UAEU*; [2] *Terrestrial and Marine Biodiversity Sector, Environment Agency, Abu Dhabi*

Calligonum comosum (Polygonaceae) is a perennial shrub growing in the United Arab Emirates, and are being used in traditional medicinal system of UAE. The aim of proposed study was to evaluate the phytochemical constituents and in vitro antioxidant activities of the leaves of C. comosum. During the preliminary phytochemical analysis, the methanolic and ethyl acetate extract of C. comosum was screened for the presence of flavonoid, tannin, carbohydrates, alkaloid, protein, steroids, terpenoids, saponin, phenols, Phlobatannin, Cardiacglycoside, Anthraquinines and Volatile oils. Further the plant leaf extract was tested for their total phenol and flavonoid content and free radical scavenging activity such as 2, 2′-azinobis- (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS●+) radical decolorization assay, DPPH (2, 2-diphenyl, 2-picryl hydrazyl) radical scavenging, hydroxyl radical and nitric oxide radical scavenging assays. Phytochemical screening of the plant extracts showed the presence of flavonoid, tannin, carbohydrates, alkaloid, protein, steroids, terpenoids, saponin, phenols, Phlobatannin. The plant leaves did not contain Cardiacglycoside, Anthraquinines and Volatile oils. The yield of the c. comosum methanolic leaf extract (CCME) was 11% and ethyl acetate extract (CCEAE) was 4.93%. Total phenolics content of CCME and CCEAE was 8.15, 4.53 mg/g of extract calculated as quercetin equivalent and the flavonoid was 2.13, 1.67 mg/g of extract calculated as gallic acid equivalent respectively. C.comosum leaves methanolic and ethyl acetate extract showed high free radical scavenging activity as evidenced by the low IC50 values in DPPH (31.17 and 33.27 µg/mL), in ABTS (21.43 and 20.73µg/mL), in nitric oxide (28.47 and 29.44 µg/mL) and in Hydroxy radical (31.34 and 29.14 µg/mL) scavenging assays. The results exhibited a positive linear correlation between these phytochemicals and the free radical scavenging activities. Our findings provide evidence that the methanolic and ethyl acetate extract of C. comosum are having potential antioxidant effects and this justifies its uses in folkloric medicines. Through the present study, a scientific validation of traditional knowledge is achieved in a preliminary level. The plant revealed promising antioxidant activity, and require further studies to throw light on their chemical composition and potential compound identifications.

Analyzing Consumers' Preferences and Willingness to Pay for the Local Food Products in United Arab Emirates

Safdar Muhammad, Ahmed Al Junaibi, Mohammed Khouri, Hamdan Al Eissaee, and Hamad Al Rasheedi
Department of Agribusiness, College of Food and Agriculture, UAEU

United Arab Emirates (UAE) along with other GCC countries have serious concerns about the food security. The government has outlined several strategies including efforts to increase domestic production. Due to unsuitable conditions for agriculture, the domestic production is limited to some products (dates, vegetables, livestock as well as meat, fisheries and poultry products). UAE is self-sufficient in few (dates and fisheries) and has potential to increase production for others products. UAE has a liberal trade policy and imports about 90% of their food Worldwide. The country is attractive to foreign exporters due to its trade policies, high income, diverse population, growing markets, and high growth rates. But due to high cost of production and other unsuitable agriculture conditions, the local producers are not able to be competitive against imported food products. There is need to differentiate their products based on some desired attributes in order to compete with imported food products. The main objective of this paper is to analyze factors affecting consumers' preferences and their willingness to pay for the local food products in UAE. The main focus of this paper is on fresh fruits and vegetables, dairy and poultry products. The market and consumers' survey was conducted in UAE. The market survey was analyzed for examining the types and availability of local and imported food products in UAE markets and their price comparison. In addition, a consumers' survey was used to identify preferences, attitude and their willingness to buy and pay for the local food products. The results from this paper will help to understand consumers' needs and provide recommendations for establishing successful local brand markets in UAE.

Camel meat balls fortified with black cumin seed and oil, Evaluation of quality and storage stability

Sajid Maqsood, Amira Aldowaila, Ahlam AlHammadi, Ahlam Abuibaid, and Meera Aldhaheri
Department of Food Science, College of Food and Agriculture, UAEU

Quality of camel meat balls fortified with black cumin seed extract (300 and 600 ppm) and black cumin seed oil (5%) was evaluated during a storage period of 9 days at 4C. Black cumin seed extract at a level of 600 ppm irrespective of addition of black cumin oil showed strong protective effective against lipid oxidation as reflected by lower peroxide value (PV) and thiobarbituric acid reactive substances (TBARS), compared to control and other treatments. Addition of black cumin oil (5%) alone was also effective in lowering the PV and TBARS, compared to control, indicating that black cumin oil also possessed antioxidative capacity. However, the effect was lower than that displayed by black cumin seeds. Total haem content and haem iron content was higher in control and samples treated with black cumin oil, compared to samples treated with black cumin seed (300 & 600 ppm) on day 9 of storage ($p<0.05$). Addition of black cumin seed extract and oil did not affect the redness (a*) values, except the samples added with black cumin oil (5%) and extract (600ppm) which showed lower redness (a*) values ($p<0.05$). However, the treatment groups showed higher redness (a*) values on day 3, compared to control, indicating that black cumin seed extract was effective in retaining red color of the meat. Black cumin seed extract did not display antimicrobial effect on the camel meat microbial load which was indicated by similar psychrophilic bacterial count between control and samples treated with black cumin seed extract (300 & 600 ppm). Texture profile analysis of cooked camel meat balls revealed that the supplementation of black cumin seeds and oil didn't affect the texture profile ($p<0.05$). Therefore, supplementation of camel meat balls with black cumin seeds and oil proved to be effective in retarding lipid oxidation and retain red color during the refrigerated storage of the camel meat balls.

Somatic embryogenesis in Haloxylon persicum - an endangered tree species suited for landscapes in UAE.

Shyam S.Kurup[1], Fayas T P[1], Abdul Jaleel Cheruth[1], Nadia Hassan Tawfik[1], Shaikha Salem Al Dhaheri[2], Rajmohan K[3], and Sreeramanan Subramaniam[4]

[1] Department of Aridland Agriculture, College of Food and Agriculture, UAEU; [2] Environmental Agency, Abu Dhabi, UAE; [3] Department of Plant Biotechnology, KAU, India; [4] School of Biological Sciences, Universiti Sains Malaysia (USM), Malaysia

Haloxylon persicum (Bunge ex Boiss & Buhse), is a tree species belong to the family Amaranthaceae native to UAE. The species is distributed in central Asia, Middle East, Iran, Afghanistan, North West China and near eastern deserts. This species has xeromorphic characters to combat extremes of temperature, radiation and moisture stress. Misuse of rangelands and overgrazing are the major threat for the disappearance of this useful plant species that could be exploited for future native landscaping. To develop an efficient regeneration protocol for rapid multiplication, nodal explants of 1-1.5 cm were cultured in Murashige and Skoog basal medium supplemented with different concentrations of thidiazuron (TDZ)(0.5, 1, 2µM). The TDZ showed a significant effect on explants and the bud sprouting was observed within 14 days of culture establishment. After 2 months of in vitro maintenance, callus formation and direct adventitious shoot formation was observed in all media combinations. Callus formation was found to be high in 1µM TDZ compared to 0.5 and 2 µM. Medium supplemented with 0.5 µM TDZ produced more number of shoot buds (5.3 shoot buds) compared to 1 µM TDZ (2.6 shoot buds) and 2 µM TDZ(3 shoot buds). The regenerants will be subjected to in vitro conservation techniques for long term storage.

Drying of dates at Bisr stage of date fruit development

Ahlam Abdullah Al-Hammadi, Sara Mohammed Al Neyadi, and Thuraya Abdo Ali Noman
Food Science Department, College of Food and Agriculture, UAEU

Because of the high sugar content of Tamer dates, there is currently an increased concern about their contribution to the prevalence of diabetes and obesity in UAE. Thus, it will be beneficial to be able to utilize high fiber-containing date varieties at the BISR stage as functional ingredients in foods, which will contribute to decreasing the glycemic burden contributed by glucose and fructose. Freshly harvested BISR from two UAE date varieties (Barhi & Neghal) were procured from College of Food and Agriculture farm. The Bisr dates were steam-blanched for 03 minutes and then dried in a tray dryer or sun dryer. For the air dryer, four different air temperatures were used (50°C, 60°C, 70°C & 80°C) and the air velocity was around 1.5 m/s. Colour reflectance values 'L', 'a' and 'b' of the samples were measured using Hunter lab colorimeter. Titrable acidity was determined by titrating known quantity of sample against 0.1N NaOH and expressed as citric acid. Ascorbic acid was determined by 2,6-dichlorophenol indophenol titration based on the reduction of ascorbic acid by the dye in the pH range of 1–3.5. The non-enzymatic browning was determined by measuring the absorbance of the alcoholic extract at 420 nm. Total antioxidant activity was measured by ferric reducing antioxidant power assay and DPPH radical Scavenging activity. We demonstrate that air-drying rates, for two varieties, declined rapidly until equilibrium was reached. It was noted that there was no constant rate drying period during drying of date palm fruits. Drying took place predominantly in the falling rate period. This indicated that diffusion was the main physical mechanism governing the moisture movement in date palm fruits. This trend is typical for most fruits. The results were in agreement with some existing literature on drying of various food products. Differences in the moisture ratio and drying rates could be due to variation in initial moisture, composition (dry matter contents) and surface area of the date palm fruits. Colour characteristics of air-dried Bisr for both varieties were found better than sun-dried samples. The same trend was found for total antioxidant activity, non-enzymatic browning and rehydration characteristics

Tolerance to soil salinity by Micromonospora halophytica capable of producing 1-aminocyclopropane-1-carboxylic acid (ACC) deaminase

Khaled Abbas El-Tarabily, Abdulmajeed S. Alkhajeh, and Tarek Youssef
Department of Biology, College of Science, UAEU

Worldwide, salinity is one of the most important abiotic stresses that limit crop growth and productivity especially for crops that are grown under irrigation. The objective of this work was to evaluate whether actinomycetes isolated from saline soils in the UAE can increase tolerance in tomato plants to salt stress through the reduction in the endogenous levels of the stress hormone ethylene. Thirteen isolates of streptomycete (SA) and non-streptomycete actinomycetes (NSA) that showed ACC deaminase activity were obtained from a total of 45 isolates. The most promising isolate selected that produced the highest levels of 1-aminocyclopropane-1-carboxylic acid (ACC) deaminase in vitro was identified as Micromonospora halophytica. This wild type isolate (WT) (isolate # 41) significantly increased the fresh and dry weights, and root and shoot lengths of tomato plants grown under saline condition, both under gnotobiotic and greenhouse conditions. The application of the WT strain of M. halophytica significantly, reduced the endogenous levels of ACC, the immediate precursor of the hormone ethylene, in the roots and shoots compared with the non-inoculated control treatment. In comparison, an ACC deaminase non-producing mutant strain (MT) Streptomyces atrovirens (isolate # 8) which acted as negative controls failed to reduce the endogenous levels of ACC in the roots and shoots and failed to promote plant growth under saline conditions both under gnotobiotic and greenhouse conditions. The application of the WT strain also significantly, increased photosynthetic pigment contents, plant water use efficiency, transpiration rate, stomatal conductance, and photosynthetic rate, compared with control. The WT strain and S. atrovirens were incapable of producing detectable levels of indole-3-acetic acid (IAA), indole-3-pyruvic acid (IPYA), putrescine (Put), spermidine (Spd), spermine (Spm), gibberellic acid, isopentenyl adenine, isopentenyl adenoside and zeatin in their culture filtrates. The application of the WT and MT strains or S. atrovirens failed to increase the in planta levels of endogenous plant growth regulators tested including IAA, IPYA, Put, Spd and Spm in the roots and shoots. This study is the first published report to demonstrate the potential of actinomycetes to ameliorate the deleterious effects of high salinity stress on plant growth through promotion of plant growth.

Archaeological fieldwork at two hilltop sites in Oliveira de Azeméis (Portugal)

Adriaan De Man[1] and Joao Tiago Tavares[2]
[1] *Department of History and Archaeology, College of Humanities and Social Sciences, UAEU;* [2] *Municipality of Oliveira de Azemeis*

Under the auspices of the municipality of Oliveira de Azeméis, in Northwestern Portugal, two hilltop sites were restudied during the summers of 2014 and 2015, in order to interpret their successive occupations. In both cases, there was clear potential for classical, late antique and medieval contexts. This was especially true for the site of Ul, where a terminus Augustalis and a Roman milestone, together with a number of red slip ware fragments, coins, tiles and bricks, had been known by the local population for many years. In the case of Monte Calbo, the recent plantation of trees on the upper plateau brought to light a wide dispersion of pottery, indicating a settlement of considerable dimensions. The combination of a geophysical survey and of test trenches led to a better definition of Ul, whereas at the Calbo hilltop, the recovered pottery, as well as a small hatchet, point after all to the Late Bronze Age, and not, as initially suspected, to a more recent period. At the highest point of this area, however, the bedrock was altered and the spot would fit into a well-known network of medieval lookout towers, active during the Islamic period in this frontier region. This poster presents some preliminary data of a still ongoing project, which seeks to understand the successive relevance and interconnections of secondary sites in an archaeologically important coastal territory.

Examining Medical Students Extra-curricula Research through the Lens of Transformative Learning Theory

Margaret Elzubeir[1] and Chris Howarth[2]
[1] *Department of Medical Education;* [2] *Department of Physiology*, *College of Medicine & Health Sciences, UAEU*

BACKGROUND: Programs designed to improve research capacity building among medical students continue to grow internationally, but reporting of characteristics, challenges and lessons learned are limited. Equally lacking is application of a relevant theory to the process. SUMMARY OF WORK: we present data collected between 2007 and 2012 illustrating voluntary research activities of undergraduate medical students and draw on transformative learning theory to analyze students research reports indicating ways extra-curricular research involvement transforms students as they achieve personal growth and development. SUMMARY OF RESULTS: Despite a decline in compulsory in-house research activity, it is possible to continue to nurture research activity among medical students. This requires concerted effort and support by local and international medical educators and clinical researchers. Evaluating the transformative nature of research activity among UAE students we found considerable evidence in support of transformative learning processes and principles as described by Mezirow (1995, 2000). CONCLUSIONS: Extra-curricula research education and training can foster meaning-making and actions of a potential generation of physician scientists through learning about the subject of research, self, environment and others.

Post Graduate Medical Education in the United Arab Emirates: Guidelines on a Code of Ethics and Professional Conduct for Trainees

Tahra AlMahmoud, Ali AlFazari, and Frank J Branicki
College of Medicine and Health Sciences, UAEU

Purpose: The concept of structured Postgraduate Medical Education (PGME) residency training programs is gaining widespread support from healthcare providers and is becoming a high national priority in the United Arab Emirates. In addition, trainees (Residents) learn from an 'informal' curriculum with trainers being of diverse cultural, ethnic and religious backgrounds. The roles and responsibilities of trainees are defined, thereby ensuring the safety and appropriate care of patients in situations where trainees are involved. The aim of this project was to set guidelines for a Code of Ethics that will govern the conduct and activities of Postgraduate trainees in various medical specialties, there being 14 programs now established in various disciplines. Methods: Various elements from international organizations with recognized high ethical standards and opinions of scholars who are experts in this field were reviewed and adapted, with preservation of core Islamic values. Results: This document focuses on professional responsibilities in the following aspects: professional practice standards, professional community standards, research standards, professional relationships with colleagues, physician duties towards society, physician duties towards the work place establishment , the relationship between physician trainees, postgraduate training programs and industry, reporting responsibilities, comments or behaviors considered unacceptable and a summary of general principles for the trainee. Conclusion: A formal document is now available to all Residents in training to emphasize the need for ethical considerations to be addressed with a strong sense of obligation to patients' best interests.

How we develop high quality single best answer multiple choice questions

Tahra AlMahmoud, Margaret Ann Elzubeir, and Frank J Branicki
College of Medicine and Health Sciences, UAEU

Background: The primary goal of any assessment is to provide accurate feedback about students' knowledge and/or skills; preferably this should be free of confounding factors that may interfere with the scored results. Contrary to best practice guidelines for development of multiple choice questions (MCQs), however, items are often flawed. This reality disappoints students and discourages examiners from using such pre-existing databases. Vetting and review of items can, nevertheless, improve the quality of MCQs. Purposes: Our approach, herein described, was to standardize the format used for MCQ assessment and provide some practical advice for quality enhancement. Methods: We describe an enhancement-focused vetting and review approach to development of high quality single best answer MCQs at one institution. Results: A collaborative approach involving core clinical disciplines including Internal Medicine, Family Medicine, Obstetrics/Gynaecology, Paediatrics, Psychiatry, Public Health, Radiology and Surgery was effective in vetting, reviewing and standard setting over 100 quality MCQ items for a high stakes examination. Conclusions: While logistics and time constraints are of concern to busy faculty members, there is consensus that utilizing resources to develop well-written MCQ questions based on blueprinting are well worth the effort to produce reliable and valid examinee scores. An enhancement-focused approach can be institutionally rewarding and lead to improved quality of high stakes assessments.

Informed Consent Education in a Multicultural Medical Environment: Clinical Clerks' perspectives

Tahra AlMahmoud, M. Jawad Hashim, Margaret Ann Elzubeir, and Frank J Branicki
College of Medicine and Health Sciences, UAEU

Purpose: Ethics training and professionalism theme exposure varies across curricula. The authors were interested in exploring medical students' perceived need for educational training about informed consent and other ethical issues in a developing cosmopolitan country with unique cultures. Methods: An anonymous paper survey, adapted from a published study, was distributed to 128 final year clinical clerks. The survey items addressed the level of educational attention needed for specified ethics topics compared to the amount currently provided. Results: 84% completed the survey. Students indicated need for more attention to all topics related to informed consent (mean=7.07±1.24, on a scale of 1 to 9). Most additional attention was requested for topics discussing risks, benefits and alternatives to the recommended treatment with patients (7.34±1.44), conducting assessments of decision- making capacity (7.29±1.67), obtaining informed consent or refusal from surrogate decision-makers (7.08±1.57), conducting assessments of decision- making capacity (7.29±1.67), and obtaining informed consent from patients who are capable of making decisions (7.00±1.69). The cohort expressed need for care of vulnerable patients education (7.24±1.19) with maximum score for care of abused children. Women perceived greater curricular needs for many items of ethics education than did male respondents ($p>0.05$). There was significant differences between students who scored high or low on the item "being treated in an ethical professional manner and endorsement of educational needs for care of adolescents (mean 6.65± 1.72 versus7.26±1.35 respectively, $p=0.048$). Conclusion:There was high perception of need for more academic attention to all topics pertaining to ethical issues surrounding informed consent and educational care of vulnerable patients.

Eating more fruits and vegetables exert a positive health effects on obese Emirati patients by decreasing their waist circumference and attenuating associated oxidative damage and inflammation

Salah Gariballa, Juma Al Kaabi, Javed Yasin, Awad Alessa, and Habiba Ali
College of Medicine and Health Sciences, UAEU

Background: The prevalence of (abdominal) obesity and related diabetes and cardiovascular disease is reaching epidemic proportion in the United Arab Emirates (UAE). Visceral (abdominal) fat secretes a number of inflammatory and oxidative damage factors implicated in diseases associated with obesity and at present, little is known about strategies that specifically reduce visceral obesity. Methods: We investigated the effects of increased fruits and vegetables consumption on body weight, waist circumference (WC) and metabolic risk factors in 356 obese UAE subjects [291(93%) females, mean (SD) age 35±11yrs)] visiting local health centers. A hundred obese diabetic patients (59 females, aged 51±12) were used as controls. All 356 subjects assigned to increased fruits and vegetables consumption had structured education to increase their fruits and vegetables consumption by experienced dieticians. Dietary information was collected by using validated food-frequency and 24-hour recall dietary questionnaires. Antioxidants and markers of oxidative damage and inflammation were also measured at baseline and follow up. Multiple Logistic regression analysis was performed to determine the influence of age, level of education, marital status, energy intake, fruits and vegetables intake, physical activity and number of education sessions on body weight and WC decrease. Results: During 427±223 days of follow up, 313 obese subjects had 13±5 education sessions. Their weekly fruit and vegetables intake increased from 23.8 servings to 25.0 (p =0.033). Mean body weight decreased from 83.9 kg at baseline to 81.4kg at follow up in the intervention group compared with the increase from 82.2 kg to 86.9 kg seen in the control group. Weight loss and decrease WC in the intervention group were associated with increased antioxidants and decrease in markers of both oxidative damage and inflammation. A decrease calorie intake was associated with significant weight loss [odd ratio (95% CI): 1.001(1.000, 1.001); p=0.001]. In contrast increased fruits and vegetables consumption had an independent positive effect on WC decrease [1.044 (1.000, 1.089); p=0.050). Conclusion: Our results support a beneficial role of higher fruits and vegetables intake in subjects with visceral obesity. These findings could have enormous public health implications for reduction of visceral obesity in the UAE and the Middle East.

Trauma research in UAE: Lessons learned

Fikri Abu-Zidan
Department of Surgery, CMHS, UAE University

Research is the major pillar for a successful development of a trauma system. Performing clinical research in the developing countries has multiple barriers including insufficient planning and financial support, shortage of research time, and inadequate health informatics structure. A multidisciplinary approach is vital to overcome these barriers. Collaboration between health care providers and clinical researchers is important so as overcome these barriers and pave the way for high standard useful trauma research. A Trauma Group was established at the College of Medicine, UAE University in 2001 with a mission to promote and perform high standard research and education in the field of trauma so as to improve medical care of patients in the UAE. The members of the group consisted of clinicians of different relative fields and epidemiologists in the UAE. This group has been highly successful with tremendous input on international highly respected level in clinical, educational, research and preventive areas. This included publication of more than 150 papers in the last 15 years. This presentation will be given by Professor Fikri Abu-Zidan who has led this group during the period of 2001-2013 highlighting the factors that contributed to this success and future barriers that have to be avoided. Lessons learned will be helpful for those who are willing to perform trauma research of high standard in other developing countries.

Risk Factors for Type 2 Diabetes in Native Emirati Adolescents

Syed Mahboob Shah, Fatima Al Maskari, Ayesha Al Dhaheri, and Juma Al Kaabi
College of Medicine and Health Sciences, UAEU

Background: United Arab Emirates (UAE) reports one of the highest worldwide prevalence of type 2 Diabetes among adults. We estimated the prevalence of type 2 diabetes and its correlates among adolescents in Al Ain, UAE. Methods: For this cross-sectional study, amongst a random sample of 1,220 adolescents from 8 schools (sampling frame, 114 schools with children 12 to 18 years old), the fasting plasma glucose (FPG), lipids, BMI, waist circumference, and blood pressure were measured. PDM and DM were diagnosed by FPG (100-125 mg/dl) and (≥126 mg/dl), respectively. Results: The mean age was 15.2 ± 1.8 years; 613 (50.2%) were female. The prevalence of DM and PDM was 8.20 (95% CI, 3.91-14.02) and 82.79 (95% CI, 67.98-98.9) per 1000 adolescents, respectively. Compared to females the prevalence of PDM and DM (combined) was higher in males 125.21 (95% CI, 67.98) vs. 57.28 (95% CI, 40.26-77.08). In a multivariate model, participants reporting moderate level of metabolic equivalent physical activity(MET) were less likely to have PDM and DM (adjusted odds ratio (aOR)=0.49, 95% CI, 0.27-0.91) compared to their counterparts with mild level of MET. Abdominal obesity (aOR=2.47, 95% CI 1.41-4.34) and male gender (aOR=1.93, 95% CI, 1.19-3.14) were also significantly associated with PDM and DM, while a positive family history of diabetes was not (aOR=1.02, 95% CI, 0.65-1.60). Conclusion: Type 2 diabetes is significant public health problem among study adolescents. Screening for diabetes and pre-diabetes among adolescents and early education about lifestyle changes may help to mitigate the diabetes epidemic in the UAE.

Falls from windows in children: assessment of newspaper reporting of incidents and risk factors in the United Arab Emirates

Hanan Mansour Al-Marzouqi[1], Maryam Radwan Al-Ali[1], Nada Nasser Al-Saadi[2], and Michal Grivna[1]
[1] *Institute of Public Health;* [2] *Department of Psychiatry, College of Medicine & Health Sciences, UAEU*

Background: Unintentional falls are a major cause of morbidity and mortality with a significant burden on victims, families, and societies. They are the second leading cause of injury-related hospitalization for all ages, accounting for about 30% of injury admissions and they present 10-15% of all Emergency Department visits. Details on child falls from heights (windows, balconies etc.) are not easy accessible. In the latest incident in February 2015, a seven-year-old boy fell from an eighth-floor balcony while trying to feed birds in Sharjah. Last year, four children were killed or seriously injured in similar incidents across the emirates. Our aim was to assess the incidence, activities and risk factors for falls from windows/balconies in children in the UAE using newspapers. Methods: We conducted a retrospective survey electronically searching national newspapers in the UAE for child fall incidents 2005-2015. A structured data abstraction form was prepared by identifying information fields essential for fall prevention, including demography, activity and risk factors. The attempt was made to contact newspapers directly to access their clipping files. Data were entered to Excel and analysed using Excel and SPSS. Results: We recorded 52 fall incidents during study period. 68% were boys, 11.9% were UAE-nationals, and mean age was 4.6 years (Range: 0.1-15years). 21 children felt from windows and 13 from balconies. Information on activity was available only in 19 reports, from these 7 children were climbing the furniture, 3 were playing, 2 were sleeping, 7 were doing other activity. Information on supervision was provided in 22 cases (10 were supervised by mother/father/family member, 1 by maid and 11 children were not supervised). 42 children died and 10 children were hospitalized and survived the fall incident. Conclusion: The newspapers proved to be helpful source for child falls from heights, since Ministry mortality reports are lacking details on personal and environmental risk factors. Information from study is useful for prevention in the UAE, it is necessary to improve window safety by installing window guards and raising awareness.

Patient satisfaction and waiting time at hospitals in the UAE

Haleema Al Hammadi and Youssef Boulaksil
College of Business and Economics, UAEU

Healthcare systems are developed to fulfil patient's medical needs. Due to tough competition, pressure is increasing on the healthcare providers to deliver quality, efficient, and effective services at minimum cost. One of the key quality characteristics of healthcare systems is the timeliness, which refers to the waiting times in hospitals and the amount of time spent to serve a patient. From the literature, we know that timeliness in health care systems is strongly correlated with patient satisfaction. This study focuses on the waiting times of patients in the UAE, which is generally perceived as being very long. Based on a questionnaire that has been filled by 536 randomly selected patients in the UAE, we obtain insights into the waiting times, service times, and patient satisfaction in the UAE. The questionnaire has been carefully crafted based on a research framework that we developed. The results reveal interesting insights for hospital managers and health care policy makers in the UAE.

Impact of the "Skills for Change" Program on Nutrition Knowledge and Physical Activity levels of Adults with Type 2 Diabetes

Habiba I. Ali[1], Carine Platat[1], Latifa M. Al Ketbi[1], Hanan A. El Baki[2], and Wissam Ibrahim[1]
[1] *Nutrition and Health Department, College of Food and Agriculture, UAEU;* [2] *Ambulatory Healthcare Services, SEHA*

Despite the high prevalence of diabetes in the UAE, limited research has been conducted on the impact of diabetes self-management education on nutrition knowledge and physical activity. The "Skills for Change" program, a randomized intervention trial was conducted in 7 community-based health centers to address this gap. Methods: Participants were Emirati adults with type 2 diabetes. The intervention lasted for 12 months and consisted of individual diet and physical activity counseling. Group nutrition education and 6 weekly supervised physical activity sessions were offered. Pre-and post-intervention nutrition knowledge was assessed using a previously tested questionnaire. The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity. Means (SD), paired t-tests and mixed linear models were performed (intervention, n=115 and control, n=118.). Results: The mean age (SD) of the participants was 53.69 (9.4). Eighty-four percent of the participants were managed with oral hypoglycemic agents. Compared to baseline, knowledge of food sources of carbohydrate and dietary fiber has significantly increased ($P<0.0001$) among intervention participants but did not change in control participants. Sitting time during a week-day and week-end day significantly decreased ($P<0.01$ and $P<0.001$, respectively) in intervention participants whereas sitting time on a week-end day significantly increased among control participants ($P<0.01$). The differences across groups of these parameters throughout the project were statistically significant ($p<0.001$). Conclusions: Participation in the "Skills for Change" program was effective in improving nutrition knowledge and decreasing sedentarity among patients with type 2 diabetes.

Prevalence of the Metabolic Syndrome and Its Component Factors among Female Students at United Arab Emirates University

Maysm Nezar Mohamad[1], Ayesha S. Al Dhaheri[1], and Syed M. Shah[2]
[1] *College of food and Agriculture;* [2] *College of Medicine and Health Science, UAEU*

Scientific evidence has confirmed the continuous increase in the prevalence of the metabolic syndrome in the young population. This study investigates the prevalence of metabolic syndrome (MetS) and its components among young female adults (17-25 years old) in the United Arab Emirates University. Design: Cross-sectional study of 555 Emirati female college students during the academic year 2013/ 2014 at United Arab Emirates University (UAEU) in Al-Ain, United Arab Emirates. Methods: Anthropometric measurements, including height, weight, body mass index (BMI) and waist circumference (WC) were measured. Biochemical measures including total cholesterol (TC), triglyceride (TG), low density lipoprotein-cholesterol (LDL-C), high density lipoprotein-cholesterol (HDL-C), and fasting blood glucose (FBG) concentrations were determined from fasting venous blood samples. Clinical and dietary data were also collected. Results: The total prevalence of metabolic syndrome using the harmonized IDF/AHA/NHLBI criteria was 6.8 %. One MetS component was found in 38.4% of participants, and two MetS components were found in 11% of participants. The most frequent component of MetS was reduced HDL-C levels, followed by central obesity, carbohydrate metabolism disorder, hypertension, and hypertriglyceridemia. The prevalence increased from 4.1% among participants aged 17 through 19 years to 11.3% for participants aged 23 through 25 years (P=0.044). Conclusion: The prevalence of MetS among Emirati female students is highly prevalent. Its occurrence was directly proportional to the increase in body mass index (BMI).This highlights the importance of regular screening and urgent intervention programs for college students, targeting weight reduction and an increase in physical activity.

Accurate analysis of vitamin D in humans

Iltaf Shah
Department of Chemistry, College of Science, UAEU

Vitamin D deficiency is association with many diseases. Recent immunoassay techniques cannot distinguish between the different Vitamin D forms, with different suggested biological activities. LCMS methods are preferred but still under-or over estimation occurs, due to co-eluting epimers and isobars and thus falsifies the actual measurement and interpretation of Vitamin D status. Due to this difficulty very little is known about the full biological role of the downstream metabolites of vitamin D. To further facilitate research on vitamin D metabolism in humans, it was of utmost importance to develop a novel LC-MS method to account for ten known forms of vitamin D. The assay uses LCMS dynamic multiple reaction-monitoring (Dyn-MRM) technology to facilitate rapid analysis of 10 analogues of vitamin D with limits of detection and calibration ranges (ng/mL) as follows: Vitamin D2 [0.019, 0.2-39.7], Vitamin D3 [0.019, 0.2- 38.5], 3-epi-25OHD2 [0.02, 0.04-40.2], 3-epi-25OHD3 [0.021, 0.04-41.3], 24R,25(OH)2D3 [0.021, 0.04-41.7], 25OHD2 [0.010, 0.2-41.3], 25OHD3 [0.010, 0.2-40.2], 1,α25(OH)2D2 [0.004, 0.006-0.416], 1α25(OH)2D3 [0.020, 0.04-40.2] and 23R,25(OH)2D3 [0.004, 0.006-0.42]. The LCMS results are obtained in less than 7 minutes. Twenty healthy sera samples were evaluated against vitamin D external quality assessment scheme (DEQAS) and Chromsystem for accuracy and precision. Results matched those of the DEQAS samples for key vitamin D analytes, whilst providing quantitative data for the additional vitamin D forms. In conclusion, this assay is the first to quantify ten forms of vitamin D simultaneously in human sera and excludes misleading measures owing to epimers and isobars. The significant improvement in run time, coupled with a single extraction protocol, makes this assay instrumental in research and clinical practice where specific and accurate measurement of the different forms is required.

Population Model for Thalassemia with Premarital Screening and Education Factor

Sehjeong Kim and Abdessamad Tridane
Department of Mathematical Sciences, College of Science, UAEU

Thalassemia is a genetic blood disease. One in twelve people in the UAE is a thalassemia gene carrier. Due to the deformation in hemoglobin genes, this causes irregular shapes of red blood cells, which results in reduced oxygen transport to organs. This is a high-fatality disease and very costly to treat. Hence, we will address important issues on thalassemia prevention in the view of public health in the UAE including population screening strategies and public education in terms of mathematical modeling at the population level.

Myocardial Ischemia/Reperfusion Injury: Role of Galectin-3

Suhail Najm Abdullah Al-Salam[1] and Satwat Hashmi[2]

[1] Department of Pathology, College of Medicine and Health Sciences, UAEU; [2] Department of Biological and Biomedical Sciences, Agha Khan University, Pakistan

Myocardial reperfusion has the potential to recover the ischemic myocardium after a period of coronary occlusion. Reperfusion, however, can cause a wide spectrum of deleterious effects. Galectin-3 (GAL-3), a beta galactoside binding lectin, is closely associated with myocardial fibrosis and heart failure. We investigated its role in ischemia-reperfusion injuries (IR). C57B6/J wild type (WT) mice and GAL-3 knockout (KO) mice were used for murine model of Ischemia-reperfusion in the heart where a period of 30 min ischemia was followed by 24 hours of reperfusion. There was a significant increase in GAL-3 levels in the left ventricle after IR injury which signifies an important role for GAL-3 in IR in the heart. Troponin I levels were found to be significantly higher in GAL-3 KO group than the GAL-3 WT group depicting that GAL-3 is regulating troponin I levels in the IR model. Antioxidant enzymes Superoxide dismutase, Glutathione and catalase were found to be significantly raised in the GAL-3 WT IR group as compared to the GAL-3 KO IR group. We also noticed a more anti-apoptotic bcl-2 and less pro-apoptotic cleaved caspase-3 and cytochrome c protein expression in GAL-3 WT IR group than in GAL-3 KO IR group. Our study shows that GAL-3 is associated with an increase in the anti-oxidant activity in the IR injured myocardium. We can conclude that GAL-3 can interfere with redox pathways controlling cell survival and death and plays a protective a role in the pathogenesis of ischemia reperfusion injury in the heart.

Long Term Visual and Refractive Outcomes Following Surface Ablation Techniques in a Large population for Myopia Correction

Tahra AlMahmoud[1], Sadhana V. Kulkarni[2], David Priest[2], Sabrina E. J. Taylor[2], George Mintsioulis[3], and W. Bruce Jackson[3]

[1] Department of Surgery, College of Medicine and Health Sciences, UAEU; [2] Ottawa Hospital Research Institute, University of Ottawa, Eye Institute, Ottawa, Canada; [3] University of Ottawa, Department of Ophthalmology, Ottawa, Canada

Purpose: To evaluate the visual and refractive outcome for four wavefront-guided surface ablation (WGSA) techniques (LASEK, LASEK flap-off [LASEK FO], Epi-LASIK, and Epi-LASIK flap-off [Epi-LASIK FO]) in a large myopic population. Methods: This retrospective review included 1000 myopic eyes (SE –1.0 to 8.0D) treated with WGSA (VISX STAR S4 with IR) using four different epithelial management techniques. Flaps were either retained (163 Epi-LASIK, 361 LASEK) or discarded (277 Epi-LASIK FO, 199 LASEK FO). Eyes in each group were stratified to either low, mild, moderate or high myopia based on preoperative SE. UDVA, CDVA, MRSE, predictability, lines lost, and haze were compared at 3, 6 and 12 months. Results: At 1 year, UDVA and CDVA of ≥ 20/20 and 20/15 were comparable across the four procedure groups and within each subgroup of myopia. Predictability was ≤ ± 0.5 D of intended correction in 96% to 99% of eyes. LASEK FO and Epi-LASIK FO outperformed the EPI-LASIK in achieved MRSE especially for high myopia category (-0.012, 0.040, and -0.27 D respectively, P1 line of CDVA; and 50% to 60% of eyes in each group gained ≥1 line. No significant haze was recorded in any group. There was no statistically significant difference between groups in the preoperative MRSE and efficacy indices except for LASEK FO. Conclusions: At 1 year, there was no statistically significant difference in visual outcomes between techniques for any degree of myopia. However, the achieved MRSE for LASEK FO and Epi-LASIK FO were closer to emmetropia.

Inhibition of mTOR Increases the Severity of Lung Inflammation in Mice Infected with Influenza A Virus

Ahmed Deemas Alsuwaidi[1], Saeeda Almarzooqi[2], Steven M. Varga[3], and Abdul-Kader Souid[4]
[1] *Department of Pediatrics*; [2] *Department of Pathology, College of Medicine and Health Sciences, UAEU;* [3] *Department of Microbiology, University of Iowa, USA;* [4] *Department of Pediatrics, College of Medicine and Health Sciences, UAEU*

Background: Inhibitors of the serine/threonine kinase mechanistic target of rapamycin (mTOR) have been shown to induce inflammatory lung disease in mice. Here we examined the impact of sirolimus (rapamycin) treatment on the lung pathology associated with acute influenza A virus (IAV) infection. Methods: BALB/c mice were inoculated intranasally with 10 µL IAV [A/PR/8/34 (H1N1)] of 108.1 TCID50. The mice were also injected intraperitoneally with either sirolimus (2.5 mcg/g) or DMSO (about 5 µL), given daily beginning on the day of inoculation. The mice were sacrificed on days 2 and 4 post-inoculation. Mouse weight, lung and thymus histology, lung cytosolic cytochrome c expression (using rabbit anti-cytochrome c antibody), intracellular caspase activity (using the caspase-3 substrate Ac-DEVD), cellular GSH (using monobromobimane labeling), and lung viral copies were measured to assess the impact of sirolimus on the course of IAV infection. Results: Mice treated with sirolimus alone exhibited poor body weight gain associated with adverse events in the lung (pulmonary inflammation) and thymus (decreased gland weight, decreased caspase activity, and increased glutathione). In addition, mice treated with sirolimus exhibited significantly increased weight loss following IAV infection. Histopathology following IAV infection revealed increased pulmonary inflammation in mice administered sirolimus as compared to controls. Cellular glutathione was also increased in mice administered sirolimus as compared to controls. Despite the increased disease, sirolimus administration had no impact on viral replication. In contrast, cytosolic cytochrome c staining in inflammatory cells was less prominent in IAV-infected mice that were administered sirolimus as compared to mice received either IAV or sirolimus alone. Similarly, intracellular caspase activity was reduced in IAV-infected mice treated with sirolimus as compared to controls. Conclusion: Thus, mTOR plays a critical role in modulating pulmonary inflammation and inflammatory cell apoptosis, both of which influence the relative severity of IAV infection.

The mTOR Inhibitor Sirolimus Suppresses Thymocyte Respiration

Suleiman Al-Hammadi, Alia Albawardi, Saeeda Almarzooqi, and Abdul-Kader Souid
College of Medicine and Health Sciences, UAEU

Inhibition of mTOR (mechanistic target of rapamycin) by sirolimus (rapamycin) has been shown to suppress Jurkat cellular respiration (mitochondrial O2 consumption). The bearing of this apparent impairment of cellular bioenergetics on the immunosuppressive activity of the drug, however, has yet to be fully illustrated. This study investigated in vitro effects of mTOR inhibitors and other molecularly-targeted therapies on O2 consumption in thymic fragments from C57BL/6 mice. The rate of thymocyte respiration (μM O2.min-1.mg-1) was significantly reduced in the presence of 10 μM sirolimus or everolimus ($p \leq 0.007$). In contrast, the dual PI3K (phosphatidylinositol-3-kinase)/ mTOR inhibitors BEZ235, GDC0980 and GSK2126458, the highly selective PI3K p110-δ inhibitor idelalisib, and the calcineurin inhibitor tacrolimus had minimum or no effects on thymocyte respiration ($p \geq 0.045$). Sirolimus was then administered intraperitoneally (2.5 μg/g) on Days 0 to 3 and the thymus was examined on Days 4 and 14. Significant thymic involution (reduction in the size of the gland with depletion of cortical lymphocytes) and increased cytochrome c positive cells (about 20%) were observed on Day 4; these changes were resolved on Day 14 (10 days post-cessation of sirolimus treatment). On Day 4, the residual thymic tissue (mostly thymic medulla) had normal rate of cellular respiration ($p=0.937$), decreased caspase activity, and increased cellular glutathione ($p=0.019$). Intraperitoneal administration of the multikinase inhibitors sorafenib and regorafenib had no effects on thymic size ($p=0.667$). Thus, the highly selective mTOR inhibitors impose specific effects on the thymus, manifested by suppression of cortical lymphocyte respiration and induction of cortical lymphocyte apoptosis.

Chronic pulmonary effects of nose-only water-pipe smoke (Shisha) exposure in mice

Abderrahim Nemmar[1], Suhail Al-Salam[2], Priya Yuvaraju[1], Sumaya Beegam[1], Javed Yasin[3], and Badreldin H Ali[4]

[1] Department of Physiology; [2] Department of Pathology; [3] Department of Internal Medicine, College of Medicine and Health Sciences; UAEU; [4] Badreldin H Ali, Department of Pharmacology, College of Medicine & Health Sciences, Sultan Qaboos University

Water-pipe smoking (WPS) is a method of tobacco smoking commonly practiced in the Middle East, and is now popular among the youth in the West. However, the mechanisms underlying the chronic pulmonary effects of WPS exposure remain unknown. Here, we evaluated the respiratory effects and their possible mechanism of nose-only exposure to mainstream WPS in mice. The duration of the session was 30 min/day and 5 days/week for 6 consecutive months. Control mice were exposed using the same protocol to air only. WPS induced an increase of airway resistance in vivo. The analysis of bronchoalveolar lavage fluid (BALF) showed an increase in neutrophil and lymphocyte numbers, as well as in lactate dehydrogenase, myeloperoxidase and matrix metallopeptidase 9 activities, and in some proinflammatory cytokines including tumour necrosis factor α, interleukin-6 and interleukin 1β. Histological analysis of lungs revealed the presence of foci of mixed inflammatory cells infiltration in the interalveolar interstitium which consisted of neutrophils, lymphocytes and macrophages. Notably, the mean diameter of alveolar spaces and ducts were increased in WPS-exposed mice compared to air only. In lung tissue, lipid peroxidation, reactive oxygen species, superoxide dismutase activity and reduced glutathione were all increased by WPS exposure. Along with oxidative stress, WPS exposure caused an increase in lung DNA damage index. We conclude that chronic nose-only WPS exposure impaired pulmonary function and induced enlargement of alveolar spaces and ducts, inflammation, oxidative stress and DNA damage. Our findings provide novel mechanistic elucidation for the long-term effects of WPS on the respiratory system.

Autoimmune Diabetes: Roles of Interferon-gamma and interleukin -17

Eric PK Mensah -Brown[1], Mariam Al Shamsi[2], and Allen Shahin[2]
[1] *Department of Anatomy;* [2] *Department of Microbiology and Immunology, College of Medicine and Health Sciences, UAEU*

Elements of the innate immune system, in particular proinflammatory cytokines and other mediators of inflammation, act both in priming and promoting aggressive adaptive immune response to self antigens leading to type 1 diabetes. The interplay between the cytokines, interleukin 17 (IL-17) and interferon gamma (IFN-γ) in promoting or inhibiting autoimmunity still remains unresolved. While the role of IFN-γ remains controversial, studies also indicate that IL-17 might not always promote inflammation. Significantly, these cytokines have been reported to be both antagonistic and synergistic in action by different groups of researchers. We previously showed that both IL-23 and the Toll-like receptor agonist, Bacterial lipoproteins such as S-(2, 3-bis (palmitoyloxy)-2(2-RS)-propyl)-N-palmitoyl-®-Cys-(s)-Ser-(S)-Lys(4)-OH trihydrochloride (Pam3CSK4) enhance diabetogenesis with significant expression of both cytokines. We examine here, the roles of IL-17 and IFN-γ in experimentally-induced diabetes using the multiple low doses of streptozotocin (MLD-STZ) model of disease induction in IL-17 and IFN-γ deficient mice (KO) on C57Bl/6 background (WT). Both KO and WT mice developed delayed and sustained hyperglycemia, profuse mononuclear infiltration and reduced number of insulin containing islet cells accompanied by expression of several proinflammatory cytokines in pancreatic lymph nodes after 5 doses of STZ although IL-17 KO mice showed evidence of disease 7 – 10 days earlier. We also demonstrate here that unlike in the WT, while no enhancement of disease occurred in both IFN-γ and IL-17 KO mice after subdiabetogenic doses of STZ followed by IL-23, administration of Pam3CSK4 after subdiabetogenic doses of STZ led to the development of diabetes with lower levels of glycemia in IL-17 KO mice. In addition to disease causing cytokines, diabetogenesis was accompanied by enhanced influx of antigen presenting cells and suppression of regulatory T cells. We conclude therefore that while IFN-γ might be necessary for the establishment of disease in both IL-23 and TLR 2 agonist enhanced disease, IL-17 might be necessary for the induction of a more severe disease.

The role of B cells and their preclinical infiltration to the CNS in spontaneous relapsing-remitting experimental autoimmune encephalomyelitis (RR-EAE) mice

Zakeya Nasser Al Rasbi
College of Medicine and Health Sciences, UAEU

Multiple sclerosis (MS) is the most common autoimmune disorder affecting the central nervous system (CNS). There are between 2 and 2.5 million people are affected with MS globally, with four patterns of MS progression patterns have been described. The most common disease pattern is relapsing-remitting (RR) subtype of MS, therefore; experimental mouse model with similar to the most common MS progression pattern was used in this study. Relapsing remitting (RR) experimental autoimmune encephalomyelitis (EAE) mouse is EAE spontaneous animal model where all T cells are transgenic and specific for MOG 92-106 peptide. IgG oligoclonal bands (OCBs) in human cerebrospinal fluid (CSF) produced by B cells are hallmark for multiple sclerosis (MS). The characteristic of those B cells are not well characterized. Endogenously recruited myelin oligodendrocyte glycoprotein (MOG)-binding B cells that can produce anti-MOG antibodies have been observed in RR-EAE mice. Thus, the aim of this study was to characterize MOG-binding B cells and preclinical events in RR mice. Recombinant fluorescent MOG tetramers were utilized to find MOG-binding B cells which occurred at low frequency in RR mice. MOG-binding B cells were distributed throughout the immune compartments, with a tendency to accumulate in the cervical lymph nodes, which drain the central nervous system (CNS). MOG-binding B cells were mature; isotype switched and preferentially resided within the germinal center (GC). Analysis of affinity purified serum anti- MOG antibodies suggested a heterogeneous population of endogenous MOG-specific B cells in RR mice. Anti-MOG antibodies were found in the serum of encephalitic, and also of healthy RR mice. There is a strong correlation between the number of CNS infiltrating T and B cells and serum titer of anti-MOG antibodies in RR mice.

Serologic Immunity to Childhood Vaccine-Preventable Diseases in the United Arab Emirates

Lolowa A. Al Mekaini[1], Salwa M. Kamal[2], Omer Al Jabri[2], Maher Soliman[2], Huda Alshamsi[2], Majeda S. Alshamisi[2], Shafeqa O. Ahmed[2], Hassib Narchi[1], Abdul-Kader Souid[1], and Ahmed Deemas Alsuwaidi[1]
[1] *Department of Pediatrics, CMHS, UAEU;* [2] *Ambulatory Healthcare Services, Abu Dhabi*

Background: United Arab Emirates has adopted the WHO Expanded Program on Immunization, with current childhood coverage of ≥98%. The appropriateness of our childhood immunization, however, needs to be appraised in studies investigating immunities against the pathogens. This study aimed at: (1) assessing serologic immunity to our childhood National Immunization Program; and (2) using post-vaccine serology to evaluate humoral immunity. Methods: Serologic testing for nine vaccine-preventable infections was performed between July, 2014 and September, 2015 in 296 healthy children attending the Well-Child-Care Program of Ambulatory Health Services (Al Ain, Abu Dhabi). Children age (mean ± SD) was 56 ± 26 months (median 50; range 23-150). The participants had up-to-date immunization status by history. Results: Prevalence of the seronegativity varied markedly among studied vaccines, ranging from 0% (Haemophilus influenzae type B) to 58.8% (pertussis). Other vaccines with high seronegativity prevalence were varicella (29.8%) and mumps (18.4%). The rate of seronegativity for rubella was 0.7%, measles 2.0%, diphtheria 3.9%, tetanus 4.0%, and poliovirus 4.1%. Seventy-six (26%) children had no seronegativity to the nine vaccines, 130 (44%) had seronegativity to only one vaccine; 60 (20%) had seronegativity to two vaccines, and 25 (8%) had seronegativity to three vaccines, and five (2%) had seronegativity to 4-5 vaccines. Thus, immune competent children are expected to have serologic immunity to at least five of the nine tested vaccines, especially the Haemophilus influenzae type B and poliovirus vaccines. Conclusion: A large number of the immunized children are susceptible to common communicable infections, especially pertussis, varicella, and mumps. Studies are needed to explore whether this problem can be ameliorated by modifying our National Immunization Program. Immune surveillance is necessary to investigate waning immunity and proper recommend booster dosing.

Long range interactions (LRIs) between U5 and Gag sequences maintaining flexibility in embedded energy of the base paired nucleotides are required for Mason-Pfizer monkey virus (MPMV) genomic RNA packaging

Rawan M. Kalloush, Lizna M. Ali, Farah Mustafa, and Tahir A. Rizvi
College of Medicine and Health Sciences, UAEU

Selective and specific genomic RNA (gRNA) packaging into the budding virion is an essential step in retroviral life cycle. The specificity of gRNA packaging is conferred by recognition of specific cis-acting sequences, the packaging signal (Ψ), present at the 5'end of the retroviral genome, which interacts with the nucleocapsid protein. We have recently shown that sequences encompassing the MPMV Ψ are spread between R and the first 120 nt of Gag, consisting of several structural motifs. Further investigation of these motifs by SHAPE (selective 2 hydroxyl acylation analyzed by primer extension) methodology has validated this higher order structure of the MPMV packaging signal RNA. A distinguishing feature of SHAPE-validated MPMV packaging signal structure are two LRIs (LRI-I and LRI-II) involving complementary sequences from U5 and first 70 nt within Gag, which have been shown to be phylogenetically conserved and important for MPMV gRNA packaging. Therefore, we tested whether these two LRIs could potentially play a role in MPMV gRNA packaging by maintaining the overall RNA structure and whether this involvement was at the primary sequence or secondary structural level, or both. Towards this end, a series of deletions/substitutions mutations were introduced into the U5 and Gag sequences that either disrupted the complementarity systematically or restored it artificially using non-viral sequences. These mutants were tested in a biologically relevant in vivo packaging and transduction assay for their effect on RNA packaging and propagation. Test of these mutants revealed that disrupting the base-pairing of the LRIs structural motifs affected both gRNA packaging and propagation, suggesting that the LRI structural motifs are essential for MPMV packaging and propagation. The mutational analysis further suggests that it is the primary sequence in its native structural context that is important for efficient gRNA packaging since recreation of the artificial LRIs failed to restore packaging or propagation to wild-type levels. These results biologically validate the existence of LRIs between U5 and Gag in MPMV and establish the role of these complementary sequences in crucial steps of viral life cycle, providing a better understanding of the molecular interactions that take place during MPMV gRNA packaging.

Optimization of DNA extraction from archival formalin-fixed human brain tissues for the detection of Epstein-Barr virus by PCR

Asma Hassani, and Gulfaraz Khan
Department of Microbiology and Immunology, College of Medicine and Health Sciences, UAEU

Background: Brain tissues are potentially a useful source of material for studying neurological disorders such as multiple sclerosis (MS). However, most autopsy tissues are fixed and preserved in formalin, which jeopardises the quality of DNA that can be extracted and used for downstream analyses. Unfortunately, a limited number of protocols, which can be effectively used in extracting DNA from such tissues are available. Here we aimed to optimise DNA extraction from archival formalin fixed brain tissues for subsequent analysis of the role of Epstein-Barr virus (EBV) in the pathogenesis of MS. Methods: Brain tissues from 32 cases fixed in formalin for 2-22 years were used to extract DNA using standard phenol-chloroform method. We optimised for digestion buffer content, proteinase K concentration, the length of tissue digestion and selecting suitable fragment size for PCR amplification. Results: DNA extracted from archival formalin-fixed tissues suffered from poor quantity, quality and PCR inhibition. PCR inhibition was overcome by increased washing of the tissue in PBS, digesting with a buffer that contained 0.5 mg/ml proteinase K and 0.1% SDS, precipitating the DNA using low NaCl concentration, and amplifying fragments between 100-200 bp. This optimised protocol was used for extraction of DNA from meninges of 26 MS and 6 non-MS (control) cases to investigate the potential role of EBV in the pathogenesis of MS. Meninges from all 32 cases tested positive for the house-keeping gene β-globin (104 bp), whereas only 9/26 MS and 0/6 control cases gave positive signal for EBV (152 bp). Conclusion: Although most of the DNA extracted from archival long-term formalin-fixed tissues is of limited use in molecular studies, optimising the various steps in the extraction process can yield DNA of sufficient quality and quantity. The optimized protocol described here is simple, reproducible, cost effective, and easily adaptable. The finding of EBV DNA in archival formalin-fixed meninges of MS cases, advocates further research to investigate the role of this virus in the pathogenesis of MS.

Nano-vesicles secreted by Epstein-Barr virus-immortalized cells carry viral small RNAs (EBERs)

Gulfaraz Khan[1], Waqar Ahmed[1], Pretty S. Philip[1], and Saeed Tariq[2]
[1] *Department of Microbiology and Immunology*; [2]*Department Anatomy, College of Medicine and Health Sciences, UAEU*

Background: Epstein-Barr virus (EBV) is an oncogenic herpesvirus associated with several human malignancies. Although the mechanism of oncogenesis is unclear, a number of viral products, including EBV latent proteins and non-protein coding RNAs have been implicated. An accumulating body of evidence indicates that some viruses, including EBV, are able to transport selected products to neighboring cells and induce biological change by exploiting the exosome secretory pathway. Exosomes are nano-vesicles secreted by most cell types. Here, we investigated if EBV-encoded small RNAs (EBER-1 and EBER-2), two highly abundant non-protein coding RNAs that have been implicated in oncogenesis, are excreted from infected cells via exosomes. Methods: To test if EBER-1 and EBER-2 were released in exosomes from EBV-infected cells, we purified exosomes from culture supernatants of three EBV positive cell lines (B95-8, EBV-LCL, BL30-B95-8), one EBER-1 transfected cell line (293T-pHEBo-E1) and two EBV-negative cell lines (BL30, 293T-pHEBo). The identity of purified exosomes was determined by electron microscopy and western blotting for the exosome markers CD63 and Flotillin. Purified exosomes were tested for the presence of EBERs using RT-PCR. To ensure that the positive signal was not due to free non-exosomal EBER contaminants, all exosomal fractions were treated with RNase A before RNA extraction and RT-PCR. Purified exosomes were also tested for the presence of the EBER-1 binding protein La, using western blotting. Results: Consistent with previous reports, both EBER-1 and EBER-2 could be detected in the culture supernatants of EBV infected, but not non-infected cells. Furthermore, both EBERs could also be detected in exosomes from EBV infected cells. RNase A treatment of exosomes prior to RNA extraction did not abolish the EBER-positivity, indicating that EBERs were present within the exosomes. Moreover, the EBER-1 binding protein La was also found to be present in exosomes. Conclusions: Our data indicates that EBERs are most probably released from EBV infected cells in the form of EBER-La complex in exosomes. Further studies are required to explore the mechanism by which EBER containing exosomes are taken up by adjacent non-infected cells and the biological impact they have on these cells.

Exosomes isolated from Epstein-Barr virus infected cells induce apoptosis in the recipient cells via the extrinsic pathway

Waqar Ahmed, Pretty S Philip, Samir Attoub, and Gulfaraz Khan
College of Medicine and Health Sciences, UAEU

Background: Epstein-Barr virus (EBV) is a lymphotropic gamma-herpesvirus implicated in the pathogenesis of a number of human malignancies of both epithelial and lymphoid origin. The mechanism by which EBV leads to cell transformation remains unknown. A number of studies have suggested that EBV infected cells release viral and cellular factors in the micro-environment via nano-vesicles called exosomes, derived from the cells endosomal membrane system. Exosomes have been shown to carry a wide range of molecules, including mRNA, miRNA, proteins and soluble factors which can induce various cellular changes in target cells, including tumor development, invasion, metastasis and even apoptosis. Recent studies have also shown that viruses can hijack the host cell's exosomal machinery to evade immune system aiding in their trans-infection. Methods: Differential ultra-centrifugation was used to isolate exosomes from both EBV positive and EBV negative cell lines. The identity of purified exosomes was determined by electron microscopy and western blotting for exosomal markers, flotillin and CD63. The quantification of exosomes was carried out using the Bradford assay. Fluorescent microscopy was performed to show the uptake of exosomes by the recipient cells. For functional assays, including cell proliferation and apoptosis, specific commercially available kits were used. Western blotting was carried out to identify viral and cellular components present in isolated exosomes. Results: Our data suggest that exosomes isolated from both type I and type III EBV latently infected cells, induced apoptosis in a time and dose dependant manner in recipient cells. We also observed that the fluorescently labeled exosomes were taken up by the recipient cells where they induced apoptosis via the extrinsic pathway. The blockage of caspase3/7/8 pathway resulted in the reduction of apoptosis. Furthermore our data indicated that the Fas ligand present in exosomes of EBV infected, but not uninfected cells was the key inducer of apoptosis. Conclusion: This study suggests that EBV can hijack the exosome pathway in infected cells to excrete viral and cellular components that may contribute to immune evasion and tumorigenesis.

NDM-7 carbapenemase producer Enterobacteriaceae isolated in the Arabian Pensinsula

Agnes Sonnevend[1], Akela Ghazawi[1], Dania Darwish[1], Laura Villa[2], Alessandra Carattoli[2], and Tibor Pal[1]
[1] *College of Medicine and Health Sciences, UAEU;* [2] *Instituto Superiore di Sanita, Rome, Italy*

New-Delhi-metallo-beta-lactamase 7 (NDM-7), a two-amino-acid-variant of the NDM-1, hydrolyse the carbapenem antibiotics with higher efficiency. It was first described in 2013 in Germany, from a patient of Yemeni origin. The aim of our study was to reveal the incidence of the NDM-7 producer Enterobacteriaceae in a collection of strains isolated in 2011-2013 in four countries of the Arabian Peninsula and to characterize the isolates producing the NDM-7 variant. NDM gene was detected by PCR in 169 of 340 carbapenem resistant Enterobacteriaceae isolated in Kuwait (n=49), Oman (n=63), Saudi Arabia (n=54) and in the United Arab Emirates (n=174). Sequencing confirmed the presence of the blaNDM-7 in four Escherichia coli isolates: ABC133, ABC218 from the UAE, OM26 from Oman and KW53T from Kuwait. Pulse-field gel electrophoresis and MLST confirmed that the NDM-7 producer E. coli isolates were non-clonal, they belonged to ST4108, ST167, ST4107 and ST448, respectively. They lacked the major known virulence genes of E. coli, although all four possessed the traT serum resistance gene. All four strains remained susceptible to colistin, tigecycline and fosfomycin, and they were variably susceptible to aminoglycosides and chloramphenicol. Although no clonality of the strains was observed, all carried the blaNDM-7 on plasmids of 45kb in size, which were self-transmissible from all, except ABC133. In order to compare all plasmids, from this latter isolate the NDM-7 plasmid was transformed into E. coli DH5α. None of the plasmids carried resistance genes other than the blaNDM-7, and they exhibited high similarity in restriction patterns with BamHI, EcoRI and HindIII endonucleases. Sequencing of the plasmids revealed that they all belonged to the IncX3 incompatibility type exhibiting minor variations in the genetic loading regions with plasmid backbones highly similar to each other and also to IncX3 plasmids carrying blaNDM-1 or blaNDM-5. The non-conjugative nature of pABC133-NDM-7 was due to the insertion of IS3 element into its conjugation machinery. Our findings confirm that the blaNDM-7 variant is present, albeit with low frequency, in the countries of the Arabian Peninsula. Furthermore, it also emphasizes earlier observations that the IncX3 incompatibility type plasmids are important vehicles of blaNDM carbapenemase genes.

Superimposed resistance mechanisms causing multi-drug resistance in the strains of the first pan-drug resistant Klebsiella pneumoniae outbreak in the UAE

Tibor Pál, Ágnes Sonnevend, and Akeal Ghazawi
Department of Medical Microbiology and Immunology, College of Medicine and Health Sciences, UAEU

Resistance to carbapenems among Enterobacteriaceae is often associated with resistance to other antibiotics forcing the application of such "last resort" drugs as polymyxins (e.g. colistin) exhibiting considerable toxicity. Once susceptibility to these drug is lost the organism is often scores as "pan-resistant". Resistance to colistin is usually results from the alteration of the PhoPQ and PMrAB two-component regulatory systems leading to the addition of the cationic 4-amino-4-deoxy-L-arabinose to the lipid A moiety of the bacterial outer membrane modifying it to prevent binding of polymyxins. MgrB is a small regulatory transmembrane protein that negatively regulates the above system. Mutations, deletions or insertions in the mgrB gene is a common cause of colistin resistance. In May 2013 a female patient was transferred from Um Al Quwain, via an unspecified Dubai hospital, to one in Abu Dhabi. Multiple samples from the same patient, one from another patient in the same hospital, and further two from UAQ were received for detailed molecular investigations. All strains exhibited high level of clonal relatedness as revealed by macrorestriction analysis, plasmid profiling and multilocus sequence typing and all exhibited resistance to all antibiotics tested, including colistin. The strains were carrying two carbapenemase genes, blaNDM-5 and blaOXA-181. PCR targeting the mgrB yielded a much larger amplicon than expected. Sequencing the amplicon revealed that the the mgrB gene was interrupted by the insertion of a transposon containing the entire blaOXA-181 gene. PCR-cloning the insert together, with the flanking pieces of the mgrB gene resulted in resistance to ertapenem in a suitable recipient. Our data, within the context of the molecular epidemiological analysis of the first pan-resistant K. pneumoniae outbreak, describes a new and alarming variant of mgrB-based colistin resistance, i.e. the insertion of a functional carbapenemase genes renders the mgrB non-functional. In this way a single genetic event, i.e. the incorporation of the carbapenemase gene into the mgrB could lead to resistance to two completely distinct classes of antibiotics, causing the loss of the two most commonly used "last resort" antibiotic treatment options.

Mathematical modeling of the imported Communicable diseases in the United Arab Emirates

Abdessamad Tridane[1], Abdulmajeed Al Khajeh[2], and Mohamed Ali Hajji[1]
[1] *Department of Mathematical Sciences;* [2] *Department of Biology, College of Science, UAEU*

The aim of this work is to study, via mathematical models, the impact of imported communicable diseases on the population of the United Arab Emirates (UAE). The nature of the health policies in the UAE imposes on us to consider models that categorize the living population in the UAE based on epidemic and immigration status. For example, there are no health requirements for the local population, the permanent residents, to sustain their residency status in the country. However, the non-locals are required to have certain health conditions to maintain their residency status in the country. By the same token, some migrants come from epidemic regions, while others come from non- epidemic regions. Our goal is to show the feasible outcomes of a possible imported disease, such as TB or Malaria, on the UAE population as well as a control strategy to maintain a lower epidemic size in the UAE.

A Novel System for Sensing and Monitoring the Temperature of Vaccines

Waseem Arshad, Rashad Ramzan, Azam Beg, Nabil Bastaki
College of Engineering, UAEU

Use of vaccines to control and prevent the diseases is a vital part of modern human life. But storage and transportation can render a significant percentage of the vaccines ineffective – the result is the huge losses in terms of human health and money.This invention Intelligent Vaccine Temperature Sensing and Monitoring System (iVTS2) aims to develop a novel semiconductor (CMOS) based miniature sensor system that not only maintains a complete and accurate temperature log but also eliminates the human errors. Additionally, the life-cycle cost of the sensor would be lower than to the currently used chemical tags.The traditional RFID technology cannot be used for the stated purpose because the electromagnetic (EM) waves are absorbed by the liquids.

Microalgae Lipid Content and Cell Quantification Using Electrical Parameters

Leena Osama Saqer, and Mahmoud Al Ahmad
Electrical Engineering Department, College of Engineering, UAEU

Microalgae are considered as the most promising renewable feedstock for biodiesel production. For an economical production, it is essential to have high level of lipids productivity. This requires high biomass growth rate coupled with high lipids content. However, this is difficult to achieve simultaneously as conditions favoring high biomass productivity usually results in low lipid accumulation, and vice versa. Various methods have been proposed to monitor and determine microalgae lipid content accumulation, but they are indirect, time consuming, require sample preparations, and costly treatment steps. A new quick and rapid electrical based technique is proposed to quantify cells constituents utilizing the characterization of lipids, and taking into consideration the cells concentration, which allows continuous determination of the lipid content in any microalgae cell suspended in a cultivation medium. The proposed method is based on finding the cell effective dielectric constant which is directly related to the cell composition and can be used as figure of merit to be correlated with the lipid content. The cell capacitance was estimated by measuring the suspension capacitance and de-embedding the medium contribution to it. A capacitor is used to host the microalgae suspension and is probed to the electrical analyzer tool, which records desired electrical measurements that will be used for processing to reflect the lipid content and cell concentration levels in microalgae. This technique can also be employed to quantify the carbohydrate and protein contents of cells.

The Molecular and Cellular Basis of Monogenic Disorders in UAE

Bassam R. Ali, Praseetha Kizhakkedath, Nadia A. Akawi, Reham M. Milhem, Salma Ben-Salem, Anne John, Makanko Komara, and Lihadh Al-Gazali
College of Medicine and Health Sciences, UAEU

The interplay between genomics and medicine led to the development of a new discipline called "Genomic Medicine" which is expected to revolutionize healthcare worldwide by providing (1) more accurate diagnostic tools (2) higher predictive power of disease risk (3) novel opportunities for developing more effective and personalized treatments and (4) development of creative prevention strategies. In recent years, we have been using molecular, genomic and cellular approaches to elucidate the underlying causes and mechanisms of single gene disorders in the United Arab Emirates (UAE). Those disorders are particularly highly prevalent among Arab populations, including the UAE's, due to their high rates of consanguinity. Our research in recent years resulted in the identification of numerous mutations and the elucidation of the cellular basis of several single gene disorders. In this lecture, we will present examples on our approach of using next-generation whole-exome sequencing for the identification of disease genes and mutations underlying rare recessive disorders among Emirati families. In addition, the exact cellular mechanisms underlying some single gene disorders will be presented.

Epigentic regulation mechanisms links early developmental environment with growth and metabolism

Starling Emerald Bright David[1], Ashok Daniel Prabakaran[1], Jimsheena Valiyakath Karahkat[1], Ranjith Vijayan[2], Jisha Chalissery[3], Ahmed H. Hassan Al-Marzouqi[3], Earnest Adeghate[1], and Eric Mensah-Brown[1]
[1]Department of Anatomy, College of Medicine and Health Sciences; [2] Department of Biology, College of Science; [3] Department of Biochemistry, College of Medicine and Health Sciences, UAEU

The link between early developmental environment and increased risk of developing metabolic diseases is becoming clearer. To identify the epigenetic regulatory mechanisms associated with early developmental environment and to evaluate the consequences of any variations in them, we used Wistar rats and their birth weights [lower birth weight (LBW; 5-25 percentiles) vs. average birth weight (ABW; 50-75th percentile) as surrogate marker for early life environment and analyzed the link between epigenetic regulatory mechanisms and metabolism. The birth weight of the LBW group which had lower fasting blood glucose levels, had equalized between the groups by the end of 3rd week and increased in the LBW pups by 145 days. Changes among the members of the PI3K/AKT signaling pathway in the liver and muscle were also detected. Microarray analysis identified 1077 genes which were differentially expressed in muscle tissue between the ABW and LBW pups (more than 1.5 fold, $P<0.05$). The DNMT levels and the promoter methylation of Insulin II were also different between ABW and LBW animals. CHIP analysis also confirmed a clear difference in the growth trajectories between these animals. Co-IP experiments further suggested that the protein complex of DNA methyl-transferase DNMT1 plays an important role in linking the early developmental environment with the growth and metabolism of the developing embryo. This regulatory interaction is important for maintain optimal growth and development.

Compound heterozygous MPDZ mutations are the underlying cause of mild non-progressive communicating hydrocephalus

Nesreen Khalid Al Jezawi[1], Bassam R Ali[1], Lihadh Al-Gazali[2], Aisha Al-Shamsi[2], Salma Ben-Salem[1], Anne John[1], Jehan Suleiman[2], and Ranjit Vijayan[3]
[1] Department of Pathology; [2] Department of Paediatrics, College of Medicine and Heath Sciences; [3] Department of Biology, College of Science, UAEU

Congenital hydrocephalus (CH) results from the accumulation of excess cerebrospinal fluid (CSF) in the brain, leading to neurological impairments. However, the adverse effects of CH can be reduced if the condition is detected and treated early. Several previously reported CH cases were shown to be caused by mutations in the L1CAM gene. In addition, a mutation in Multiple PDZ domain (MPDZ) gene has been recently reported to be responsible for CH in an autosomal recessive pattern. In this study an Emirati family with one child affected by CH was clinically evaluated followed by whole-exome sequencing which revealed two compound heterozygous novel mutations (c.394G>A, p.G132S and c.1744C>G, p.L582V) in the MPDZ gene. Each of the parents was heterozygous for one of the two mutations. In silico analysis revealed that the two mutations are predicted to be disease causing and therefore are the most likely cause of CH in the affected child. Keywords: Congenital hydrocephalus, Multiple PDZ, L1CAM, Compound heterozygous mutations, Autosomal Recessive.

New Mutation in TECRL gene is associated with lethal Catecholaminergic polymorphic ventricular tachycardia

Elhadi H. Aburawi[1], Lihadh Al-Gazali[1], Arthur A.M Wilde[2], Robert Passier[3], and Zahurul A. Bhuiyan[4]
[1] Department of Pediatrics, College of Medicine and Health Sciences, UAEU; [2] Heart Center, Department of Clinical and Experimental Cardiology, Academic Medical Center, Amsterdam; [3] Department of Anatomy & Embryology, Leiden University Medical Center, Leiden, The Netherlands; [4] Institute of Social and Preventive Medicine, University Hospital (CHUV) and University of Lausanne

Introduction: Inherited arrhythmogenic diseases (IADs) are one of the prevalent causes of sudden cardiac death (SCD) in the young. This can be classified into disorders with or without structural heart defects. The latter, comprised of channelopathies such as Long-QT syndrome (LQTS) or Catecholaminergic polymorphic ventricular tachycardia (CPVT) are caused by mutations in ion channel or calcium handling genes that primarily affect the electrical activity of the heart. Patients and Methods: Sudanese family described in this study has several children affected with CPVT; the parents are first-degree cousins. Seven out of thirteen children (Fig. 1A) presented with exertion-induced arrhythmias and/or SCD. Five children had an arrhythmic episode, which was fatal and two survived. An ICD was implanted in one while the other suffered severe brain damage. Exome sequencing was performed to explore the genetic defect, and also patient-specific Stem cell induced-Cardiomyocytes (hiPSC-CM) were made to evaluate the functional phenotype. Results: ECG showed ventricular fibrillation and torsade de pointes, which was reversed to sinus rhythm following DC shock (Fig. 2). ECG at rest showed borderline prolonged QTc interval of 450 ms (Fig. 1B). ICD interrogation revealed an episode of ventricular tachycardia (Fig. 1C). All children who were affected inherited the splice donor site mutation, c.331+1G>A homozygously in the TECRL (also annotated SRD5A2L2) gene on chromosome 4. Conclusion: CPVT3 is a new, malignant form of cardiac arrhythmia, caused by homozygous mutation in the TECRL gene. These findings have implications for diagnosis and treatment of inherited cardiac arrhythmias.

Optimal Control Approach in a Delayed Mathematical Tumour Model with Immuno-Chemotherapy

Fathalla A. Rihan
College of Science, UAEU

A delay differential model with optimal control is presented to describe the dynamics of tumour-immune interactions in the presence of immuno-chemotherapy treatments. The role of interleukin-2 (IL-2) in stimulation of the effector cells and tumour dynamics is considered in the model with a discrete time-delay to justify the time required to stimulate the effector cells. An expression for the length of the time-delay to preserve stability is deduced. Two optimal control variables are incorporated to identify the best treatment strategy with minimum side effects by blocking the production of new tumour cells and keeping the level of normal cells above the average of its carrying capacity. %Existence of the optimal controls and optimality system are established. Pontryagins maximum principle is applicable to characterize the optimal controls. An algorithm, to approximate the solution of the optimal control problem, is suggested by solving the state system (forward) and adjoint system (backward) in time. The numerical simulations show that combination therapy protocol of immuno-chemotherapy reduces the tumour cells load in few months of therapy.

Markers for human T regulatory cells in health and cancer: New insights

Eyad Elkord[1], May Abd Al Samid[2], Belal Chaudhary[2], Yazan Khaled[3], and Basil Ammori[3]
[1] College of Medicine & Health Sciences, UAEU; [2] University of Salford; [3] University of Manchester

Regulatory T cells (Tregs) are key players of immune regulation/dysregulation both in physiological and pathophysiological settings. Recent evidences show that Tregs negatively impact anti-tumor immunity and cancer immunotherapy. We, and others, reported that Tregs are expanded in peripheral blood and tumor microenvironment of cancer patients, correlating with poor prognosis, reduced survival, and lack of patients' responsiveness to therapy. Despite significant advances in understanding Treg function, there is still a pressing need to define reliable and specific markers that can distinguish different Treg subpopulations. We have recently reported that the majority of peripheral and tumor-infiltrating FoxP3+ Tregs expresses Helios, an Ikaros family transcription factor, and FoxP3+Helios+ Treg subset was significantly higher in renal cell carcinoma patients. We show for the first time that markers of activated Tregs [latency associated peptide (LAP) and glycoprotein A repetitions predominant (GARP, or LRRC32)] are expressed on CD4+FoxP3- T cells expressing Helios (FoxP3-Helios+) in the steady state. Following TCR stimulation, GARP/LAP are up-regulated on CD4+Helios+ T cells regardless of FoxP3 expression (FoxP3+/-Helios+). CD4+GARP+/-LAP+ Tregs make IL-10 immunosuppressive cytokine but not IFN-γ effector cytokine. Further characterization of FoxP3/Helios subpopulations showed that FoxP3+Helios+ Tregs proliferate in vitro significantly less than FoxP3+Helios- Tregs. Unlike FoxP3+Helios- Tregs, FoxP3+Helios+ Tregs secrete IL-10 but not IFN-γ or IL-2, confirming they are bona fide Tregs. Taken together, Helios, and not FoxP3, is the marker of activated Tregs expressing GARP/LAP, and FoxP3+Helios+ Tregs have more immunosuppressive characteristics. This work implies that therapeutic modalities for treating autoimmune and inflammatory diseases, allergies and graft rejection should be designed to induce and/or expand FoxP3+Helios+ Tregs, while therapies against cancers or infectious diseases should avoid such expansion/induction. In addition, we compared levels of different FoxP3+ Treg subpopulations in cancer patients. In pancreatic cancer patients, and unlike colorectal cancer liver metastases patients, we did not detect an increase in Treg levels as defined by FoxP3 and Helios. However, defining Tregs based on GARP/LAP expression showed that FoxP3–LAP+ T cells, FoxP3–Helios+GARP+LAP+ Tregs in non-activated and activated settings, and FoxP3+Helios+GARP+LAP+ activated Tregs were increased in cancer patients compared to controls. Taken together, our results indicate that Treg investigations in different pathological settings should consider different Treg-related markers such as GARP, LAP, Helios, and others and not only FoxP3 as a sole Treg-specific marker.

Mechanistic insights into bacterial therapy of tumors: Implications for cancer immunotherapy

Suneesh Kaimala[1], Yassir A. Mohamed[1], Ghada Bashir[1], Ashraf Al-Sbiei[1], Maria J. Fernandez-Cabezudo[2], and Basel K. al-Ramadi[1]

[1] Department of Microbiology and Immunology; [2] Department of Biochemistry, College of Medicine and Health Sciences, UAEU

Tumor immunotherapy has recently emerged as an effective therapeutic modality against several types of cancers. In contrast to chemotherapy and radiotherapy that target cancer cells, immunotherapy is based on targeting the host's immune system in such a way as to increase its potency against malignant cells. Tumor development is associated with changes in hematopoiesis that lead to an increase in myelomonocytic cells within the tumor tissue. The accumulation of myeloid cells/macrophages within tumors not only promotes angiogenesis and tissue remodeling required for tumor growth but also maintains the tumor milieu as an immunosuppressive environment. Given these critical roles, myeloid cells are attractive targets for manipulating tumor growth and metastasis. Salmonella enterica serovar Typhimrium are facultative anaerobic bacteria that have the capacity to home efficiently and thrive within the hypoxic environment of tumors. We have previously demonstrated that bacterial therapy of tumors using attenuated strains of Salmonella can effectively inhibit tumor growth and improve host survival in a preclinical animal model. Given that Salmonella organisms utilize host macrophages as their primary niche for survival, we investigated the consequences of Salmonella treatment on myeloid cell recruitment, phenotypic characteristics and functional activation within tumor tissue of B16.F1 melanoma-bearing animals. Using highly sorted cell populations, in combination with 6-color flow cytometry and gene expression analysis by qRT-PCR, we demonstrate that bacterial therapy functions by targeting intratumoral myeloid cells, effectively changing them from serving a tumor-promoting role to cells that help in fighting tumor proliferation and expansion. Interestingly, this form of therapy is dependent on the production of IFN-γ, a critical proinflammatory cytokine with profound macrophage-activating properties. In this context, bacterial therapy of tumors essentially represents another form of immunotherapy. The implications of these findings will be discussed.

Growth and Differentiation of Gastric Stem Cells on 3D Biodegradable Scaffolds

Yaser E. Greish[1], Sherif Karam[2], Abdel Hamid Mourad[3], Sunitha Pulikkot[2], Prashanth Saseedharan[2], and Sneha Ann Thoms[2]

1 Department of Chemistry, College of Science; [2] Department of Anatomy, College of Medicine and Health Sciences; [3] Department of Mechanical Engineering, College of Engineering, UAEU

Recent therapeutic trends for some congenital and acquired diseases include stem cell therapy and tissue engineering. This study aimed at the cultivation of mouse gastric stem (mGS) cells on artificial biodegradable polycaproactone and chitosan scaffolds to test for their growth and differentiation into gastric cells. Non-porous, microporous and microfibrous scaffolds were fabricated and assessed for their morphological integrity with scanning electron microscopy (SEM). mGS cells were seeded onto the scaffolds and left in tissue culture for up to 12 days. Results revealed the attachment, growth and differentiation of mGS cells preferentially on the microfibrous scaffolds in the standard culture conditions. Fluorescence and confocal microscopic analysis of cryosections probed with N-acetyl-D-glucosamine-specific lectin and anti-trefoil factor 2 antibodies indicated that, within 9-day culture, more than 50% of the mGS cells differentiated into mucous neck cells.

MCJ protein is a novel prognostic factor for responsiveness to chemotherapy in human breast cancer

Maria J. Fernandez-Cabezudo[1], Issam Faour[2], Mohammed A. Jaloudi[3], Yassir A. Mohamed[4], Ghada Bashir[4], Saeeda Al-Marzooqi[5], Alia Al-Bawardi[5], M. Jawad Hashim[6], Mercedes Rincon[7], and Basel K. al-Ramadi[4]

[1] Dept. of Biochemistry; College of Medicine and Health Sciences, UAEU; [2] Department of Surgery; [3] Department of Medical Oncology, Tawam Hospital-Johns Hopkins Medicine, Al-Ain, UAE ; [4] Department of Medical Microbiology and Immunology; [5] Department of Pathology ; [6]Deptartmetn of Family Medicine, College of Medicine and Health Sciences, UAEU; [7] Department of Medicine, University of Vermont, Burlington, VT, USA

Purpose: Inherent or acquired tumor chemoresistance remains a major limiting factor for the success of cancer chemotherapy. Novel approaches to improve treatment outcome in patients are urgently needed. MCJ (Methylation-Controlled J protein)/DnaJC15 is an endogenous inhibitor of mitochondrial respiration previously shown to regulate sensitivity to chemotherapeutic drugs in breast cancer cell lines. This study was designed to investigate the role of MCJ in response to neoadjuvant chemotherapy in breast cancer patients and obtain evidence for its action as a regulator of chemoresistance in preclinical mouse models. Experimental design: A prospective longitudinal study was undertaken in a cohort of breast cancer patients that correlated MCJ expression in patient biopsies prior to initiation of neoadjuvant chemotherapy with the pathological and clinical responses evaluated post therapy. Moreover, the role of MCJ in drug response in vivo was investigated using a model of mammary cancer and MCJ-deficient mice. Results: The clinical response and residual cancer burden (RCB) following neoadjuvant chemotherapy correlated directly with MCJ level in tumor biopsies. Low MCJ correlated with poor clinical response to therapy and was associated with short disease-free survival. Regression analysis identified MCJ as an independent predictor of clinical response to chemotherapy. Additionally, using MMTV-PyMT and MCJ-deficient mice, we show that loss of MCJ increases chemotherapy resistance in vivo. Conclusions: The findings suggest that MCJ expression could be a novel prognostic factor for response to neoadjuvant therapy in breast cancer patients. Restoring MCJ function may be an alternative strategy for enhancing the response to chemotherapeutic drugs in cancer treatment.

Anti-breast cancer activities of Rhus coriaria (Sumac): A Preclinical Study

Rabah Iratni
Department of Biology, College of Science, UAEU

We investigated the anticancer effect of Rhus coriaria on breast cancer cell lines. We demonstrated that Rhus coriaria ethanolic extract (RCE) inhibits the proliferation of these cell lines in a time- and concentration-dependent manner. RCE induced senescence and cell cycle arrest at G1 phase. These changes were concomitant with upregulation of p21, downregulation of cyclin D1, p27, PCNA, c-myc, phospho-RB and expression of Senescence-associated-β-Galactosidase activity. No proliferative recovery was detected after RCE removal. Annexin V staining and PARP cleavage analysis revealed a minimal induction of apoptosis in MDA-MB-231 cells. Most importantly, transmission electron microscopy revealed the presence of autophagic vacuoles in RCE-treated cells. Interestingly, blocking autophagy by 3-methyladenine (3-MA) or chloroquine (CQ) reduced RCE-induced cell death and senescence. RCE was also found to activate p38 and ERK1/2 signaling pathways which coincided with induction of autophagy. Furthermore, we found that while both autophagy inhibitors abolished p38 phosphorylation and only CQ led to significant decrease in pERK1/2. Further, RCE induced DNA damage and reduced mutant p53, two events that preceded autophagy. Most importantly, by using chick embryo tumor growth assay, we showed that R. coriaria suppressed tumor growth and metastasis in vivo. Our findings provide strong evidence that R. coriaria possesses strong anti-breast cancer activity through induction of senescence and autophagic cell death, making it a promising alternative or adjunct therapeutic candidate against breast cancer.

Akt2 knock-down reveals its contribution to human lung cancer cell proliferation, growth, motility, invasion and endothelial cell tube formation

Samir Attoub[1], Kholoud Arafat[1], Nasseredine Kamel Hammadi[1], Jan Mester[2], and Anne-Marie Gaben[2]
[1] *Department of Pharmacology & Therapeutics, College of Medicine & Health Sciences, UAEU;* [2] *INSERM U673 and U938, University Pierre and Marie Curie, Saint-Antoine Hospital, Paris, France*

The Akt/PKB serine/threonine protein kinase consists of three isoforms: Akt-1, -2 and -3. Their overexpression has been detected in human cancers, but their roles in cancer progression are unclear. We investigated the impact of specific silencing of Akt1 and Akt2 on human lung cancer cell proliferation, colony growth, motility, and invasion in vitro as well as tumor growth in vivo using human Non-Small Cell Lung Cancer cells LNM35, and on the vascular tube formation using HUVEC cells. Although silencing of Akt1 decreased cellular invasion at least in part via COX-2 inhibition, it had almost no effect on cell motility, proliferation, colony formation, and angiogenesis. Transient as well as stable silencing of Akt2 resulted in a strong inhibition of Rb phosphorylation associated with a decrease in cellular proliferation and colony formation, leading to the inhibition of tumor growth in the xenograft model. Silencing of Akt2 also reduced cellular motility and invasion in vitro, presumably via COX-2 inhibition. Moreover, silencing of Akt2 in the HUVEC cells resulted in the inhibition of their spontaneous angiogenic phenotype. Altogether, these results indicate that Akt2 plays an important role in lung cancer progression and can be a promising target for lung cancer therapy.

Developing Polyclonal Antibodies Targeting a Novel Growth-Related Protein in Pancreatic Cancer

Amal H.I. Al Haddad[1], Mahmoud A. Ali[1], Sandor Lovas[2], and Thomas E. Adrian
[1] *College of Medicine and Health Sciences, UAEU;* [2] *Creighton University School of Medicine, USA*

Background: Pancreatic cancer is the most fatal disease amongst all solid malignancies. A larger window of opportunity for early detection and better future targeted therapy is possible by understanding the sequential additive genetic alterations in its pathogenicity. Via global expression profiling, TTMP gene was found to be involved in the genetic evolution of pancreatic cancer. TTMP is a novel growth-related gene which is downregulated in pancreatic cancer cell lines. Based on our earlier studies and our current unpublished data, TTMP is a novel protein that can be a founder member in its family and further characterization are needed should we wish to understand its role in pancreatic cancer promotion, development, and/or progression. Aim: In order to better understand the role of the TTMP gene, specific anti-TTMP antibodies against unique C- and N-terminus synthetic peptides need to be generated. Methods: Five rabbits were immunized with each of the two conjugated peptides. Animals were bled regularly and antibody titers were checked by ELISA. Western blotting was used to assess the specificity of the antibodies. Results: A significant antibodies titers of up to 1.0X106 dilutions against the C- and N-termini were generated in all animals. Antibodies worked well for western blotting. Interestingly, both C- and N-terminus antibodies generated in all rabbits detected same molecular weight protein. Conclusion: These highly specific antibodies can serve a pivotal role in further studies to characterize the novel growth-related protein in pancreatic pathogenesis; TTMP gene. Development of specific antibodies against a membrane-spanning protein which is highly glycosylated is challenging. However, educated design of the haptens was required to overcome such challenge. These antibodies can aid better understanding of the role of TTMP in the context of pancreatic cancer pathogenesis.

The Molecular Functions of the Chromatin Modifier Fun30

Zeina Al-Natour and Ahmed H. Hassan Al-Marzouqi
Department of Biochemistry and Molecular Biology, College of Medicine and Health Sciences, UAEU

In eukaryotes, the compaction of DNA into the nucleus inhibits the access of factors to DNA which leads to the repression of many important cellular processes required for maintenance and growth of the cell. To access the DNA and the genes, the nucleoprotein structure, called chromatin, which consists of DNA, histones, and non-histone proteins needs to be opened up or altered. This is accomplished as a result of DNA and histone modifications or by DNA binding protein. Many studies in the past few years have described conserved protein complexes whose function is to modulate the access of transcription factors to regulatory regions of genes relieving chromatin-mediated repression. This is important since mutants of some of these chromatin modifiers in humans have been implicated in some diseases. Phylogenetic analysis shows that these complexes share several common features including the presence of a distinct ATPase domain. Based on sequence homology to this domain, we have recently identified new candidate remodelers (i.e. Fun30) in yeast Saccharomyces cerevisiae. We have previously shown that Fun30 is a homodimer with a molecular weight of about 250 kDa. Biochemical characterization of Fun30 revealed that it has an ATPase activity that is stimulated by both DNA and chromatin. Consistent with this, we showed that Fun30 binds to both DNA and chromatin and exhibits activity in ATP-dependent chromatin remodeling assays. Fun30 was more recently found to have a role in DNA damage repair by facilitating long range resection of DNA with double strand breaks. Here, we report that Fun30 relaxes both negatively and positively supercoiled DNA, and has an annealing activity suggesting a possible role of Fun30 in DNA replication and repair. Moreover, we demonstrate that Fun30 is recruited to DNA during S phase and interacts genetically with certain genes involved in DNA damage repair.

Frondoside A Potentiates the Effects of Conventional Therapeutic Agents in Acute Leukemia

Fatma Hussain Sajwani and Thomas E. Adrian
College of Medicine and Health Sciences, UAEU

Among hematological malignancies, acute leukemia is the main cause of mortality. Despite improvement of survival with current chemotherapies, some patients still die from the disease or the treatment side effects. Thus new therapeutic agents are needed. Frondoside A is a triterpenoid glycoside form the sea cucumber, Cucumaria frondosa that has shown potent anticancer effects in different types of cancer. Previous studies in acute leukemia have been limited. The current study investigated the effects of frondoside A in acute leukemia cell lines alone and in combination with the drugs currently used for this malignancy. This study is the first to attempt comparing the efficacy of this compound to available conventional drugs. Acute leukemia cell lines were used including CCL-119, CCL-240 and TIB-202.Cells were cultured and treated with different concentrations of frondoside A, vincristine sulphate, asparaginase and prednisolone each compound alone. Experiments were conducted with treatment incubation periods of 24, 48 and 72h. The inhibitory concentration 50 (IC50) for each compound at each time point was determined for each of the 3 cell lines. Treatment duration of 48h was chosen for the combination therapy experiments. Cell viability assessment post-treatment was done using CellTiter-Glo® luminescent assay. CCL-119 cells were very sensitive to frondoside A treatment (IC50 1.5μM at all treatment durations). CCL-240 and TIB-202 were less sensitive to frondoside A treatment (IC50 of 2.5μM and 3.0μM respectively). Frondoside A markedly enhanced the anticancer effects of all of the conventional drugs ($P<0.05$) in all cell lines, with the exception of the combination with prednisolone in the CCL-240 cell line. Asparaginase combined with Frondoside A IC50 was significantly better than asparaginase alone ($P = 0.003$ in CCL-119, 0.01 in CCL-240 and in TIB-202), Similar findings were demonstrated for vincristine ($P = 0.008$ in CCL-119, 0.013 in CCL-240 and 0.001 in TIB-202). For Prednisolone, the combination therapy was significantly better in suppressing cell viability than the drug alone in CCL-119 (P-value=0.002) and in TIB-202 (P-value=0.001). These findings suggest that frondoside A may be valuable in the treatment of acute leukemia, particularly when used in combination with the current therapeutic drugs.

Manuka Honey Inhibits Cellular Growth, Metastasis and Angiogenic Capacity of Human and Murine Breast Cancer

Mezoon M. Al Dhaheri[1], Junu A. George[2], Yassir A. Mohamed[1], Ghada Bashir[1], Kholoud Arafat[3], Samir Attoub[3], Khalil B. Ramadi[3], Maria J. Fernandez-Cabezudo[2], and Basel K. al-Ramadi[1]

[1] *Department of Microbiology & Immunology;* [2] *Department of Biochemistry;* [3] *Department of Pharmacology, College of Medicine and Health Sciences, UAEU*

Honey has been used for >2000 years as traditional medicine, particularly in wound healing. In recent years, the recognized antibacterial properties of honey have helped to expand its use to a spectrum of conditions including gastric ulcers, skin ulcers, and burns. Intrinsic properties of honey, such as high osmolarity and acidity, and the presence of flavonoids and phenolic acids are responsible for its antibacterial and antioxidant activities. We previously demonstrated that low concentrations of manuka honey can inhibit the growth of several types of cancers. Moreover, using a preclinical model of implantable melanoma, systemic administration of manuka honey resulted in a significant retardation of tumor growth. Successful growth of malignant tumors depends on the acquisition of several properties, such as evasion of host immune responses, increased angiogenic activity and metastatic potential. The aim of the current study was to characterize the potential modulatory effect of manuka honey on tumor angiogenesis and metastasis in murine and human breast cancers. We demonstrate that manuka honey induces concentration and time-dependent apoptosis of human breast cancer cells (MDA-MB-231), principally via a caspase 8-dependent mechanism. This is associated with increased depolarization of the mitochondrial membrane, indicative of apoptosis-related damage to the organelle. Moreover, exceedingly low concentrations of manuka solution (≤1%) were able to inhibit MDA-MB-231 cell migration, invasion and angiogenic capacity. In a preclinical model using triple-negative breast cancer cells (4T1 cell line), treatment of tumor-bearing mice with a combination of oxaliplatin and manuka honey led to a significant inhibition of tumor growth and metastasis and enhanced animal survival. Our findings identify multiple mechanistic pathways for the anti-cancer properties of manuka honey on human and murine breast cancers.

Molecular and cellular basis of the effect of incretins in diabetes mellitus

Ernest Adeghate[1], Mohamed Lotfy[2], Tariq Saeed[1], and Hameed Rashed[1]
[1] College of Medicine & Health Sciences, UAEU; [2] College of Science, UAEU

Diabetes mellitus (DM) is associated with chronic hyperglycaemia (HG). Persistent HG induces impaired lipid, protein and carbohydrate metabolism and oxidative stress leading to insulin-resistance. These changes lead to macro- and micro-angiopathy in several tissues and organ systems. Incretins has been widely used as therapeutic instruments in the management of DM. However, the molecular and cellular basis of its function has not been completely elucidated. Streptozotocin-induced diabetic Wistar rats were given exenatide (a synthetic incretin) i.p. for 2 and a half months. Pancreatic tissue samples taken from control and exenatide-treated rats were processed for markers of oxidative stress using immunohistochemical method. The pancreatic tissue level of glutathione peroxidase gene expression was also determined in normal rats and animals treated with exenatide. Exenatide, when administered i.p. for 10 weeks caused large and significant ($p<0.001$) increases in the percentage distribution of catalase-positive cells (91.60 ± 0.80) when compared to untreated diabetic rats (66.30 ± 2.90). In addition, the percentage distribution of glutathione reductase-immunopositive cells increased markedly ($p<0.01$) in diabetic rats (86.10 ± 2.10) after exenatide treatment when compared to untreated diabetic rats (66.20 ± 3.70). Immunohistochemistry showed that catalase and glutathione reductase is found in pancreatic beta cells where it co-localizes with the hormone, insulin. Exenatide also caused marked and significant ($p<0.01$) elevation in glutathione peroxidase gene expression (1.44 ± 0.09) when compared to untreated normal control (0.97 ± 0.06). Metabolic parameters such as blood glucose level, body weight and glucose tolerance improved in rats treated with exenatide compared to untreated normal controls. These results showed that exenatide may improve insulin homeostasis by enhancing the antioxidant pool in pancreatic beta cells.

Different pattern of mRNA expression in sinoatrial node from Goto-Kakizaki type 2 diabetic rat

Howarth FC[1], Qureshi MA[1], Jayaprakash P[1], Parekh K[1], Oz M[2], Raza H[3], Adrian TE[1]

Departments of [1]Physiology, [2]Pharmacology & [3]Biochemistry, College of Medicine & Health Sciences, UAE University, Al Ain, UAE

The Goto-Kakizaki (GK) rat is a non-obese Wistar substrain which develops Type 2 diabetes mellitus early in life. In vivo biotelemetry experiments have demonstrated reductions in heart rate in GK rats from a young age (Howarth et al, 2008). To further characterize the mechanisms that underlie the low heart rate action potentials were measured in isolated perfused heart and expression of mRNA, encoding more than 80 cardiac muscle proteins, were measured in sinoatrial node (SAN) and right atrial (RA) biopsies. Experiments were performed in rats aged 12-13 months. Non-fasting and fasting blood glucose were elevated in GK rats and blood glucose at 120 min after a glucose challenge was 97±2 vs. 231±13 mg/dl in control and GK rats, respectively. Heart rate was significantly ($P<0.05$) reduced in GK heart (161±12 bpm, n=10) compared to controls (229±11 bpm, n=10) suggesting that mechanisms intrinsic to the electrical conduction system of the heart may be partly responsible for the low heart rate. Among many differences in the pattern of mRNA there are some worthy of particular emphasis. Expression of genes encoding the following proteins were significantly downregulated in GK SAN: the cardiac muscle protein, Myl1 (4-fold); the gap junction proteins, Gja1 and Gjc1(2-fold) Gja5 (4-fold); the intracellular calcium transporters, Itpr1-3 (2-fold); the calcium channels, Cacna1g (2-fold), Cacna1h (4-fold), Cacna2d3 (2-fold), Cacng4 (3-fold); the sodium channels Scn3b (6-fold) and Scn7a (3-fold); the potassium channels, Kcna2 and Kcnd3 (2-fold), Kcnk5 (3-fold) and Kcnk6 (2-fold); and the hyperpolarization-activated cyclic nucleotide-gated channel, Hcn4 (5-fold). In contrast it was notable that expression of four of the genes Gja5, Cacna1g, Cacna2d3 and Cacng4 were upregulated in GK RA. Interestingly, expression of, Nppa coding for atrial natriuretic peptide, was upregulated in GK SAN. Collectively, this study has demonstrated differences in the pattern of mRNA encoding a variety of proteins that are associated with the generation and conduction of electrical signals in the SAN of GK diabetic rat. Whether these changes in mRNA are translated into changes in structural protein and in turn changes in function remain to be clarified. Work supported by a UAEU Program for Advanced Research (UPAR) grant.

Behavioral and functional morbidities among patients with obesity referred for Bariatric Surgery

Ossama Tawakol Osman[1], Essam Emam[2], Fadwa Almugaddam[1], Fawaz Torab[1], and Taoufik Zoubeidi[1]
[1] *College of Medicine and Health Sciences, UAEU;* [2] *Tawam Hospital- Johns Hopkins*

INTRODUCTION: Severe obesity (BMI >40 kg/m2) is associated with significant morbidity and increased mortality in the United Arab Emirates (UAE). Conventional weight-loss treatments are usually ineffective for severe obesity and Bariatric surgeries increasingly recommended. There were two objectives of the study; first to determine the frequency of symptoms of depression and anxiety among obese bariatric outpatients in Alain and Second to understand the co-morbidity of common physical illnesses in this population. SUBJECTS and METHODS: One hundred five (n=105) consecutive patients (F=74, M=31) who seek bariatric surgery at Tawam Hospital agreed to participate and have signed the IRB approved informed consent. They routinely completed a behavioral/ psychosocial evaluation and were interviewed by a psychiatrist. We combined clinical assessment with a research program to identify baseline psychological characteristics such as symptoms of anxiety and depression that may potentially interfere or complicate the surgical procedure [Hospital Anxiety and Depression Scale (HADS)]. We have assessed how patients perceive the effect of their obesity on several domains of functioning and its impact on psychosocial quality of life [Sheehan Disability Scale (SDS)]. Statistical methods used Pearson Correlation to study correlation between scales and quantitative variables. Frequencies were determined for categorical variables. We compared the age of onset of obesity with disability scores on SDS, using Kruskal–Wallis instead of one-way analysis of variance due to lack of normality of SDS. RESULTS: The reported relative frequency of significant symptoms on the HADS were 26.7% for anxiety and 14.7% for depression. There were significant correlations between the onset of obesity and the higher scores on the last three dimensions of functioning on the SDS. Recent adult age of onset for obesity was significantly correlated with high SDS scores on the dimensions of Social (P=0.014), family life/home responsibilities (P=0.006), and religious duties (P=0.042). The high frequency of comorbid chronic medical conditions will be presented in details. CONCLUSION: This is the first prevalence study for anxiety and depressive symptoms among bariatric patients in the UAE. The data support the hypothesis that stress can rationally motivate adults with chronic medical problems to seek drastic remedial treatment.

The Role of Glutamate signalling in Diabetic Neuropathy

Nadia Hussain, and Thomas E. Adrian
College of Medicine and Health Sciences, UAEU

The majority of diabetics develop neuropathy, which can be debilitating, but the underlying pathophysiological mechanisms are poorly understood. Diabetic neuropathy progresses in a distal to proximal manner. Previous studies have shown that glutamate, the most common excitatory neurotransmitter, plays a role in the pathogenesis of. The reason why the role of glutamate in nociception becomes a problem in diabetes and the mechanisms that are involved are unknown. The aim of this project was to identify changes in expression of genes and their protein products that are involved in glutamate signalling in diabetes. This will help to further the understanding of the mechanisms of diabetic neuropathy. In diabetic rats, there were consistent changes in expression, particularly in the lumbar and sacral dorsal root ganglia of the spinal cord and in the sympathetic ganglia. The changes were consistent between the different groups of animals as well as between adjacent groups of ganglia. The most prominent changes in both the GK groups included marked upregulation of Gria4 (ionotropic AMPA receptor), downregulation of Grik3 and Grik4 (both ionotropic, kainite receptors) and Grin1 and Grin2A (both iontropic, NMDA receptors), activation of all of which has been shown to induce hyperalgesia; downregulation of Slc1a6 (excitatory amino acid transporter 4) and upregulation of Slc1a1 (excitatory amino acid transporter 3), both of which mediate neural reuptake of glutamate from the synaptic cleft; and upregulation of Gclc (glutathione synthase), which reflects a response to protect against oxidative damage. Despite many theories existing about the pathogenesis of diabetic neuropathy, there is no unifying hypothesis. It is possible that changes in glutamate signalling can contribute to these other mechanisms and possibly unify these different theories. A better understanding of the role that glutamate plays in development of diabetic neuropathy may pave the way for future therapeutic intervention.

Different pattern of mRNA expression in sinoatrial node from streptozotocin-induced diabetic rat

Zannatul Ferdous, Qureshi MA, Jayaprakash P, Parekh K, Oz M, Raza H, Adrian TE, and Howarth FC
College of Medicine and Health Sciences, UAEU

Experiments in isolated heart have shown that heart rate is lower and sinoatrial node (SAN) action potential duration is longer in streptozotocin (STZ) – induced diabetic rat compared to (Howarth et al, 2007). In sino-atrial preparations the pacemaker cycle length and sino-atrial conduction time are prolonged in STZ heart (Howarth et al, 2007). To further characterize the molecular basis of electrical disturbances in the STZ heart action potentials were measured in isolated perfused heart and expression of mRNA, encoding more than 80 cardiac muscle proteins, were measured in sinoatrial node (SAN) biopsies. Experiments were performed after 3-4 months of STZ (60 mg/kg, ip) treatment. Non-fasting blood glucose was elevated 5-fold in STZ (514±55 mg/dl) compared to control (97±15 mg/dl) rat. Heart rate was significantly ($P<0.05$) lower in STZ (203±7 bpm) compared to control (239±11 bpm) rat. Among many differences in the pattern of mRNA there are some worthy of particular emphasis. Expressions of genes encoding some proteins were significantly downregulated in STZ SAN: the cardiac muscle protein, Tnnc1 (2-fold); the gap junction protein, Gja1 (2-fold); the calcium channel, Cacng4 (10-fold); the sodium channel, Scn5a (2-fold); the potassium channels, Kcna2 and Kcnb1 (2-fold), Kcnd2 (6-fold). Whilst genes encoding some other proteins were significantly upregulated in STZ SAN: the intracellular calcium transporters, Itpr1-3 and Ryr3 (2-fold); the cell membrane transporters, Atp2b1 and Slc8a1 (2-fold); the calcium channels, Cacna1g and Cacna2d2 (2-fold), Cacnb3 (4-fold); the potassium channels, Kcnj5, Kcnk3 (3-fold) and Kcnk6 (2-fold). Interestingly, expression of, Nppa (4-fold) and Nppb (3-fold) coding for the natriuretic peptides, were also significantly upregulated in the SAN of STZ rat. Collectively, this study has demonstrated differences in the pattern of mRNA encoding a variety of proteins that are associated with the generation and conduction of electrical signals in the SAN of STZ diabetic rat heart. Whether these changes in mRNA are translated into changes in structural protein and in turn changes in function remain to be clarified. Work supported by a UAEU Program for Advanced Research (UPAR) grant.

The role of the uninjured nerve in the development of peripheral neuropathic pain

Safa Shehab[1] and Milos Ljubisavljevic[2]
[1] *Department of Anatomy;* [1] *Department of Physiology, College of Medicine and Health Sciences, UAEU*

The precise mechanisms that underlie neuropathic pain are not fully understood. Although several potential explanations have been proposed, the consensus seems to suggest that neuropathic pain originates from a lesion in the somatosensory nervous system. Spinal nerve ligation is a commonly used model to produce neuropathic-like manifestations in rodents. In this model, when the fifth lumbar (L5) spinal nerve is ligated and cut, rats develop hyperalgesia (an exaggerated response to painful stimuli) and allodynia (pain in response to innocuous stimuli, for example touch) in the hind paw as seen in human. Since the skin of the hind paw of the rat is mainly innervated by L4 and L5 nerves, it is assumed that uninjured L4 nerve would be involved in the development of neuropathic pain. Anatomically, we have previously shown that the unmyelinated primary afferents of L5 spinal nerve, which are responsible for pain transmission, did not only terminate in the corresponding L5 spinal segment, but also intermingled with primary afferents of L3, L4 and L6 nerves. Subsequently, we demonstrated up-regulations of neuropeptide Y, vasoactive intestinal polypeptide and neurokinin-1 receptor and down-regulations of substance P, calcitonin gene related peptide and IsolectinB4 binding following L5 nerve injury not only in the dorsal horn of L5 spinal segment where the injured L5 enters, but also in L3-L6 spinal segments where adjacent L3, L4 and L6 nerves terminate. To investigate the potential role of the adjacent uninjured L4 nerve in heat hyperalgesia, we have employed phosphorylated extracellular regulated kinase (pERK) as a pain marker in response to heat noxious stimuli applied to both hind paws following unilateral L5 nerve injury. We demonstrate here that the number of pERK-immunoreactive neurons was significantly higher in the ipsilateral side of L4 spinal segment, which receives innervation from uninjured L4 nerve, compared with contralateral control side which receives both uninjured L4 and L5 spinal nerves. The data demonstrate that uninjured L4 nerve plays an important role in the development of heat hyperalgesia at the spinal cord level following L5 nerve injury.

Infantile postnatal exposure to lead (Pb) enhances tau expression in the cerebral cortex of aged mice: relevance to AD.

Abdu Adem[1], Bihaqi SW[2], Bahmani A[2], and Zawia NH[2]

[1] *Department of Pharmacology, College of Medicine, UAEU;* [2] *Department of Biomedical and Pharmaceutical Sciences, University of Rhode Island, Kingston, RI, USA*

The sporadic nature in over 90% of Alzheimers disease (AD) cases, the differential susceptibility and course of illness, and latent onset of the disease suggest involvement of an environmental component in the etiology of late onset AD (LOAD). Recent reports from our lab have demonstrated that molecular alterations favor abundant tau phosphorylation and immunoreactivity in the frontal cortex of aged primates with infantile lead (Pb) exposure (Bihaqi and Zawia, 2013). Here we report that developmental Pb exposure results in elevation of protein and mRNA levels of tau in aged mice. Western blot analysis revealed aberrant site-specific tau hyperphosphorylation accompanied by elevated cyclin dependent kinase 5 (CDK5) levels in aged mice with prior Pb exposure. Mice with developmental Pb exposure also displayed altered protein ratio of p35/p25 with more Serine/Threonine phosphatase activity at old age. These changes favored increase in tau phosphorylation, thus providing evidence that neurodegenerative diseases may be in part due to environmental influences that occur during development.

Long-term effects of repeated prefrontal cortex transcranial direct current stimulation (tDCS) on food craving in young adults

Milos Ljubisavljevic, Kinza Maxood, Joji OOmmen, and Nico Nagelkerke
College of Medicine and Health Sciences, UAEU

This study examined whether a 30-min session of transcranial direct current stimulation (tDCS) of the right prefrontal cortex has long-term effects on food craving in young (mean age 21.3±2.1), healthy, normal-weight (BMI 23.2±2.1) adults. The experiments were conducted on 30 healthy individuals who reported frequent food cravings and no prior history of eating disorders. Participant's food craving rating was examined by Food Craving Questionnaire State (FCQ-S), Food Craving Questionnaire Trait (FCQ-T) and Food Craving Inventory (FCI) before, during, immediately (5-days) and one month (30-days) after tDCS. Subjects were randomized so that real tDCS (REAL) group received 5 days of real tDCS (30 minutes, 2 mA with current density kept at 0.06mA/cm2) or sham (SHAM) group receiving one day of real tDCS on the first day (same parameters), followed by 4 days of sham tDCS. In both groups tDCS was given with ramp-up/ramp-down of 1 minute. Food cravings ratings were significantly reduced in both groups after 5 days of either REAL or SHAM tDCS. There were no statistical significant difference in percent change in cravings ratings from pre- to 5 days post-stimulation between REAL and SHAM stimulation groups. However, while craving ratings returned to pre-stimulation levels after 30 days in SHAM group (FCQ-T and FCQ-S) they remained significantly decreased (FCQ-T), or decreased even further (FCQ-S) in REAL tDCS group. The analyses (FCI) also suggests that active (REAL) prefrontal tDCS significantly decreased food cravings ratings for all food categories including sweets, carbohydrates, fast food and fat after both 5 and 30 days. Furthermore, the craving for sweet food was significantly further decreased after 30 days. These findings in healthy, young, normal-weight subjects indicate that repeated, 5 days, of tDCS application is able to reduce food cravings for at least 30 days improving the self-reported ability to resist foods. Further confirmation of tDCS efficacy is needed before effective obesity tDCS interventions are developed.

Disease-modifying effect of B-vitamins on brain atrophy and cognitive decline in MCI is enhanced by omega-3 fatty status

Abderrahim Oulhaj[1], A.D. Smith-OPTIMA[2], F. Jerneren[2], H. Refsum[3], and C.A. de Jager[4]

[1] *Institute of Public Health, CMHS, UAEU;* [2] *Department of Pharmacology, University of Oxford, United Kingdom;* [3] *Department of Nutrition, Institute of Basic Medical Sciences, University of Oslo, Norway;* [4] *Division of Geriatric Medicine, Department of Medicine, University of Cape Town, Cape Town, South Africa*

Background: Elevated concentrations of plasma total homocysteine (tHcy) are a strong risk factor for cognitive impairment and dementia, while eating fish rich in omega-3 fatty acids appears to be protective. The VITACOG trial showed that lowering tHcy by B-vitamin treatment in mild cognitive impairment (MCI) slows the rate of global brain atrophy and of cognitive decline. We have now investigated whether baseline plasma omega 3 fatty acid concentrations (docosahexaenoic acid, DHA; eicosapentaenoic acid, EPA) modify the treatment effect of B-vitamins on the cognitive decline in this placebo-controlled trial. Methods This study from the VITACOG trial included 266 older persons (≥70 y) with MCI, randomly assigned either to placebo (n = 133) or to daily high-dose B-vitamin supplementation (folic acid, 0.8 mg; vitamin B6 , 20 mg; vitamin B12, 0.5 mg) (n = 133) for 2 y. The participants all underwent cognitive testing at baseline and 2 y later, with some tests (HVLT with delayed recall [DR] and the TICS-M) repeated more frequently. The effects of the intervention on on cognitive performance were analyzed according to baseline omega-3 fatty acid concentrations (EPA+DHA), adjusted for age, gender, APOE4, education, and were stratified for plasma homocysteine (tHcy) at baseline. Results Cognition: There were significant interactions between B-vitamin treatment and baseline plasma omega-3 fatty acids and several cognitive tests. In general, there was no beneficial effect of B-vitamin treatment on cognition in those with low omega-3 levels, but at high omega-3 levels (upper tertile), those treated with B-vitamins showed either no cognitive decline or even improvement, compared with the placebo group; the latter showed cognitive decline. Conclusion: The disease-modifying effect of B-vitamin treatment in MCI, as revealed by assessment of cognitive test performance, is markedly enhanced in subjects with good omega 3 fatty acid status. These results highlight the importance of considering several risk factors when designing clinical trials. A trial of a combination of B-vitamins and omega-3 fatty acids in MCI is clearly needed.

Anticonvulsant and Procognitive Properties of the non-imidazole histamine H3 receptor antagonist DL77 in Various Experimental Models

Ali Saad[1], Dhanasekaran Subramanian[1], Mohamed Shafiullah[1], Dorota Łażewska[2], Katarzyna Kieć[2], and Bassem Sadek[1]

[1] Department of Pharmacology & Therapeutics, College of Medicine & Health Sciences, UAEU; [2] Katarzyna Kieć-Kononowiczc-Jagiellonian University, Medical College, Faculty of Pharmacy, Poland

It has become clear that histamine H3 receptors (H3Rs) have beenare implicated in modulating epilepsy and memory in laboratory animals. The novel new non-imidazole H3R antagonist DL77 with has excellent selectivity profile and shows high in-vivo potency as well as in-vitro antagonist affinity with ED50 values of 2.1 ± 0.2 mg/kg and 8.4±1.3 [nM], respectively. In the present study, the anticonvulsant effects of DL77 on maximal electroshock (MES)-, pentylenetetrazole (PTZ)-, and strychnine (STR)-induced seizure models were investigated. Moreover, the precognitive procognitive properties of DL77 were tested on acquisition, consolidation and retrieval processes in a one-trial inhibitory avoidance task in male Wistar rats. The results indicate that DL77 (5, 10, and 15 mg/kg, i.p.) significantly and dose-dependently reduced MES-induced seizure duration, whereas no protection was observed in PTZ- or STR-induced seizures. Importantly, the protective action observed for DL77 in MES-induced seizure was comparable to that of the reference antiepileptic drug (AED) phenytoin (PHT), and was, also, reversed when rats were pretreated with the CNS penetrant pyrilamine (PYR) (10 mg/kg, i.p.), or with the selective H3R agonist R-(alpha)-methyl-histamine (RAMH) (10 mg/kg, i.p.). Furthermore, the results observed in the precognitive procognitive studies indicate that acute pre-training and pre-testing systemic administration of DL77 (2.5, 5, and 10 mg/kg, i.p.) facilitated acquisition and retrieval, whereas consolidation was not enhanced. Taken together, our results show that DL77 demonstrates anticonvulsant properties in the MES-induced seizure model and improves cognitive performance through actions on different memory stages. Therefore, H3Rs may have implications for the treatment of degenerative disorders associated with impaired memory function and may represent a novel therapeutic pharmacological target to tackle cognitive problems associated with the chronic use of antiepileptic drugs.

Brain parenchymal TNF-α and IL-1β induction in experimental pneumococcal meningitis

Johann Braun[1] and Kaywan Izadpanah[2]
[1] *College of Medicine and Health Sciences, UAEU;* [2] *University of Freiburg, Germany*

Background: Streptococcus pneumoniae is one of the most common causes of acute meningitis and damages brain parenchyma predominantly in the hippocampus and cortex. Triggers and mechanisms of both brain parenchymal inflammation and damage in pneumococcal meningitis are mostly unknown. Methods: Meningitis was induced in mice by intrathecal injection of live bacteria (wild type or mutant pneumococci deficient in pneumolysin and hydrogen peroxide production), heat-inactivated pneumococci, or pneumococcal cell wall fragments. Host inflammation was blocked with anti-CD18 antibodies or the broad spectrum matrix metalloproteinases (MMP)-inhibitor GM 6001. Brains were assessed for tumor necrosis factor alpha (TNF-α) and interleukin 1 beta (IL-1β) mRNA induction with real time polymerase chain reaction (PCR) and in situ hybridization (ISH). Results: TNF-α and IL-1β were upregulated in situ in the brain time-dependently and maximally in the hippocampus during pneumococcal meningitis. Brain parenchymal upregulation of TNF-α and IL-1β was independent of both cerebrospinal fluid leukocytosis and the pneumococcal toxins pneumolysin and hydrogen peroxide. However, it was attenuated significantly in meningitis induced by heat-inactivated pneumococci. Pneumococcal cell wall fragments were potent inducers of TNF-α and IL-1β mRNA in brain parenchyma. Brain TNF-α mRNA was downregulated by a matrix metalloproteinases inhibitor. Pneumococcal cell wall fragments were located in brain parenchyma by fluorescence immunohistochemistry. Conclusions: Pneumococcal cell wall fragments and host matrix metalloproteinases trigger cytokine induction in the brain parenchyma during pneumococcal meningitis.

Economic Analysis of Demand for Food Import in the UAE: Major Drivers Pattern and Growth over Last Five Decades

Berhanu A. Degefa
Department of Agribusiness, College of Food and Agriculture, UAEU

Abstract Attaining sustainable food security - ensuring stable supply and access to food and sufficient resources to maintain it – has been among the key socio-economic development agenda of the UAE. While the major source of supply of food and agricultural products for the UAE is import from international market, the domestic crop and livestock production system also plays a role towards meeting the demand for domestic food consumption and raw materials needed for agro-processing. Knowledge of the historical development of the volume and value of food and agricultural import, the relative importance of demand factors and implications for future food security management is essential from the perspective of public policy making. Information from the world Trade Organization in 2012 shows that the UAE is a 15th biggest importer of food, constituting 1.1% of worlds imports (ZAWYA, April 2014). The quantity of food and agricultural import of the UAE progressively increased from 427 thousand tonnes in 1970s to 1.6 million tonnes in 1980s and 3.4 million tonnes in 1990s (FAOSTAT). Over the last ten years, food and agricultural import significantly grew and has reached 14.7 million tonnes in 2014, increasing by 58% compared to 9.3 million tonnes in 2005. The economic importance of food import trade is also significant. The import bill reached over 61 billion Dirhams (16.7 billion USD) in 2014 increasing by three fold from 20.5 billion Dirhams (5.6 billion USD) in 2015 (UAE National Bureau of Statistics). This research paper, based on the available time series secondary data, attempts to undertake economic analysis of the growth of the demand for food import, the change in the pattern of demand for key food commodity groups, the reaction of the import demand to various factors including international food prices, and the socio-economic development in the UAE over the last five decades. The paper will also, to some extent, assess and address how the rising demand for food import impacts (incentives) on the UAE domestic agriculture and food production system.

Investigating the Antimicrobial Activities of Camel Milk and its Fermented Product against Foodborne Pathogens

Mutamed Ayyash, Maryam Al-Yammahi, and Nouf Al-Kaabi
Department of Food Science, College of Food and Agriculture, UAEU

Camel milk is a UAE national product attracting the international interests. The aim of this study was to investigate the antimicrobial properties of camel milk against foodborne pathogen bacteria. E. coli O157:H7 (non-pathogenic) was inoculated in pasteurized camel and cow milks separately. Milks were incubated at three different temperatures (7, 20 and 37°C) for 24 h. Additionally, E. coli growth were examined in camel milk fermented by three different lactic acid bacteria. Pathogen growth, pH, and titrable acidity of milks and LAB growth and viscosity of fermented camel milk were determined. LAB showed significant inhibition against E. coli in fermented camel milk during storage. Camel milk showed significant antimicrobial activities against foodborne pathogens especially at 37C in comparison with cow milk. Further studies will be needed to identify and characterize the antimicrobial component in camel milk.

Seedling and Cuttings Production for Hydroponics Using Different Substrates

Moustafa Fadel, Omar AL Shehhi, Mohsin Al Mussabi, and Abdullah Al Ameri
College of Food and Agriculture, UAEU

Hydroponics represents an extraordinary promising technique if used efficiently in arid regions where water resources are extremely scarce where a great portion of the used water may be recycled and saved. Limited research studying the production of seedlings for such purpose is available. This research paper focuses on investigating the effect of using various substrate materials on the development of seedlings for ornamental plants. Bermuda grass, Petunia (Compacta Enana Rosa) and Epipremnum aureum are used widely in landscape design. Bermuda is used as a turf grass; Petunia is used as a flowering plant and Epipremnum aureum as an indoor ornamental plant. Three substrate materials were used to germinate and propagate seeds of the first two and the cuttings of the third one. Synthetic sponge (Polyurethane sponge), Rockwool and treated cotton were used as the substrate material in each case where an experimental hydroponic system was designed and installed to execute the test. An experimental setup of closed hydroponic system was developed to carry out the experiment with recycled water and aeration mechanism pumping air in reservoir I order to increase Oxygen levels in the recycled water. Water pumping was programmed in different regimes to allow better aeration for seeds and cuttings under investigation. Results showed that, Bermuda grass germinated in Rockwool reached a germination rate of 70% while it did not exceed 50% when sponge and treated cotton were used after 15 days. On the other hand the highest germination rate of Petunia was observed when treated cotton was used where it recorded about 30% while it was 22% and 7% after 20 days where Rockwool and sponge were utilized respectively. Cuttings propagation of Epipremnum aureum developed the highest number of shoots when treated cotton was used where it gave 10 shoots after 10 days while it gave just 7 shoots when Rockwool and sponge were used as the propagation substrate.

Study on the convenient fertilization for the enhancement of quality of mango fruits under different environmental conditions

Ola Abd El Satar Abd El Haliem, and Mohamed Abd El Mohsen Salem
Department of Arid Land Agriculture, College of Food and Agriculture, UAEU

Mangifera indica L. (Mango) are one of the most economically important tropical fruits in the world due to their unique taste, aroma, and nutritional content. Mango grows on a wide range of climatic and soil conditions in the world. There are many factors that influence yield, maturity and quality of fruits the mango. The same cultivar can attains different characteristics in different growing conditions. Even in the same region, different environmental conditions at different years can affect maturity and quality of the fruit. There were great variations in growth, yield as well as physical and chemical properties of the fruits of various mango cultivars grown in different climactic conditions. Fertilization is one of the most important intercultural operations that affect directly to the yield of mango because imbalanced fertilization is considered to be one of the major contributing factors for the low productivity. Mango under non-shading conditions will be high respiration and low carbohydrate but under the conditions of shading are providing this carbohydrate, which is reflected in the growth and yield of the tree. Additionally, greenhouse mangoes will suffer from low winter as they do when cultivated in the open air but the higher greenhouse temperatures during the rest of the year confer the advantages of shorter unproductive phases and the coincidence of the first or terminal flowering with better temperatures for fruit set which in turn means an early harvest at better prices. The main objectives of increase the quality of mango fruits produced under greenhouse and find the convenient fertilization program that favors the higher yield and quality of mango. So, the present investigation was aimed to study on the convenient fertilization program viz., Nitrogen treatments: 80,100,120,150 unit and control (130) N / fed/ year), Potassium treatments (80, 100 and control (90) unit/ fed/ year as K) and Environmental conditions (open field and shading with polyethylene net 40%) for the enhancement of quality of mango fruits under greenhouse condition. After the treatment the growth parameters (tree, leaf characteristics), flowering, fruiting, the chemical characteristics and hormonal status were analyzed.

The First Baseline Date for the United Arab Emirates (UAE) Indigenous Essential Oil-Bearing Species from the Amaranthaceae Plant Family

Suzan Marwan Shahin and Mohammed Abdul Mohsen Alyafei
Department of Aridland Agriculture, College of Food and Agriculture, UAEU

Arid lands are rich regions for essential oil-bearing plant species. The arid environmental conditions (e.g. high temperatures, water scarcity) are the major abiotic stress factors, that force special group of plants, in the natural wildlife, to produce expensive phytochemicals, like essential oil compounds, for survival purposes. The main value for such aromatic phytochemicals is the wide range of their industrial applications (e.g. medicinal, cosmetic, fragrance, flavor). The United Arab Emirates (UAE) is a country located in the desert region of the world, with similar arid conditions to anywhere else. Since the UAE is a young established country, there is scarcity related to some research fields, and particularly to the indigenous medicinal and aromatic plants. The main purpose of this work is to reveal the first exclusive data for the three indigenous essential oil-bearing plant members from the Amaranthaceae family, which are Achyranthes aspera, Aerva javanica and Chenopodium album. The study will declare major information related to their natural characteristics (e.g. taxa, form, life form, life cycle, flowering season) and their availability in the UAE wildlife (e.g. important locations, soil characteristics, habitat, status). Furthermore, the study will present up-to-date information related to the extracted essential oils, including functional plant parts, extraction method, yield, main chemical constituents and their biological activity.

Physico-chemical and Rheological Characteristics of Yoghurt Produced from Mixtures of Cow and Camel Milk

Ahlam Abdullah Al-Hammadi, Sara Mohammed Al Neyadi, and Sami Ghnimi
Food Science Department, College of Food and Agriculture, UAEU

Set yoghurt has not been achieved with camel milk but several traditional fermented products have been made by fermentation of camel milk with Streptococcus thermophiles, Lactobacillus delbrueckii subsp. Bulgaricus, and Saccharomyces yeast. Unlike the case with other ruminant milks (cow, goat, sheep), camel milk does not coagulate well during fermentation to produce a firm gel-like structure possibly due to the presence of anti-microbial agents such as lactoferrin, lysozyme, and lactoperoxidase that inhibit the growth of the starter cultures used in the manufacture of yoghurt. Therefore the objective of this study is to observe the influence of using camel milk in combination with cow milk on the physicochemical properties, texture and rheological characteristics of set-type yoghurt. Seven formulations of yoghurt were prepared by mixing different proportions of cow and camel milk. Samples were analyzed for their pH, chemical and mechanical properties, flow behaviour, and colour throughout storage at 4º. The addition of camel milk led to smaller changes in pH and an obvious decrease in the firmness and consistence of the gel among the formulations. Colour characteristics (L*, a*, b*), chroma (C*) and whiteness index (WI) showed that the addition of camel milk caused an increase in L* and WI and a decrease in (C*). Yogurts with addition of camel milk were lower in values of storage and loss modulus than yogurt with pure cow milk. In general, the higher the camel milk content, the greater the physicochemical and rheological differences with regard to the 100% cow milk yoghurt.

Studies on Evaluating Novel Native Plant Species for Sustainable Landscape Management Practices in Abu Dhabi Emirate

Mubarak Mohammed S.R. Jaber Alkhaili, Shyam S.Kurup, Mohammed Abdul Mohsen Alyafei, and Abdul Jaleel Cheruth
College of Food and Agriculture, UAEU

The aridity, shortage of irrigation water and the rapid increase in urban projects in the last three years are threatening the future expansion of the landscaping in AL Ain city lying in the Abu Dhabi emirate. The city per capita green area is 24 sq. m. far higher compared with other arid area cities (Alain, 2009). Landscape work in the city, which accounts for 70% of the irrigated water and the other 30%, comes from underground water. Moreover, most of the big urban development projects demand a share of the treated water for their landscaping works. In addition to these problems, most of the existing plants used are not native to the area, and hence to tolerate the heat and drought, they require a lot of water. From the problems outlined above, it can be seen that the landscape extension and its sustainability are critical issues. Using native plants in urban landscaping work will be an effective tool to help the city to achieve future plans of increasing green areas in a sustainable way. Research work has been initiated to survey different floristic regions in Abu Dhabi emirate with a view to collecting native plant species in the form of shrubs, herbs and ground cover plants. 146 collections have been made in the form of seeds and cuttings to evaluate them for suitability for landscape work. The trees will be evaluated ex situ for the landscape qualities in terms of flowering characters, growth habits, canopy characters, bark quality before it is promoted for landscaping work.

Growth promotion of Salicornia bigelovii by a polyamine-producing isolate of Micromonospora chalcea in the United Arab Emirates

Khaled Abbas El-Tarabily and Abdulmajeed S. Alkhajeh
Department of Biology, College of Science, UAEU

Salicornia bigelovii is a promising halophytic crop for saline soils, and can therefore significantly contribute to the management of saline environments in arid regions. S. bigelovii has substantial economic value as a bioresource of diverse and valuable product, in addition to its importance as a culinary product. Of fifty-two actinomycetes isolated from S. bigelovii rhizosphere in the United Arab Emirates, a halophilic isolate of Micromonospora chalcea (WT) was found to be capable of producing high levels of putrescine on decarboxylase agar medium amended with L-arginine and to produce spermidine, spermine and putrescine in liquid decarboxylase medium. In the greenhouse, the application of the WT strain to soil amended with L- arginine (as a precursor for putrescine) significantly ($P < 0.05$) promoted the growth of S. bigelovii plants and increased the fresh and dry weights and lengths of roots and shoots, compared with control plants. Soil inoculation with the WT strain resulted in a significant ($P < 0.05$) increase in the levels of putrescine, spermidine and spermine, certain endogenous plant growth regulators (PGRs) (indole-acetic acid, indole- pyruvic acid, gibberellic acid, isopentenyl adenine, and zeatin), chlorophylls (a, b) and carotenoids compared with control plants. A polyamine non-producing mutant strain (PNPM) obtained from the wild-type isolate (WT), however failed to promote S. bigelovii growth. There were no significant ($P > 0.05$) differences between the levels of polyamines, endogenous PGRs, chlorophylls (a, b), and carotenoids between plants that were not exposed to either of the strain (control) and those grown in soil with the PNPM strain. This study is the first to demonstrate the potential of a polyamine-producing actinomycete to promote the growth of the halophytic plant S. bigelovii. The current study demonstrates the feasibility of using halophilic actinomycetes to promote the growth of S. bigelovii cultivated under greenhouse and potentially for field application for forage and seed production in proposed seawater irrigated production of S. bigelovii.

Transcriptome Analysis Reveals Genes Commonly Regulated by Biotic and Abiotic Stresses in Arabidopsis

Synan AbuQamar, Arjun Sham, Salma Al-Ameri, and Ahmed Al-Azzawi
Biology Department, College of Science, UAEU

Plant responses involve changes at the cellular, physiological and molecular levels to adapt with biotic and abiotic stresses. We investigated the effects of combinations of different environmental stresses on the transcriptome level of Arabidopsis genome using comparative microarrays. We showed a unique program of gene expression was activated in response each biotic and abiotic stress. In addition, about 25% cold-, 6% drought-, 12% oxidative stress-, 2.5% heat-, 19% salinity- and 41% osmotic stresses-induced genes were commonly upregulated with B. cinerea treatment; and 33%, 7%, 5.5%, 7.6%, 19% and 48% of genes commonly downregulated with B. cinerea treatment, respectively. We investigated the role of cyclopentenones in mediating responses to B. cinerea infection and abiotic stress through TGA transcription factors, independent of jasmonic acid. Changes in the transcript levels of genes encoding components of the cyclopentenone signaling pathway in response to biotic and abiotic stresses suggest that the oxylipin signal transduction pathway plays a role in plant defense. The overlapping of plant responses to abiotic and biotic stresses unravels the complexity of genes and networks, provides new programs for resistance to multiple environmental stresses. Future directions to further analyze the functions of commonly expressed genes in response to environmental stresses; will increase our understanding of the plant stress response.

Identification of Arabidopsis Candidate Genes in Response to Biotic and Abiotic Stresses Using Comparative Microarrays

Synan AbuQamar, Salma Omar Al Ameri, and Arjun Sham
Department of Biology, College of Science, UAEU

Plants have evolved with intricate mechanisms to cope with multiple environmental stresses. To adapt with biotic and abiotic stresses, plant responses involve changes at the cellular and molecular levels. The current study was designed to investigate the effects of combinations of different environmental stresses on the transcriptome level of Arabidopsis genome using public microarray databases. We investigated the role of cyclopentenones in mediating plant responses to environmental stress through TGA (TGACG motif-binding factor) transcription factor, independently from jasmonic acid. Candidate genes were identified by comparing plants inoculated with Botrytis cinerea or treated with heat, salt or osmotic stress with non-inoculated or non-treated tissues. About 2.5% heat-, 19% salinity- and 41% osmotic stress-induced genes were commonly upregulated by B. cinerea-treatment; and 7.6%, 19% and 48% of genes were commonly downregulated by B. cinerea-treatment, respectively. Our results indicate that plant responses to biotic and abiotic stresses are mediated by several common regulatory genes. Comparisons between transcriptome data from Arabidopsis stressed-plants support our hypothesis that some molecular and biological processes involved in biotic and abiotic stress response are conserved. Thirteen of the common regulated genes to abiotic and biotic stresses were studied in detail to determine their role in plant resistance to B. cinerea. Moreover, a T-DNA insertion mutant of the Responsive to Dehydration gene (rd20), encoding for a member of the caleosin (lipid surface protein) family, showed an enhanced sensitivity to B. cinerea infection and drought. Overall, the overlapping of plant responses to abiotic and biotic stresses, coupled with the sensitivity of the rd20 mutant, may provide new interesting programs for increased plant resistance to multiple environmental stresses, and ultimately increases its chances to survive. Future research directions towards a better dissection of the potential crosstalk between B. cinerea, abiotic stress, and oxylipin signaling are of our particular interest.

Development of a sustainable organic farming system using beneficial bacteria to reduce dependency on agrochemicals in the UAE

Asma H. M. Alsedeeri[1], Dana S. Aleryani[1], Maitha R. AlMansoori[1], Sheikha K. R. AlMeqbali[2], Zainab A. M. S. Ali[1], and Khaled A. El-Tarabily[1]

[1] *Department of Biology, College of Science*; [2] *Department of Nutrition and Health, College of Food & Agriculture, UAEU*

While the high input of agrochemicals (inorganic chemical fertilizers and pesticides) into soil is a major agricultural method for the enhancement of plant crop production, it is also detrimental to health of the environment and the consumers. As a result of the increasing environmental and health related problems caused by the current over-use of synthetic agrochemicals, the deployment of non-hazardous innovative alternatives including the environmentally friendly biological fertilizers are too attractive to ignore. In the UAE, farmers are still using conventional agrochemicals to promote plant growth, pesticides to control plant diseases and to date field trials have not been attempted to apply new biological fertilizers as a full or partial alternative to the agrochemicals. The application of the new innovative alternatives are known to improve the efficiency of organic farming, through increased rates of seed germination, root and shoot growth, and fruit and vegetable production as a result of increased soil fertility and ability of the plants to absorb nutrients. In the current study, twenty five actinomycetes isolates obtained from different agricultural UAE soils were selected from a screening of over than 350 actinomycetes isolates based on their ability to solubilize phosphorus, oxidize sulphur, produce plant growth regulators including auxins and polyamines, produce chitinase enzymes, and through the production of the enzyme 1-aminocyclopropane-1-carboxylic acid deaminase. These isolates were tested in the greenhouse in the presence and absence of inorganic chemical fertilizer. In the greenhouse, the application of a mixture of these 25 actinomycetes isolates significantly ($P < 0.05$) promoted the growth of bean, cowpea, cucumber, corn, squash, and radish plants and increased the fresh and dry weights and lengths of roots and shoots, compared with control plants. This study is the first to demonstrate the potential of a mixture of beneficial actinomycetes to promote plant growth through combined mechanisms of actions including phosphorus solubilization, production of auxins, polyamines and 1-aminocyclopropane-1-carboxylic acid deaminase. These results also indicate that the successful treatment can be effective and economical for horticultural production in sandy soils such as those found in the UAE and can act as a substitute or supplement for inorganic fertilizer.

Intergenerational Conflict in Arab Families: Salient Issues and Scale Development

Timothy M Daly[1], Sarah Rasmi[2]
[1] *College of Business and Economics,UAEU;* [2] *American University of Dubai*

Using a mixed-methods approach, we identified and explored intergenerational conflict issues that are salient to Arab adolescents and emerging adults (N = 485). We also developed and validated a scale that captures these issues across several studies. A qualitative study of Arab adolescents and emerging adults (N = 26) was first used to identify and describe unique intergenerational conflict items that are important to Arab families. An exploratory quantitative study (N = 100) and subsequent validation study (N = 157) were conducted to refine and validate the list of items. The final Arab Family Conflict Inventory consisted of 35 items that included both culturally specific items and items covering issues commonly found across ethnocultural groups. The scale was found to be psychometrically sound.

Morphosyntactic Development in Emirati Arabic

Dimitrios Ntelitheos[1], Ali Idrissi[2]
[1] *College of Humanities and Social Sciences, UAEU;* [2] *Qatar University*

We calculate developmental indices of language growth in Emirati Arabic based on a two-year longitudinal corpus of six Emirati children. The target indices include Mean Length of Utterance in morphemes and words (MLUm and MLUw), utterance per turn counts (UoT), type-token-ratio (TTR) and D (an index of vocabulary diversity). Spearman correlation tests show significant correlations between MLUm, MLUw and age. A slightly weaker correlation is found between age and D but not with TTR. Finally, a strong correlation is found between age and UoT. The results provide an important new data point in the body of knowledge about language growth, and show that language acquisition displays the same developmental patterns regardless of the language-specific formal properties of the target language, e.g. nonlinear word structure in Arabic.

Mate Selection for Marriage in Contemporary Emirati Society

Aqil Kazim and Mohammed Aboelenein
College of Humanities and Social Sciences, UAEU

This paper aims at exploring the process of mate selection for marriage among young Emiratis today. Several studies reported that the UAE youth are exposed to global thinking and heavily engaged with modern technology. This is mainly due to the significant social, economic and cultural changes that took place in UAE during the past ten years. However, youth still hold to traditional views when it comes to one of the most crucial decisions in their life, i.e., marriage. We interviewed a representative sample from the three federal higher educational institutions in the country: the United Arab Emirates University (UAEU), Zayed University (ZU), and the Higher Colleges of Technology (HCT). The main research question was to what extent Emirati youth are bound by social traditions in their mate selection choices, and whether or not they find these traditions in conflict with their universally-shaped ideas and attitudes. The study reached important results with regard to the following questions: (1) the perception of marriage among young Emiratis, (2) the preferred vs. available channels for mate selection, (3) arranged marriage vs. mate selection via modern channels such as internet, workplace, etc., (4) factors that determine mate selection in today's society such as age, educational level, type of job, income, etc., (5) attitudes towards divorce. Key words: mate selection, marriage, Emirati youth, contemporary Emirati society, social and cultural changes.

Investigating L2 Learners Metalinguistic Awareness in Problem-solving Domain: A Psycholinguistic View

Hosni Mostafa El-dali
College of humanities and social sciences, UAEU

Problem-solving is a process by which an individual uses previously acquired knowledge, skills, and understanding to satisfy the demands of an unfamiliar situation. The student then must synthesize what he or she has learned, and applies it to the new and different situation. Educators and Language teaching specialists seem to agree that academic success should be measured not just in terms of what students can remember but that what students are able to do with their knowledge. It is commonly accepted that the application of knowledge and critical thinking are higher-order cognitive skills that require deep conceptual understanding. Memorization and recall, on the other hand, are lower-order cognitive skills that require only a minimum level of understanding. Relatedly, cognitive psychologist seem to agree that there are two types of 'understanding'; the first is called ''instrumental understanding'' which appears to be adequate for simple problems that require straight forward application of certain rules. The second is called ''relational understanding'' which appears to be obligatory for complex problems that require strategic thinking, and decision-making abilities. On the other hand, during the last thirsty years ideas about language learning and teaching have been changing in fundamental ways. The most fundamental change is, perhaps, the focus on learners as active creators in their language learning process, not as passive recipients. It is widely accepted, Therefore, that the language of L2 learners (Interlanguage ''Selinker, 1972'' or Learners-Language ''Gass,1983'') is a system in its own right. To understand such a system, we should focus on discovering how L2 learners evaluate and correct their own or other people's utterances. The major point of interest in this study, then, is L2 learners' linguistic intuitions and their role in making linguistic decisions in solving multi-dimensional grammatical problems and sentence completion tasks. To this end, the present study has a theoretical conceptual framework in which pertinent issues will be examined and evaluated. It, also, has an empirical section in which the results of an experiment on forty L2 Learners will be presented, analyzed and, accordingly, conclusions will be made and pedagogical implications will be suggested.

Armenian Merchants in Arab world in the 19th century

Yehia Mohamed Mahmoud Ahmed
Department of History & Archeology, College of Humanities and Social Sciences, UAEU

Armenian Merchants in Arab world in the 19th century The Arab world has witnessed several waves of Armenian immigration through history particularly during the Ottoman era in Egypt and Arab world from the sixteenth century until the nineteenth century. After years of settlement and immigration, the Armenian minority became part and parcel of the multi-ethic/multi-cultural Egyptian society. Due to their commitment and dedication, the Armenians gained a reputation as experts in the fields of business and commerce. This paper investigates the participation of the Armenian people in Mohamed Aly's civilizational project which put Egypt on the map of the modern world. The paper will explore the significant role, played by Boghos Yosefyan, the central political and economic advisor of Mohamed Ali, in the development of the Egypt Renaissance. Based on the mutual correspondences (and letters) between the two parties (Mohamed Ali and Boghos) in addition to other historical documents, pursued in the Egyptian historical Archive, this study traces the nature of the role played by Boghoss Yosefyan in the construction of the Egyptian Renaissance during the first half of the nineteenth- century.

Using RSA to unravel the neural structure of the language network

Sami Boudelaa
Department of Linguistics, College of Humanities and Social Sciences, UAEU

Previous neuro-imaging research into Indo-European languages shows that the processing of derivationally complex words (e.g., friendly, happiness) engages a bilateral fronto-temporal network underlying whole-form access processes, while the processing of inflectionally complex words (e.g., walked, talked) activates a left-lateralised fronto-temporal subsystem subserving combinatorial processes (Bozic et al. 2010; 2013). It is unclear however whether the derivation-inflection contrast in English and its allied neural mapping hold for typologically more distant languages. Recent fMRI work on the Semitic language, Arabic, analysed using classical univariate subtractive approach suggests that non-concatenatively complex words, that is words formed by interleaving a root and a word pattern (e.g., (kaatib, "writer") as well as concatenatively complex words formed by adding a suffix to an existing stem (e.g., kitaab+uhaa, "her book") engage the same left-lateralised fronto-temporal network activated by inflectionally complex words in English. Here we take the previous research into Arabic a step further by using multivariate Representational Similarity Analysis (RSA: Kriegeskorte et al., 2006) to ask whether differences in morphological organization are coded in differential neural activation patterns across key fronto-temporal regions. RSA reveals fine-grained fronto-temporal similarities between non-concatenatively complex words in bilateral inferior frontal areas (BA45-47), left temporal pole and left inferior temporal areas, related to semantic comprehension. In contrast, concatenative complexity correlates with left-lateralised inferior frontal (BA44) and bilateral superior/middle temporal areas, relevant to the processing of syntactic structure.

المكونات اللسانية التداولية في أفكار ابن جني (392 هـ)

Mohammed Adeel Abdelaziz Ali
Department of Arabic language, College of Humanities and Social Sciences, UAEU

لاحظ النحويون القدماء ارتباط اللغة بمحيطها الخارجي، وأن وصف الظواهر النحوية والتحليلات اللغوية المرتبطة بها لن يكتمل بدونه؛ لذا تعاملوا مع المتون اللغوية بوصفها نشاطا اتصاليًا حيًا، يخضع لمحيطه وظروفه، بما يحويه من شخوص وأحداث. وإن المطلع على كتب النحاة وتحليلاتهم الرصينة - لأحوال الجمل وما يطرأ عليها من ذكر وحذف، وتقديم وتأخير، وتعريف وتنكير- سيعلم يقينا أن النحاة العرب كانوا أول من نادى بعدم جواز دراسة اللغة منفصلة عن سياقات استعمالها، وحتمية فحص ملابسات الاتصال فيها. ويأتي ابن جني على رأس هذه الكوكبة، فهو ناقد بصير، ومفكّر صاحب رؤية مميزة، وتجربة فكرية ومعرفية واعية، لاسيما بعد مراجعته آراء علماء العربية وتصوراتهم، وقد نضج الخلاف بينهم واتضحت معالمه. كذلك فإن ثقافته النحوية الجامعة ضمنت له حسم الخلافات وتسوية الاعتراضات الموازية وفق أهدافِه وغاياته. وذلك فضلا عن وعيه الفائق بأصول الفقه وأحكامه، واتصاله بالواقع اللغوي - لاسيما بصدد التعامل مع المرويات- رافضا الإمعان في الذهنية والتعليل، ويروم راقم هذه السطور فحص الأسس الفكرية التي تبناها ابن جني وهو بصدد التعامل مع الظواهر اللغوية، لاسيما أن مقاربة ابن جني كانت تدعو إلى تذويب المسافة بين مكونات النظام اللغوي، وتلح على الانصهار والتفاعل فيما بينها، فجاءت نظرته كلية شاملة لذاك النظام بخلاف نظرة سيبويه الوسيطة التي كانت تدعو إلى المزج بين مكونات النظام اللغوي، وبخلاف المقاربة التقليدية التي نحت تجاه التفرقة بين مكونات النظام والحرص على استقلاليتها حال وصفها وتفسيرها. أقول: إن أبا الفتح قد أعتدَّ بفحص العلاقة بين العرف اللغوي - بوصفه معيارا ضابطا - وبين مطالب السياق الاستعمالي، ولم يجنح تجاه مسالك التأويل فيعمد إلى الإضمار والاستتار، وغيرهما من الفرضيات، لرأب الصدع بين واقع الاستخدام الشائع على ألسنة المستعملين وبين القواعد والأحكام، مما يفتح بابا للتصورات الذهنية والتأويلات لا نهاية له. وتمتح الدراسة مهامها ومكوناتها من معطيات المنهج الوصفي وإجراءاته. إذ سيقوم الباحث باستقراء جوانب محددة من كتابه الخصائص، دارسا إياها ومحللا، وصارفا همته إلى تحديد نظرة ابن جني الكلية من خلال خطابه اللغوي الخصائص، ومنه إلى إثبات أن أبا الفتح - وهو بصدد وصف القضايا اللغوية وتفسيرها - لم يكن منصرفا عن مقامات إنجازها، وضوابط إرسالها اللغوية والمعرفية بل قل إن شئت سماتها الشكلية أو الصورية جنبا إلى خصائصها التداولية.

منهج الآلوسي في استعمال الكليات النحوية في توجيه الأحكام الفرعية : آيات الأحكام نموذجاً

Emad Ahmad Suliman Zapin
Department of Arabic language, College of Humanities and Social Sciences, UAEU

بسم الله الرحمن الرحيم منهج الآلوسي في استعمال الكليات النحوية في توجيه الأحكام الفرعية : آيات الأحكام نموذجاً د. عماد أحمد سليمان الزبن جامعة الإمارات العربية المتحدة- كلية العلوم الإنسانية والاجتماعية قسم اللغة العربية وآدابها الملخص تعدّ الكليات النحوية من أبرز العلوم الآلية التي تكشف عن حقيقة النصّ القرآنيّ، لا سيّما في إطار الكشف عن الأحكام العملية الفرعية، ولا يخفى أنّ تباين مناهج تنزيل هذه الكليات على نصّ الأحكام الفرعية وتعدّدها، من الأسباب المركزية في تعدّد البصائر الاجتهادية في قراءة النصّ القرآنيّ؛ لذلك فلا معدى عن تطلاب سمات المنهج التي يتخذها العالم ونحن نكشف عن أطر تفكيره النحويّ، وقد حفزتني هذه الرؤية المنهجية على محاولة الكشف عن منهج الآلوسيّ في تنزيل الكليات النحوية على الفروع العملية، لما لذلك من دور بارز في الإهداف على العناصر المركزية لتفكيره النحويّ، ولأنّ هذا المنحى الإجرائيّ ماثل في رقعة واسعة من تبصّراته من جهة أخرى، لذلك فقد تقرّر أنّ نتائج هذه الدراسة ستتصل بسبب وثيق بمنحى الكشف عن العناصر المنهجية المشكّلة لتفكير الآلوسي النحوي. وقد اتخذت من آيات الأحكام رقعة لهذا التبصّر، واعتمدت في إحصائها ما قرّره العلماء الذين قدموا دراسات علمية فيها، كالسيوطي في الإكليل، والقنوجي في نيل المرام ، والصابوني في تفسير آيات الأحكام، فقمت بجمع العناصر النحوية التي استعملها الآلوسي في توجيه الحكم الفرعي، ونصصتُ على العناصر المنهجية في هذه العملية الإجرائية؛ أجلَ الوقوف على المحددات المنهجية المشكّلة للتفكير النحوي عند الآلوسي في تفسيره روح المعاني، واعتمدت في دراستي على مظانّ أصلية كتفسير الآلوسي، ومصادره كتفسير أبي السعود العمادي، والبيضاوي وحاشية الشهاب عليه، وكشاف الزمخشري، واعتمدت على مظانّ غير أصلية كمصادر النحو واللغة والبلاغة وعلوم القرآن، ويبرز في هذا الإطار كتاب الإسنوي الموسوم بـ الكوكب الدري فيما يتخرج على الأصول النحوية من الفروع الفقهية، لأنّ دراستي شديدة الاتصال بهذا المصدر من حيث المنهج والطريقة الإجرائية، لذلك فقد اعتمدت عليه كثيراً في القسمات المنهجية التي قدمتها في دراستي.

أدب الرحلات في المشهد الأدبي الإماراتي المعاصر «الجزائر حبيبتي» لأحمد راشد ثاني أنموذجاً

الرشيد بوشعير
كلية العلوم الإنسانية والاجتماعية – جامعة الإمارات العربية المتحدة

يعد أدب الرحلات من الأنواع الأدبية التي تراجعت وأوشكت أن تندثر وتختفي من المشهد الأدبي العربي المعاصر؛ وذلك مرتبط بطبيعة العصر وتطور الذائقة الأدبية؛ فالرسائل الديوانية والتوقيعات والمقامات، والشعر التعليمي، والتأريخ شعراً، كلها أنواع أدبية كانت مزدهرة في العصور القديمة، ولكنها انقرضت كما انقرضت بعض فصائل الحيوان والنبات، إذا أردنا أن نماثل بينها كما ماثل الناقد الفرنسي «برونتيير».

وأدب الرحلات في المشهد الأدبي الإماراتي يظل مقتضباً ومبتسراً، بالرغم من كثرة أسفار الأدباء الإماراتيين وولعهم باستكشاف العوالم الأخرى.

وإذا كان الكتاب الإماراتيون لا يحرصون على تدوين تجاربهم في الرحلة فإنهم كانوا يحرصون على الإفادة منها في أعمالهم الإبداعية الأخرى، سواء في الشعر أم في القصة والرواية، على نحو ما يطالعنا في قصيدتي «ريودي جانيرو» و«فينيسيا» لسلطان العويس، و«رأس ذي يزن» لسعاد العريمي، و«النبراس» لعلي أحمد الحميري، و«الحياة كما هي» لظبية خميس، و«حدث في اسطنبول» لكريم معتوق؛ فكل هذه الأعمال الأدبية لا تخلو من أدب الرحلات في شكله المضمر.

وهناك قلة من الكتاب الإماراتيين الذين أرادوا أن يكتبوا في أدب الرحلات في شكله الصريح، ومن هؤلاء محمد المر وأحمد راشد ثاني موضوع هذه المداخلة.

لقد زار أحمد راشد ثاني كثيراً من الأقطار العربية والأجنبية، ولكنه لم يكن حريصا على تدوين مشاهداته وانطباعاته وتجاربه، على نحو ما فعل محمد المر، ما عدا ما دونه عن زيارته القصيرة إلى الجزائر، وهي الزيارة التي ألهمته نصه السردي الجميل الموسوم بـ «الجزائر حبيبتي».

ويمكن تحديد ملامح منهج أحمد راشد ثاني في كتابة هذه الرحلة فيما يأتي:

1- التخييل :
2- انتقاء العينة الاجتماعية :
3- القدرة على التقاط المفارقات :
4- توظيف بعض تقنيات الرواية.
5- اللغة الشعرية :

ويخلص هذا البحث إلى أن أحمد راشد ثاني في هذه الرحلة يثري هذا النوع الأدبي ويطور من أدوات كتابته بالإفادة من خبرته الإبداعية في الفنون الأدبية الأخرى.

أدبيّة الرحلة وإشكاليّة التجنيس: دراسة نظريّة في ضوء المنهج الشكلانيّ

شفيق محمّد الرقب
قسم اللغة العربيّة وآدابها-جامعة الإمارات العربيّة المتحدة

تُعدّ الدراسة الأجناسية للأدب عملاً تصنيفياً تُضبط عن طريقه منظومة الآثار الأدبية. والجنس الأدبي اصطلاحاً: "هو مقولة تسمح بالجمع بين عدد معين منا النصوص حسب معايير مختلفة, وترسي في الوقت نفسه قواعد لقراءة هذه النصوص وتأويلها", وهذا يستدعي نشاطاً تحليلياً يقوم على جمع النصوص الفردية وتصنيفها في أجناس محددة بناء على السمات المميزة لها, "وانطلاقاً من مصادر أولية تقر بأن الأدب ليس ركاماً من النصوص المفردة بل مجموع ما بينها من علاقات".
ولم يحظ أدب الرحلات بدراسات كثيرة تنطلق من اعتبار الرحلة جنساً أدبياً, وظلّ ينظر إلى هذا الأدب على أنه يشمل مجمل كتابات ذات العلاقة بالسفر، لذا فإنّ هذه الدراسة تهدف إلى كشف السمات الفنيّة التي تجعل من الرحلة جنساً أدبيًّا له مقوّماته الخاصّة، انطلاقاً من النظريات النقديّة الحديثة الّتي وضعتها المدرسة الشكلانيّة.

مسند الإمام أبي حنيفة ـ دراسة وتحقيق
Musnad of Imam Abu Hanifa study and investigation

Abdulazeez Shakir Hamdan
Department of Islamic Studies, College of Law, UAEU

لقد تفنن علماء الحديث في جمع أحاديث النبي صلى الله عليه وسلم وفق مناهج مختلفة ، وقد كان من بين تلك المناهج المنهج المشهور الذي يعرف بالمسند – بضم الميم وسكون السين وفتح النون – ويريدرون به ترتيب الأحاديث على أسماء الرواة من الصحابة دون النظر الى ما تدل عليه الأحاديث من موضوعات . وللمسند منهج آخر عند المحدثين يريدون به ترتيب الأحاديث على حسب الموضوعات أو على حسب شيوخ المصنف . وهو بهذا الاعتبار يشبه ما يعرف بمنهج آخر عند المحدثين يعرف بالمعجم – وهو في اصطلاحهم الكتاب الذي يروي فيه المؤلف أحاديثه مرتبة على أسماء شيوخه . وهذا النوع هو ما قصده ابن خسرو البلخي في جمع أحاديث الإمام أبي حنيفة ، حيث قام بجمع طائفة من أحاديث هذا الإمام الجليل مروية بإسناده اليه مرتبة على شيوخ أبي حنيفة – رحمه الله تعالى - . ويعد هذا المسند من أهم مسانيد أبي حنيفة على الإطلاق – والتي تصل الى أكثر من خمسة عشر مسنداً – ولذلك اعتمده الحافظ ابن حجر في كتابه " تعجيل المنفعة بزوائد الأئمة الأربعة " ، والإمام الحسيني في كتابه " التذكرة برجال العشرة " ويأتي هذا البحث لتحقيق ذلك المسند الذي ما زال حبيساً في خزائن المخطوطات العربية والإسلامية . وقد كانت المنهجية التي سرت عليها في تحقيق هذا المخطوط ـ الذي تزيد عدد صفحاته على مائتي ورقة ـعلى النحو الاتي : أولاً : التعريف بالإمام ابن خسرو من حيث اسمه ونسبه ومولده وفاته ونشاته وشيوخه وتلاميذه ، وبيان منزلته العلمية ، وأقوال أهل العلم فيه . ثانيا : دراسة هذه الرواية من مسند الإمام أبي حنيفة ، وبيان قيمتها العلمية . ثالثاً : بيان منهج الإمام ابن خسرو في هذا المسند. رابعاً: نسخ الكتاب على النسختين التي تم الحصول عليهما ، ومقابلة نصوصهما. خامساً : تخريج الأحاديث والآثار ، والحكم عليها صحة وضعفاً . سادساً : عمل مشيخة لأبي حنيفة في هذا المسند ، مع التعريف بجميع شيوخه . سابعاً: التعليق على المواضع التي تحتاج الى بيان وتوضيح . ثامناً : عمل فهارس فنية متنوعة تسهل وصول الباحث الى بغيته. وآخر دعوانا أن الحمد لله رب العالمين.

Participatory Education: Insights from Biogeography, Phenomenology and Sun Tzu' Art of War

Nihel Chabrak and Essam Eldin Moustafa
College of Business & Economics, UAEU

In this paper we propose a participatory educational model to transform students learning experience and to help building high national capabilities to sustain economic performance and competitiveness, in a context of Emiratization. Drawing on biogeography, we explain why conventional educational models fail in creating leaders and innovators. The curriculum arrangement in the conventional model prevents students from establishing links between topics they learn in different courses and with their daily lives. Students experience insularity" that adversely affects their inclination to learn and self-develop. Students tend to become GPA-driven, with little interest in learning. Instead of creating leaders, the traditional educational model creates mundane actors and "judgmental dopes". Based on Sun Tzu Art of War precepts and on a phenomenological approach of the "lived experience", participatory education disrupts the artificial arrangement of the curriculum in the conventional educational model that creates "islands" of knowledge. Students are inspired and empowered to create and innovate by experiencing the "being" of entrepreneurs and innovators. For Sun Tzu a skilful leader is the one who subdues the enemy's troops without any fighting. Participatory education leads to victory because students continue learning and self-developing on their own. A phenomenological approach based on the "lived experience" helps creating the conditions for this endless learning journey. It leads students not to think conceptually but to live their experience. The lived experience is more than drawing on students' experience, a task most of educators do in-class. In the lived experience students do not evoke their experience. Rather, they create, evaluate and transform it. Participatory education helps students not to live in a future driven by the past. It places students in a setting where they can create a future and the required context in the present to make this created future happens.

A Targeted Role for L1 in L2 Vocabulary Acquisition with Mobile Learning Technology

Daniel Baxter Jackson III
University Foundation Program, UAEU

This presentation aims to examine the role L1 in L2 vocabulary learning with mobile technology. By surveying the top performing students on a Computer Generated Exam (CGE) on their use of two mobile learning applications, Quizlet and Educreations - their perceptions and scores corroborate and support the targeted use of L1 in L2 vocabulary building.

Deployment of Technology Innovations in Teaching and Learning: A Comparative Study

Enas Said Abulibdeh[1], and Abdurrahman Ghaleb AlMekhlafi[2]
[1] AAU; [2] College of Education, UAEU

This study investigates the deployment of technology innovations in terms of services, applications, and platforms in teaching in the UAE, Malaysia, and Jordan. A total of 250preservice and in-service teachers participated in the study. A5-point Likert scale questionnaire was used to collect data on technology innovations, namely services, applications, and platforms that are being used by teachers to enhance teaching and learning. Descriptive statistics and independent-samples t-tests were used to analyze data. Descriptive statistics were used to measure the overall mean scores of the investigated variables, while independent samples t-test were used to compare between teachers on selected variables including gender, country , years of experience, and level of usage. Study findings revealed a variation in the use of the technologies investigated. On the other hand, results revealed thatyeas of experience impacted the usage of new technology negatively. Pre-service teachers showed more tendency and willingness to adopt and learn innovative technology compared to in-service teachers. Implications and recommendations for education are discussed.

Attitudes Toward and Images of Children with Disabilities

Hala Elhoweris, Mahmoud Fahd Gharaibeh, Marwa Alkaabi, Olla Abdulrahman, Maryam Saif Alshamsi, and Wasmeya Al Ahbabi
College of Education, UAEU

Young children without disabilities can be shocked the first time they see a person with a disability. Even children with disabilities can be frightened when they encounter a person with a different disability than their own. According to Covington, many people without disabilities feel the fear of individual with disabilities (Bryant & Bryant, 2011). Books about children with disabilities can help children with disabilities become more accepting of their own and can help children without disabilities become more accepting of their peers with disabilities. Many research studies indicated that people with disabilities were often portrayed negatively in children literature (Biklen and Bogdan, 1977; Blaska & Lynch, 1994). Previous researchers indicated that individuals with disabilitis were often disparaged and erroneously presented in childrens literature books. Since the role of media and literature in shaping children attitudes toward individuals with disabilities is well documented in research (e.g., Bryant & Bryant, 2003), it is critical to analyse the available children literature books in the UAE library and College of Education Student Development Unit. The aim of this study was to analyse children literature books which feature books with disabilities characters and to examine the differences between Arabic and English children literature portrayal of people with disabilities. One hundred and ten children literature books were reviewed. Of the books that were reviewed, thirty eight books only included persons with disabilities in the storyline or illustrations. A qualitative analysis was used using the 'Images and Encounters Profile', a tool developed by Blaska and Lynch (Blaska, 1996) with ten criteria for reviewing books with characters with disabilities. Findings of this study indicated that people with disabilities were portrayed negatively in English and Arabic children literature books.

Reshaping UAEU Students Perceptions toward Private Sector Employment

Ali Said Ali Ibrahim
College of Education, UAEU

This study investigates whether raising UAEU male and female student's awareness of the unemployment problem and motivating them to pursue private sector employment upon graduation could lead to reshaping their perceptions of work in the private sector. The study is done using a pre-test, treatment, post-test research design. First, initial student's perceptions are explored using a 30-item questionnaire. Then, over one month, students are exposed to readings, statistics, and videos about the unemployment problem in the UAE and prospects for the private sector. Moderated WhatsApp discussions are also utilized. Finally, the impact of this treatment on student's perceptions is assessed. In addition, student's perceptions of the major barriers to private sector employment and of needed governmental efforts are investigated. The study found that it is hard to change the perceptions of students toward private sector employment for various reasons. UAEU Emirati students feel entitled to government jobs and believe that employment in government positions provides higher salaries, higher job security, and safer retirement. They also believe that in government positions, they will have fewer hours to work and less work demands. They made recommendations for accepting employment in the private sector; nonetheless, these recommendations are hard to implement without serious governmental support.

The academic effect of integrating iPad technology in teaching 3rd-grade primary school students with dyslexia, English as a Second Language (ESL) reading, spelling and writing skills

Elazab Mohamed Elazab Elshazly and Efthymia Efthymiou
College of Education, UAEU

The purpose of this study is to explore the academic effect of integrating iPad technology in teaching 3rd-grade primary school students with dyslexia, English as a Second Language (ESL) reading, spelling and writing skills. The study's objective is to investigate the impact of iPad on the academic improvements of third-grade students' with dyslexia reading, writing and spelling skills in a primary school in Al Ain, UAE. The design of this study is a quasi-experimental design, based on a pre and post control group design. The study sample is consisted of twenty (20) male students with dyslexia, from two (2) grade three (3) classes in one primary school in Al-Ain in the UAE. Students' outcomes in spelling, reading and writing on their 2014-2015 grade-3 English will be compared based on different instructional methods. The experimental group (10 students with dyslexia) will be instructed through iPad applications, and their improvements will be compared to those of the control group (10 students with dyslexia) instructed through traditional, non-technological, methods. A pre-assessment test will be conducted for evaluating the reading, spelling and writing skills of both groups of students prior to the intervention. After eight (8) weeks, both groups will be involved in post-tests for evaluating their improvements, if any, in reading, spelling and writing. Significance of the study Globalization and the increasing supremacy of the English language over the political, cultural and economic levels necessitate an effective preparation for the young generation to acquire the abilities and skills that help them meet the needs of their future careers. The ability to read English effectively and to handle various IPad tools purposefully has become an essential need for the young generation to cope with the current information revolution. This study is unique in its deep analysis of the effect of IPad tools on the reading skill to achieve better integration of IPad to improve reading English as a second language. The study explores the effect of various IPad tools on the spelling, reading and writing skills.

Teacher resistance to educational change in the United Arab

Wafaa El Zaatari, Ali Ibrahim, and Ali Al-Kaabi
College of Education, UAEU

Teacher resistance to educational change in the United Arab Emirates This study investigated four factors for teacher resistance to educational change in government schools in the UAE: psychological, personal, school-culture-related, and organizational. Data were collected through a survey of 39 statements on a Likert scale completed by 255 male and female, foreign and national teachers who taught different grade levels. The findings of the study showed that teachers felt the need for change and trusted change agents and principals. However, they needed to be prepared psychologically because they were afraid of the unknown consequences of change. They were also exhausted by frequent changes that they felt were imposed. Further, they faced difficulties in teaching students who were not grasping the new curriculum because of the English language barrier. The study recommended that well-planned changes, supportive principals, change-based effective professional development, and a reward system are needed for the change to succeed. Above all, change should fit the UAE culture.

The Impact of Classroom Density on Teachers' Performance and Students' Achievement in Al-Ain Schools: Perspective of Teachers and Students

Saif Saeed Salem Almanei and Sultan Al Swuidei
College of Education, UAEU

This quantitative study aimed at investigating the students' and teachers' perceptions about the effects of classroom density on teacher's performance and student's achievement in Al-Ain Schools. The study addressed the two research questions (a).To what extent classroom density impact teacher's performance in Al-Ain Cycle Three Schools?(b) To what extent classroom density impact students achievementin Al-Ain Cycle Three Schools? To have an in-depth understanding of whether class density impacted teaching and learning students, the causal comparative study design was conducted to collect data via two questionnaires; one for teachers, and the other for grade 12 students. The findings of this study revealed that classroomdensity impacted both the teacher's performance and students' achievement negatively according to the perceptions of most teachers and students. The study grants some insights that help schools and all stakeholders improve teaching and learning by reducing the classroom density. It is recommended to take into consideration the classroom density and set rules that decrease the classroom density; set clear rules to the importance of availability of multifunctional halls and using multifunctional furniture, deliver non-traditional lessons and integrate technology in teaching and learning in classrooms in Al-Ain schools. The study is limited to grade twelve students in one academic year 2014 in one educational zone. It included one Cycle three school teachers.

The Effect of the Utilization of Webquest on Students' Reading Comprehension Performance

Aisha Saeed Alshamsi and Abdurahman Almekhlafi
College of Education, UAEU

Government leaders, educators and general public is most countries in the world believe combining English language proficiency with skills in information technology will facilitate success in life (Tuan, 2011). The WebQuest is considered as a framework for structuring learner-centered instruction in teaching English as a Foreign Language using Internet resources. This study investigated the effect of WebQuests on Grade 11 students' reading comprehension performance at one of Al Ains Secondary Schools in the United Arab Emirates. Students' perceptions towards these WebQuests were also investigated. A quasi-experimental research design was employed for this study. The study employed quantitative techniques in order to answer two research questions that involve students reading comprehension performance and perception towards the utilization of WebQuest in English classrooms. A pretest and posttest reading comprehension assessment was administered for both groups. Prior the treatment and WebQuest instruction, both groups were set for a reading comprehension pretest. One unit of WebQuest was selected to be implemented in Grade 11 English language classrooms. The treatment group received a researcher developed WebQuest embedded in their English language curriculum, while the control group received in a classroom based teaching environment. After the treatment, the same reading comprehension that was used as a pretest was used as a posttest for both groups. After the treatment, a five-point Likert scale questionnaire to examine the perception of the experimental group towards using WebQuests for teaching reading in English was administered. Analysis of co-variance (ANCOVA) and descriptive statistics were used for data analysis. Results indicated a significant difference in reading comprehension performance in favor of the experimental group (WebQuests users). The results were also enhanced by the positive feedback of the students towards the implementation of the WebQuest through the perception survey carried out after the treatment. Further research is needed in the area of WebQuest and its usefulness in enhancing students' reading comprehension and literacy in general, and another research to find if there is a correlation between students' perception toward utilizing WebQuest and their reading comprehension performance. Finally the study makes pedagogical recommendations for adapting WebQuests in the Emirati context and for future research in the UAE.

Development and Validation of Instrument to Assess Scientific Inquiry Practices in the United Arab Emirates' Secondary School Curriculum

Hassan Hamid Tairab and Ali Khalfan Al Naqbi
College of Education, UAEU

The main purpose of this study is to develop and validate an instrument to assess the provision of scientific inquiry practices in United Arab Emirates' (UAE) secondary school science curriculum. The study is part of a funded research project that examined Emirati school science teachers and their students' knowledge and practice of inquiry based instruction and processes of science. It was thought that through examining such provision of scientific inquiry practices we can identify the extent to which inquiry-based instruction and processes of science are implemented in the Emirati schools and how these practices relate to and affect the overall goals of science education in UAE. The study was based on the notion that scientific inquiry is a much needed and thought of pedagogy within the context of UAE. An inquiry based instruction is a teaching and learning approach by which students are actively engaged and progressing towards becoming literate about what science is, what science looks like, how to do science, and how to communicate science. The study adopted the NRC's (2000) framework that identified five essential features to characterize the scientific inquiry as a theoretical framework to conceptualize the instrument dimensions. Initial analyses suggest that the newly constructed instrument can accurately draw our attention to the extent of provision of scientific inquiry practices in high school science curriculum of United Arab Emirates schools.

A College-Wide Assessment Management System in an Integrated Medical Curriculum

Sami Shaban
College of Medicine and Health Sciences, UAEU

Introduction: In an integrated curriculum such as the one at the College of Medicine and Health Sciences (CMHS), United Arab Emirates University, each course is taught by multiple instructors from several disciplines. The College found itself in need of a management system to perform the vital task of assessment and has opted to develop its own assessment management system to meet the needs of creating a college-wide question bank for all levels of the curriculum, delivery of assessments, and reporting of results and examination analyses. Methods: The process of development and implementation of the CMHS Assessment Management System (AMS) involved requirements analysis, relational database design and process flow design. The system uses ASP, JavaScript, AJAX, and MS SQL Server. The online system is user-friendly and user control is taken into account. Results: Based on the requirements analysis, a system was developed for collecting and storing tagged questions (with metadata), delivering assessments, collating and disseminating results, giving feedback to learners, giving feedback to question writers, comparing grouped questions (e.g. by theme), and automatically generating assessments based on selected criteria. Over 400 assessments of the Multiple Choice Question (MCQ) variety have been delivered during the last three years. Currently there are over 15,000 unique MCQ questions in the bank assessing all levels of the medical curriculum which have been developed by CMHS faculty members for the most part. These questions have been delivered to learners in examinations and are stored in the system along with their tags and psychometric data. Conclusions: An integrated curriculum can benefit from an assessment management system by creating a question bank and delivering assessments. Specifically by collecting and storing tagged questions, delivering assessments, collating and disseminating results including question psychometrics, giving feedback to learners, giving feedback to question writers, and finally by collecting tags (metadata) for each question which allows for comparison of grouped questions (e.g. by theme). Both learners and teachers can benefit from such a system by getting proper feedback on performance.

United Arab Emirates ICT Penetration as Indicator of an Information Society: A Case Study of ICT Penetration and Usage among United Arab Emirates University Students

Yazid Benchabane and Ahmed Bello Abubakar
University College, UAEU

The advent of mobile technology and diffusion of communication technologies influence the lives of everyone nowadays; United Arab Emirates is one of the models of an information society with high percentage of Information and Communication Technology (ICT) penetration among its citizens and an economy that leverage ICT for increased competitiveness and development. In this paper, we investigate the ICT penetration and usage among students in the United Arab Emirates University (UAEU), ICT usage habits and behaviors, the use of social networks, and students' attitude toward ICT and its impact in their learning process. Therefore, we surveyed 200 freshman and college students, and from the results we analyze students' activities when they interact with ICT in the learning process, students' attitude toward the use of ICT within the institution and readiness for the 21st century information society.

Storytelling for Children

Eman Rabiah, and Boumediene Belkhouche
College of Information Technology, UAEU

Long ago, storytelling was a part of our cultural heritage, where people used to gather in the market to hear stories from storytellers. At night, children used to gather around their grandparents and listen to stories and lullabies. These stories were enjoyable and educational, because they evoked fantasies, heroics, far away magical places, while transmitting wisdom, heritage, and values. Nowadays, smart devices have completely occupied our spaces and storytelling is slowly fading away from tradition. This kind of transmission in the culture motivates us to restore our cultural heritage, specifically the idea of storytelling, by building an interactive story that that is designed for children, to let them learn in a joyful context. The interactive story was built based on the storytelling concept, in which the child listens to a storyteller and will be able to interact with the story environment at the same time. The interactive story has three major educational goals: enhancing the reading skill, enhancing the listening skill and enriching the children vocabulary. To achieve the desired goals, we start by finding a story that is relevant to our culture, re-writing the story in a way that is more appropriate for children, using appropriate vocabularies, and then we start to design the needed graphics and programming the story to respond to the children interaction. This paper discusses the importance of restoring our cultural heritage (the idea of storytelling), and how we present the storyteller in a modern context using new technologies, the effectiveness of using this approach in learning, specifically to enhance the children vocabulary and knowledge acquisition, and to link them to their environment and culture. Then we discuss our approach and the steps we followed to achieve our goals, and finally we present a simulation that shows the output of our approach.

Arabic Vocabulary Acquisition through Exploration

Fatmah Al Ramsi , and Boumediene Belkhouche
College of Information Technology, UAEU

Language competency is fundamental to academic and social success. Vocabulary acquisition is a primary basis for language competency. Dictionaries have been used as a resource to enrich vocabulary. The general trend in dictionary development is towards the introduction of interactivity and visualization. Not only do they effectively capture the traditional didactic concepts, modern e-dictionaries provide structures and functions that support and encourage learning. To a certain extent, they can be viewed as a scaled down version of game-based learning (GBL), which can be used as a subcomponent. . In GBL, we see effective alternatives to acquire linguistic skills, specifically in the context of the Arabic language. GBL supports a highly effective multi-modal learning environment and various forms of learning strategies, such as exploration, interactivity, and active participation. The purpose of this research is to develop a conceptual model and an implementation as a proof of concept. Our model lays the foundations of game-based learning by defining methods, processes, and procedures to support the development of game-based learning systems. Integration of learning and gameplay raises various issues, among them the learning process, learning content, and game characteristics. To delimit the progress in GBL modeling, we review some existing Arabic games intended for education of children. We found that there are very few games for learning Arabic dedicated to children. We analyzed several games for learning Arabic in terms of the nature and organization of the contents, gameplay, interactivity, graphics and assessment. Generally, they are simplistic and they tend to revolve around the same trivial idea. The overall presentation lacks quality in terms of graphics, animation, colors, and voice-over. None of these Arabic games shows a systematic design process. Moreover, to synthesize the dominant features and trends, we conducted a comparison of current dictionaries features in different languages. We selected some representative English and French dictionaries available on the web, which provides many features like searching (by image and by category) and finding detailed descriptions. For comparison purposes, an Arabic dictionary was also included. This study was intended to identify possible features that enhance the ease of learning a new language within a GBL context.

Game-Based Learning: Requirements and Challenges

Heba Ismail, and Boumediene Belkhouche
College of Information Technology, UAEU

Game-based learning (GBL) research addresses issues of integrating video games and learning in order to provide environments that are highly conducive to enjoyable and effective learning. Despite the fact that GBL instantiations are complex software systems, their designs have not benefited from software engineering modeling. Indeed, the prevailing "designs have been elaborated in a descriptive mode by researchers outside of computing. Thus, our task is to apply requirements engineering in order to derive from these conceptual designs a set of software requirements that captures the functionality of GBL systems. The resulting functional requirements can be used as a basis for software design and implementation. Ideally GBL systems should successfully achieve learning outcomes in a joyful and engaging game environment exploiting suitable software features and components. Consequently, GBL Systems combine at least three distinct design disciplines: game design, instructional design, and also include aspects of software design. The approaches taken for each can be very different so combining them is not straightforward. The variability in the nature of each discipline imposes a great challenge in modelling the design of GBL. Moreover, Learning is a very complex human activity that is not easily modeled or measured. For example, different people have different learning styles, different subject matters may require different learning approaches, as well as, learning capacity may differ from one person to another. There are some rules and theories defining such aspects of learning in educational and cognitive sciences, yet, defining them in a concrete and consistent software model that can be used as a general basis guiding the design of all GBL systems is not an easy job. Furthermore, maintaining the essence of "game" while fostering learning is a big challenge. Finally, choosing the best software logic controlling the implementation of cognitive function without compromising learning, or joyfulness is yet another challenge that we need to deal with. Our approach involves: (1) an analysis of some established GBL design frameworks; and (2) an elaboration from these conceptual designs of a set of software requirements that capture the functionality of GBL systems. The proposed requirements are intended

A Game-Based Learning Software Model

Shamsa Abdulla Salem Ali, Nafla El Derei, and Boumediene Belkhouche
College of Information Technology, UAEU

We elaborate a software model of game-based learning by developing several design perspectives to facilitate direct implementation. Our main concern is to elaborate a software design so that implementability issues can be directly addressed. Our resulting design lends itself easily to implementation using any object-oriented approach. The proposed software model consists of four perspectives. Initially, we mapped the game-based learning framework into a three-tier system architecture which consists of: (1) the presentation layer that represents the user interface to translate the tasks and the results to visual objects the user can understand; (2) the business logic layer that executes commands and calculations, and makes logical evaluations; and (3) the data layer where the information is stored and retrieved from a data model repository. The next perspective is the model-view-controller (MVC) architecture, which shows the packages and their classes that are used to implement an educational game. The third perspective is captured by the structural design (class diagrams), which is a refinement of the MVC architecture. The last perspective is the behavioral design (state chart): For the player to learn while playing an educational game, he/she must perform cognitive activities by interacting with objects in the game in order to acquire knowledge. The following state chart illustrates the states of one object of the game, which is the player. For an object to move from one state to another it must carry out relevant actions during the interaction with the other objects, thus resulting in a state change. Basic cognitive actions that are provided consist of: perception, association, recognition, debriefing, locating, composition, recalling, and classification. Physical actions are the basic movements, such as: jump, walk, run, and many others

Modeling and Virtualization of Emirati

Aysha Al Neyadi, Eiman Al Hassani, Shaikha Al Nuaimi, Wadha Al Ketbi, and Boumediene Belkhouche
College of Information Technology, UAEU

Cultural heritage is the soul and strength of society. Preserving it and keeping alive in a meaningful sense require a multimodal representation that immerses the visitor into an authentic and semantically-rich environment. To accomplish this objective, we elaborate a model and a game-like implementation of an Emirati village in the 1960s. Emirati culture has a great importance in terms of content and history; it reflects the past life of our ancestors, a life rich in culture, wisdom, and great deeds. Not only this culture needs to be preserved for future generations, but it must be a source of inspiration and learning. Museums are the typical media that serve as repositories of culture. Technology though virtualization and animation has found its way into museum displays. Such displays offer multimedia representations of cultural artifacts to enhance the visitor's learning experience. Yet, they do not take full advantage of interactivity and immersion as supported by games. Besides learning, there is a critical need for the transmission and preservation of our cultural heritage in a format that is attractive an engaging. This becomes clearly evident when one realizes the limited knowledge Emiratis have about the past. They need an environment that would help them relive the ancient life. A virtual environment capturing this past will help preserve, present, learn, collect and document the heritage that related to Emirati culture, effectively building a connection between the past and the present and transferring the culture to future generation. The Emirati virtual environment is a learning environment intended for the general audience. It captures the Emirati life style of a village in the 1960s. This environment immerses the explorer into old life scenes of the past. Moreover, it is intended to capture and preserve the Emirati culture for present and next generations by modeling the traditional way of life. To capture the essence of a culture-rich village, we developed a conceptual model of a village. This is a hierarchical model that highlights the major components and their relationships. Components may be physical (e.g., trees, houses) or conceptual (activities, such as ceremonies. The central node is the main concept (the notion of village) and the peripheral nodes constitute its refinements. Links represent the relationships. Nodes may be atomic, that is, not subject to further refinement, or complex nodes that have their own maps. Complex node will be further refined. The use of conceptual maps has been shown to be an effective medium for organizing knowledge and facilitating learning. Our approach for elaborating a conceptual model of cultural village involved a synthesis of various historical documents, pictures, and testimonies from Emirati elders. This process addressed the basic question of how to capture rich and authentic settings in one cohesive environment. Thus, material depicting the past was analyzed into order to identify the components, their characteristics, and their functionalities. This decomposition allows us to create at the implementation level a variety of highly-flexible scenes and scenarios. That is, starting with these compon

Developing innovative eco-friendly parking facility at UAEU campus as a part of UAEU strategy plan of 2017-2021

Amany Salem Mohammed Alkinde, Amani Ali Albadi, and Khaula Alkaabi
College of Humanities and Social Sciences, UAEU

The general trend of the UAE to have clean environment and a renewable resources of energy, His Highness Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi said:" oil in the UAE will run out within fifty years". In this project we will discuss environmental, economic problems and new application to the renewable energy, in which we tried to find some solutions to reduce these problems and to apply some new technologies. One of these problems is air pollution that produced from cars that works by fuels. So, we decided to reduce fuels usage by switching into the electrical power that works by renewable energy. Electrical car offers the best solution for clean air and reducing spent fuels. It can be used in many different field and places, minimum cost and service. We will create a model that represents electrical charging station at UAEU campus with parking system. This charger station depends on the Solar energy of the sun and will switch the parking color from grey to green because of its benefits. We will distribute a survey to UAEU student and faculty members in addition to the cars companies to see their opinion about electrical parking station and to see the public awareness about renewable energy and environmental problems.

New Urbanism as a tool to revive Sharjah neighborhoods local parks

Rana H. Abdulla Al Thawabta and Sahera Bleibleh
College of Engineering, UAEU

United Arab Emirates, as most of developing countries, is witnessing a rapid development in diverse levels such as the economic, social, culture, and environmental levels. Although such development is contributing in the country growth, evolution and modernity, it still has many side effects which challenge the country on various scales as the pollution problem and its effect in the local ecological system. Currently, UAE tries to adopt many strategies to confront the impact of these challenges on the city as sustainability which becomes one of the main adopted concepts that leads the development criteria. Sustainability or sustainable urbanism movement - which is the umbrella of many similar concepts as smart growth, green building, and new urbanism - has been defined by researchers from different perspectives.. However, the most common definition of sustainable urbanism is that it is being the ultimate solution to achieve better life quality for human being as well as the ecological system. Based on the concepts and criteria of the sustainable urbanism movement, this paper investigates sustainability on the level of neighborhood urban structure and the active use or passive use of open spaces -particularly local parks in Sharjah city. Applying case study approach, the fieldwork has been conducted in local parks in selected neighborhoods in Sharjah city to explore its effect on the surrounding environment and the inhabitants' life quality. There are two main reasons for selecting the local park as the research case study: the first is the possibility to measure sustainability through exploring the presence of its theoretical criteria (environmental, social, and economic) and their impact on the selected physical spaces. And, second, is the contextual dimension by observing the actual use of space and community activities. The research aims to find the missing link between theory and implementation in an attempt to develop a proposal to actively engage the abandoned spaces in the selected neighborhoods.

Mapping the changes and degradations of the mangrove forests between 1990-2015 in the Emirates of Abu Dhabi UAE using satellite data

Mazoun Al Alawi, Amany Al Kendi, Fatima Al Neyadi, and Abdelgadir Abuelgasim
College of Humanities and Social Sciences, UAEU

In the past 30 years the UAE have embarked in an ambient program of urban and economic development, including major projects related to coastal development. Historically, mangrove forests formed a major land cover on the coastal areas of the UAE. Such forests provides vast ecological and economic functions. Mangroves helps to maintain water quality by filtering toxic pollutants, excess plant nutrients and sediments by absorbing other pollutants. Mangrove forests are rich in biodiversity providing a habitat for a wide range of marine terrestrial and plant species. Mangrove leaves, live or decaying, and their tree roots provide nutrients that nourish plankton, algae, fish and shellfish. Furthermore, mangrove forests provide protection and shelter against extreme weather events, such as storm winds, high waves and floods, as well as tsunamis. Loss of mangroves can lead to polluted drinking water due to the intrusion of saltwater into ground water aquifers and exposes coast lines to erosions. However, mangrove forests in the UAE have been seriously affected and degraded in the past few decades. This research study assesses the ecological status and changes of the historical areal extent of the mangrove forests in the UAE using a set of multi-temporal satellite data set. In addition, identify the primary reasons for mangroves forest degradation being natural or anthropogenic. The study area focuses on the mangroves in the Emirates of Abu Dhabi. Landsat TM data from 1990s and 2015 have been acquired for the study. Image processing steps involved radiometric normalization, image cropping and land cover classification. An unsupervised classification approach was followed to separate mangroves, water, desert and urban pixels. A post classification comparison method was applied to investigate the changes in the mangrove areas. Preliminary results showed that mangroves areas have been decreasing tremendously during the 25 years period. The land areas covered by mangroves in the Emirate of Abu Dhabi have declined due to anthropogenic human activates in the coastline mainly due to coastal development, construction of sea ports, man-made islands, and other infrastructure features.

Integration of a Vicon Camera System for Indoor Swarm of a Parrot AR Drones

Marwah Mohammed Abdoon, Maha Abdulwahab Shehada, Shaima Abdulwahab Al Habsi, Ahamed Masood Thottiyil, and Hassan Noura
Department of Electrical Engineering, College of Engineering, UAEU

The study of UAV technology and its application have substantially grown in the past two decades and is an active research field. A research project was done in summer 2015 focusing on UAV's technology field. The purpose of this research was to test an indoor autonomous flight control of UAV and implement a cooperative flight control of two UAV's quadrotors. In this research, a UAV of type Parrot AR Drone 2.0 was used and controlled by MATLAB Simulink (SDK) which was developed by Mathworks. The SDK allows a single AR Drone to track a predefined trajectories (e.g. square and triangular trajectories) and retrieve its estimated position. To test the drone controller, a Vicon capture system was used to track the AR Drone real position. To compare between the estimated position obtained by AR Drone on-board sensors and the real position provided by Vicon cameras, the SDK and the Vicon Simulink were integrated together. A code was written in MATLAB to make 3-D plots for the measurements. As a result, the AR Drone position estimation was found to be inaccurate compared to the drone real position. In order to implement a cooperative flight control, the SDK was adjusted to control two AR Drone simultaneously. There were many adjustments done. First, the SDK Simulink blocks were duplicated to control each drone separately. Since all AR Drones has the same default IP address, one of the two IP addresses was changed to avoid confusion. Also, one of the local UDP ports was changed and assigned a different value by trial and error. As a result, both AR Drones were successfully able to be controlled simultaneously. Both of them were able to follow the same trajectory as well as different trajectories. A full-fledged cooperative control implementation on the drones with real time motion capture feedback system is a consideration for future work.

Designing an Eye Partner-Assisted Scanning Keyboard

Zeenat S AlKassim and Qurban Ali Memon
College of Education, UAEU

The proposed research work focuses on building a substitute keyboard for people with physical disabilities (particularly, paralysis). This is done through designing an algorithm for eye movement detection using the partner-assisted scanning technique. The study covers all stages of gesture recognition, from data acquisition to eye detection and tracking, and finally classification. With the presence of many techniques to implement the gesture recognition stages, the main objective of this research work is implementing the simple and less expensive technique that produces the best possible results with a high level of accuracy. The results, finally, are compared with similar works done recently to prove the efficiency in implementation of the proposed algorithm. The system starts with the calibration phase, where a face detection algorithm is designed to detect the user's face by a trained super vector machine. Then, features are extracted, after which tracking of the eyes is possible by skin-colour segmentation. A couple of other operations were performed. The overall system is a keyboard that works by eye movement, through the partner-assisted scanning technique. A good level of accuracy was achieved, and a couple of alternative methods were implemented and compared. This keyboard adds to the research field, with a new and novel combination of techniques for eye detection and tracking. Also, the developed keyboard helps bridge the gap between physical paralysis and leading a normal life. This system can be used as comparison with other proposed algorithms for eye detection, and might be used as a proof for the efficiency of combining a number of different techniques into one algorithm. Also, it strongly supports the effectiveness of machine learning and Appearance-based algorithms.

The Impact of Dubai's Architectural Wonders on the Daily Indigenous Performance in the Light of Cultural Modernity and Urban Space

Zulfat Salahudeen Kassim Al Kassim and Sahera Bleibleh
College of Education, UAEU

Alongside the dramatic development boom that the UAE has witnessed as a whole over the last few decades, Dubai specifically has undergone bewildering and spectacular architectural evolutions that transformed the city into a tourist hub and a global attraction. Iconic buildings such as Burj Khalifa and Burj Al Arab have emerged as prominent landmarks that promote the city's global image and are built to combine traditional/local elements in such a way as to form completely new unrecognizable forms i.e. a new genre of design. Thus, those architectural spectacles attract visitors from outside as well as Emirati citizens/residents from within. However, one is bound to ask: How does the indigenous Emirati population 'receive' and 'perceive' these major architectural developments? Moreover, what kind of cultural implications do they pose on the Emirati on a daily basis? This research aims at exploring how Dubai's iconic architecture has impacted the traditional, historical and cultural heritage of the United Arab Emirates's indigenous population. Above all, the study aims at surfacing the voice of the indigenous Emiratis with respect to these themed architectural structures/environments and to reveal how they define their cultural identity through their daily interactions with cultural aspects around them.

Sustainable Heat Treatment

Basel Alsayyed Ahmad and Iman Abdulwaheed Abdulkareem
College of Engineering, UAEU

The author in this paper presents an application for a sustainable manufacturing process, namely, heat treatment in general, but annealing in particular. A solar collector of solar heat is designed and manufactured. A parabolic solar collector is designed with a reflecting surface and the heat is collected at the focal point of the parabolic surface. A comparison study has been made between regular furnace annealing and solar annealing. A workpiece of the same properties is used to prepare samples to be heat treated with traditional furnace, and via the solar heat treatment. Initial results are encouraging; however, more work is being developed to study and define the solar annealing process parameters.

Fabrication of low cost H2S gas sensor using CuO nanoparticles

Ayah Faeik Salim Abu Hani[1], Dr. Saleh Thaker Mahmoud[1], Dr. Ahmad Ibrahim Abdelrahman Ayesh[2]
[1] *College of Education, UAEU;* [2] *Qatar University*

Hydrogen sulfide (H2S) gas is a colorless, poisonous, corrosive, and flammable. H2S often results from the bacterial breakdown of organic matter in the absence of oxygen, thus, it exists in natural gas with a percentage up to 90%, and by far the largest industrial route to H2S occurs in petroleum refineries. The aim of this project is to fabricate low cost hydrogen sulfide gas sensor by incorporating CuO nanoparticles within the polymer membranes and to investigate the sensing characteristics of the fabricated sensors. CuO nanoparticles can be synthesized with different methods such as a colloid microwave-thermal method, where the average size of nanoparticles can be tailored by controlled microwave treatment time. The proposed sensor consists of poly-vinyl alcohol (PVA) polymer doped with ionic liquids (IL), and CuO nanoparticles, then the mixture is dried to obtain a thin film (sensing material). The sensor is then exposed to H2S gas diluted with N2 gas under constant conditions during the measurements. Basically, the resistance of the sensor is measured at different operating temperatures where the sensors sensitivity, response time and recovery time are studied and compared with other works. Finally, our main interest is to produce low cost H2S sensor which is sensitive and selective to H2S gas.

CO2 absorption sing fabricated polymeric flat sheet membrane

Dalal Mohamed Al Mansoori, Sarah Khameis Hefaity, and Nayef Ghasem
College of Engineering, UAEU

Global warming is the increase in the average temperature of the earth's atmosphere. Climate temperature alteration is the one of the major environmental crisis of our time. Carbon dioxide (CO2) is a very important component of the atmosphere, carbon dioxide is released through natural processes such as respiration and volcano eruptions and through human activities such as deforestation, land use changes, and burning fossil fuels. Humans have increased atmospheric CO2 concentration by a third since the Industrial Revolution began. CO2 is believed to be the major cause of global warming. In this study a polymeric flat sheet membrane fabricated in our lab is used as gas-liquid contactor process for absorption of CO2 from flue gas. Various concentrations of aqueous sodium hydroxide are used as the absorption solvent. In the present work varies flat sheet membrane were casted using polyether sulfone (PES) and polyvinyl diene fluoride (PVDF). The fabricated flat sheet membranes were installed in a flat sheet module and testing against removal of CO2 absorption for gas mixtures. The PVDF membrane shows superior performance over PES flat sheet membrane. The effect of various operating parameters were experimentally investigated. The effect of inlet gas flow rate, inlet liquid flow rate and solvent temperature on the percent removal of CO2 were investigated. Results reveal that high liquid flow rate and solvent temperature enhanced removal efficiency by contrast, the percent CO2 removal decreases with increases of inlet gas flow rate.

Carbon dioxide capture and separation technologies

Mayar Kamel and Mahmoud Al-Ahmad
Electrical Engineering Department, College of Engineering, UAEU

Carbon dioxide (CO2) capturing has shown a major role in reducing the harmful concentration of greenhouse gas emissions in the atmosphere, it also controls the effects of global warming which has become an environmental issue in the recent years. CO2 adds more than 60% to global warming because of its enormous emission. In the previous 650,000 years the concentration of CO2 was the maximum. Human activities causing greenhouse gases, includes N2O affected by the changes of agricultural land, CH4 from natural gas, and SF6 from refrigerants, CO2 designed by burning fossil fuels and etc. Energy is one of the most critical features of our present lives. Moreover, studies have shown that increase in greenhouse gas levels in atmosphere are supposed to cause global warming. To solve such problem a range of technologies and methods have been proposed. The three main well-known CO2 capture technologies which have studied and thoroughly discussed are Post-combustion, pre-combustion and Oxy-fuel combustion. Global Research (GE) has also studied and investigated the various separation techniques, includes chemical absorption, physical absorption, cryogenics, membrane, chemical looping and adsorption. CO2 emissions are still growing, and the need for carbon capture and storage (CCS) is becoming more urgent. Recent publications presented drawbacks of some separation techniques such as membrane, cryogenics, and chemical absorption. Membrane separation cannot complete great amount of separation and needs more membrane area and multiple stages, while cryogenics Separation lack of energy needed and chemical absorption have high equipment corrosion rate and low carbon dioxide loading capacity. Future work for new capturing and separation of carbon dioxide are going to be studied.

Electronic Properties of BixSb2−xTe3 as a potential thermoelectric material

Musab Asad[1], Ahmed Benkraouda[2], Ahmed Dirir[1], Ali Qarani[3], and Maamar Benkraouda[3]
[1] *Department of Electrical Engineering*; [2] *Department of Mechanical Engineering, College of Engineering;* [3] *Department of Physics, College of Science, UAEU*

Thermoelectric (TE) materials have huge potential for power generation, heat pumping, and refrigeration. However, their practical application is restricted because of the low Performance of the thermoelectric devices compared to traditional fossil fuel power generators and compressor-based refrigerators. A high performance thermoelectric material has to be a good electrical conductor as well as a poor thermal conductor and, at the same time, possess large Seebeck coefficient. Quantitatively the efficiency of thermoelectric devices is expressed by the dimensionless figure of merit ZT. Bismuth and Antimony tellurides and the alloys based on these materials play a significant role for thermoelectric technology. Already early studies of the BixSb2−xTe3 compounds in the late 1950s reported ZT∼1 at room temperature, confirmed by further experiments. This value remains, even to date, among the maximal one available at room temperature for bulk materials. Current progress in nanostructure fabrication, in particular, epitaxial growth of high-quality superlattices, encourages the possibility of significant performance improvement of thermoelectric devices. In this work we study the effect of Bi dopant on the electronic properties of the antimony tellurides and how this could affect their thermoelectric properties.

Nanoparticles Decorated Graphene-oxide based Sensor for Glucose Detection

Falah Awwad, Khadija Said, Namat Bashir, Ghaida Yousef, Bayan Mazen, and Aknan Osama
Department of Electrical Engineering, College of Engineering, UAEU

The current trust in biosensor development is towards low-cost, highly sensitive, multi-analyte selective, and miniaturized systems for different environmental applications including food and water safety in addition to biomedical applications. Graphene is a flat monolayer of carbon atoms tightly packed into a two-dimensional (2D) honeycomb lattice. Because of its unique physiochemical properties such as high surface area, excellent electrical conductivity, strong mechanical strength, unparalleled thermal conductivity, remarkable biocompatibility and ease of functionalization, it has received increasing attention in physical, chemical, and biomedical applications. Graphene-oxide (GO), which was found as a promising and cheap alternative to grapheme, was tremendously examined and analyzed by many scholars and researchers during the past few decades. GO is a water soluble colloidal suspension from the chemical exfoliation of graphite and can be reduced thermally to conductive GO. It has physiochemical properties that paved the way for fabricating many devices such as glucose sensors. In fact, Go was used in a variety of conductive biosensors that utilize Field-Effect Transistor (FET) structure. In this research work, graphite-oxide based MOSFET glucose sensor was fabricated. As a result of adding different concentrations of glucose to the sensor, a nonlinear increasing curve between ID and VDS for constant value of VG=0V was found. The sensitivity of GO was obtained by observing the change in current ID (at constant VDS). It was observed that when glucose concentration was increased, the sensitivity of GO increased. Moreover, it can detect the lower concentration at 1μM. This project is part of the 2015 SURE (Summer Undergraduate Research Experiences) program funded by the UAE University. The purpose of this program is "to promote and support the engagement of undergraduate students in research experiences, thereby, providing the students with exposure to and training in conducting research while working in teams with other undergraduate and graduate students under the supervision of qualified faculty members".

Electronic properties of ZnO nanorods: A first-principles investigation within the LDA, GGA and modified Becke–Johnson exchange potential.

Sharifa Ali Khlafan Al Mutawa, Reem Maher Mohamad, Ahmed A. Altelbani, Omar Abu Zidan, and Noureddine Amrane
College of Science, UAEU

The choice of a proper exchange and correlation potential for efficient treatment of excited- state properties such as the electronic band structure and density of states is required in density functional theory (DFT). The GGA-PW91 (Generalized gradient approximation-Perdew et al.) scheme yielded a wider band gap as compared to experiments. The use of PBE08 for the exchange-correlation potential allows only minor improvements to the band gap, however, the mBJ eigenvalue spectrum gives an excellent description of the band structures and yields significant improvement to the value of the energy gap as compared with the experimental one, since there is no exchange and correlation energy term from which the mBJ potential can be deduced, an experimental lattice parameter is used as input, a direct optimization procedure to get the lattice parameter in a consistent way is not possible as in the usual theory, Also the mBJ potential can be a very useful tool for the theoretical study of complex systems containing semiconductor compounds such as surfaces, superlattices and interfaces. The densities of states for the 3 different exchange potentials have been presented, this has provided additional evidence of the band structures and also has allowed to analyze the contributing atomic states. We have also analyzed the difference in properties between bulk ZnO and nanorod

Methyl cinnamate-CyD Inclusion Complexes

Muna Bufaroosha, Nail Shaleh, and Sulafa Abed Halim
Department of Chemistry, College of Science, UAEU

Methyl cinnamate-CyD (alfa, bita and gamma cyclodextrins) were studied using HNMR spectroscopy. The stoichiometry of the complexes were examined via absorptios pectroscopy. The alfa-cyclodextrin complexation is of 1:1 and very week.

Hierarchical Control Strategy for Ocean Wave Energy Converters

Addy Wahyudie and Omsalama Mubarak Saeed
Electrical Engineering Department, College of Engineering, UAEU

This research work considers maximizing power captured from ocean wave energy converters. The objective is to design and simulate a robust controller to maximize the captured power for both nominal and perturbed model of a heaving WEC. The goal is achieved using a hierarchical control strategy (HCS). The later consists of a higher and lower control levels. The hierarchical higher-level controller (HHC) was responsible for producing the reference velocity that is used by the hierarchical lower-level controller (HLC) to regulate the actual velocity of the WEC buoy. The HHC was implemented offline using a simple look-up table based on various sea states conditions. For the HLC, we consider the problem of synthesizing PID controller to guarantee robust stability and performance in the presence of model uncertainty. This problem was translated to simultaneous stabilization of the closed-loop characteristic polynomial and a family of complex polynomials. For a fixed proportional gain, integral and derivative gain values is constructively determined using a linear programming. This research work also provided an algorithm of complex polynomial stabilization. In particular, MATLAB codes is developed to design appropriate PID parameters. The code is applied to design a robust PID controller for the heaving WEC buoy. Based on the dynamical model and its uncertainties, which is modeled as multiplicative input perturbations, the admissible regions of gains satisfying nominal stability and robust performance are characterized. The elegant feature of this method is that it computationally characterizes the entire set of the admissible PID gain values that achieve robustness based on the design requirements.

Design of Ocean Hydraulic Wave Energy Converters

Addy Wahyudie[1] and Mahad Paracha[2]
[1] *Department of Electrical Engineering;* [2] *Department of Mechanical Engineering, College of Engineering, UAEU*

Wind, solar, and geothermal power production are all well-established industries, providing energy for many countries, but to works towards an economy primarily powered by renewable energy, one must be willing to explore other alternatives. Harnessing renewable energy from the oceans is a viable idea and ocean power technology currently exists, however, these sustainable practices and tools are not widely known or readily available. So, one of the main goals of the project is to promote the advancement of ocean energy as a viable form of renewable energy. Basically, the main aim indicates towards the designing and construction of small scale hydraulic wave energy converter (HWEC) and its actuation which resembles to the nature of the ocean waves. The HWEC consists of low speed rotary permanent magnet generator, hydraulic motor, accumulator, two ways valves and piston. Then the design and selection of the right dimensions of these components, and additional sensors such as current and voltage sensors are placed. Moreover, the actuation system consists of computer, data acquisition, motor and other mechanical components.

Automated Solar Powered Electric Car

Saman Shanaei[1], Brad Zellefrow[1], Saeed M. Alkamali[2], Abdulla Adnan[2], Husain Abdeen[2], Abdulla Taha[2], Abbas Fardoun[2], and Sangarappillai Sivaloganathan[2]

[1] Electrical Engineering Department, American University of Dubai; [2] College of Engineering, UAEU

Autonomous vehicles have witnessed significant technological advances over the years. Safer and energy efficient transportation has been the focus of numerous major research projects all around the world. This project, sponsored by the UAE University (UAEU) Renewable Energy Laboratory, focuses on a solar powered electric cart, capable of autonomously navigating to predetermined destinations in UAEU campus. Solar cells and the main Lithium ion battery, line following based navigation, obstacle detection, and transmission system are among the main components of the design. The project studies the systematic design of a self-sustainable and fully autonomous cart that can transport passengers around the university campus. The cart, designed and improved under the supervision of Dr. Abbas Fardoun, is a result of the integration of multiple mechanical and electrical subsystems in addition to a solar system allowing it to efficiently store and utilize solar energy during operation. The cart is fitted with three solar cells in order to increase the duration of its operation during the day. An Arduino is the main microcontroller of the system receiving input from the vehicle's sensors and governing its mechanical components, including the automated brakes, the motor, and the cart's automatic steering. The main focus of this research is to study the build and integration of the subsystems as well as their overall impacts on the vehicle's efficiency. The results of this project are going to be incorporated into the subsequent designs of this major ongoing research at UAEU. With further development, the carts like the ones in this project could improve the transportation infrastructure of university campuses all around the world.

Balloon operated pumping machine

Fathi M Allan[1], Lama F Allan[2], Fatima Salem Abdulla Ali Al Kalbani[2], and Al Han Mohammed Farea Al Dhaheri[2]

[1] *Department of Mathematical Sciences, College of Science;* [2] *Department of Civil Engineering, College and Engineering, UAEU*

In this project we will present a new idea of water pumping machine that operates using the contraction power of the balloon. The machine consists of pumping chamber which is provided with outlet valve that leads to the outside atmosphere attached to the lower part of the chamber and another inlet valve connected to the upper part of the machine and connected from the other side to a water reservoir. The top of the chamber is covered with a balloon or a piece of rubber that can be expanded under the influence of the pressure difference between the inside the chamber and the outside. Initially it is assumed that the chamber is full with water, when the outlet valve is open the water will fall outside to the external reservoir under the influence of the gravitational force creating a vacuum inside the chamber and therefore a negative pressure inside the chamber will be developed. The balloon then will concave downward inside the chamber under the influence of the pressure difference between the inside and the outside of the chamber. When the outlet valve is closed the influence of the falling water will stop and the balloon will go back to its initial position under the influence of its contraction property. During this process, the balloon will act as a suction machine forcing the water to be pumped again into the chamber from the inlet valve. A prototype of the machine has been built and will be presented in this project.

A method of harvesting the acoustic energy

Fathi Allan[1], Amr Bolbol[1], Mohammed Muneer Lajam[2], Moaaz Jamous[1], Mohammed Ali Al Mansouri[2], and Hamad Humaid Khouri[2]

[1] *Department of Mechanical Engineering, College of Engineering;* [2] *Department of Mathematical Sciences, College of Science, UAEU*

Harvesting the acoustic energy is becoming very attractive topic for researchers for the last decades. Several methods are available for the harvesting process including electromechanical resonator and piezoelectric material among others. It is based on transforming of the mechanical energy caused by vibration into electrical energy. The purpose of this project is to study experimentally the effect of the sound wave on the pressure inside a closed region. The experiment consists of building a closed region such as a cylinder. A sound source is placed outside the region and the sound be sent to the closed region through a speaker placed inside the cylinder. The effect of the sound on the pressure inside the cylinder is studied by monitoring the amount of water that can be lifted under the influence of the pressure difference. Several measurements were taken and the final results will be presented.

Open top chambers to study the effects of elevated level carbon dioxide under field conditions

Mohammed A. Salem, Wasef Al-Zayadneh, A. Senthilkumar, and Salama Khamis Sultan Al Kaabi
Department of Aridland Agriculture, College of Food and Agriculture, UAEU

The increase in atmospheric carbon dioxide concentration carbon dioxideis expected to have significant effects on plant growth and nutritive value. Innovative approaches for conducting long-term experiments on plants have been developed to investigate the growth and yield response of different plants to predicted elevated levels of carbon dioxide. The accuracy of the results depends on the system adopted and its maintenance of the desired carbon dioxide levels with near natural conditions for other parameters.Studies examining the effects of elevated carbon dioxide on plants under field conditions have been limited by the inherent difficulty to modify air composition in open air. In one of such efforts, an efficient and inexpensive open-top chamber system was designed to study the effects of elevated atmospheric carbon dioxide under field conditions. A system for continuous monitoring and maintaining the desired level of carbon dioxide in open top chambers. Carbon dioxide gas was supplied to the chambers and maintained at set levels using manifold gas regulators, PC linked Program Logic Control. These open top chambers are cost effective for meeting the requirements of field research on carbon dioxide enrichment.

Debye Bio Quantification

Mahmoud Al Ahmad
Department of Electrical Engineering, College of Engineering, UAEU

Label free quantification of biological species, virus particle, cell and microorganism are becoming increasingly important. Quantification methods based on antigen detection, such as p24, or genome detection are particle-specific or enzyme-linked immunosorbent assays (ELISA). Other methods such as real time PCR, viral plaque and colony forming assays have been developed to aid the determination of titers. Most of these techniques also require high concentrations, and by their accuracy. However, a general-purpose label-free quantification method has not yet been developed. Here, we demonstrate a universal label free quantification methodology assisted electrically by Debye theory. The cell counts estimated by counting the impurities inside a defined volume by observing the change in electrical parameters. Empirically we found that the particle count could be approximated by the change of the particle suspension dopant concentration relative to the control medium dopant over the change of the Debye volume relative to Debye control medium volume. The presented techniques obtained are well corroborated with conventional methods. This universal method can be applied to accurately measure and characterize microlagal cells, viruses, and nanoparticles. It is anticipating this approach to be a starting point towards establishing the foundation for label-free electrical-based identification and quantification of an unlimited number of biological and chemical analytes.

Recent development in hemodynamics: FSI

Hashem M. AlArgha[1], Mohammad O. Hamdan[1], and Waseem H. Aziz[2]
[1] *Department of Mechanical Engineering, College of Engineering, UAEU;* [2] *Tawam Hospital*

Background: Computational fluid dynamics (CFD) recently has gained lots of momentum to be used as a medical tool for studying aneurysms in the brain and predicting the cause of aneurysms initiation, growth and rupture risk. The CFD simulations in aneurysm adopt different fluid models to accurately simulate blood hydrodynamics such as Newtonian blood viscosity. Method: In this work, a numerical study is constructed to inspect whether the Newtonian blood viscosity model assumption is appropriate to predict maximum shear stress within aneurysms or not, and how such model is compared to a realistic non-Newtonian viscosity model. A comparison is done between the Newtonian model and the Carreau model for five different patients in respect of maximum wall shear stress, area average of wall shear and velocity profile. Results: The numerical results of the Newtonian and the non-Newtonian models relatively formed similar wall shear stress and velocity profile values at high velocity regions such as the arterial walls. As for the aneurysm dome, a noticeable difference between the two viscosity models is observed due to the low velocity circulation inside this region. Conclusions: It is concluded that the Newtonian assumption is valid for high velocity regions due to the equal coefficient of viscosity for both Newtonian and non-Newtonian models mainly inside the artery. The Newtonian fluid assumption presents error of around 45% in WSS when compared to Carreau non-Newtonian model in regions of stasis or slowly recirculating vortices mainly inside the aneurysm dome. On the other hand, the Newtonian model closely estimates the WSS in relatively high flow rate region such as the parent artery. Overall, the Newtonian assumption is deemed to be an invalid assumption when considering the pulsatile velocity of blood.

Enhancing heat transfer from hot fluids by interfacing them with immiscible high thermal conductivity liquids

Salah A. B. Al Omari and Emad Elnajjar
Mechanical Engineering Department, UAEU

The present study investigate experimentally the effect of using a liquid metal on the heat transfer characteristics heating/ cooling of water in direct contact. A parametric study is performed to study the effect of different liquid metal to water volume ratio, height, contact area on heat transfer processes under consideration. The effect of these parameters on the overall heat transfer performance is documented. Results show significant cooling when water cools while being in direct contact with the liquid metal; with clearly higher cooling rates than when water cools without being interfaced with a liquid metal. The thermal characteristics of the interface between the two liquids during heat exchange are monitored in order to get more insights into the physics of the processes involved.

Development of a Novel Photovoltaic-Phase Change Materials Water Heating System

Hamza Alnoman and Dr. Ahmed Hassan
College of Engineering, UAEU

The increased operating temperature causes multiple failures in terms of power loss, panel integrity and panel life. In order to reduce PV operating temperature for increased power and life and utilize the thermal energy accompanied by solar radiation, phase change materials (PCM) are employed at the back of PV.The PCM absorb heat at constant temperature during solid-liquid phase change and are reported to keep PV at a nearly constant temperature and reduce their temperature induced power loss.In the current research, paraffin wax based PCM are contained in a PV restrict their temperature and while the effectiveness of stored thermal energy for water heating applications is evaluated in winter conditions of hot UAE Climate. The heat stored in the PCM was used to heat water with a continuous loop coolant flow system and the temperatures in the water tank was monitored. It is observed that a 30 Wp PV panel with surface area of 0.6 m can raise temperature of water 80 litres by up to 9°C increasing it from 28 °C to 37°C . Further work related to study year round performance of the system to evaluate economic feasibility of the proposed design is currently being conducted.

Hydrodynamic focusing in a microfluidic device with four-microchannel intersection

Manea Al Rayssi, Maan Al Zareer, Suood Yousef Humoodah, Abd Elrahman El Shorbagy, Mahmmoud Syam, and Saud A. Khashan

Department of Mechanical Engineering, College of Engineering, UAEU

In this project, we experimentally examine the hydrodynamics focusing in a microfluidic system. Hydrodynamic focusing is a technique relying on squeezing one of the streams in a four-microchannel intersection by two side streams and reforming it downstream into a thin sheathed film. The application microfluidic chip is fabricated using soft-lithography techniques. The fluid handling is controlled by a syringe pump with multiple ports. The visualization, image recording and processing were conducted by an inverted microscope and its compatible software. Some preliminary results, particularly those concerning the parameters controlling the hydrodynamic focusing, were introduced.

Thermal properties Measurements of (MWCNT –Water) Nanofluid

Emad J. Elnajjar and Salah Al Omari
College of Engineering, UAEU

Different nanofluid's thermal properties were measured, the measurements were used to characterized the nanofluid and how it effects the heat transfer performance. A nanofluid consists of water as a base fluid and Multiwall carbon nanotubes (MWCNT-Water) suspension was prepared with different fraction volume fraction ratio of 0.05%, 0.15%, 0.15%, 0.25% and 0.25%. This study focus on the thermal conductivity, PH, Zeta Potential, Size and viscosity measurements. The results demonstrate an enhancement of thermal conductivity range from 10 to 50% for volume fraction of 0.05% to 0.25% respectively. The viscosity decreases linearly with temperature at rate of 0.02 cP/degree. The suspension demonstrate consistent stability over one year period of time. The nanofluids thermal conductivity was measured using Decagon Devices, Incorporation, the nanofluids PH measured using Fann meter type Model 50 SL Rheometer and the nanofluids Zeta Potential and size were measured using Zetasizer Nano-ZS by Malvern Instruments. The laboratory measurements were compared to the reported theories of nanofluids thermal conductivity and viscosity.

Improving Numerical Forecasting in the Gulf Area by Assimilating Doppler Radar Radial Winds

M.N. Anwar and Fathalla A. Rihan
College of Science, UAEU

An approach to assimilate Doppler radar radial winds into a high resolution Numerical Weather Prediction (NWP) model using 3D-Var system is described. We discuss the types of errors that occur in radar radial winds. Some related problems such as nonlinearity and sensitivity of the forecast to possible small errors in initial conditions, random observation errors, and the background states are also considered. The technique can be used to improve the model forecasts, in the Gulf area, at the local scale and under high aerosol (dust/sand/pollution) conditions

The Impact of CO2 Enrichment on the Growth of Important Plant Species

Abdulla Y. Abdulla Almarzooqi and Taoufik Ksiksi
Department of Biology, College of Science, UAEU

Carbon dioxide is a primary Greenhouse gas and it is increasing in the atmosphere as a result of human activities. Concentrations of atmospheric carbon dioxide are increasing worldwide at a rate of 1% or more annually (Mugnozza et al., 2001). Which may lead to differences in growth patterns in plants, as they use CO2, water and sunlight at appropriate temperatures to carry out photosynthesis. The photosynthetic productivity will greatly increase, if there is an increase in concentration of atmospheric carbon dioxide from 330 ppm to 1000 ppm (Wittwer, 1979). Plants also respond to rising atmospheric CO2 by primarily increasing the resource use efficiency by reducing stomatal conductance, transpiration, and improving water use efficiency (Drake et al., 1997). The labs in the United Arab Emirates University were used to assess a total of six plants species' response to CO2 enrichment. We tested two CO2 conditions: 500ppm (ambient) and 1000ppm (enriched) using two growth chambers (Binder, mpdel:720, KBW E5.1) and under water stress conditions. Most plants showed slightly higher growth under enriched carbon dioxide concentrations, with no water stress. Alfalfa, for instance, showed more growth in the 1000ppm CO2 and under water stress. Rhodes grass had the highest chlorophyll content under CO2+/water+. Stomata count (per sq mm) was comparable between conventional conditions and combined CO2 and water additions (CO2+/water+). CO2 could be used as a fertilizer, for some plant species, which will benefit our environment and food supply.

On Reliability-Enhanced Quantum Cellular Automata (QCA) Designs

Latifa Hamad, Fekri Kharbash, Aisha Fahad, Alia Saeed, Fekri Kharbash, and Valeriu Beiu
College of Information Technology, UAEU

As a novel nanotechnology, quantum-dot cellular automata (QCA) can attain dense packages due to the extremely small size of quantum dots. However, fabrication defects and fault rates in the nanotechnology are expected to be quite high. In this work, the behaviors of basic QCA devices in the presence of input cell defects are thoroughly analyzed in order to study their defect tolerances and determine the ranges of allowable defects. Rotation, missing and misalignment input cell defects for QCA device are modeled and simulated using QCA designer. The performances of three basic majority QCA devices with input cell defects are investigated under various defect scenarios. The results show that different QCA devices have different input defect tolerances.

Solvatochromic behavior and DFT calculations of Fuchsin

Muhammad Abdul Rauf
College of Science, UAEU

The absorption spectra of Fuchsin dye were studied in various solvents. It was found that solvent effects on the absorption wavelength are consistent with the solvatochromic model of Kamlet, Abboud and Taft. The solvent polarizability value π^* was found to have a linear relationship with the absorption wavelength of the dye in various solvents. The absorption value of the probe molecule was also affected by both the electric permittivity and refractive index values of the solvent. Density functional theory (DFT) calculations showed good agreements with the experimental results using the B3LYP functional set. Experimental and theoretical results confirmed that the chemical properties of fuchsin are strongly dependent on the polarity of the chosen medium and its hydrogen bonding capability. DFT calculations were also used to assign the absorption in the region 540–570 nm to a π–π^* transition between the HOMO and LUMO of the molecule.

Group algebras whose groups of normalized units have exponent 4

Viktor Bodi and Mohammed Salim
College of Sciences, UAEU

It is well known that there does not exist a reasonable description of finite groups of prime square exponent p^2 (not even in the case when the exponent is 4). However Z.Janko (see for example [3,4,5]) was able to characterize these groups under certain additional restrictions on their structure. In this way he obtained interesting classes of finite p-groups. In our talk we give a full description of locally finite 2-groups G such that the normalized group of units V(FG) of the group algebra FG over a field F of characteristic 2 has exponent 4 (see [1], [2]). Joint research with M.A.~Salim. [1] A. A. Bovdi. The group of units of a group algebra of characteristic p. Publ. Math. Debrecen , 52(1--2):193--244. [2] V. A. Bovdi and M. Salim. Group algebras whose groups of normalized units have exponent 4. Submited for publ. , 1--10, 2015. [3] Z. Janko. On finite nonabelian 2-groups all of whose minimal nonabelian subgroups are of exponent 4. J. Algebra , 315(2):801--808, 2007. [4] Z. Janko. Finite nonabelian 2-groups all of whose minimal nonabelian subgroups are metacyclic and have exponent 4. J. Algebra , 321(10):2890--2897, 2009. [5] Z. Janko. Finite p -groups of exponent p^e all of whose cyclic subgroups of order p^e are normal. J. Algebra , 416:274--286, 2014.

Fabrication and characterization of graphene oxide based field effect transistors for glucose-sensor applications

Khadija Said[1], Ahmad I. Ayesh[2], Falah Awwad[3], and Naser Qamhieh[4]
[1] Department of Physics, College of Science, UAEU; [2] Department of Mathematics, Statistics and Physics, Qatar University, Qatar; [3] Department of Electrical Engineering, College of Engineering, UAEU; [4] Department of Physics, College of Sciences, UAEU

Graphene based transistors have been developed rapidly. They have potential to be used for post-silicon electronics because of their high charge carrier mobility, saturation velocity, current-carrying capability, and thermal conductivity. In this work, graphene-oxide based metal–oxide–semiconductor field-effect transistors (MOSFETs) were fabricated. The devices were used as glucose sensors, and their sensitivity was enhanced by using different nanoparticles. The resistivity of each FET was studied at different concentrations of glucose for a potential use in medical and industrial applications.

Numerical Solvers for Problems in Bioinformatics Using Finite Differences approaches

Saoud Faisal Mohammed Badaam, Ahmed Khalfan Ali Khalfan Al Shamisi, Ali Nasser Mohammed Al-Malahi, Ammar Nemmar Hamadallah ,Mohd Khier Ibrahim Al Srihin, and Muhammed I. Syam
College of Science, UAEU

In this project, Biomathematics problems based on the modeling of electrical activity of human heart is taken for the investigation. A reliable method based on finite difference methods is used to obtain an approximate solution of a model of heart based on nonlinear oscillatory Van-der Pol (VDP) equation. It is based on the Crank–Nicolson method. Comparison with EKG for healthy people and people have heart problems will be done. In addition, comparison with other numerical results in the literature will be studied.

Comparing university research across disciplines: An application of the Harzing's (2014) individual annual h-index in comparing faculty research performance across different colleges in a single university

James C. Ryan[1], Hessa Mubarak Saeed Hamad Al Shamsi[2], Klaithem Ali Saeed Hazeem Alsheryani[1], Fatima Mirza Munawar[1], Aisha Mirza Munawar[1], and Maitha Abdulla Saif Nasser Alnuaimi[1]
[1] *College of Business and Economics, UAEU;* [2] *HCT, Al Ain Women's College*

Harzing's (2014) 'hIa' metric is applied in the current study to examine average faculty research performance across 6 colleges in a leading Middle-eastern university. Average faculty performance for a range of common metrics of research publication such as papers, citations and h-index are presented to allow for a comparison of the degree to which the hIa can account for publication patterns and career length in the current sample. Scopus publication data for all faculty members across 6 colleges was collected and analyzed to evaluate Harzings claim that the hIa provides a metric for a more reliable comparison between academics. Publication patters across the current sample are also compared with results from Harzing (2014). Results are discussed in relation to the use and possible improvement of the hIa metric.

Senior Exhibition Management System (SEMS)

Sara Rashed Suwaidan Rashed Al Kendi, Mouza Mohammed Salem Salmeen Shout Al Shamisi, Aysha Mohammed Ahmed Saif Al Sawafi, Badour Ismail Ali, and Mamoun Awad
College of Information Technology, UAEU

In this research senior students will design and develop Senior Exhibition Management System (SEMS). SEMS will maintain a repository of all students, examiners, grades, reports, and assessments. Students, advisors, examiners, and administrators can access SEMS for different functionalities. Students can upload their reports, check announcements and schedules, and see their grades. Examiners can post their evaluations (grade and comments) for the projects assigned to them. Admin will configure the system to adapt each semester new batches of senior students.

Modeling airport employees commuting mode choice at Dubai International Airport

Khaula Abdulla Alkaabi
College of Humanities and Social Sciences, UAEU

The aim of this paper is to model airport employee's commuting mode choice at Dubai International Airport (DXB). In addition, the paper models airport employee's willing to car share and discusses the factors that influence them to use public transportation to travel to their work at the airport, and presents key considerations for improving the use of this mode share among them. A questionnaire survey was distributed in the airport among employees and contained stated preference and revealed preference questions. Two models were used: First, the Multinomial Logit Model (MNL) was used to model airport employees mode choice and second, the Binary logit Model (BLM) was used to model airport employee's willingness to car share. The analysis revealed that DXB employees were particularly sensitive to their income, nationality, employment status, car parking permit, and parking reimbursement in making mode choices and that they are not willing to car share.

FlyNet: Deployment of Connected UAVs for Monitoring, Target Detection and Tracking

Abderrahmane Lakas and Tony Ng
College of Information Technology, UAEU

Recent years have seen new advances in the field of vehicular ad hoc networks (VANET). These category of networks are formed with connected vehicles without the use of communication infrastructure. Participating vehicles serve as relays for other vehicles for exchanging and routing information between themselves. VANETs use routing protocols that are adapted to the real-time constraints imposed by the highly dynamic nature of the vehicles. Indeed, connectivity between vehicles can change dramatically and therefore leading to a dramatic change in the topology of the network. In this project, we aim at extending routing protocols to support data exchange between unmanned airborne vehicles (UAVs). FlyNet consists principally of an airborne VANET, which is formed of connected UAVs. Many applications are envisaged for connected UAVs. One of the them is to monitor roadways, collect information about the road and traffic condition and send it to traffic centers. FlyNet is also meant to support applications such as early intervention in case of accident or disaster situations where enforcement and transportation authorities cannot have initial access to the site. In that case, FlyNet can be quickly deployed to provide initial and real time assessment of the targeted area. FlyNet uses the latest communication technologies such as 4G-LTE, 3G and WiFi as well as current sensing technologies. Thanks to existing data routing protocols for ad hoc networks, FlyNet devices will be able to fly in various formations, which allow them to stay in radio communication range and therefore maintaining connectivity while carrying out their predefined mission. Second, with recent advanced in image processing, pattern matching and target tracking, FlYnet will be able to detect certain situation and track specific targets for for localization and tracking. Such situations include accidents, traffic jams, and traffic management. Initial design development of FlyNet include master-slave configuration and the deployment of OLSR routing protocol and streaming of video captures over FlyNet.

A Histogram-Based Model for Road Traffic Characterization in VANET

Hesham El-Sayed and Liren Zhang
College of Information Technology, UAEU

This research introduces a new route guidance algorithm using light processing histogram model which captures the arrival rate distribution in VANET and presents a compact road traffic model with real time updating. This model can be used to obtain the queue occupancy distribution and delays at cross junctions or traffic signals using a finite queue model. These delays can eventually be used by the vehicles to compute the optimized route to destination. A microscopic simulator has been used to evaluate the effectiveness of the proposed road traffic model by measuring the traffic congestion. Comprehensive comparative studies show that the proposed road traffic model provides a good prediction on road traffic status, and can be used in conjunction with other standard shortest path algorithms.

Compressive Sensing Framework for Narrow-band Interference Mitigation in OFDM Cooperative Communications

Imad Barhumi
Department of Electrical Engineering, College of Engineering, UAEU

In this paper, narrow-band interference (NBI) mitigation is addressed for amplify and forward (AF) orthogonal frequency division multiplexing (AF-OFDM) cooperative communication systems. Based on the channel gains between the interferer, destination and the relay nodes, two copies of NBI are received at the destination terminal in addition to the desired signal. Hence, NBI may degrade the performance of AF-OFDM systems which necessitates the adoption a technique to reduce the effect of NBI. NBI can be modeled as a sparse signal in the frequency domain. In this sense, compressive sensing (CS) framework can be used to estimate NBI, and then cancel it before detecting the transmitted signal. NBI mitigation at the destination terminal for single relay AF-OFDM systems is investigated using CS theory. In addition, NBI mitigation for space-time-block-coding (STBC) AF-OFDM systems is also addressed. Simulation results prove the merits of the proposed approach.

Security Issues in Smart Power Grid Networks Related to Smart Meters

Khaled Shuiab[1], Zouheir Trabelsi[1], Ezedin Barka[1], and Mohammad Abdul-Hafez[2]
[1] College of Information Technology; [2] College of Engineering, UAEU

The development of Smart Grid power systems is gaining momentum in many countries leading to massive deployment of smart meters to realize the envisioned benefits. However, there are several concerns among the consumer communities and the service providers with respect to information security when it comes to the deployment of smart meters. This paper attempts to address the main challenge related to smart grid information security by examining the resiliency of smart meters to security threats and attacks. Several common information security attacks are being used to study their impact on the performance of smart meters in a controlled laboratory environment. Results obtained showed drastic effect on the functionality of smart meters and their associated data gathering servers. Common security attacks which are usually launched against computer systems, mobile devices and other appliances with Internet connectivity are being used. The focus is on two major attacks, namely the DoS attack and the MiM attack. We investigate the use of these common attacks to evaluate the resiliency of smart power meters against such attacks. As a specific case, we investigate the cache poisoning attack on corrupting the Address Resolution Protocol (ARP) cache entries of smart meters. Hosts with corrupted ARP cache entries are usually unable to communicate properly with the other network hosts, such as servers collecting power measurements from smart meters. Consequently, a DoS situation may emerge from corrupting the ARP cache entries of smart meters or corresponding servers. We will introduce the DoS and MiM attacks and explain how these attacks can be launched against smart meters connected through a LAN. In addition, we will present how Cognitive Radio (CR) can be integrated and used in a Smart Grid communication network to serve as one possible communication method for connecting Smart Meters to the Smart Grid and talk about security issues related to such a deployment.

VIN Utilization for Improved Vehicular Sensing

Najah A Abu Ali
College of Information Technology, UAEU

In this paper, we present a system that makes use of advanced vehicle manufacturer specific sensors to provide more accurate detection of driver and road events. The system only utilizes driver's smartphone, and OBD dongle with CANBUS capabilities, the OBD allows us access to Vehicular Identification Number (VIN) to uniquely identify vehicles. Consequently, the system is capable to identify the PID specific to each sensor under consideration. Hence, based on the vehicle VIN we are able to identify the best method to analyze each sensor's data. This is achieved by first creating a database that includes each manufacturers and their corresponding VIN numbers, available sensors, the type of sensors' raw data collected, and the best method to analyze the raw data at the driver's smartphone. Once the OBD is connected, the smartphone will send a request to the system, which will reply with the type of sensors' data and the best method to analyze it.

UAV Tracking Moving Targets Using On -Board UWB ISAR Radar Sensor

Liren Zhang and Ahemed Karam
College of Information Technology, UAEU

Compressive sensing (CS) based Inverse Synthetic Aperture Radar (ISAR) imaging using ultra wideband (UWB) technology can be used to exploit the sparsity of the target scene and achieve high resolution and effective noise reduction with limited measurements. This presentation extends the CS based ISAR imaging using UWB sensor to further include the continuity structure of the target scene within Bayesian framework. A correlated prior is imposed to statistically encourage the continuity structure in both the cross-range and range domains of the multiple targets region. The UWB Gibbs sampling strategy is the advantage for the applications in Bayesian inference. Because the resulted method requires to recover the whole multiple target scene at a time with heavy computational complexity, an approximate approach is proposed to alleviate the computational burden. Experimental results demonstrate that the proposed algorithm using UWB technology can achieve substantial improvements in terms of preserving the weak scatters and removing noise over other reported conventional CS based ISAR imaging processing technology. This research is supported by UAEU-NRF grant 31T054.

A VANET Algorithm for Real-Time Urban Traffic Network Route Guidance

Yaser Elsayed Hawas
College of Engineering, UAEU

This paper presents an inter-vehicular communication (VANET)-based algorithm for real-time route guidance in urban traffic networks. The algorithm enables communication between searcher vehicle and candidate vehicles whose origin node matches the destination node of the searcher vehicle, and traveling in the opposite direction. The data entities of knowledge sharing among the vehicles and the algorithmic procedure as well as the conditions for information sharing are presented in details. A microscopic simulation model is utilized to assess the effectiveness of the algorithm against the benchmark shortest path algorithm. Simulation runs are conducted under various network congestion levels, link speeds and link lengths in order to evaluate the network productivity, and the travel time measures of the presented VANET algorithm compared to the benchmark shortest path algorithm.

Spatio-Temporal and Hazard Mapping of Earthquake in UAE (1984-2012): Remote Sensing and GIS Application

M. M. Yagoub
Department of Geography and Urban Planning, College of Humanities and Social Sciences, UAEU

Assessment of historical earthquake events helps in revealing its distribution and coupling it with other geographical data provides a holistic view about areas and people that are affected. This study investigates the spatio-temporal distribution of earthquake events taking place in UAE and its effect on the population. Analyzing data from 1984 to 2012 showed that during the period of 28 years there were frequent earthquakes that occurred with intensity ranges from mild to moderate with the maximum magnitude of 5.1.Spatially, earthquake events were found clustered in the Emirate of Fujairah in the Eastern part of UAE (Oman Thrust).Temporally, the maximum number of earthquake events (49% of the events) occurred in 2011 and this is in line with the United States Geological Survey(USGS) report that indicates in 2011 the earthquake activity reached its highest level in 20 years. Even the magnitude of the earthquakes is low, the frequency of being increased in the past few years coupled with urban development are point of concern and it becomes necessary to develop preventive measures such as hazard maps for the area. In this study seven parameters are used for generation of a hazard map, this includes geology, soil, slope, land use, historical earthquake events, fault line, and roads.GIS weighted overlay analysis is used to demarcate the earthquake risk zones. The resulting map prepared will help in systematic and proper development of land use for community planning and mitigation policy. To the knowledge of the author, the research is the first attempt that integrates diverse GIS data to produce hazard map for the Eastern part of UAE and therefore it adds acknowledge about the area. The methodology could be adopted by other regions around the world.

Mapping Urban Morphology Changes due to Special Economic Zones in Dubai Using Landsat Archival Data

Naeema Mohamed Dawood Alhosani
College of Humanities and Social Sciences, UAEU

There are presently more than 40 special economic zones (SEZs) across the United Arab Emirates. These SEZs include businesses technology hubs, science cities, recreational parks, and media parks. The concept of SEZ in the UAE does not differ remarkably with other parts of the globe. SEZs in the UAE enjoy incentives such as tax exemptions, unrestricted capital flights etc… The present research argues that SEZs should be viewed as unique phenomena being important hubs of globalisation and global business linkages between countries and corporations. The study aims to document how the SEZs change or affect the transformation of urban morphology and land use practices in the UAE. For instance, the research results aim to show the new spatial patterns and land use that emerge around the SEZs compared to before their establishment. The research is based on sequential analysis of temporal geospatial digital maps generated from archival Landsat TM for the period 2000-2015. In previous research studies satellite data have been used to document impacts on the urban morphology and land use practices worldwide. The study area is located around Al Quoz and Al Barsha localities situated in the western side of the city of Dubai with a vibrant SEZs. Two Landsat scenes from April 2000 and February 2015 were used in the study. Simple image pre-processing involved cropping the study area and radiometric corrections. A land cover classification and segmentation approaches were applied for both scenes. The images are classified into different classes such as buildings and houses, industries and ware houses, roads, sand, vegetation, and water. Preliminary results show that in the year 2000, the pattern of buildings and houses were scattered within the study area. But by 2015, the settlements has compacted and is focused on the either sides of the study area. In the middle portion of Al Quoz industrial zone, the pattern of buildings and houses are still scattered because of the influence of industries and unsuitable living condition in the surroundings. The pattern of the industries and warehouses in the city has been changed drastically. In the year 2000, industries were concentrated mainly in the Al Quoz area in a scattered form and there was no commercial center in the Al Barsha area. By 2015, the industries got compacted and are concentrated mainly in the Al Quoz zone. There is a good correlation between industries, buildings and houses in the study area. When the industries are increasing, buildings and houses are also increasing and are spreading on both sides of the Al Quoz industrial zone such as Al Barsha and northern side of the Al Quoz. The findings of this research would help local authorities and corporation in planning for the future of these global businesses and local sustainability in the context of environmental planning and sustainability.

Use of Landsat data to create a time-series of sand dune fields maps in Abu Dhabi Emirate

Nazmi Saleous[1], Salem Issa[2], and Rami Saeed[1]
[1] *College of Humanities and Social Sciences;* [2] *College of Science, UAEU*

Up to 90% of the United Arab Emirates' (UAE) surface is covered by sand dunes and intervening inter-dune belts. The country is severely affected by problems related to sand dunes movement and aeolian deposits, recognized as a major contributor to desertification. This study discusses the use of publicly available Landsat TM and ETM+ data to detect sand dunes fields and enable monitoring of their movements in the Emirate of Abu Dhabi, UAE. The study focuses on developing a classification approach and applying it to historical Landsat data to produce consistent Land cover maps useable in subsequent change detection studies. Landsat scenes acquired over the period 1984 - 2013 are used to evaluate different multispectral classification approaches and determine the accuracy of resulting maps. The methodology uses several configurations of supervised classification techniques that include different band combinations to determine those that produce the highest accuracy in mapping the predominant land cover classes in the area: Sand dunes, Sand sheets, Urban, Vegetation, Sabkhas, Limestone and Water. Preliminary results of applying these approaches indicate that the use of Principal Components as input to the classification algorithm leads to improved detection accuracy. However, all methods used exhibit a certain level of confusion between sparse vegetation and other classes. The use of a vegetation index as a discriminator helps improve the classification accuracy. To facilitate the use of resulting classification maps in change detection studies aiming at assessing and modeling sand dunes movement, a geodatabase is built containing resulting layers for further GIS analysis.

Mapping Abu Dhabi landscape change (vegetation) during 1993-2014

Yazan Jamal and Naeema Alhosani
College of Humanities and Social Sciences, UAEU

The United Arab Emirates (UAE) possess the world's seventh largest oil reserves and it is also one of the most developing countries in the Middle East. It has been mentioned by the International Monetary Fund (IMF) that UAE is a high-income developing country (Miller, 2004). Over the past few years, the UAE has been undergoing remarkable developments through several investments along with the export of their well-known resources, petroleum; such kind of infrastructure and urban development will significantly alter the landscape. The purpose of this report is to reconnoiter the land cover changes (vegetation) within the capital of UAE, the city of using Landsat archival images during the period 1993-2014. The landscape change mapping will be achieved using a suite of Landsat image processed using ArcGIS software. Traditionally, remote sensing and GIS have been successfully integrated and used to quantify land cover change extent, distribution and trajectories of change.

Remote Sensing and GIS for detecting and counting palm trees

Salem M. Issa, Ahmad M. Jalil, Abrar M. Abdulkareem, and Nader A. Haidar
Geology Department, College of Science, UAEU

The purpose of this research is to promote and support the engagement of undergraduate students in research experiences. In addition, this project aimed at training the students to use innovative techniques in their research as well as their future place of work in the domain of satellite image processing techniques using new software and newly captured high resolution (~50 centimeter) satellite imagery. A high resolution Pleiades satellite image (~50 centimeter) dated 30-September-2013 and covering the Al Ain city centre-Al Ain Oasis, was pre-processed, segmented, and classified using eCognition software, to automatically detect and count the number of palm trees planted in the Al Ain Oasis. The methodology was based on an object-oriented classification scheme. In this research the Region Growing Algorithm, implemented in the software was applied. The results show that the algorithm detected most of the trees although over estimation was noted in areas with large crowns; this is due to the overlapping of trees' branches in those densely planted areas. Furthermore, the accuracy of the results depends heavily on the threshold determination during the segmentation process. The results' accuracy vary even in the same study area with different algorithms being applied. The main advantage of using satellite imagery is their continuous coverage over wide areas. However, there are many reasons why the accuracy of the results differs from one study to another. These can be summarized as: first, the different conditions under which the analyses are performed affect the results; second, the varying spatial and spectral resolutions of the sensors used and thirdly, the most important factor is forest type and trees species under consideration. The accuracy of tree detection and delineation can be improved by combining LiDAR and large scale satellite/Aerial imagery. These new sensors together with hyper-spectral data are very promising sensors in tree crown detection and delineation, more research about this topic is needed. Finally, we recommend to apply the findings of this pilot project to a larger area, e. g., acquire a complete coverage of high resolution imagery to launch a national project to inventory all palm trees implemented in the whole country. This will benefit the nation's efforts in minimizing both time and cost with little traditional field works; besides providing decision makers with rapid, accurate and up-to-date information about the nation's natural resources and assets.

GIS-Based Offshore Wind Farm Site Selection

Salem Issa[1], Jasem Al Mazrouei[2], and Nazmi Saleous[2]
[1] *Geology Department, College of Science;* [2] *Department of GIS, College of Humanities and Social Sciences, UAEU*

Power generation in the United Arab Emirates (UAE) is entirely dependent on conventional fossil fuels. In fact, it is estimated that in 2009 around 98% of the electricity generated in the country comes entirely from natural gas based power plants (Mondal et al 2014). Electricity demand growth in recent years approached 9%. The country's energy consumption has risen enormously in recent decades due to energy subsidies, economic development and increasing population growth (Mondal et al 2014). The UAE's record of CO^2 was 60.8 Mt in 1990 and increased to reach 146.9 Mt in 2008. Recently, it has been reported that the United Arab Emirates is one of the highest per capita energy consumer in the world. Consequently, environmental pollution and carbon emission has been a major challenge facing the country over the past several years (Kazim 2010). Geographic Information System (GIS) has long been recognized as an efficient tool in the management and development of natural resources, land use planning, wildlife management, environmental and forestry planning. This research outlines how to locate a new site for planting a new wind farm offshore the United Arab Emirates - Abu Dhabi emirate, using GIS. Locating wind farms offshore Abu Dhabi is poses a great challenge as most of Abu Dhabi territorial water are occupied with Oil and Gas infra structures, Oil and Gas pipelines, submarine cables, Marine Protected Areas and Marine habitats. However, there still some remaining structure-free zones where wind speed is favorable for potential wind farms sites to be located. This research main objective was to implement a Geographic Information Systems (GIS) research project to identify potential sites to build an offshore wind farm in function of: wind speed, water depth, and structure-free area. Different locations within Abu Dhabi offshore area were identified and categorized based on the above factors. The results indicated that the model is capable of identifying highly suitable, less suitable and unsuitable locations for wind farms building. The approach could help identify suitable wind farm locations in other areas with similar geographic settings.

Optimization of High Performance Structures in Automotive Systems

Basel Alsayyed Ahmed and Barraq Khalid Abdulrahim
College of Engineering, UAEU

In automotive industries competitions arise and corporates seek faster methods and techniques of designing to cut off the time span of development cycle and to reduce cost by running structural optimization in the conceptual phase of the car development cycle. Structural optimization exists in various forms and the most common are size, shape, and topology that are studied with the objective which is mass or stiffness, parameters or design variables based on the type of structural optimization, and design constraint that defines the bounds of the optimization analyses. Size optimization is concerned with design variables that are represented by thickness or material properties. Shape optimization is concerned with design variables that control the shape of the model. Topology optimization is concerned with the optimal distribution of material in the structure. Recent researches in structural optimization have emphasized on parametric modeling as a key point to facilitate the modification of geometrical model and adapt the change to the analysis model through CAE software. They also considered some simplification on the static loading conditions that was obtained from the database of one of the competitive car in the market. This research will be utilizing the existing geometry model from the manufacturer and create the analysis model that will be correlated and validated with a physical model instrumentation through modal identification to build an accurate baseline for the FE model. This research will also eventually derive the structural forces obtained from the multi-body dynamics analysis to be used in the structural optimization in Nastran, which will create a robust and accurate loading for the optimal design of the chassis. In order for the research outcome to be effectively put in use for industrial application that will serve purposely automotive or aerospace design optimization with re-usability of the design methodology and parameters, a knowledge expert system is to be developed that will benefit future optimization work.

Date Pits and Date Palm Wood-Based Heat Insulator Composites

Basim Abu-Jdayil[1], Abdel-Hamid Mourad[2], and Atif Hussain[1]
[1] *Chemical & Petroleum Engineering Department;* [2] *Mechanical Engineering Department, College of Engineering, UAEU*

A composite material made of unsaturated polyester and date-pits or date palm wood as filler was fabricated to serve as an insulating material. Unsaturated polyester liquid blended with fillers with 0 – 60% as a polymer/filler ratio was transformed into solid upon thermo-set process. The composite characterization was performed by testing the compressive strength, thermal conductivity, and water retention. The results indicated that increasing the date pits, in general, causes a slight increase in thermal conductivity coefficient. This may be due to the higher conductivity of the filler. On the other hand, the date wood based composites showed decrease in the thermal conductivity with increasing filler content. However, the thermal conductivity of both composite materials is very promising and comparable with the commercial thermal insulators. Although compressive strength tests showed a decrease in strength with increasing the filler content, the prepared composites presented superior mechanical strengths (35 – 108 MPa) when compared with the commonly used insulating materials. Generally, composites containing date wood showed better mechanical, physical and thermal properties than that containing date pits. From the experimental work performed on these composite materials, we arrive at the conclusion that the date-pits and date wood can be utilized to manufacture stable and compatible composite materials. One would say that date wood based composites show good characteristics in terms of thermal conductivity(< 2.5%) and mechanical strength (72 – 108 MPa) and with such cheap and abundant fillers from natural resources, they show a promising thermal insulating material both for domestic and industrial applications.

Microencapsulation of Phase Change Material

Yasir Rashid and Ahmed Hassan Noor Muhammad
College of Engineering, UAEU

To reduce energy consumption in buildings especially for the purpose of space heating and cooling, Phase change materials (PCMs) got intense attention due to heat absorption during phase change as latent heat of fusion and ability to passively regenerate by releasing the absorbed energy to outside surrounding at night time in summer or to indoor in winter with some time shift to keep building cooled or warmed respectively. Application of PCMs is already studied in walls, wall boards, under floor heating systems, construction slabs and concrete however the some problems related to reduction in compressive strength of concrete incorporated PCM, non-uniform distribution of PCM inside concrete, insignificant increment of thermal inertia, improper bonding of encapsulated PCM with concrete, and structural instability over long cycles of charging and discharging. The current research intends to address PCM integration problems by right PCM and encapsulant material selection, improved bonding between the PCM and encapsulant by investigating into appropriate concreter mix and settling phenomena and improved PCM regeneration with a proper building integration design. Intensive experiments are conducted at small scale concrete block incorporated with microencapsulated PCM with various thermal and structural loadings to optimize the thermal and structural performance. Improved results in the terms of thermal inertia improvement decreased cooling load and less reduction in compressive strength of concrete is reported.

Preparation and Characterization of Ag- and Cu-doped TiO2 Nanomaterials

Haya A.R. Ahmed, and Samir I. Abu-Eishah
College of Engineering, UAEU

The goal of this work was to improve the performance of TiO2 nanomaterials by increasing their optical activities through shifting the onset of the response from the UV to the visible-light region. Among the several ways to achieve this goal, doping TiO2 with metal elements (e.g. Ag or Cu) was selected to narrow the band gap and enhance the optical properties of TiO2 nanomaterials. In this work, Cu-doped TiO2 and Ag-doped TiO2 nanoparticles were prepared and characterized to study their properties, and in particular their optical activities. The Ag-doped TiO2 catalyst was prepared by the sol-gel method while the Cu-doped TiO2 catalyst was prepared by using two different techniques for comparison purposes: the sol-gel method and the inert gas condensation technique under ultra-high vacuum. Both types of nanomaterials were characterized, where applicable, by using Fourier transform infrared spectroscopy (FTIR), Field emission scanning electron microscopy (FESEM) and Electron Probe Micro-Analyser (EPMA) for surface morphology and chemical composition, Brunauer–Emmett–Teller (BET) analysis for surface area and porosity measurements, X-ray diffraction (XRD) to determine their crystal structure and UV-visible absorption spectrometry (UV-Vis) to measure the optical properties. In addition, the Cu-doped TiO2 nanomaterials prepared by the sol-gel method, were subjected to rheological measurements and analysis to determine their flow behaviour. Furthermore, X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM) and UV-visible absorption spectrometry (UV-Vis) analyses have been conducted to characterize the Cu-doped TiO2 thin films prepared by the inert gas condensation technique. The experimental work conducted in this work revealed promising results for improving the performance of the TiO2 nanomaterials by its doping with Cu and Ag metals where the optical activities were remarkably enhanced and shifted from the UV to the visible light region resulting in an appreciable increase in the Ag- and Cu-doped TiO2 nanomaterials effectiveness for photocatalytic applications.

Experimental Investigation of KEVLAR KM2Plus Nano-Reinforced Laminated composite Properties

Omar Gamal Ayad[1], Ashfakur Rahman[1], Mohammed Ali Al Mansoori[1], Ahmed Mohammed Gafar[2], Mariam Al Kuwaity[1], and Abdel-Hamid Ismail Mourad[1]

[1] Department of Mechanical Engineering, College of Engineering; [2] Department of Physics; College of Science, UAEU

Composite materials have applications in a wide range of aspects of research in many advanced technologies and industrial engineering fields because of their superior properties such as light weight, high strength-to-weight ratio, high stiffness and low density. Hence, they are designed to achieve outstanding thermo-mechanical properties that aren't possible with traditional materials. Kevlar fibers are among the best impact resistance fibers, which have been widely used in impact-resistance reinforcement for composite materials. Multi-walled carbon nanotubes have been widely used as Nano-fillers for polymer reinforcement due to their excellent properties. This work is concerned with the synthesis of Carbon nanotube (CNT) reinforced Kevlar composites with various weight % of CNT (0.2%, 0.3%, 0.4%, 0.5%, 0.6%, 0.8%), by the wet lay-up technique. These samples are then studied for their various thermo-mechanical properties. The thermal properties of the laminated Kevlar samples are investigated using Thermal-Gravermetric Analysis (TGA) and Differential Scanning Calorimetry (DSC). The thermal conductivity of the samples is investigated as well by using the Lasercomp heat flow meter instrument. The mechanical properties are investigated using the methods of tensile and three point bending tests. The variation in the characteristics between the laminated Kevlar samples is explained based on the differences in their carbon nanotube (CNT) concentrations. It has been noticed that the CNT reinforced Kevlar composite has excellent properties as obtained from the various experiments, thereby making it a material of keen interest in the different industries. Further work is also currently in progress to evaluate the applicability of this composite to a broader range of applications.

Self-cleaning superhydrophobic polymeric powder coatings for solar panels

Riham Mohamed Sorkatti Abubakr, Abdel-Hamid I. Mourad, and A S Mohammad Sayem Mozumder
College of Engineering, UAEU

Super-hydrophobic coatings are of great interest for many applications. These coatings consist of hierarchical micro-nano structures. Due to this, these surfaces showed water contact angle (CA) more than 160˚; water rolls off to clean the surface with a sliding angle (SA) of less than 5˚. This is how, these coatings exhibit self-cleaning properties, which is better known as lotus effect. These polymeric coatings could be applied to the solar panels with the aim of improving their efficiency by easing contaminants removal when wetted with water, resulting into improved sunlight transmission. In this study, solar panels are coated by electrostatic spraying method using corona spray gun. The coated panels are then cured into an oven to ensure melting and fusing of the polymeric coating into a homogenous film. The proposed procedure, eliminate the use of toxic solvents which is responsible for the hazardous emissions of VOC. Adhesion of the coatings to the substrate is analyzed by standard pull-off test. Scanning Electron Microscopy is used to examine the topography of the surfaces. At the end, thermogravimetric analysis (TGA) and differential calorimetry will be performed to confirm the thermal stability of the developed coatings. Most importantly, electrical transmission efficiency will be calculated before and after applying the coatings to the solar panels.

RC Airplane Design- Build –Fly (AIAA Mock Competition)- Learned Lessons

Rabih Tahouf, Youssef El Kassem, and Ahmed Mohamed Aboelenin
College of Engineering, UAEU

This report will shed light on the process of designing a RC plane, which will be involved in the Mock DBF competition. It is a step by step report, detailing how the plane will be designed, including all specifications and constraints. Depending on this information, a manufacturing and testing process will be made. This project is done by UAEU AIAA team. The objective of the competition is to produce an electric remote controlled aircraft that will receive the highest total score: a combination of the written report score, total flight score, and rated aircraft cost (RAC). The rules of this mock DBF competition is to make maximum laps in air within a specific time. The second mission, is a bonus to make a takeoff with maximum loads. It is important that the aircraft to possess a light weight in order to make a large number of laps. Also, it should be strong enough to handle a payload within the second mission. As mentioned by rules, the aircraft must make a maximum number of laps within four minutes without loads (M1). In addition, the minimum load to be carried in the second mission (M2) is 1 kg. Given that the maximum Battery Packs weight is limit to 0.75 kg and the payload cross section area is square (2.5 cm *2.5 cm). The team aimed for nothing less than the first place in the competition. So, the aircraft should complete minimum requirements of all missions without failing. There are many conceptual designs to achieve these missions, the team decided to choose a conventional aircraft design consisting of a mid-tapered wing with, rectangular fuselage and a single tractor motor was selected. The aircraft optimizations consist of 4 simulated passengers which should be carried during mission (M2) in order to maximize the score. This sets the maximum payload weight to 1 kg.

On Shape Memory Alloy Materials

Mariam Al Mansouri[1], Abdel-Hamid I. Mourad[2], Afraa Seraidy[1], Raghed alhousari[1]
[1] *Department of Mechanical Engineering;* [2] *Department of Electrical Engineering, College of Engineering, UAEU*

Shape memory alloys, SMAs, provide two behaviors that made them useful and important. These are the shape memory effect and the pseudoelastic effect. Shape memory effect is employed for actuation whereas pseudoelasticity used or many applications such as vibration isolation, large recoverable deformations and dampening. They can actuate in three-dimensional manner, which allow the fabrication of actuation components that has different deformations such as extend, bend or twist. These characteristics made SMAs an attractive material to be used in many different fields including aerospace industry. The main objective of the present paper is to summarize classification, different applications, limitations of shape memory alloys and to investigate its utilization in the aircraft industries and all new possible applications of SMAs. This paper is part of a current project that studies the influence of electrical current on SMA behavior and development of a small scale surface actuator driven by electrical current controller. The behavior of the SMA will be monitored by measuring its temperature when applying current at different rates and magnitudes. A controller will be designed to control the applied current that will be used to move small-scale components or systems as for example small scale aircraft wings.

The fabrication of PVDF composite nanofibers and their application in oil-water separation

Zinab Ahmed Al Haddad, Ioannis Zuburtikudis
Department of Chemical and Petroleum Engineering, College of Engineering, UAEU

The fascinating intrinsic properties of poly(vinylidene fluoride) (PVDF) polymer combined with the advantages offered by nanofibrous mats render PVDF electrospun mats very useful in a wide variety of applications ranging from biomedical and energy ones to filtration and membrane distillation. Here, we report a detailed investigation of the electrospinning process of PVDF with alumina (Al2O3) nanoparticles. The effect of five different parameters on the morphology and wettability of PVDF nanocomposite electrospun mats was investigated and quantified through a screening experimental design (DoE). Predictive models were developed for the fabrication of these mats, which can be used as a road map for dictating the optimum experimental settings needed for the preparation of mats with a predetermined morphology and/or wettability, specific to the intended application. The prepared PVDF nanofibrous mats are superhydrophobic and thus, extremely water repellent. Their contrasting wettability (repelling water and adsorbing oil) make them promising candidates for separating liquids with different surface tensions. Since oil and water have different surface tensions, in principle they can be separated using these prepared mats. This is very useful for many applications, oil spill cleaning up being one of very big interest to us.

Preliminary in vitro evaluation of novel Ca-deficient hydroxyapatite-polymer composites for potential bone filling applications

Amani Al Yafeai, Sulafa Abdel Halim, Mariam Al Nehayan, Khaula Al Jahoushi, and Yaser E. Greish
Department of Chemistry, College of Sciences, UAEU

Human hard tissues have unique structure and morphology due to the mechanical and chemical interlocking between the ceramic apatite nanocrystallites and the polymeric (collagen) nanofibers. These features have inspired biomaterial scientists to investigate the development of synthetic composite analogues made of biocompatible ceramics and polymers. The closest ceramic material to hard tissue is hydroxyapatite (HAp; Ca10(PO4)6(OH)2), while polymeric analogues must be initially biocompatible before being considered for any biomedical application. The current work investigated the use of a simple wet method to prepare hydroxyapatite-based bone-like composites. HAp prepared in the current study had a deficiency in its calcium content; hence called Ca-deficient HAp (Ca-def HAp); to closely mimic the apatitic structure of hard tissue. Ca-def HAp was prepared in the presence of a natural biocompatible polymer called Chitosan. This polymer has functional groups such as –OH and –NH2, that makes it close to that of collagen in terms of initiating and enhancing the deposition of bone-like calcium phosphate crystallites in nature. The prepared slurries were dried, and analyzed for their phase composition using infrared spectroscopy (IR), and thermogravimetric analysis (TGA) and were also analyzed for their morphology using scanning electron microscopy (SEM). The prepared Ca-def HAp-chitosan composites were further evaluated for their performance in protein-free simulated body fluid (SBF), in what is considered a preliminary in vitro evaluation study. Composite powders were soaked in SBF media for up to 14 days and experiments were followed by measuring the variation of pH, [Ca2+] and [PO43-] ions in the media as well as the morphological variation of the powders thereafter. Result showed the formation of phase-pure Ca-def HAp in the presence of up to 10 wt% chitosan as confirmed by IR and TGA findings. Minor morphological changes were observed with varying the initial concentration of chitosan during the precipitation of Ca-def HAp in the presence of chitosan. In addition, a sustained decrease in the Ca2+ and PO43- ions in SBF with time indicated a degree of bioactivity as explained by the continued nucleation and growth of bone-like apatite crystallites onto the surfaces of the Ca-def HAp-chitosan particles.

The amorphization of a metallic alloy

Fathalla Hamed
Department of physics, College of Sciences, UAEU

The details of the structural changes a metallic alloy goes through to become a metallic glass remain an open debate. Here, we present experimental results on the structural stages a particular metallic alloy of Cu60Zr30Ti10 takes on its journey to become a metallic glass. Press cooling technique of molten metals was devised and applied toward amorphsing a metallic alloy from the crystalline state. Press cooled Cu60Zr30Ti10 metallic samples with varying thicknesses were produced. X-ray diffraction studies have revealed the structural stages that Cu60Zr30Ti10 takes on its journey from the crystalline to the amorphous state. Cu60Zr30Ti10 Prefers orientational growth nucleation before it jumps into the amorphous state.

Investigating Magnetic Properties of Ferrite Nanoparticles

Ihab M. Obaidat
College of Science, UAEU

Using magnetization measurements, blocking temperatures of aggregates of Mn0.5Zn0.5GdxFe(2-x)O4 ferrite nanoparticles (NPs) with x = 0.02, 0.05, 0.11, 0.15, and 0.2 were found to have a nonmonotonic behavior with increasing size of the particles. The calculated effective magnetic anisotropy was found to increase with two distinct rates as the size of the particles was decreased. In some samples, the zero-field-cooled magnetization was found to exhibit a significant negative magnetization in a considerable part of the low temperature region. To our knowledge, this is the first time that negative magnetization is reported in such nanoparticles. Using zero-field-cooled magnetization measurements at different temperatures, M (H) curves were obtained for Mn0.5Zn0.5Gd0.02Fe1.98O4 ferrite NPs with average size of 35 nm. The temperature dependence of the coercivity, Hc(T) was found to deviate slightly from the classical Kneller's law while the temperature dependence of saturation magnetization, Ms(T) was found to have an excellent agreement with the Bloch's law.

Performance assessment of modern multi-story buildings under near-field earthquakes including the verification of shear failure modes

Bashir Almurad, Aman Mwafy, and Abdelrahman Ashri
Department of Civil & Environmental Engineering, College of Engineering, UAEU

The reliable definition of performance limit states under earthquake loads is significant for the accurate vulnerability assessment of structures. In the present study, the performance criteria of concrete buildings are described in terms of both member and overall structural response, including the assessment of shear failure modes. Several performance criteria along with a number of experimentally verified shear prediction models that account for the changes in shear supply with the degradation of concrete strength and the fluctuation of axial force under earthquake loading are implemented in a post-processor to monitor the seismic response of concrete buildings. A wide range of reference structures is selected to represent code-conforming multi-story concrete buildings with different heights. Fiber-based simulation models and a diverse set of earthquake records representing the near-field seismic scenario are used to carry out a large number of incremental dynamic analyses under different combinations of ground motion components and at various levels of earthquake intensities. The significance of adopting improved performance criteria, particularly the reliable prediction of shear failure modes, on the seismic vulnerability of concrete buildings with different heights is illustrated in this systematic study. The conclusions of this comprehensive study contribute in the development of reliable vulnerability relationships and loss estimation systems for multi-story concrete buildings.

Effect of Washers on the Response of Bolted Composite Connections

Omnia Ragab AbouEl-Hamd[1], Amr M.I. Sweedan[1], and Khaled M. El-Sawy[2]
[1]Dept. of Civil & Environmental Engineering, College of Engineering, UAEU; [2]Architecture Dept., College of Architecture & Design, Effat University, KSA

The superior properties posed by fiber reinforced polymers (FRPs) have introduced them to several engineering applications. In the structural engineering field, fiber polymers have been used for retrofitting and strengthening of existing structures. The mechanical behavior of bolted FRP-steel connections under various connecting parameters is still questionable. This paper investigates the effect of washers on the response of bolted composite connections experimentally. The test program examined nine composite FRP-steel connections with variable number of washers-per-bolt. Results indicate that washers have significant effect on the failure modes of the tested FRP-steel connections. The experimental outcomes highlight the significant enhancement in the load carrying capacity of the composite connections associated with the utilization of washers. The optimum number of washers-per-bolt is suggested based on economical and practical evaluations.

Self-compacting concrete incorporating ceramic waste powder

Sama Tarek Sayed Taha Aly[1], Amr S. El-Dieb[1], and Mahmoud M. Reda Taha[2]
[1] *Civil and Environmental Engineering Department, College of Engineering, UAEU; Civil Engineering Department, University of New Mexico, USA*

Self-compacting concrete (SCC) is a special type of concrete that represents a great advancement towards a better quality sustainable concrete. This type of concrete inherits superior advantages over the traditional concrete. It is featured with high fluidity without tendency to segregation. This distinctive feature is achieved by the addition of filler materials to increase the fines in the mix in order to meet with the typical required range of powder content according to the SCC guidelines (450-600 kg/m3). Various researchers conducted several investigations since the development of SCC in late 1900 using different filler materials. These fillers are either inert or reactive (i.e. hydraulic or pozzolanic) and are known to enhance the segregation resistance of the mix. In order to maintain the flowability of the mix, super-plasticizers and viscosity modifying admixtures are usually added. The use of alternative industrial waste and industrial by-products in construction materials is receiving global attention in a way towards resolving an environmental concern and producing greener concrete. This study investigates the feasibility of using finely ground ceramic waste powder (CWP) as an alternative constituent material in SCC mixes and its effect on fresh concrete flowability. The powder will be used with different weight contents and will be evaluated through tests to determine the mix's fresh flow characteristics and segregation resistance such as: slump flow, T-50 cm slump flow, J-ring, L-box, V-funnel and column segregation tests. It was noticed that using CWP has little or no effect on admixtures demand as well as measured flowability characteristics. Incorporating CWP significantly improved the segregation resistance of SCC mixtures.

Vulnerability of High-rise Buildings with Severe Irregularity under Diverse Earthquake Scenarios

Sayed Khalifa and Aman Mwafy
Department of Civil & Environmental Engineering, College of Engineering, UAEU

The main aim of this study is to assess the seismic vulnerability of the modern code designed tall buildings that exhibit severe vertical irregularity when compared with regular counterparts. The discontinuity in the lateral force resisting system and the weak story, which represent severe cases of structural vertical irregularity, are investigated. 50-story high-rise buildings are selected to represent a regular structure and two irregular high-rise buildings. The reference buildings are designed using the modern seismic design provisions that are adopted in the UAE. Detailed simulation models are developed for the benchmark buildings. A large number of natural earthquake records, representing two seismic scenarios that are relevant to many regions of medium seismicity, are selected to assess the seismic vulnerability of the reference regular and irregular tall buildings. It is concluded that although the design provisions of the irregular buildings account for additional overstrength, they are substantially more vulnerable at different performance levels than the regular tall structure. The observed damage probabilities reflect the large increase in seismic losses and the need for mitigation strategies for structures with severe irregularity.

Towards Self-recovering Construction Schedules: an Artificial Intelligence Approach

Hamad Aljassmi and Youssef Abduljalil
Department of Civil and Environmental Engineering, College of Engineering, UAEU

It is common for a construction schedule to deviate from its original planned baseline, as uncertainty is inherent in all construction activities. Accordingly, planners are required to perform periodic schedule updates that incorporate retrospective progress to more accurately schedule remaining activities. Ideally, an update should capture current project status, compare it with expected progress, analyse factors driving deviations, and reflect the learnt lessons to the upcoming schedule. Yet, this is not a common practice in construction. Unless a substantial recovery plan is induced, planners often neglect one or more of the aforementioned procedures, as these are deemed very complex non-value adding tasks. Consequently, projects often fail to maintain a realistic forecast of upcoming activities, and as such fail to take proactive actions towards potential delays. Based on this recognition, this research project is dedicated to developing a system that semi-automates the schedule updating process, were retrospective progress is continuously captured, 'machine-learned', and reflected on forecasting upcoming productivity rates. Using these continuously refined productivity rates, more realistic activity duration forecasts are approached as the project progresses. In particular, this research project is threefold. First, features (i.e. factors) driving productivity deviations will be deduced from an extensive literature review, and further verified by interviews with industry experts. Second, sensors automating, when possible, the collection of data concerning these productivity features will be reviewed and assessed. Third, the productivity features' data will be fed into a blended artificial intelligence model that (a) matches future activities with similar completed activities, using Case-Based Reasoning (CBR); and (b) predicts future activity productivity rates, using a Neural Network (NN) that adjusts productivity rates of past similar activities as per feature differences. In essence, this research project provides a platform towards a self-recovering schedule system, which serves as an alert for construction managers to proactively prevent potential schedule deficiencies.

The impact of Emirati household occupants on energy consumption; exploratory investigation

Amna Mohamed Al Ameri and Kheira Anissa Tabet Aoul
Architectural Engineering Department, College of Engineering, UAEU

The existing commercial and residential buildings in the United Arab Emirates (UAE) account for over 65% of the total energy consumption, with the residential sector leading the way with around 40%. Further, the energy demand trend is expected to keep rising, similar to its threefold increase from 2000 to 2012. Factors such as population growth, economic development, along with the physical building characteristics, climatic context and occupants' behavior have resulted in high-electricity demand, ranking the UAE as one of the highest energy consumption per capita in the world. The UAE government has taken serious actions to curb the excessive energy consumption. Building regulation and codes emerged as well as energy saving campaigns. While actions and studies are flourishing in terms of building energy efficiency, very little is known about occupants behavior and energy usage in their home, despite the vast body of literature acknowledging that occupants behavior is a driving factor in determining building energy consumption. Further in the UAE, there are evidences that Emirati housing occupants carry a higher energy usage in their homes than non-nationals. Hence, this paper reports on an exploratory qualitative study that aims to investigate nationals' behavior and its impact on energy consumption in their detached houses (villa) in Al Ain city (Abu Dhabi Emirate). The methodology is based on semi-structured interviews, addressing occupants' daily energy usage patterns, cultural aspects and their awareness level of energy consumption in their homes. Housing data and electricity bills have been considered. A pilot study with a small number of units was run first and the main investigation was carried out in 20 units. This paper presents preliminary results of this investigation, where the expected findings will contribute to a better understanding of Emirati energy consumption patterns in relation to their culture, way of life and behavior and potentially open appropriate venues to address energy use reduction in the UAE residential sector.

Design and Modeling of Hollow-Based Energy Harvester

Areen Abdallah Romi Allataifeh, and Mahmoud Fathi Al Ahmad
Electrical Engineering Department, College of Engineering, UAEU

During the past decade, self-sustaining, and low power devices such as medical implant sensors, portable electronic devices, and wireless sensors have been widely spread. However, the rechargeable energy-limited batteries are prohibitively expensive and cumbersome, which draws researcher's attention to a new type of energy source. Harvesting energy from the environment is an attractive alternative to battery-operated systems, especially for long-term, low-power consuming and self-sustaining electronic systems. Vibrational harvested energy using piezoelectric cantilevers and resonators provides sufficient output for small scale power applications due to their ability to withstand large amounts of strain. The piezoelectric material of the harvester is one of the main factors that affect the amount of generated energy depending on elasticity and dielectric coefficients. The optimum configuration and shape of piezoelectric harvester should be determined due to the dependency of the generated voltage on size and geometry of the piezoelectric materials. In this work, the design and analysis of two piezoelectric based harvesters are conducted. Plate and hollow cylindrical structures have been used to collect vibrational energy from ambient. A CoventorWare 3D simulation tools have been used to simulate the harvested voltage, input impedance, maximum displacement and mechanical resonance. The comparison has been implemented to conclude the most effective structure for harvesting energy.

Contact angle and IFT measurements at elevated temperatures and pressures for evaluating wettability in a selected carbonate reservoir in the UAE

Jassim Abubacker, Hazim Al Attar, Abdurazak Zekri, Essa Georges Lwisa, and Mohammad Jasem Khalifi
College of Engineering, UAEU

Waterflooding is the most common method of secondary recovery. Extensive research in the recent years, on crude oil, brine, and rock systems has documented that the composition of the injected water can change wetting properties of the reservoir during a waterflood in a favorable way to improve oil recovery. Thus, injection of "smart water" with a correct composition and salinity can act as a tertiary recovery method. The injection of seawater into high temperature chalk reservoirs is an example of smart water injection in carbonates. The chemical mechanism behind the wettability alteration promoted by the injected water has been a topic for discussion both in carbonates and sandstones. In this work, Interfacial tension (IFT) of oil/brine system were measured at ambient and high pressure high temperature (HPHT) conditions. The brine that exhibited the least IFT was used as a non-wetting phase with aged trims of rock in oil, for the measurement of contact angle at high pressure high temperature conditions. The results of this work have shown that sea water of salinity 57,539 mg/l should be used a base brine for improved oil recovery process. All the measurements were conducted on carbonates. Extensive IFT and contact angle studies were performed for diluted and sulphate-spiked sea water, but none of those seemed to have the capability of changing the wettability of rock. Because of its least IFT with oil at HPHT and its ability to change rock wettability as indicated by the least contact angle, sea water is considered to be the smart water for use in the EOR flooding.

Large Scale Photovoltaic Field Model Identification for Fault Detection and Diagnosis Using Heuristic Evolutionary Algorithm

Zahi M. Omer, and Abbas A. Fardoun
Department of Electrical Engineering, College of Engineering, UAEU

This paper investigates the use of metaheuristic evolutionary algorithms, to predict the voltage-current signature of photovoltaic (PV) field under fault conditions. Recently, UAE has been pursuing sustainable clean energy solutions with large investments in the solar energy production and research. PV power plants are subjected to different types of faults. These faults range from mild one (e.g., aging and corrosion) to hard faults (e.g., open circuit, short to ground, PV-PV fault, partial shading…etc). Currently, PV systems fault diagnosis and analysis for large scale PV arrays is extremely hard and costly. It takes enormous efforts in terms of system shutdowns periods and manpower.The knowledge of the fault signature under different fault conditions decreases the time for fault identification and hence the time to fix/correct for the PV field fault. However, a model of PV field or parameter identification is required to predict IV signature under fault conditions. In this study, metaheuristic evolutionary algorithms are utilized to predict the model of a PV field from experimental measurement. The IV signature of PV field under healthy and different fault conditions is predicted from the developed model. MATLAB/Simulink SW is used to implement the algorithm. Simulated results for a single and multi PV system is compared to measurements under fault and health conditions to verify the capability of the proposed solution for a PV field. Hence, the proposed approach saves a lot of field engineering and energy shut down time under fault conditions. As a result the PV filed system quality is improved. Simulation based analysis in MATLAB/Simulink uses the predefined modules model without numerous practical consideration, which influences the simulation results. This study shows the added accuracy of the simulation results by updating the solar cell parameters extracted from the recently developed bird mating optimizer (BMO) algorithm.

A Remotely Controlled Video Surveillance System Powered by Solar Tracker

Latifa Ahmed Al Dhaheri, Aamna Mohammed Al Teneiji, Maryam Abdulla Saeed Rashed, Dhabia Hamed Al Ahbabi, and Atef Abdrabou

Department of Electrical Engineering, College of Engineering, UAEU

In several industries, outdoor monitoring is essential for security purposes and for situational awareness. This applies for oil & gas refineries, pipelines, and construction projects. Ideally, monitoring these industrial areas are difficult to be done on-site for 24 hours 7 days a week by humans. Therefore, in this work, we propose a design of a wireless video surveillance system that is cost-effective, eco-friendly, and easy to be maintained. Our proposed system offers three main unique features that outperform similar systems. First, it is capable of transmitting either live videos and/or still pictures (for remote locations) via wireless communications to a main control center. The still pictures/videos can be displayed in a desktop computer, smart phones, or tablets via easy to use web interface. Second, the system is powered by a green solar energy supply. The solar power supply maximizes the absorption of the sun radiation by using a solar-tracker, which increases the system power output. Third, the system provides the ability to control the shooting direction of the surveillance cameras and to remotely switch them on or off in order to reduce the energy consumption. The last two features help reducing the system size and cost by decreasing the volume and the weight of the photo-voltaic cells in addition to the required battery capacity. The output power of the solar system is calculated analytically and compared with experimental results. Extensive measurements are conducted for battery charging and discharging time. The performance gain of the solar-tracker is experimentally measured by comparing the output power of the system with and without the solar-tracker. The video resolution and clarity are tested in different outdoor distances and wireless channel conditions. The number of system units covering a specific area is carefully selected to reduce the overall system cost while leaving no unmonitored spots.

Nanotechnology in the service of Oil Industry: Using abundant natural nanoparticles for Enhanced Oil Recovery

Maitha Jumaa Hamad AlKaabi and Ioannis Zuburtikudis
Department of Chemical and Petroleum Engineering, College of Engineering, UAEU

Enhanced oil recovery (EOR) aims to extract the trapped oil from a reservoir and thus, it results in a much higher oil production from it. This, in turn, increases the revenues and therefore, EOR is very important from the financial point of view. That's why, there are many research efforts in the subject. Researchers try to develop and optimize various methods of EOR. Recently, the advent of Nanotechnology has started to provide tools for the development of even better methods. Herein, we report the use of nano-clays as a means of affecting and customizing the interfacial tension (IFT) between water and crude oil, which may lead to an efficient and cost-effective method of oil recovery. Hydrophilic nano-clays at different concentrations were dispersed in de-ionized water and the IFT between the water mixture and Bu-Hasa crude oil was measured at room temperature and at elevated temperature using a TECLIS tensiometer. The results for the 3% w/v, 5% w/v and 10% w/v nano-clay/water mixtures were found to be 14 mN/m, 8 mN/m and 9 mN/m respectively; these values of IFT are approximately 7 times less than the IFT between de-ionized water and Bu-Hasa crude oil. Increase of the temperature from 40℃ to 80℃ reduced the measured IFT even further; by 10 to 4 times compared to that of de-ionized water depending on the sample. Furthermore, monitoring the IFT of the various mixtures through time showed that it is further reduced. Studies on the stability of model emulsions created from nano-clay/water mixtures and Bu-Hasa crude oil also indicate that these emulsions are highly stable. All these experimental findings suggest that the hydrophilic nano-clays used are very promising in developing an improved EOR method.

Modelling and control of Bridgeless PFC modified SEPIC Rectifier with Multiplier Cell

Abbas Fardoun and Ahmad AlGabri
College of Engineering, UAEU

this paper introduces a new bridgeless rectifier that operates with high power factor and high efficiency. The proposed rectifier is derived from the conventional single-ended primary inductance converter (SEPIC) and it is suitable for universal line applications. Multiplier cells have been introduced in the literature to extend the converter gain and to decrease the voltage stresses across the converter switches. The reduced voltage stress across the power switch enables the use of a lower voltage and RDS-ON MOSFET switch, which will further reduce the conduction losses. Moreover, the low voltage stress across the diodes allows the use of Schottky rectifiers for alleviating the reverse-recovery current problem, leading to a further reduction in the switching and conduction losses. The circuit is designed to operate in discontinuous conduction mode (DCM) to achieve almost unity power factor naturally and zero current switching at switch turn on. Large and small signal models of the proposed converter are detailed. Detailed open and closed loop analysis, simulation & experimental results are presented.

A Low Complexity Algorithm for Mode-Selection of OFDM Relaying Systems

Hanan Al-Tous and Imad Barhumi
College of Engineering, UAEU

A low complexity algorithm is proposed for joint allocation of power profiles at the source and relay nodes and subcarrier mode-selection for a single user relay aided orthogonal frequency division multiplexing (OFDM) cooperative communication system. Two scenarios are addressed in this work, in the first scenario, the relay uses DF cooperative relaying to transmit data on a set of available subcarriers, and the remaining subcarriers are used for direct transmission. In the second scenario, the relay uses AF with diversity on a set of available subcarriers, and the remaining subcarriers are used for DF with diversity. The objective is to allocate the resources to maximize the data rate over one OFDM symbol subject to either individual power constraint on each node or total power constraint. We formulate such a problem as subcarrier based resource allocation that seeks joint optimization of subcarrier mode-selection and power profiles at the source and relay nodes. The algorithm is based on an ordering of the channel gains ratio and splitting them into two partitions. The partition that maximizes the OFDM symbol rate is sought. Simulation results demonstrate the merit of the proposed algorithm.

Buildings Retrofitting and Energy Efficiency Optimization Strategies in the UAE Context

Kheira Anissa Tabet Aoul and Ahmed Hassan Noor Mohamed
Department of Architectural Engineering, College of Engineering, UAEU

This study targets the evaluation and optimization of energy performance of existing governmental housing in the United Arab Emirates (UAE). The UAE has one of the world's largest energy consumption per capita, with the building sector accounting for 70% of the consumed energy, used primarily for cooling due to its extreme hot climate. The residential sector accounts for 65% of newly constructed buildings and uses up to 39% of the energy. Building thermal regulations on the other hand were not introduced until recently, in 2003 for Dubai and 2010 through Estidama in Abu Dhabi. Hence, this study l intends to assess the energy performance of dominant housing typology and explore energy efficient measures for the retrofitting of existing housing. The project's goals will be realized by adopting mathematical simulation models from commercial energy simulation programs for selected existing building types to predict their energy performance. The simulation models will be experimentally validated through in-situ measurements and controlled indoor experiments for the building components and systems. The model will be extended to identify energy efficient retrofit opportunities for UAE existing building stock to help comply with the latest building codes. The validated simulation model will be used to evaluate various design concepts, building components and system integrations to achieve energy efficient new as well as retrofit building stock in the context of the UAE. The research is expected to generate in situ energy performance data for building stock, potential improvement areas for energy efficient retrofitting for code compliance and energy efficient future building designs to reduce greenhouse gas footprints of the UAE.

In-Situ Performance Measurement of Green Wall System in UAE

Mahmoud A. Haggag and Ahmed Hassan
Architectural Engineering Department, College of Engineering, UAEU

This study is based on in-situ data collection and processing from a green-building in UAE to evaluate the performance of the green wall for energy savings. A previous study by the authors after two year of installing the system indicate that The decreased temperature on the green facades are achieved by: a) decreased heat gain caused by the green wall due to incident radiations being blocked by the vegetation leaves, soil mass, and the assembly carrying the plants; b) the evaporative cooling caused by the irrigation water to the plants; c) heat resistance due to low thermal conductivity of the plants acting as heat insulators to the ambient heat gain by the wall. This technology can reduce peak time indoor air temperature by at least 5°C for the month of July, and reduce the peak air conditioning energy demand by up to 20%. Green wall technology contributes directly to LEED credits since it covers issues like sustainability, energy saving, air quality, and sound reduction. The system has been working about five years now and the plants density is grown enough to impact greater cooling load. The aim is to quantify the amount of energy savings achieved through green wall primarily due to decreased cooling load with increased plant density and draw a relationship between plantation age, density and energy performance. Based on the measured energy and environmental savings, a cost-benefit analysis for the systems will conclude the process. The results will help document the performance data to evaluate effectiveness of the green wall at the long term in the hot climate of UAE in context of school buildings.

A Microstrip Probe Based On Electromagnetic Energy Tunneling for Extremely Small and Arbitrarily Shaped Dielectric Samples

Rashad Ramzan[1], Muhammad Omar[1], and Omar Farooq[2]
[1] *College of Engineering, UAEU;* [2] *Taibah University, Madinah, Saudi Arabia*

An energy-tunneling sensor is fabricated by joining two air-suspended short-circuited microstrip cavities with a common ground interconnected by a half-wavelength wire. Due to tunneling, highly concentrated fields are created at the tip of the wire. In this work, we propose to exploit these concentrated fields to detect the presence of extremely small and arbitrary shaped samples and their dielectric properties. The simulation and measurement results show respective frequency shifts of 60 and 80 MHz in the tunneling frequency when 2×2×1.6 mm3 samples of FR4 and Rogers 6006 materials are placed on the wire tip. This kind of energy tunneling probe can bring a special advantage in the area of biomedical and forensic analysis where, usually the samples are small in size with no defined shape.

Bistable composite laminates for morphing and energy harvesting applications

Samir Abdel-Rahman Mohamed Emam
Mechanical Engineering Department, College of Engineering, UAEU

Bistable composite laminates have received a considerable attention due to their potential for morphing and energy harvesting. A bistable or multi-stable laminate is a type of composite structure that exhibits multiple stable static configurations. The characterization of unsymmetric fiber–reinforced laminated composite plates as a bistable structure is well established and quantitatively determined after about 30 years of research. As predicting cured shapes of unsymmetric composite laminates became well identified, attention was directed to the design of these structures for morphing applications. Bistable composite laminates have attracted researchers as a morphing structure because a bistable structure settles at one of its equilibrium positions without demanding continuous power to remain there. If the structure is triggered to leave an equilibrium position, it will snap or jump, to the other equilibrium position. The snapthrough response is highly geometrically nonlinear. With the increased demand for broadband vibration energy harvesters, the bistable composite laminate, which is able to gain large–amplitude vibrations in snapthrough motion, has recently attracted attention. This research is utilizing the bistable composites for morphing and energy harvesting applications. This research work will be supported by theoretical models and experimental testing. A preliminary results show promising results.

Dielectric Sensing based on Energy Tunneling in Wire-loaded Microstrip Cavities

Rashad Ramzan[1], Muhammad Omar[1], and Omar Farooq[2]
[1]College of Engineering, UAEU; [2]Taibah University, Saudi Arabia

The electromagnetic energy tunneling which takes place in narrow channels and bends loaded with epsilon-near-zero materials or resonant wires is accompanied by very intensive electric fields. The resulting transmission response is, therefore, highly frequency selective. Hence such configurations can be employed in highly sensitive dielectric detection. In this paper, the energy tunneling set-up is created in a microstrip environment using resonant wires. The dependence of various wire and microstrip parameters on the sensitivity of the sensor is studied. The microstrip technology, compared to the rectangular waveguides, is low cost, robust, easily manufactured and suitable for planar integration.

Evaluation of Yearly Cooling Performance of Phase Change Materials Integrated into PV Systems in Extremely Hot Weather Conditions.

Ahmed Hassan[1], Hamza Nouman[1], and Jawad Sarwar[2]
[1] *College of Engineering, UAEU;* [2] *Texas A & M University, Qatar*

Phase change materials (PCMs) are used as temperature regulators for PV systems to reduce their temperature dependent power loss and improve their life and integrity. Previous research at this subject was limited in terms of being in mild weather conditions and for a specific season lacking detailed understanding of PCM performance in the extremely hot weather conditions with varying seasons. The current research aims to evaluate the effectiveness of PCM being subjected to a very hot weather conditions and varying conditions for the whole year. The proposed system is deployed outdoors in extremely hot ambience of Al Ain, UAE and the experiments are conducted for the whole year duration. The effect of PCM in reducing PV temperature and increasing PV power are reported. A transient heat transfer numerical model is developed and the model predictions are compared with experimental results thereby showing a good agreement between the simulated and experimental results. The PV-PCM system shows reasonable temperature drop and power gain by employing PCM for the whole year however showing a slight difference in the magnitude of the cooling and power gain effect across the seasons.

Microfluidic System for Multi-Target Cell Separation

Saud A. Khashan and Sawsan Dagher
College of Engineering, UAEU

We introduce concept designs for a microfluidics system aimed at multi-target sorting. The functionality of the proposed continuous-flow, magnetophoresis-based microfluidic systems were demonstrated by handling the simultaneous sorting of a poly-sized suspension of magnetic beads. The designs rely on focusing of the injected sample toward the repulsive side of a single ferromagnetic wire. The wire is integrated into the microfluidic device without being invasive to the flow itself. The enhanced functionality of the design is quantified using a Lagrangian-Eulerian computational model that accounts for the dominant mechanisms of particle transport including fully-coupled particle-fluid momentum transfer. The obtained CFD results here demonstrate the capability of the proposed concept designs to simultaneously sort three types of magnetic beads with high purity and at throughputs scalable with the depth of the microchannel.

Concentrated photovoltaic (CPV) system and its cooling by using phase change material (PCM)

Ahmed Hassan Noor Muhammad and Ali Hasan Shah
College of Engineering, UAEU

Photovoltaics are promising sustainable energy generators however their higher costs and large area requirements still remain important issues to resolve. Solar radiation concentration in is considered to be an important tool to improve the efficiency and reduce cell area to reduce the costs associated with photovoltaics. By using concentrated photovoltaics (CPV) system, large amount of sunlight can be concentrated into a smaller area by applying lenses or mirrors. However it follows an increase in the photovoltaic cell's temperature which is detrimental for cell life and electrical yield. While a variety of approaches have been used to the keep the cells cool, most of them are based on heat dissipation to ambient which reduces the overall energy efficiency of the system. In the current research an attempt is made to store the excess heat, which if otherwise would raises the cell temperature, in phase change materials (PCM) and utilize it for domestic and industrial water heating applications in low concentration regimes. In order to realize this, the mirrors are used for concentration and a thermal management is designed at the back of low concentration PV to store heat during daytime heating cycle while a coolant is passed through the melted PCM to utilize this heat for heating applications. An improvement in CPV efficiency is reported in terms of combined thermal and electrical yield in low concentration photovoltaic system (LCPV).

Modeling Effect of Cerebral Aneurysms Size through Numerical Analysis

Mohammad O. Hamdan[1], Hashem M. Alargha[1], Saud Khashan[1], Amr Elshawarby[2], and Waseem H. Aziz[2]
[1]Mechanical Engineering Department, College of Engineering, UAEU; [2]Neuro Endovascular Centre, Tawam Hospital

Computational fluid dynamics (CFD) recently has gained lots of momentum to be used as a medical tool for studying aneurysms in the brain and predicting the cause of aneurysms initiation, growth and rupture risk.This study looks into the hemodynamics and dynamic pressure variation inside cerebral aneurysm via detailed numerical analysis of the fluid-solid interactions (FSI). Hence the computational fluid dynamics is coupled with finite element analysis methods and is used to solve the boundary conditions in an idealized geometry. The study focus on analyzing effect of the aneurysm aspect ratio on the wall shear stress (WSS), the stagnant volume ratio (SVR) and wall stresses (Von Mises stress).

Numerical validation of cooling performance of phase change materials integrated into heat sinks for electronics cooling

Hassan Hejase, Ahmed Hassan Noor, Mohammad O. Hamdan, and Shaimaa Mohamed Abu Ayyan
College of Engineering, UAEU

This study aims to analyze the cooling performance of phase change material (PCMs) integrated into metallic heat sinks both experimentally and numerically. The heat sinks are prepared as metallic containments having fins with optimized inter-fin spacing. The heat sink filled with PCM are subjected to various heat loads. The heat generating surface and heat sinks surface temperatures are monitored to evaluate the PCM thermal performance. A three dimensional transient heat transfer numerical model is developed to validate the experimental results. Also the numerical model is used to optimize the heat sink geometry, the PCM amount and the cooling-heating response in order to identify potential applications in electronic packaging in terms of temperature control and charging-discharging cycle time.

Investigating flow field and energy separation in counter-flow vortex tube via 3D computation fluid dynamics

Youssef Jamal Elkassem, Mohammad Omar Hamdan, Braa Kakah, and Hashem Alargha
College of Engineering, UAEU

A numerical analysis is carried out in this study order to understand of the flow field and the associated temperature separation in a counter-flow vortex tube. A three dimensional computational fluid dynamics model, using ideal gas compressible flow assumptions, is performed the performance of a vortex tube. Standard k-epsilon CFD turbulent model is utilized in the following study. Vortex tube with four tangential inlet streams, one axial hot outlet stream and one axial cold outlet stream is considered for the analysis. Investigations will consider the variation of fluid properties and flow parameters as the fluid particles progress in the flow field. Fluid properties like temperature and flow parameters like particles velocities will be obtained along the tube to understand the flow behavior inside the tube.

Advanced Window Systems: Design and Performance Test of a Hybrid Photoluminescene-Photovoltaic Building Technology

Daniel Efurosibina Attoye, Kheira Anissa Tabet Aoul, and Ahmed Hassan Noor
Department of Architectural Engineering, College of Engineering, UAEU

The energy crisis of the 21st century has inspired researchers to investigate innovative and sustainable energy-saving building technologies. Literature shows that modern daylighting strategies provide significant reduction in building energy consumption, with health and productivity improvements. Advancements in photovoltaic (PV) technology and the renewed interest in daylighting are principal tools for researchers in the drive for net-zero energy buildings. However, the intermittency of sunlight limits –to a certain degree, the vast potentials of these tools in building design. This research focuses on the use of an advanced window system consisting of photoluminescent (PCM) glazing panels and PV cells to create a hybrid Building Integrated PV (BIPV) system. An experimental setup will be designed using a scaled ratio of the window system to test the performance of this hybrid technology. It will be first simulated under numerical models, and then the prediction will be verified with experimental results carried under UAE conditions. The window system will be tested in vertical (V) and diagonal (D) positions to investigate the degree of variation in daylight levels and power outputs of the window system in these positions. It is expected that the results will give information regarding the amount of daylight allowed and power generated by the window system, as well as advance the optimization BIPVs which characteristically produce less power than conventional PV systems. It will also lead to a reduction in the embodied energy of buildings as traditional windows and roof-mounted PV panels will be hybridized into a single energy-efficient façade system for achieving high-performing building designs.

Options for Maintaining a Sustainable Fishery Production against Climate Change Conditions in the United Arab Emirates

Eihab Fathelrahman[1], Khalid Siddig[2], and Saif Al-Qaydi[3]
[1] *College of Food and Agriculture, Department of Agribusiness, UAEU;* [2] *Faculty of Agricultural Sciences, University of Hohenheim, Germany;* [3] *College of Humanities and Social Sciences, UAEU*

Fisheries around the world continue to face increasing demand for more fish catch to provide healthier alternative source of protein relative to red meat, meanwhile the jury is still out of the real causes of the declining wild fish stock globally. United Arab Emirates (UAE), like many other countries, witnessed a declining per capita fish availability in the last three decades due to a decreasing of fish catch. Fish represents one of the major diets in the country. The goal of this research is to study benefits of adapting sustainable practices in face of uncertainty in UAE. More specifically, the study aims at carrying out scenarios/impacts analyses of the efforts to sustain such valuable natural resource endowment (i.e. fish stock). Fisheries sector sustainable practices include hard measures such as construction of artificial fish habitats in the Arabian Gulf and soft measures such as the enforcement of regulations that protect and conserve the fisheries' stocks. The economic impacts of these practices evaluated assuming targeted shifts/ climate Change scenarios These scenarios assumed two levels of changes in natural resource endowment, and conventional other factors of production such as capital and labor used in the country to produce fish final products (i.e. study of technological change). The empirical UAE economic data used to construct the General Equilibrium (GE) Model of the UAE. Results of simulated interventions obtained from the GE model showed that prices of the fishery products as well as other related commodities will decline and the consumers will benefit the most from such interventions. Factors of production such capital and labor prices were found to be significantly changing due to the sustainable practices in both positive and negative directions. The study also measured the changes both consumers and producers' welfare in the UAE due to the simulated targeted interventions in response to the climate changes. This research attracted both scholars and graduate students to participate in the research activities. Research beneficiaries include the climate change and fisheries research community in UAE, policy and decision makers, fisheries communities' organizations.

Effects of global climate change on agriculture

Mohammed A. Salem, Wasef Al-Zayadneh, A. Senthilkumar, and Laila Ahmed Ali Al Dhaheri
Department of Aridland Agriculture, College of Food and Agriculture, UAEU

Climate change is expected to influence crop and livestock production, hydrologic balances, input supplies and other components of agricultural systems. However, the nature of these biophysical effects and the human responses to them are complex and uncertain. For example, crop and livestock yields are directly affected by changes in climatic factors such as temperature and precipitation and the frequency and severity of extreme events like droughts, floods, and wind storms. In addition, carbon dioxide is fundamental for plant production; rising concentrations have the potential to enhance the productivity of agro ecosystems. Climate change may also change the types, frequencies, and intensities of various crop and livestock pests, the availability and timing of irrigation water supplies, and the severity of soil erosion. Agricultural systems are managed ecosystems. Thus, the human response is critical to understanding and estimating the effects of climate change on production and food supply. Agricultural systems are also dynamic, producers and consumers are continuously responding to changes in crop and livestock yields, food prices, input prices, resource availability, and technological change. Accounting for these adaptations and adjustments is difficult but necessary in order to measure accurately climate change impacts. Failure to account for human adaptations, either in the form of short-term changes in consumption and production practices or long-term technological changes, will overestimate the potential damage from climate change and underestimate its potential benefits. On a global scale, the regional increases and decreases associated with climate change are not expected to result in large changes in food production over the next century. Nonetheless, impacts on regional and local food supplies in some low latitude regions could amount to large percentage changes in current production. Climate change may therefore impose significant costs on agriculture areas.

Climate Change and Food Security: The Effects of Long Term Elevated Solar Ultraviolet–B (UV-B) Radiation on the Agricultural Sustainability in the United Arab Emirates (UAE)

Rahaf Ajaj, Suzan M. Shahin, and Mohammed A. Salem
Department of Aridland Agriculture, College of Food and Agriculture, UAEU

Agriculture plays a fundamental role in food security and the sustainable development of the globe. With the world population explosion and with the challenges of climate change, there would be a major concerns in providing adequate food for the people in many countries. Climate change and global warming has become a real threat to the global food security. High temperatures, Increase of CO2 levels, ozone layer depletion and excess levels of the solar ultraviolet (UV) radiation, are becoming more predominant, resulted in many significant adverse effects on the productivity of many agricultural crops. High levels of UV-B has the ability to damage the living organisms by destructing the DNA and causing severe changes in the membrane and protein denaturation. In addition, this type of radiation could alter the plant's physiology and thus could affect the vegetation growth and development. The UV-B radiation could be a serious threat to the agriculture; as it reduces the terrestrial plant productivity by about 6%. The United Arab Emirates (UAE) is a country located in the arid region of the world, with severe environmental and climatological conditions. The enormous growth in the urbanization with the sharp growth in population are major stress factors on the agricultural sector of the country, especially with the raising challenges of climate change and global warming. Therefore, the future of the agricultural sustainability in the UAE became in a real critical situation. Consequently, the main objective of this work is to shed the light on the influence of the UV-B radiation, as one of the main factors of climate change, on the agricultural sustainability. As well as, to highlight tailored solutions, that can rescue the future of the agricultural sector in the UAE, which will assure the sustainability and food security in the country.

Modelling the Ecological Impact of Climate Change in Hot Regions – Environmental Prospects for the UAE

David L. Thomson[1], Teng A. LI[2], Obaid A. Al Shamsi[1], Sounak Ghosh[1], Alya A.I. Al Hammadi[1], Hiba M.A. Ganieb[1], Amina M.J. Laham[1], Huda M. Shaheen[1], and Halima S.S.N. Almeqbaali[1]
[1] *College of Science, UAEU;* [2] *HKU*

To date, research into the ecological impacts of climate change has been focused heavily on the temperate and arctic regions where the largest increases in temperature are predicted to occur. The impact of rising temperatures does however depend not only on the magnitude of the temperature increase, but also on whether current temperatures are already too hot, or whether indeed they might actually still be too cold. If temperatures in the mid- and higher- latitude regions are still too cold, then global warming could actually benefit species there, enhancing their fitness by helping them to breed and survive successfully. If temperatures in the Tropics are already too hot then the ecological impacts could actually be much greater even if the temperature changes are smaller. In this presentation, I give an overview of work on my research grant "Modelling the Ecological Impact of Climate Change in Hot Regions – Environmental Prospects for the UAE". I outline how we have developed the research programme and the progress we have made so far in testing whether the most negative ecological impacts of climate change might actually occur in hot regions. As well as the graduate and undergraduate projects presented separately at the conference, I show how we have developed a database to synthesize avian data from studies conducted in different parts of the world and test whether the impacts in the heavily studied mid- and higher latitudes really are more negative. We found many studies which had examined the relationship between vital rates and temperatures, but all of these studies had been conducted in the mid- and higher latitudes - none had been conducted in the Tropics. More than twice as many studies found positive rather than negative relationships indicating the mid- and higher latitudes are still too cold and that rising temperatures there are significantly more likely to have positive than negative effects. The programme is still in progress, but findings so far draw attention to the potential importance of climate change in hot regions.

Biological impacts of climate change in hot regions - are warm-water fish already living above their optimal temperatures?

Alya Ali Ibrahim AlHammadi, Hiba Mohamed Ahmed Ganieb, Amina M Jamal Laham, Halima Salem Salmeen Nassib Almeqbaali, Huda M Shaheen, and David L. Thomson
College of Sciences, UAEU

Temperature increases in the tropics are relatively small compared with the mid- and higher northern latitudes, and much of the research on the biological impacts of climate change has so far been focused in these more northerly regions. The impact of rising temperatures is however determined not only by the size of the temperature increase but also by whether organisms are currently living in temperatures which are already too hot or in temperatures which are still too cold. If species in hot regions are already enduring conditions above their thermal optima then the impacts of even small temperature increases there could actually be much more negative than larger temperature increases further north. Here, we will present three undergraduate research projects in which we are using indicators of metabolic performance to identify the optimal temperatures of three warm-water fish and to test whether they habitually experience temperatures above these optima in the regions they inhabit.

The ecological impacts of climate change in hot regions – is our biodiversity particularly vulnerable in the UAE?

Obaid Ali Al Shamsi, and David L. Thomson
College of Science, UAEU

The United Arab Emirates is exposed to some of the highest temperatures on Earth, and the ecological impact of climate change will depend on whether our wildlife populations can continue to survive and reproduce as temperatures rise further. Fitness is thought to increase with temperature up to some optimum and it is only beyond this optimum that rising temperatures start to have negative effects. Fitness per se has however been quantified only rarely and inferences are more commonly based on physiological metrics of performance. Here I present some plans for my Masters project in which I aim to reconstruct the relationship between temperature and fitness itself using long-term monitoring data for a number of key biodiversity indicator species in the United Arab Emirates. I outline how I plan to use these relationships to test the vulnerability of our wildlife populations; examining how negative the impacts will be and quantifying the scope for adaptation.

Rising temperatures in hot regions – how many species would be able to survive in the United Arab Emirates?

Sounak Ghosh, and David L. Thomson
College of Science, UAEU

The upper critical temperature TCmax is the temperature at which a species' physiology can no longer function, resulting in death from direct heat stress. This temperature has now been measured in a wide range of ectothermic organisms. Here I present plans for my Masters project in which I aim to examine how many of these species could survive in the temperatures we currently see in the United Arab Emirates, and how many could still survive if temperatures were to increase as predicted by the climate models of the IPCC. I plan to examine not just average temperatures, but also the extremes, comparing levels of temperature variability in the United Arab Emirates with variability in other regions of the world.

Importance of Sampling and Sample Preparation in Slake Durability Test

Abdulkarim Ahmed Owain Alali, Hasan Arman, and Osman Abdelghany
College of Science, UAEU

The slake durability test is intended to assess the resistance offered by a rock sample and to estimate qualitatively the durability of rocks in the service environment. Four type's rock samples, belonging to the Early Oligocene epoch Asmari Formation, were collected from Jabal Hafit, Al-Ain city, United Arab Emirates (UAE). The objective of this study is to emphasis the importance of sampling and sample preparation.

Greywater reuse in arid climates through the water sensitive urban design system

Dr. Rezaul Chowdhury[1], Taoufik Ksiksi[2], Mohamad M. Mohamed[1], Jameelu Abaya[1], and Sybil Sharvelle[3]
[1] *Department of Civil and Environmental Engineering, College of Engineering;* [2] *Department of Biology, College of Science, UAEU;* [3] *Colorado State University, USA*

Best management practice of water from the users' end is regarded as one of the most effective ways of solving water scarcity issue and environmental protection. Although, arid regions of the world require more of this practice than other parts of the world, most of the advancement carried-out in this field are more suitable for application in non-arid regions. Bioretention system is one of the Water Sensitive Urban Design (WSUD) technologies that received significant attention of researchers and it is acknowledged to play a significant role in improving the quality of stormwater in the urban landscape. However, findings have shown that greywater which constitute the largest portion of domestic wastewater in the UAE could be used to operate the bioretention system. A positive signal was received when investigated in the laboratory settings, however, a better picture and a more representative result can be obtained if the system is studied in a larger scale. As such, the research intends to explore further, the effectiveness of using the vegetative bioretension system to treat domestic greywater after it has been stored under the permeable pavement reservoir. Analysis of the physical, chemical and biological properties of the effluent from the bioretension system will give a reliable definition of the ability of the system to improve the quality of the greywater if operated in this region. The bioretention system can play a dual role in improving greywater quality and landscape aesthetics. Consequently, selection of appropriate plants for them is a research question for this arid region. Twelve different species of native and exotic plants in triplet planted in 36 prototype bioretention columns in the laboratory. The columns are irrigated by synthetic greywater and the removal efficiency of heavy metals are monitored on a monthly basis. The retention of heavy metals in the water, plants (leaves, stem and roots) and soil are also investigated. The outcomes of the research will be useful in adopting the greywater reuse and improving the landscape aesthetic.

Transient behavior of the CO2 absorption in porous polymeric hollow fiber membrane contactors

Nayef Ghasem, Mohamed Al-Marzouqi, Nihmiya Abdul Rahim, and Nima Atbaei
College of Engineering, UAEU

Conventionally, packed columns are used for the absorption of carbon dioxide from natural gas and flue gas. The gas/liquid contact is performed within an absorption tower. The tower consists of a packed column over which the absorption liquid and gas are flowing in counter current mode of operation. The large active area required for CO2 mass transfer efficiency from the gas into the liquid prompts the use of huge absorption tower, which extremely increases the cost of the process. In recent years, hollow fiber membrane contactors technology has been considered a promising alternative to conventional absorption technologies, since it offers higher absorption efficiency and avoids common operating problems found in traditional packed columns. Gas-liquid hollow fibers membrane contactors offer larger gas/liquid contact are per unit volume. The aim of this work is to develop a transient mathematical model and simulate the behavior of CO2 removal by sodium hydroxide aqueous solution in hollow fiber membrane contactor module with time. The case of non-wetted operation mode is considered. The simulation results are compared with the experimental data. The mathematical model simulation results showed that both CO2 mass transfer rate and removal efficiency were favored by concentration of sodium hydroxide, liquid flow rate, by contrast, increase in gas flow rate and initial CO2 concentration will reversely affect the capture process. Moreover, the simulation results agreed with the experimental data.

Absorption of CO2 from natural gas using aqueous ammonia solutions and regeneration using hollow fiber membrane contactors

Abdul Rahim Nihmiya, and Nayef Ghasem
Department of Chemical and Petroleum Engineering, College of Engineering, UAEU

The focus of this research work is to investigate the potential for the energy efficient and effective separation of CO2/CH4 gas mixture via lean solvent and regenerating of the rich solvent through absorption/stripping mechanism taking place in a hollow fiber gas liquid membrane contactor (GLMC) process by using aqueous ammonia (NH3) as absorbent liquid. The experimental results revealed the CO2 absorption ability of ammonia in GLMC is lowly than the same concentration of MEA or NaOH. However by increasing the solution concentration the CO2 absorption performance similar to conventional absorption liquids could be obtained. But the problem was as the solution concentration increased the ammonia would slip from the solution easily. The possible solution was mitigating the NH3 escape from the solution either by using chilled ammonia solution or using any additives that mitigate the NH3 escape from the solution. Glycerin was added to the solution to mitigate the ammonia escape from the solution. Experimental observations showed by adding glycerin the CO2 absorption performance of aqueous ammonia solution could be enhanced effectively in GLMC applications. The optimized operating range of concentration is 2-4 M, since the higher concentrations cause other practical problems such as precipitation of the reaction product and membrane wetting. Although reaction kinetics could be enhanced by increase in temperature, the optimum temperature should be adopted in order to overcome the other practical problems such NH3 slip and membrane wetting. Hence the optimal temperature is about 30–40 °C. The stripping results exposed the aqueous ammonia solution could be regenerated at low temperature as 60 °C compare to conventional amine high temperature regeneration. The long term stability experiments showed any concentration of aqueous ammonia solutions long term stability was very poor due to membrane wetting. Hence alkaline salts were added to the aqueous ammonia solutions in order to increase the surface tension of solutions. The results showed the long term stability of CO2 absorption by aqueous ammonia solution in GLMC could be enhanced by salt addition to the aqueous ammonia solutions.

Evaluation of a dual-purpose process for the treatment of desalination reject brine and capture of CO2

Ameera Fares Rasheed Mohammad[1], Muftah H. El-Naas[1], Mabruk I. Suleiman[2], Mohamed Al Musharfy[2], and Ali H. Al Marzouqi[1]

[1] College of Engineering, UAEU; [2] Takreer Research Center

Current approaches to sequestering carbon dioxide have numerous environmental concerns and have not be effective in developing economic and environmental friendly processes to deal with the ever-growing CO2 emissions. Meanwhile, the management of desalination reject brine is yet another environmental challenge that faces most desalination plants. The usual approach is to send the reject brine back to the sea, send it to large evaporation ponds, or inject it deep into the ground. An alternative approach is to further process the brine to extract all the salts through reactions with carbon dioxide. This has the advantages of being environmental friendly and can produce valuable carbonate chemicals. The present work optimizes the CO2 capture based on the traditional and modified Solvay processes. In the traditional Solvay process, carbon dioxide is passed into ammoniated brine and reacts with sodium chloride to form a precipitate of sodium bicarbonate, while the invented modified process uses the calcium oxide instead of ammonia to form the same precipitate. The processes has the dual benefit of decreasing sodium concentration in the reject brine and reducing carbon dioxide emissions to the atmosphere. Processes parameters were studied to determine their effect on CO2 capture efficiency and ions removal. The optimum conditions for maximum CO2 capture efficiency and ions removal have been determined using response surface methodology. The optimum CO2 capture efficiency and ions removal in the traditional Solvay process was found to be at a temperature of about 19 oC, a gas flow rate of 1.54 L/min, and a molar ratio of 3.3NH3:1NaCl. At these optimum conditions, a CO2 capture efficiency of 86% was achieved within 180 min of operation. A modified Solvay process was able to achieve much better salinity reduction and CO2 capture efficiency of 99%. The results clearly illustrated that the Modified Solvay process is more superior in terms of CO2 capture efficiency and sodium removal.

Effect of Supercritical CO2 Treatment on Date Pits for Lead Ions Removal

Naeema Aldarmaki and Haliemeh Sweidan
College of Engineering, UAEU

A study was conducted to compare the adsorption capability of Date Pits (DP) with that of date pits activated by the removal of lipids by supercritical CO2 extraction (ADP) to remove lead ions from aqueous solutions. In order to find the best conditions for adsorption, a comparative study was performed to measure the effects of solution pH, adsorbent mass, and solution concentration. Furthermore, isotherms were built for the adsorption of lead at different concentrations by DP, and ADP. The preliminary results show that DP and ADP have the same adsorption capacity for lead removal. Therefore, DP oil can be used in applications in cosmetics and the residues can be used as adsrobents.

Waste Management of Emirates Steel By-products through Carbonation Process

Suhaib Hameedi[1], Muftah El-Naas[2], Ali H. Al-Marzouqi[1], Maisa El Gamal[1], and Abdel-Mohsen Mohamed[3]
[1] Chemical & Petroleum Engineering, UAEU; [2] Gas Processing Center, Qatar University, Qatar; [3] Zayed University

Steel making is one of the major non-oil based industries in the UAE. During the steel-making process, Emirates Steel generates considerable amounts of by-products such as slag and dust as waste materials, which are estimated to be about 0.145 ton/ton of produced steel. These solid wastes usually contain considerable amounts of metal oxides and silicates. Different approaches have been used in the past for waste management of steel-making by-products. This research focuses on a simple and inexpensive approach, which is carbonation through reactions with carbon dioxide. Mineral carbonation has been selected not only to stabilize the minerals activities, but also to mitigate the emission of CO2. The research applied direct gas-solid carbonation in a fluidized bed reactor, which provides a cost-effective approach, using 10% CO2 in air as a feed gas. Ladle Furnace (LF) slag and Baghouse (BH) dust were used to carry out several experiments and then to study the operating process variables and their effects on the carbonation. Solid samples before and after carbonation were analyzed by TGA, SEM and XRD to examine the changes of the physical and chemical properties of the treated solids. Experimental results showed that CO2 could be sequestered by both slag and dust with a maximum CO2 sequestration of 0.23 kg CO2/ kg LF slag, and 0.62 kg CO2/kg BH dust based on the total calcium content.

Assessment of the Effectiveness of Different Freshwater Microalgae Strains for Phenol Removal

Sulaiman Al-Zuhair[1], Mustafa Nabil[1], Yusuf Abdi[1], Murad Al Sayyed[1], Hanifa Taher[2]
[1] Department of Chemical Engineering, College of Engineering, UAEU; [2] Department of Chemical Engineering, Masdar Institute

One of the major components in the wastewater of most chemical and petroleum industries is phenol, which is considered toxic and carcinogenic even at very low levels. Therefore, phenol cannot be discharged to the environment without treatment. Bacteria can be used to biologically treat the wastewater containing phenol. However, the accumulated biomass during this process, i.e, the grown bacteria, is not valuable. On the other hand, using microalgae instead of bacteria for phenol treatment generates usful biomass that can be used to produce lipids that are useful for producing biodiesel, proteins and pigments that have applications in the pharmaceutical and food industries. The ability of different freshwater strains, namely Chlorella sp., Pseudochlorococcum sp. and Chlamydomonas sp,.to grow in samples of water containing phenol have been tested. The effectiveness of the selected strains to utilize the phenol as a carbon source and reduce its concentration has been assessed. Both the efficiency of phenol removal and growth rate were studied in samples of different initial phenol concentrations that varies in the range of 100-450 ppm. Out the three strains, Pseudochlorococcum sp showed both the highest rate of phenol removal and highest specific growth. Three kinetics models that incorporate substrate inhibition were tested to describe the growth, which show almost identical fittings.

An Initial Assessment of Desert Plants' Potentials for Carbon Sequestration

Taoufik S. Ksiksi[1], Rebecca Trueman[2], Mahmoud A. Abdelfattah[3], Abdulla Y. Almarzooqi[1], Soltan A. Barahim[1], and Shaijal Thru Ppoyil[1]
[1] *College of Science, UAEU;* [2] Algonquin College, Canada; [3] EAD, Abu Dhabi

Desert plant species' potentials to capture carbon has not been well investigated, especially with the expected impact of enhanced greenhouse gas emissions. Atmospheric carbon dioxide concentration ([CO2]) continues to rise due to human activities. Particularly that CO2 is a leading greenhouse gas directly affected by anthropogenic activities. In many ecosystems C uptake may increase, which leads to accelerated C cycling belowground. There is a strong need for C storage in pools that have either long residence times or that transfer C from organic to inorganic forms. As arid and semi-arid regions account for about 30% of the earth terrestrial surface and these areas are expanding due to anthropogenic alterations to environments and the compound effects of anthropogenically induced climate change. The aims of the project are to examine C sequestration in the UAE arid ecosystems using biomass that increases C allocation belowground and to determine which desert/native plant species present the greatest increases in belowground organic and inorganic C pools. Field samplings of 22 sites across the UAE was conducted June to July 2015. Gravel plains had the highest carbon sequestration potentials with an average of 385.8 tons per hectare, where sand plains had the lowest average of about 56 tons per hectare. Variations among floral species were also assessed. This research highlights the need to assess soil carbon sequestration potentials at larger scales. Such larger scale assessments will provide much needed potentials of the UAE terrestrial ecosystems' to sequester carbon and minimize atmospheric [CO2].

A novel combined "Enzymatic-Advanced Oxidation Process" approach for efficient degradation of aromatic pollutants

Aysha Hamad Muftah Al Neyadi, Nabeela Ashraf, and Syed Salman Ashraf
College of Science, UAEU

Please insert your abstract here.The Abstract text should NOT exceed 350 words.Pollution of water bodies with various organic aromatic compounds pose a serious threat to both aquatic life and humans, as these pollutants can lead to various deleterious effects such as cancer, skin diseases and muscle degeneration. Not surprisingly, various chemical, physical and biological approaches have been developed and proposed to remove or degrade pollutants from contaminated water. Among the available chemical approaches, Advanced Oxidation Processes (AOPs) are the most well-developed and widely reported techniques. Additionally, biological remediation of pollutants is a set of biotechnology approaches in which the pollutants are removed using either microorganisms or enzymes. Specifically, the use of enzymes to degrade organic pollutant is at the forefront of this exciting field and has attracted much interest due to its efficiency and potential ease. Although enzymatic remediation of contaminated water shows great promise, there are several classes of organic pollutants that do not get degraded by these peroxidases (even in the presence of redox mediators). In this study a novel enzyme-AOP combined remediation approach was examined by combining AOP (UV Photolytic, UV/H2O2) with Chloroperoxidase (CPO) system to degrade two different models of organic pollutants (Trypan Blue, a diazo dye and Sulforhodamine). The degradation of these model compounds using the novel Enzyme-AOP combination approach was compared with dye degradation observed under AOP (UV/H2O2) and enzyme (CPO/H2O2) systems alone. Interestingly, both spectroscopic and analytical analyses (HPLC) showed that the combined approach (UV+CPO+H2O2) degraded the dye much more efficiently as compared with (UV+H2O2) and CPO treatments alone. In addition, LC/MS/MS studies were carried out to identify some of the possible breakdown products produced under enzyme+AOP, AOP, and enzyme-based degradation systems. Our preliminary data shows that the combined enzyme+AOP system may be another efficient approach to degrading various classes of organic pollutants, especially in contaminated aqueous environments.

Absorption of CO and CO2 Molecules on Graphene: Ab-initio Analysis

Nacir Tit, A. Rayhan, K. Said, N. Mahmoud, S. Ahmed, and W. Othman
Department of Physics, College of Science, UAEU

The adsorptions of CO and CO2 molecules on graphene were theoretically investigated using density functional tight binding (DFTB) method. In this study, three adsorbents were considered: (i) Pristine graphene (pG), (ii) Stone-Wales defected graphene (SW-G), and (iii) Single-vacancy-defected graphene (vG). Atomic relaxations were carried out leading to the final stable geometry, in which the type of interactions is assessed. The results show that CO2 molecule always exhibits physisorption with all the adsorbents. The strongest physisorption of CO2 is found to occur with the Stone-Wales defected graphene. On the other hand, CO molecule can reach chemisorption on vacancy (vG). Our results bring into evidence that CO molecules (not CO2 molecules) were the ones detected in the Gas sensing experiment done using graphene by Yoon and coworkers. The band structure and density of states (DOS), calculated for each system, corroborate the state of either physisorption or chemisorption. The sensitivity of vG towards detecting CO molecules was confirmed by the rise of conductance with the increasing CO gas dose. On the other hand, the selectivity is investigated by testing the adsorptions of six different gases on vG (i.e., CO, CO2, N2, O2, H2O, and H2S). Four gases are found to exhibit physisorption (namely: CO2, N2, H2O, and H2S) and the other two gases alter chemisorption (namely: CO and O2). The chemisorption of O2 molecule involves the dissociation process whereas the one of CO is direct. Thus, vacancy-defected graphene should be appropriate candidate adsorbent to have high sensitivity and selectivity towards the detection of CO molecules.

Portable analyzer for continuous monitoring of sulfur dioxide in gas stream based on amperometric detection and stabilized gravity-driven flow

Sayed Aly Mohamed Marzouk[1], Mohamed A.R.A Alnaqbi[1], Muna S. Bufaroosha[1], and Mohamed H. Al-Marzouqi[2]

[1] Department of Chemistry, College of Science; [2] Department of Chemical & Petroleum Engineering, College of Engineering, UAEU

The construction, optimization and application of a portable gas analyzer for the real-time measurement of sulfur dioxide in gas stream are described. The principle of operation was based on absorbing SO2 from the analyte gas stream into a gravity-driven carrier solution flowing through a diffusion scrubber (DS), in the form of a bundle of polymeric hollow fibers. The produced sulfite ions in the carrier solution were detected by anodic amperometry at a novel carbon nanotube (CNT) electrode polarized at 0.35 V vs Ag/AgCl reference electrode. Integrating the DS with the amperometric detector in addition to the novel compact design provided a light weight portable analyzer (900 g) with a small footprint. Under optimized conditions, the analyzer offered several favorable performance characteristics such as (i) good sensitivity (LOD = 4 ppm), (ii) wide linear dynamic range up to 5000 ppm, (iii) reasonably fast response time (t95%, 4.1 min), (iv) excellent signal stability and repeatability (RSD = 1.3%), and (v) continuous standalone operation for 6 hours. The interfering effect of H2S was selectively removed using a prior guard column. The analyzer was applied successfully in monitoring the removal of SO2 from SO2-N2 gas mixtures and in determining sulfite in foodstuffs.

Smart Safety System inside Vehicles

Shahrazad Abu Ghazleh, Mohammad Hayajneh, Reem Al Kaabi, and Amal Al Sariadi,

College of Engineering, UAEU

During the last two decades, hundred cases of children suffocation and car fires that caused by emission of toxic and flammable gas inside cars have been reported from different parts of the world as well as from the UAE. Therefore, the need for inventing a smart safety system inside the car is critical in order to measure a real time toxic and flammable gases concentration and transfer the readings into a database for analyzing and reporting purposes. This helps to reduce the child-death and fire risks inside the car as well as save the environment and reduce the pollution in the UAE. In this project, we suggest developing a multi-function sensor system inside the vehicle in order to measures the concentration of flammable and toxic gases that could cause car fire or suffocation. In order to achieve this, we are planning to study the properties of specific nanometer-scale particles (nanocluster). And by incorporating these nanoclusters, we are proposing to develop and fabricate nano-electronic sensing devices such as sensor for human body movement detection, thermal sensor, as well as gas sensors which are characterized by low cost, and high sensitivity and selectivity. The gas sensors should detect different types of gases such as Carbon dioxide (CO2), Carbon monoxide (CO), Nitrous Oxide (N2O), Nitric oxide (NO), Butane gas (C4H10), and Hydrogen Cyanide (HCN). The next step is to investigate the sensing characteristics of the fabricated sensors. Nanoparticles can be synthesized based on different methods such as a colloid microwave-thermal method. Sensors system should be connected to a GPS and to a smart phone system, once detecting a dangerous concentration level of toxic or flammable gases inside the vehicle, the sensor device should send a notification signal to the smartphone via a robust and reliable communion link. Communicating the notification signal to the smartphone could be carried out via Bluetooth. If the distance between the sensor node and the smartphone is farther than the range of the Bluetooth (~ 100m), cellular network can be used and the sensor device should be GSM enabled. Alternatively, a wireless local area network (WLAN) can be used.

Polynomial Type Oil-Vinegar Signature Cryptosystem

Adama Diene
College of Science, UAEU

An oil-vinegar scheme (OV) is a signature scheme based on multivariate quadratic polynomials over finite fields. The system contains m equations and n variables divided into two groups; v variables called “vinegar variables” and o variables called “oil variables”. The scheme is called balanced oil-vinegar scheme or unbalanced oil-vinegar scheme (UOV) depending whether or not v=o. These schemes are very fast and require modest computational resources, which make them ideal for low cost devices like smartcards. The balanced one has been already broken and it is proven that the unbalance one is very vulnerable for many choices of the parameters. In this paper, we propose a polynomial type of these schemes. The main idea of our construction, is to use matrices whose entries are product of randomly chosen polynomials and through matrix multiplication, we obtain the central map. We call this new signature scheme PTOV scheme. It can be as efficient as the UOV but with higher security claims.

Oxygen vacancy cluster in rutile TiO2: GGA+U study and extrapolation correction

Xiaoping Han, Noureddine Amrane, Naser Qamhieh, and Maamar Benkraouda
College of Science, UAEU

It is rather difficult to model the electronic properties of wide-gap oxides with weakly electronic correlation using first principles methods in the framework of the density functional theory (DFT) together with the Hubbard correction to account for the nonlocal effect in the exchange-correlation (XC) functionals. In this contribution the oxygen-deficient TiO2 has been studied applying a generalized gradient approximation + Hubbard U (GGA+U) formalism alone, and the result shows the limitation for GGA+U method to this weakly correlated oxide system: an inadequate effective Hubbard parameter Ueff value results in significantly undervalued prediction of the properties, while overcorrection owing to big Ueff is unphysical. The limitation in Hubbard correction is addressed satisfactorily through a physically justifiable extrapolation scheme based GGA and GGA+U (with a small Hubbard parameter), leading to accurate prediction of electronic structures and energetic properties. It was found that oxygen vacancies (VO) tend to appear in the linear cluster of VO-Ti-VO, accompanied by the appearance of a deep localized state (due to the 3d state of the Ti ions) inside the forbidden energy region. Such vacancy ordering and the associated electron localization lead to the appearance of characteristic optical spectra, being in excellent agreement with the experimentally observed optical absorption in the slightly reduced TiO2. The current method is expected to be applied to other weakly correlated systems.

Geometry of Quasiconformal Groups

Jianhua Gong
College of Science, UAEU

In this talk, I will present some recent results about geometry of quasiconformal groups such as compactness properties and Hilbert-Smith conjecture. Quasiconformal mappings in higher dimensional spaces are transformations of subdomains of the extended Euclidean space, which have uniformly bounded distortion. They provide a class of mappings that lie between homeomorphisms and conformal mappings. There are a number of interesting relevant results in the plane. On the other hand, very little is known about the higher dimensional (greater than 3) situation.

Mutually unbiased bases

Kanat Abdukhalikov
College of Science, UAEU

The notion of mutually unbiased bases (MUBs) is one of the basic concepts of quantum information theory and plays an important role in quantum tomography, state reconstruction and quantum cryptography. At present, even the most elementary questions concerning the maximum number of such bases in a given dimension and their constructions remain open. These numbers and constructions are determined only for prime power dimensions, and there is no general classification. MUBs have very close relations to other problems in various parts of mathematics, such as Lie algebras, operator algebras, algebraic combinatorics, finite geometry, discrete mathematics, coding theory, metric geometry, sequences, and spherical codes. All these branches have problems similar to MUBs, and all these problems were developed independently from others. In this talk we will discuss constructions of complete sets of MUBs, relations between these constructions, automorphism groups of MUBs, equivalence and existence questions.

An efficient numerical algorithm for solving fractional higher-order nonlinear integro-differential equations

Qasem M. Al-Mdallal, Muhammed I. Syam, and M. Naim Anwar
Department of Mathematical Sciences, College of Sciences, UAEU

This article is devoted to both theoretical and numerical study of boundary-value problems for higher-order nonlinear fractional integro-differential equations. Existence and uniqueness results for the considered problem are provided and proved. The numerical method of solution for the problem is based on a conjugate collocation and spline approach combined with shooting method. Some numerical examples are discussed to demonstrate the efficiency and the accuracy of the proposed algorithm. Keywords: fractional integro-differential equations; collocation method; shooting method. This project is supported by the United Arab Emirates University Research Affairs (grant No. COS/IRG-16/14).

All-optical switches, unidirectional flow, and logic gates with discrete solitons in waveguide arrays

Usama Al Khawaja
Physics Department, College of Sciences, UAEU

We propose a mechanism by which a number of useful all-optical operations, such as switches, diodes, and logic gates, can be performed with a single device. An effective potential well is obtained by modulating the coupling between the waveguides through their separations. Depending on the power of a control soliton injected through the potential well, an incoming soliton will either completely transmit or reflect forming a controllable switch. We show that two such switches can work as AND, OR, NAND, and NOR logic gates. Furthermore, the same device may also function as a perfect soliton diode with adjustable polarity. We discuss the feasibility of realizing such devices with current experimental setups.

On the pricing financial derivatives in illiquid markets

Youssef El-Khatib
Department of Mathematical Sciences, College of Science, UAEU

We investigate the use of the Monte Carlo method to solve numerically the pricing problem for financial derivative products in illiquid markets. The presence of a price impact of investors trading has been extensively documented in the literature. In this paper, we consider an European option where we assume that trading the underlying asset will affect the price of the option. Using the risk-neutral valuation we express the option price as an expected value under the equivalent martingale measure. Then we obtain a numerical solution using the Monte Carlo method. Graphical illustrations are provided and show the efficiency of the simulations.

An Efficient Method for Solving Fractional Boundary Value Problems

Muhammed Syam
College of Science, UAEU

In this paper, we present a numerical for solving nonlinear fractional boundary value problems using the Bernstein polynomials. It is based on the Spectral methods. Theoretical and Numerical results will be presented.

GMRES Method for Solving discretized Incompressible Navier-Stokes Equations

Nabila Azzam
College of Science, UAEU

Abstract Discretization technique to a partial differential equations leads to an algebraic system of equations, which are, in general, large and sparse. In this contribution, we use iterative solution methods of Generalized Minimum Residual (GMRES) type to solve the discretized Navier-Stokes equations. The linear system (momentum, pressure, transport equations) is solved each step by an iterative solution method GMRES. The diagonally scaled momentum equations are solved by GMRES(m), a restarted version of GMRES . Some numerical experiments are presented to illustrate the theory and methodology.

Series Solutions of Multi-Term Fractional Differential Equations

(Mohammed Khier) Ibrahim Al Srihin, and Mohammed Al-Refai
Department of Mathematical Sciences, College of Science, UAEU

In this talk, we present a new algorithm for obtaining a series solution for multi-term fractional differential equations of Caputos type. The terms of the series are obtained sequentially, and the idea is analogous to the Taylor series method, but we overcome the difficulty of computing iterated fractional derivatives, which do not compute in general. We applied the new algorithm to several types of multi-term fractional differential equations, where accurate solutions as well as exact solutions in closed forms have been obtained. We also compared our results with the ones obtained by the Adomian decomposition method (ADM).

Modified Taylor series solution of initial value problems with singularities

Ghada Janem, and Fathi M Allan
Department of Mathematical Sciences, College of Science, UAEU

Initial value problems with singular points are very important for researchers in various fields including science and engineering. Series solutions of differential equations with regular singular points are easily achieved by the method of Frobenius. While series solutions of differential equations with irregular singularities are not easily achieved at the point of singularity, and the standard numerical techniques are not capable of solving the problem due to the fact that calculations will require a division by 0. This initiates the need for development of new techniques to handle these problems. In this article we will discuss a new method based on a modified Tylor series approach to solve initial value problems with singularities at certain points in the domain of definition of the problem. The method is based on expanding the solution at different choices of the expansion point. Details analysis of the suggested method will be discussed and examples will be presented to demonstrate the efficiency of the method.

ON THE GEOMETRY OF FUCHSIAN GROUPS

Hala Alaqad, and Jeffry Gong
College of Science, UAEU

In this talk, I will present some geometric properties of Fuchsian groups. In addition, I will also present some algebraic properties of Fuchsian groups. We consider the discrete groups with emphasis on the geometry of discrete groups, which lies at the intersection between Hyperbolic Geometry, Topology, Abstract Algebra, and Complex Analysis. Here Fuchsian groups are discrete subgroups of the group of linear fractional transformations of one complex variable

Geometric Integration of Hamiltonian Systems

Hebatallah Sakaji and Anwar Hussein
College of Science, UAEU

Geometric numerical integration is a relatively new area of numerical analysis. The aim is to preserve the geometric properties of the flow of a differential equation such as symplecticity or reversibility. A conventional numerical integrator approximates the flow of the continuous-time equations using only the information about the vector field, ignoring the physical laws and the properties of the original trajectory. In this way, small inaccuracies accumulated over long periods of time will significantly diminish the operational lifespan of such discrete solutions. Geometric integrators, on the other hand, are built in a way that preserve the structure of continuous dynamics, so maintaining the qualitative behaviour of the exact flow even for long-time integration. The aim of this thesis is to design efficient geometric integrators for Hamiltonian systems and to illustrate their effectiveness. These methods are implicit for general (non-separable) Hamiltonian systems making them difficult to implement. However, I show that explicit integrators are possible in some cases. Both geometric and non-geometric integration methods are applied to several problems, then I do a comparison between these methods, in order to determine which of those quantities are preserved better by these methods. In particular, I develop explicit integrators for a special case of the restricted 3-body problem known as Hills problem.

Portfolio Selection: A New Approach

Abdulnasser Hatemi-J[1], Youssef El-Khatib[2]
[1] *Department of Economics and Finance, College of Business;* [2] *Department of Mathematics, College of Science, UAEU*

Since the groundbreaking contribution of Markowitz (1952), it is common knowledge that investors can reduce the risk of their investment via diversification in form of creating a portfolio. The optimal weights as budget shares to be invested in the risky assets included in the portfolio can be acquired via the minimization of the variance of the underlying portfolio conditional on the budget restriction as shown by Markowitz. This method manages to find a portfolio with the minimum level of risk among all available portfolios. Nevertheless, using this well-established method might not result in the maximization of the expected return per unit of risk. Though, the rational investors are expected to care about returns and risk combined and not separately. Thus, this paper suggests finding the required weights of the portfolio by maximizing the risk adjusted return subject to the budget constraint. A pertinent mathematical proof is given for the suggested solution. An application is provided, which shows that a portfolio based on our method results in higher risk adjusted return compared to a portfolio created by the well-established standard method. Keywords: Financial Markets, International Portfolio Diversification, Optimization. JEL Classifications: G10, G12, C6.

The Impact of Global Uncertainty, Equity and Commodity Shocks on GCC Stock Markets: Evidence from Quantile Regression Analysis

Chiraz Labidi[1] and Gazi Salah Uddin[2]
[1] *College of Business and Economics, UAEU;* [2] *Linköping University, Sweden*

We adopt a quantile regression model to assess the impact of U.S. policy and equity market uncertainty as well as oil and gold shocks on GCC stock markets. Our analysis is motivated by the fact that the GCC region has been one of the fastest growing regions over the past decade but remains heavily relying on oil revenues. On one hand, it goes without saying that commodities, and particularly oil have long shaped the region. It is also widely recognized that emerging markets in general, and GCC investors in particular have a cultural preference for gold that results in a higher exposure to the yellow metal. On the other hand, commodity shocks are in general proven to be associated with policy and equity market uncertainty. In this study, we use two news-based economic uncertainty proxies, namely the U.S. Economic Policy Uncertainty (EPU) index and the Equity Market-related Economic Uncertainty (EMEU) to empirically examine the impact of global uncertainty and commodity shocks on GCC stock markets over the period from May 31, 2005 to March 24, 2015. We adopt a quantile regression model to examine the impacts of the conditionning variables at specific quantiles of the returns' distributions and to capture the asymmetric response of GCC stock markets to global uncertainty and commodity price changes. While, a classical OLS regression model focuses on the mean of the dependent variable's distribution, conditional on the realizations of the independent variables, quantile regressions provide a more complete picture of the conditional relation at all parts of the dependent variable's distribution. This study is of particular interest to international investors and portfolio managers who should be cautious about the response of GCC stock markets to both commodity price shocks and global uncertainty. This research is also particularly useful to policymakers to help them discern the extent to which reliance on oil revenues which induces more economic volatility is susceptible to affect stock markets and the need for policies that would spur further economic diversification.

Social Media impact on Innovation in an emerging smart city

Maher Shirah and Ananth Chiravuri
College of Business and Economics, UAEU

This research proposal aims to investigate the impact of social media on innovation in a smart mobility context within Dubai - an Emerging Smart City. Smart cities transformation is achieved by smart initiatives which create a demanding need for more innovation. Prior literature studies suggest a positive influences of social media use on the level of innovativeness which is an enabler for smart cities. This study will investigate the impact of innovation achieved by using two types of social media tools: the internal social media use within the organization, and the external social media use by the employees outside the organizations, and will distinguish between the types of social media tools: interactional and informational social media, in order to understand the degree of influence of each of them on innovation. The study will be conducted from mobility planners' point of view. A mixed methods approach will be used to examine the impact of social media's types on innovation, this will be done by measuring the level of innovativeness based on the literature's identification of innovation, through increasing number of generated new ideas, and the percentage of valid new ideas (quality) and the percentage of implemented new ideas. The study shall provide evidences on what influence social media mostly has on innovation and how is that impacting the innovativeness of smart mobility public transportation in a smart city context. Accordingly, the study will also suggest social media practices that may enable more innovation, and will eventually suggest improvements of how roads and transportation planner should deal with and benefit from the different types of social media.

Impact of Leadership Styles on Virtual Team Performance in the UAE Government Sector

Nama Al Ameri and Ananth Chiravuri
College of Business and Economics, UAEU

There is considerable debate in management literature as to which style of leadership is the most effective in managing organizational virtual teams. From among all the theories that have dominated leadership research, the two frequently discussed theories are that of transactional and transformational leadership. Transformational leadership is found to be positively associated with leadership effectiveness across many different types of organizations. Literature on leadership states that leaders face considerable challenges managing traditional teams and this challenge becomes even more pronounced in leading virtual teams. Therefore, this research aims to study and analyze which of the two leadership styles, transactional or transformational is effective in improving virtual team performance. This study is significant because virtual teams are becoming common in organizations and due to the unique setting in which virtual teams operate, their performance is of particular concern for virtual team managers as it impacts the overall performance of the organization. Moreover, virtual teams are becoming common phenomenon in the UAE Government sector and the findings of this study will provide insights that will be useful for virtual team leaders. Furthermore, this study also aims to propose a virtual leadership model that is effective in improving virtual team performance and make a significant contribution to knowledge in the field of leadership, virtual team leadership and performance of virtual teams. A quantitative approach is adopted for this study and a questionnaire survey will be conducted among virtual team leaders and virtual team members working in selected Government departments in which virtual teams are currently operating. The Multifactor Leadership Questionnaire (MLQ) for self and rater forms will be used to understand the perceptions of virtual team members as to which of the two styles; transformational or transactional is more effective. The data gathered will be analyzed using SPSS and descriptive and inferential statistics will be calculated, which will be used to draw appropriate conclusions about the perceptions of both the virtual team leaders and the team members. Based on the findings suitable conclusions will be drawn and recommendations will be presented.

Pricing Beliefs: Empirical Evidence from the Implied Cost of Deposit Insurance for Islamic Banks

Dr. Jocelyn Grira[1], Mohammad Kabir Hassan[2], and Issouf Soumaré[3]
[1] *College of Business and Economics, UAEU*; [2] University of New Orleans, USA; [3] *Laval University, Canada*

This paper provides an economic assessment of the implicit cost of deposit insurance for Islamic as well as conventional (non-Islamic) banking systems. Using a large international sample of 348,899 year-firm observations covering 352 Islamic banks and 30,572 conventional banks in 213 countries over the 1999-2013 period, we estimate the implicit risk-based premiums for deposit insurance of Islamic banks and conventional banks. The implicit risk-based deposit insurance premium for publicly listed Islamic banks is higher than that for publicly listed conventional banks. The opposite is true when it comes to privately held banks. Moreover, we show that the estimated risk-based premium for deposit insurance of publicly listed Islamic banks is, on average, more than two times the estimated risk-based premium for privately held Islamic banks. Our findings suggest the need to enhance the supervisory mechanisms applying to the Islamic banking system coupled with the design of a comprehensive Islamic deposit insurance scheme that takes into account the distinctive feature of Islamic banks.

Becoming a Knowledge Economy the Case of Qatar UAE and 17 Benchmark Countries

Osiris Jorge Parcero and James Christopher Ryan
College of Business and Economics, UAEU

This paper assesses the performance of Qatar and the United Arab Emirates (UAE) in terms of their achievements towards becoming knowledge-based economies. This is done through a comparison against 17 benchmark countries using a four pillars' framework comprising – (1) information and communication technology, (2) education, (3) innovation and (4) economy and regime. Results indicate that the UAE ranks slightly better than the median rank of the 19 compared countries while Qatar ranks somewhat below. Results also indicate that both countries lag considerably behind knowledge economy leaders; particularly evidenced in the innovation pillar. Policy recommendations are mainly addressed at further developing the two countries' research culture as well as improving the incentives to attract top quality researchers and highly talented workers.

Foreign Direct Investment Regulation versus Labor Market Regulation: a Political Economy Approach

Louis jaeck[1] and Sehjeong Kim.[2]
[1] *Department of Economics and Finance, College of Business and Economics;* [2] *Department of Mathematics, College of Science, UAEU*

Over the last decades, a dramatic increase in Foreign Direct Investment inflows (FDI) has been observed worldwide and especially in developing countries (1990-2013 : 35000 to 77000 Million $, UNCTAD (2013)). To explain such trends, the literature has mainly focused on economic factors such as the market size and the growth potential of the host country and institutional factors such as the rule of law, the quality of the judicial system and labor market institutions. As FDI have proven to have benefical effects on stimulating economic growth and reducing unemployment in the host country, governments have been engaged in a "competition" to attract FDI. Few studies have investigated the determinants of FDI policies from a political economy perspective (Pandya (2007). In addition, there is a vast literature on the political economy of labor market reform (Saint-Paul (2004, 2010)). This paper contributes to these strands of research and analyses the interaction between FDI regulation and labor market regulation from a political economy perspective. It analyzes the setting of reform towards liberalization of Foreign Direct Investment policies as a political compromise pressured by the lobbying of a domestic lobby and an MNF lobby. Using a common agency model of lobbying, we show that the interest group's influence is not distortive for a critical distribution of supporters and non-supporters of the reform. Also, our political economy framework show that deregulation in the labor market generates a softening of FDI regulations. Besides, the model also accounts for the effect of exogenous provision of information on the beneficial effects of the liberalization of FDI policies. It is shown that the liberalization process is weaken when such provision occurs. Such counter-intuitive result lies with the interaction effects between information provision, the distribution of citizen's beliefs and lobbies' influence.

Individual and contextual antecedents of career decidedness: The mediating role of career adaptability

Mohamed A. Al Waqf
College of Business and Economics, UAEU

Career decidedness has been addressed in numerous studies within the literature on career indecision (Betz & Voyten, 1997). It is generally understood within a transitory, developmental framework of interrelation between several factors until an academic or career decision is reached(Larson, Heppner, Ham, & Dugan, 1988; Osipow, 1999). For example, the extant literature on job and organizational choice indicates that applicants are attracted to work environments that are compatible with their personal characteristics (Kristof, 1996). Job seekers' goals, values, needs, interests, and personalities have been compared with organizations' cultures, pay systems, sizes, structures, and values. However, personal values and goals alone are not sufficient to determine the eventual career choices of individuals due to the influences of contextual factors in the wider socio-cultural and economic environment surrounding them (Albert & Luzzo, 1999). In this study, I propose a conceptual model which examines the antecedents of career decidedness. In order to understand factors affecting the career decision making process and the career indecidedness phenomenon within any context, it is important to examine the combined effects of individual level factors such as quality of human capital and self-awareness (level of understanding and knowledge that individuals possessed about their interests, abilities, values, strengths, and weaknesses) (Callanan & Greenhaus, 1992) and contextual factors such as perceived extrinsic rewards and availability of employment opportunities (labour market demand) associated with specific career choice decisions. Career adaptability (Savickas, 1997) which refers to "a persons psychosocial resources for coping with the tasks of preparing for and participating in the work role" is expected to mediate the relationship between individual level and contextual antecedents and the career decidedness outcome.

Performance of start-ups in the Aviation industry: The case of Etihad versus Air Arabia Airlines

Peter Oyelere, Sultan Al Katiri, and Mouza Al Neyadi
College of Business and Economics, UAEU

The performance of national air carriers have been known to be a key indicator of a nation's economic health and stability. Airlines link different sectors of the economic sphere and their financial performance usually mirror that of the country from which they operate. We examined the performance of two airlines in the United Arab Emirates (UAE) from their start-up to 2014. The two airlines represent two different spectrums of airline operations, with Etihad airlines being a full-service legacy carrier, while Air Arabia represents the no-frills low cost carrier (LCC) airline sector. Data were collected from the financial statements of the two airlines covering the period under investigation. The collected data was analyzed and the performance levels of the two airlines were determined and compared to global standards and the economic performance of the UAE.

How to embed innovation in Emirati public sector organisations – A student contribution to the "Year of Innovation 2015"

Thomas Ahrens, Aishah Abdulla Khameis Al Sereidi, Asra Hossein Rahmdel, and Halimah Fadhl Al-Shaebi
College of Business and Economics, UAEU

Public sector research suggests that public sector organisations can generate new ideas and adopt innovations if they possess organisational innovativeness (OI). OI is characterised by a series of qualities that stretch from idea generation to turning new concepts into reality. This project used the structured interview method in order to elucidate ways in which members of Emirati public sector organisations (government and semi-government) conceive of the facilitators and the obstacles of OI to help shed light on the state of innovation in the UAE public sector. The study found that the range of facilitators and barriers to OI mentioned by the subjects was considerably narrower than that established by previous research. Relatively little attention was given by subjects to the area of customer orientation. Also relatively little attention was given to learning as a value in itself. Within the area of learning orientation, however, frequent mention was made of the significance of "trust" between managers and employees for the latter to be involved in decision making about innovations. The interviews suggested an individualised approach towards thinking about the facilitators of OI, in contrast to the OI literature, which emphasises the systemic and organisational elements and relationships that define OI. Organisational politics as a barrier to OI received almost no mentions. Subjects tended to steer away from this topic. With regards to what UAE public sector managers and employees could do in order to strengthen facilitators and mitigate the impact of barriers of OI, suggestions included training on matters related to OI and innovation. Few references were made to better research into the wishes and expectations of clients, i.e., the strengthening of the client orientation of the organisations. More frequently mentioned were suggestions to improve communication in the organisations. This included the availability of client information and its use, but also issues relating to the nature of communication itself. Key issues in this respect were an openness to innovation, acceptance of creativity, and the willingness to experiment and take risks. Communication thus was used as an umbrella term for many of the characteristics of OI as defined by the previous literature.

Identification and Influence of Social Cohesion on FDI Flows: Evidence from Middle Income Countries

Wasseem Mina
College of Business and Economics, UAEU

The World Bank (2013) argues that social cohesion shapes the context in which entrepreneurs make investment decisions and therefore job creation. In this paper, we empirically examine the relationship between social cohesion and FDI flows. Using panel data on 52 middle income countries for the period 1984-2012, we first identify social cohesion-related institutions using PCA and examine the influence of those institutions individually and collectively on FDI flows. PCA identifies religion in politics, internal and external conflicts, and ethnic tensions as institutions with highest loadings. Adopting FE, IV and system GMM, the paper finds that less religion in politics stands out with its robust, positive influence on FDI inflows. The novelty of the paper lies first in identifying social cohesion-related institutions and principal component and second in discovering the positive influence of less religion in politics on FDI flows to middle income countries.

Perceptions of Audit Quality: Towards developing a regulatory framework for audits of SMEs in the UAE

Ahmad Abdul Fattah Mohd Odeh, and Rihab Khalifa
College of Business and Economics, UAEU

Abstract The aim of this paper is to briefly describe the audit industry as a whole in the GCC and to focus on the UAE and the governing authorities that exist and their role in the industry. Then an experiment was performed by getting audit firms to audit a small entity that have lots of material unsupported transaction. The methodology used was to describe the laws and regulations that are in place in the GCC in order to find the best model that might be suitable for the UAE context and to review some of the existing authorities that are working to regulate the audit industry in the private sector in the UAE. Then using the experiment results to provide reasonable assurance that some audit firms are not complying with the bare minimum auditing standards required by international auditing standards. It is expected that the study would identify a gap in the governance authorities over auditors dealing with companies in the private sector. The originality of this study lays in the fact that it is expected to identify a need for a governance body to regulate audit firms in the UAE. If such an authority came to place and governed the audit firms that are dealing with the private sector, it would be a further topic to be researched in the future to measure the transparency of financial reporting and its impact on the UAE economy as a whole and bank lending specifically before and after the existence of such proposed body. Keywords: audit, governance, GCC, UAE, regulation, audit quality, private sector, and firm size

The Relative Risk Performance of the Islamic Sukuks over the Conventional Bonds: New Evidence from Value at Risk Approach

Mariam Aldhaheri, and Aktham Almaghaireh
College of Business and Economics, UAEU

Sukuk are securities that are asset-backed and Sharia compliant. Since their inception in 2002, Sukuk markets have experienced dramatic growth rates attracting the attention of investors, analysts and researchers alike. Despite Islamic bonds (thereafter termed as Sukuk) which held successfully their place in the international bond markets, the literature survey reveals that there are limited empirical studies on the Sukuk market risk from the investors' perspectives. Both the conventional bonds and Sukuk as financial instruments are exposed to various types of financial and market risks. Purpose: is to examine the possible market risks in regards to the Sukuk as compared to the risks of traditional bonds. Based on value at risk approach, we examine whether Islamic Sukuk exhibit a different market risk performance to conventional benchmarks. Findings: The Bond VaR is generally, and significantly, higher than the Sukuk VaR of the same issuer. There are several reasons why the risk of Sukuk is different from that of conventional bond: First, Islamic principles that prohibition of interest or usury (riba) and the strong emphasis on the performance of underlying assets in determining the payoff to investors have led to a smaller effect of interest rate changes on Sukuk value. The characteristics of Islamic finance, such as the prohibition of speculation (gharar); short selling, betting and gambling (qimar); and arbitrage (Jobst, 2007). Another contributing factor is Sukuk are illiquid instruments compared to conventional bonds as evidenced by the lack of secondary market activity. Second, there are structural differences between Islamic and conventional assets. Islamic bonds can be based on various Islamic partnerships and leasing arrangements. However, tangible assets back all of them and most of the Islamic bonds are independent of interest rate movements, such that the profit depends on the performance of the underlying asset. The Bond VaR is generally, and significantly, higher than the Sukuk VaR for a given issuer, indicating a higher level of risk in holding the Bond relative to the Sukuk. Implication: Our findings have important implications when devising international investment allocations and risk management strategies, especially since there has been a rising interest in Islamic finance.

A Framework on the Determinants of e-government Services Quality in UAE

Mohamed Abdul Rahman Al Ahmed, and Ananth Chiravuri
College of Business and Economic, UAEU

The rapid and increasingly universal acceptance of online transactions has resulted in governments providing an increasingly wide range of online services to the general public. The successful experience of launching e-government portals and services, including transactional ones, in the industrialized countries has led to the United Arab Emirates (UAE) to adopt similar such models for a wide array of public service entities. Although there is now a considerable literature on the various aspects of the efficiency, effectiveness and customer satisfaction with regard to e-government services, the majority of the associated analytical frameworks and models were not designed within the sociocultural context of the Arabian Gulf and its business environment. The purpose of this study is therefore to identify and present a framework on the quality determinants of the e-services which are currently provided by the UAE's Ministry of Interior (MOI) to the public. As these services are already in place, it will focus in particular on a theoretical model and the mechanisms by which these services can be adapted and enhanced.

Work Engagement Antecedents and Consequences across Generations in the United Arab Emirates

Nahla Abdulla Fadhlani and Abdul Karim Khan
College of Business and Economics, UAEU

Organizations today face a number of new challenges in their efforts to remain competitive in today's contemporary business environment. These include; meeting the needs of increasingly diverse workforce, the introduction of new technology, and the globalization of business (Buke and Cooper, 2004; Cooper and Buke, 2002). On the other hand academicians and practitioners both realized the importance of motivated and engaged workforce, which can serve as an inimitable competitive advantage (Lawler, 2003; Pfeffer, 1994;1998; Burke and Cooper, 2005). Realizing this importance we see a surge of research during last decade, exploring the antecedents and consequences of work engagement (Kahn 1990,1992, Schaufeli and Bakker, 2004 and Shaufeli et. al. 2003).The empirical findings suggest that enhancing work engagement may create competitive advantage for organizations (Shuck, Reio Jr and Rocco, 2011). Under the UAE 2021 vision, and the challenges associated with Emartization. Further complications are expected by the emerging work-related generational differences among baby boomers, generation X, and generation Y. In the recent years there has been evidence of some consensus in the academic literature that Y generation differs from the same age groups in previous decades (Giancola, 2008). Although this is not unanimous, but this does focus attention on analyzing generational differences and mainly Y generation in context of the UAE culture in alignment with its 2021 vision and associated challenges. In view of the background explained in the preceding paragraphs, this research aims at making a comparative analysis of the antecedents and outcomes of work engagement among different generations in the UAE, with a particular focus on the UAE Y generation. Broadly speaking this research tens to answer the following questions: (a) Do generations have the same level of work engagement as other generations?, (b) Do different factors/ antecedents contribute to the same level of work engagement across generations?, and (c) What are the consequences of work engagement in context of each generation?. The findings of this study will help both managers and policy makers to design interventions around the work-preferences of different generations of the UAE, in order to attract, engage and retain the young Emiratis in the private sector jobs, which eventually will increase the participation of national workforce in the private sector. To answer these questions a self-reported questionnaire will be administered in both languages (Arabic and English), targeting around 150-200 working Emiratis (Males and Females) from the three generations; Baby Boomers, Generation X and Generation Y, percentage of participation has been in alignment with their expected participation in the UAE population.

Attracting and Retaining Emirati Jobseekers in the UAE's Cultural Tourism Sector: a case study of the tour guide profession

Yousif Alobeidli, and Emilie Rutledge
College of Business and Economics, UAEU

The purpose of this research is to identify the factors that impact on the attractiveness of the UAE's cultural tourism sector from the perspective of national employees with a particular focus on the 'tour guide' profession and the Sheikh Zayed Grand Mosque (SZGM). Emphasis is currently being placed on developing a sustainable culturally-orientated tourist industry and is perhaps most apparent with the "Abu Dhabi, visitors welcome" campaign, Saadiyat island's "Cultural District" and the forthcoming EXPO 2020. In tandem with this is the underpinning infrastructural investment taking place in the hotel, hospitality and transportation sectors (e.g. the expansions of AUD and DBX, and the affiliated national 'carriers'). Nonetheless, and impacting on the 'sustainability' element, at this juncture the consensus view is that despite an array of policy measures to increase the number of UAE nationals employed in 'non-conventional' sectors of the economy—part of the Government's strategic economic diversification efforts (Abu Dhabi Tourism & Culture Authority, 2014; Government of Abu Dhabi, 2007, 2008)—the majority continue to seek only 'conventional' public sector positions. Based upon the extant literature and the researcher's industry experience a questionnaire was developed to explore the issues and challenges facing nationals working in the 'tour-guide' profession, a series of employee interviews were conducted in Arabic and subsequently translated and analysed. The findings of these interviews, which will also at a later stage be triangulated with the findings of two other survey instruments being deployed, are presented in this research study which sets out the scope and nature of tour guide positions in the UAE and recommends ways in which such positions can be made more attractive to Emirati jobseekers going forward.

The diffusion of innovative devices in the corporate governance realm in the UAE

Amira Bouka, Fatmah Mohamed Mohamed Soomro, Maysa Taj Al Sir Hamza Mohmmd, and Walid Cheffi
College of Business and Economics, UAEU

This research seeks to develop an analytic framework that identifies the latest smart devices in the corporate governance field, states their diffusion extent, and sheds light on their potential in terms of modernization and enhancement of the corporate governance of listed companies. Given the novelty of the corporate governance devices to be investigated, the research combined exploratory qualitative study with questionnaire survey as well as a short documentary analysis. The results show the existence of new smart devices for shareholders in the UAE, thought their diffusion is relatively limited. Shareholders are keen to widely use such devices upon overcoming technical, jurisdictional and financial difficulties. The findings also highlight that issuing companies are perceived by their shareholders as less innovative than expected in terms of corporate governance. Overall, this paper contributes constructs for the examination of the state of the art in corporate governance of issuing companies in the UAE. This study has managerial contributions in terms of demonstrating the potential of smart devices for improving the relationships between corporations and their shareholders. From a policy-making perspective the study shows the need for a stronger support from the regulators in terms of issuing rules to enhance shareholders activism.

Happiness and Migration in Germany

Mrittika Shamsuddin and Marina-Selini Katsaiti
College of Business and Economics, UAEU

In this paper we explore the impact of life satisfaction on temporary migration. In particular, temporary migrants in Germany are asked their intended years of stay in Germany. Unlike previous research that focused on a binary variable on the migrant intention to stay, we use more detailed data on the exact year length of intended stay. This way we are able to estimate the marginal effects of happiness on each additional year of stay by a migrant. Besides individual happiness we control for demographic, socioeconomic characteristics and self-assessed health status. We also examine how satisfaction with i) environment, ii) dwelling, and iii) household income may affect the intention to stay longer. With and without sample selection, we are able to identify a positive and statistically significant effect of all satisfaction categories on the intention to stay. We also identify a positive effect of self-assessed health status on the intention to stay. However, this result is not robust across the different specifications.

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