UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

The College of Graduate Studies and the College of Science Cordially Invite You to a

Master Thesis Defense

Entitled

ELUCIDATION OF THE INTERACTION BETWEEN HEMORPHINS AND TARGETS IN THE RENIN-ANGIOTENSIN SYSTEM"

by

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Abstract

Hemorphins, short bioactive peptides produced by the enzymatic cleavage of the hemoglobin β-chain, exhibit anti-hypertensive effects via the inhibition of the angiotensin-1 converting enzyme (ACE1), a key component of the renin-angiotensin system (RAS) that governs blood pressure regulation. ACE1 and its homolog ACE2, which is also involved in the RAS, share significant similarity in their catalytic domains. The main objective of this work was to identify and compare the molecular mechanisms that underlie the interaction of hemorphins of camels and that of other mammals with ACE1 and ACE2. *In silico* docking and molecular dynamics simulations were employed, and *in vitro* confirmatory assays were carried out. The study revealed interactions with equivalent conserved regions of the two ACE homologs and a similar pattern of interaction in relation to ACE2 inhibitors. Thus, the conserved residue-level interactions and the implications of poorly conserved regions between the two homologs could guide the discovery of selective domain specific inhibitors. This could be foundational in the treatment of related disorders in future medical interventions.

Keywords: Hemorphins, homologs, *in silico*, molecular docking, molecular dynamic simulations, renin -angiotensin system