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Master Thesis Defense

Entitled

***MMTV Gene Expression Depends Upon a Short Cis-acting Sequence within the 5'
Untranslated Region of the Viral Genome***

by

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Abstract

Retroviral genomes contain untranslated regulatory sequences at both the 5' and 3' ends of genomic RNA (gRNA) implicated in critical steps of virus replication. These include nucleocytoplasmic RNA transport, gRNA dimerization, and its encapsidation. For example, in human immunodeficiency virus (HIV), a second putative Rev responsive element (RRE) has been proposed at the viral 5' end that affects both gRNA transport and packaging. In mouse mammary tumor virus (MMTV), the 3' Rem responsive element (RmRE) is present in all known MMTV mRNAs, but does not control RNA export. It has been hypothesized that another control element at the viral 5' end may play a role in gRNA nuclear export, while the 3' RmRE could facilitate translation of all other mRNAs. To address this hypothesis, a series of mutations were introduced in a region present only in the unspliced gRNAs and the mutants tested to determine their effect on gRNA transport, stability, and translation. Test of these mutants revealed defects in gRNA expression, but not its transport or stability, resulting in a loss of Gag and Env protein expression. These data suggest that MMTV contains a potential transcription factor binding site at its 5' end critical for RNA expression.

Keywords: Retroviruses; Mouse mammary tumor virus; MMTV; Gene Expression; Rem; RNA transport.