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Abstract:
Gene expression is essential to life and occurs through the processes of transcription of mRNA in the nucleus, export of transcripts to the cytoplasm through the nuclear pore complex (NPC), and translation of the mRNA into protein in the cytosol. The budding yeast *S. cerevisiae* is a eukaryotic model system used to explore the regulation of mRNA export. Transcripts are able to exit the nucleus through interaction with Mex67 which binds mRNA via adaptor proteins and allows crossing through NPCs. However, during heat shock (42°C) known adaptor proteins are rendered dysfunctional thus halting general mRNA export. Under these conditions, specific transcripts are able to exit the nucleus to enable the cell to response to stress. For example, *SSA4* encodes a chaperone, which helps denatured proteins refold following heat shock is able to selectively export in response to stress. However, the mechanism for this selective export is not understood. I hypothesize that an unknown adaptor protein recruits Mex67 to allow for its selective export from the nucleus. In order to test this hypothesis, I have cloned a pair of vectors to be used as phenotypic reporters for SSA4 export. These reporters include the ADE3 ORF and *SSA4* regulatory sequence (promoter, 5' and 3' UTRs). We anticipated that these reporters would yield red yeast cells if selectively exported during heat shock conditions. Analysis of the first series of reporter plasmids indicated that the plasmids weren't fully cloned as expected, and subsequent experiments have been aimed at generating the proper clones. Future analysis will test whether these reporters successfully recapitulates selective *SSA* expression and export and use of these reporters for genetic screening to identify proteins involved in selective mRNA export.

Key Words:
mRNA export, gene expression, *S. cerevisiae*, phenotypic reporter, plasmids, adaptor protein