PI: Nilgun Tumer **PI's E-mail: tumer@aesop.rutgers.edu**

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Research Area: **BIO** **Duration of Award: 1 Year**

Project Title: Modification of the Ribosomal Target to Enhance Resistance to Trichothecene Mycotoxins.

PROJECT 1 ABSTRACT
(1 Page Limit)

Trichothecenes are a highly diverse class of toxic, sesquiterpenoid secondary metabolites that are produced mainly by plant pathogenic fungi. The contamination of important agricultural products, such as wheat, barley or maize with the trichothecene mycotoxin deoxynivalenol (DON) due to infection with *Fusarium graminearum* and *F. culmorum* is a worldwide problem. Investigation of trichothecene resistance in the yeast, *Saccharomyces cerevisiae* indicated that semi-dominant toxin resistant yeast mutants contain either alterations in the target of trichothecenes, the ribosomal protein L3 or show increased drug efflux due to overexpression of a membrane transporter protein. Mutations in the *RPL3* gene, encoding ribosomal protein L3 were initially identified in yeast by conferring resistance to trichodermin. Further evidence to suggest that mutations in L3 could confer resistance to fungal toxins is described through work with other trichothecenes. These studies pointed to the fact that trichothecene resistance may be attained through a mutation in L3 that would result in decreased fungal infection. We have developed a novel selection system to isolate trichothecene resistant alleles of L3 and demonstrated that a deleted form of the yeast L3 gene confers high level of resistance to DON when expressed in tobacco plants. Our primary goal in this project is to test the hypothesis that expression of trichothecene resistant alleles of L3 will contribute to resistance towards Fusarium head blight (scab) in wheat. Using the powerful reagents developed in our prior studies, we are now in a unique position to determine if trichothecene resistance can be engineered in wheat and whether it will contribute to resistance to Fusarium head blight. Information gained from these studies could be used to design novel strategies to combat wheat scab and improve *Fusarium* resistance of other cereals.