



## **Heat Shock RNA and Its Use in the Treatment of Cancer, Inflammation, Ischemia, and Related Disorders**

### **Principle Investigator:**

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### **Background:**

All organisms respond to extreme environmental conditions by either inducing de novo or dramatically increasing the expression of a number of genes that protect the cell from the deleterious effect of intracellular protein denaturation. These genes encode for a family of proteins called HSPs (heat shock proteins) and other molecular chaperones and cytoprotective proteins. Expression of HSPs and other chaperones is induced upon exposure to a variety of stressors including elevated temperature, oxidative stress, alcohol, hyper- and hyposmotic stress, transition metals, viral infection, amino acid analogs, etc.

### **Description of Project:**

The principal investigator has made the discovery that HSF activation by heat shock is mediated by a ribonucleoprotein complex comprising translation elongation factor eEF1A and a novel RNA termed herein "Heat Shock RNA" or "HSR1". By affecting the formation of this complex (inhibiting or increasing), either through the administration of complimentary oligonucleotides, the introduction of analogues with the capacity to bind the other elements of the complex, or by altering the expression of HSR1, heat shock responses can be altered. In doing so, various disorders can be treated. The addition of siRNA or antisense molecules to mouse tumor cells rendered them more susceptible to heat damage.

### **Applications:**

Novel therapeutics that affect activity of the HSF complex or any of its individual components to treat cancer, inflammation, ischemia, neurodegeneration, age-related diseases, HIV infection, deafness, and related disorders.

### **Patent Status:**

U.S. and PCT patent applications have been filed.

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