



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP140462

Project Title:
Systematic Investigation of Clinically Relevant Expressed Pseudogenes in Cancer

Award Mechanism:
Individual Investigator

Principal Investigator:
Liang, Han

Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

Once thought of as "junk DNA," pseudogenes are a large class of DNA molecules that have lost their ability to generate functional protein products. Of >18,000 human pseudogenes, a large proportion is transcribed into RNA molecules, which means that many pseudogenes are expressed at the RNA level. Although recent studies strongly suggest potential roles for several individual pseudogenes in tumor biology, pseudogenes represent one of the most understudied topics in the field of cancer research. Little is known about how this class of molecules contributes to the development of tumors and how they can be used to attack tumor cells. The overall goal of this project is to systematically identify expressed pseudogenes that are critical in the initiation and development of tumor cells, thereby laying a foundation for developing new treatment strategies. First, we will develop novel computational methods to comprehensively detect expressed pseudogenes and accurately quantify their expression levels in various tumor cells from large-scale, publically available molecular data. Second, we will use state-of-the-art functional assays and cell model systems to detect the pseudogenes that contribute to tumor formation in women's cancers. Third, we will develop a publically available, user-friendly database to share our findings. The expected outcome of this project has two parts: (1) the identification of key expressed pseudogenes that lead to the formation of tumor cells and which represent the most promising biomarkers or therapeutic targets; and (2) the establishment of a bioinformatic resource that allows for further clinical investigation of such knowledge by the research community. The knowledge gained from this project will not only fundamentally advance our understanding of human cancer, but also greatly assist in developing and implementing new approaches for diagnosing and treating human cancer.