



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP110355

Project Title:
siRNA/microRNA-conjugated gold nanoparticle dendrons for sensitizing cancer cells to chemotherapy

Award Mechanism:
High Impact/High Risk

Principal Investigator:
Gunaratne, Preethi H

Entity:
University of Houston

Lay Summary:

Ovarian cancer is the 5th leading cause of cancer death for women in the United States. Despite excellent initial response to chemotherapy, most women develop resistance to chemotherapy and go on to die. In fact, the vast majority of deaths in relation to all cancers result from tumors that return by developing resistance to cancer drugs. Recently, Nobel-prize winning work led to the discovery of tiny RNA molecules of about 22 nucleotides long called silencing RNAs (siRNAs) endowed with the unique ability to silence genes which produce proteins which in turn control all aspects of our body. In the last few years microRNAs, the close relative of siRNAs, have been found to be even more powerful with an ability to silence hundreds of genes. This unique ability to silence hundreds of genes that cooperate to make a tumor has earmarked microRNAs and siRNAs as promising therapeutic agents. However, a major obstacle to clinical application of is the uncertainty on how best to deliver miRNAs with maximal therapeutic impact. We are proposing to establish a new paradigm for cancer treatment by incorporating these unique RNA molecules into novel nanoparticle carriers that are designed to selectively target and kill drug resistant cancer cells. Given the exceptional power of microRNAs, we anticipate that these unique hybrid nanoparticles carrying combinations of microRNAs and silencing RNAs can revolutionize the Next Generation Cancer Drugs to significantly reduce cancer deaths in the future.