



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP140594

Project Title:  
microRNAs: Safe and Effective Therapeutic Adjuvants for Treating Drug  
Resistant Breast Cancers

Award Mechanism:  
Individual Investigator

Principal Investigator:  
Rao, Manjeet

Entity:  
The University of Texas Health Science Center at San Antonio

### Lay Summary:

Approximately 15-20% of breast cancers lack expression of estrogen receptor, progesterone receptor and HER2. These "triple negative breast cancers" (TNBCs) occur more frequently in younger patients (less than 50 years old), are particularly aggressive, have a tendency to relapse resulting in a disproportionately larger number of breast cancer deaths. This is especially true for patient pool in San Antonio that largely includes Hispanic women, whose median age at diagnosis with breast cancer is 11 years younger than the average age reported in the US and have higher prevalence of aggressive TNBC. Chemotherapy is currently the mainstay of systemic treatment for these patients. However, many patients develop drug resistance and don't respond to chemotherapy leading to their shorter survival. Even patients who do respond have severely compromised quality of life due to debilitating side effects associated with these drugs. Therefore, identification of new therapeutic molecules is urgently needed so that more efficacious and less toxic treatments can be developed. Recently, we have discovered that small RNA molecules-microRNAs (that don't make protein) may play an important role in treating chemotherapy drug-resistant breast cancers. Importantly, these molecules are naturally made in the body and are safe as our pre-clinical studies showed that they kill tumors effectively without any liver toxicity. In addition, we found that these drug sensitizer miRNAs are expressed at significantly lower levels in relapsed metastatic TNBC patient's blood compared to blood from healthy individuals. Therefore, these miRNAs can not only be used as novel therapeutic regimens but can also be used to identify those patients who might benefit most from specific drug treatments. The long term implications of the proposed research will likely extend beyond breast cancer with applications in enhancing the efficacy of chemotherapeutics currently in use for many different types of cancers.