



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP150343

Project Title:  
An ultra-sensitive nanomagnetic sensor for the early detection of  
anaplastic large cell lymphoma

Award Mechanism:  
Individual Investigator Research Awards for Cancer in Children and  
Adolescents

Principal Investigator:  
Willson, Richard C

Entity:  
University of Houston

### Lay Summary:

Early detection of cancer saves lives, costs, and suffering. Many cancers have 5-year survival rates near 80-90% when caught early, but much poorer outcomes when detected later. Advances in genomics and cell biology increasingly are identifying molecules whose presence in the body is a clear signal of cancer. We propose to advance the commercialization of an ultra-sensitive platform sensing technology for improving the detection of these diagnostically-informative molecules. We have proof-of-concept of the sensor, which was developed under an NIH grant funded in the top 2% of competing proposals. In this work we will advance the development in the sensing technology, and demonstrate its application to earlier, less-invasive diagnosis of anaplastic large cell lymphomas (ALCL). ALCL is the most common childhood T-cell lymphoma and the second most common T-cell lymphoma in adults. Especially in children, ALCL usually is characterized by a distinctive protein, NPM-ALK, which is exceptionally stable and accumulates in lymphoma cells. Ultrasensitive detection could allow earlier diagnosis, diagnosis from blood samples instead of invasive biopsies, better treatment monitoring, and earlier detection of recurrent disease. The PI leads Diagnostics for an NIH Center of Excellence, and is highly experienced in biodetection and technology-translation. We have miniaturized sensors to the nanometer scale, thus increasing sensitivity. There is a realistic prospect of detecting single molecules with sensor arrays that will be corrosion-resistant, low-fouling, and cheap enough to be disposable, like a USB thumb drive. Our team has worked together for years, and covers the needed range of magnetic nano-fabrication, biochemical, and clinical expertise. Collectively, we have started several successful companies, have ca. 100 patents, and have diagnosed hundreds of cases of ALCL.