



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP121010

Project Title:  
CyTOF Mass Cytometer and Element Tagging System

Award Mechanism:  
Shared Instrumentation Awards

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

### Lay Summary:

The MD Anderson Flow Cytometry and Cellular Imaging Core facility (FCCIC) proposes to acquire and operate a CyTOF mass cytometry instrument. This instrument represents a transformational technology enabling the detection and characterization of molecular markers in rare and mixed cell populations on the single cell level. It marries the resolution, specificity, and sensitivity of mass spectrometry to the high throughput, single cell advantages of flow cytometry. Using unique tagging methods, many proteins (parameters) can be identified and quantified simultaneously in single cells, yielding a signature that distinguishes cancerous cells at an earlier stage when therapies can be less aggressive and more effective. This new technology, applicable to all cancers, will allow researchers to observe up to 100 quantitative measurements (parameters) for each cell, at a rate of 1,000 cells per second. For comparison, current flow cytometry can detect no more than 18 parameters per cell. To appreciate the impact of increasing the parameters detected per cell, examine the contributions of flow cytometry: the 3-5 parameter flow cytometry method defined the major cell types of the immune system and the 8-10 parameter instruments helped critically in developing stem cell biology. The CyTOF will advance the research goals of many investigators and programs at the University of Texas MD Anderson Cancer Center, which will result in major contributions towards preventing and eliminating cancer.

Contributions will come in several forms including, but not limited to: better understanding of various types of cancer and pre-cancerous lesions; selection and development of better targeted cancer drugs; identification of cancer precursors and cancer stem cells; and better understanding of the tumor environment that protects cancerous cells from therapy. All of these advances will yield better treatments and outcomes for cancer patients worldwide.