



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP120429

Project Title:  
A Lentivirus-Mediated Dual Library, Dual Selection Approach for the Identification of Surface Biomarkers and Antibodies Specific to Cancer Cells

Award Mechanism:  
High Impact/High Risk

Principal Investigator:  
Chen, Zhilei

Entity:  
Texas A&M University

### Lay Summary:

Current efforts to rapidly diagnose and treat cancer are compounded by a scarcity of available molecular signatures distinguishing cancerous cells from normal cells. There is therefore an urgent need to identify both molecular signatures unique to cancer cells and agents capable of delivering therapeutic cargo specifically to the cancer cells. The goal of this proposal is to develop a novel *in vitro* selection approach for the simultaneous discovery of proteins specific to the surface of cancer cells and antibodies that recognize the newly identified cancer-specific proteins as antigens. Specifically, we have devised an evolutionary selection scheme in an *in vitro* tissue culture setting whereby cultured cells containing the genes of both proteins unique to the surface of a target cancer cell and antibodies against these unique cancer cell surface proteins will be enriched. Lentiviruses that have been surface-functionalized with proteins/peptides from either a target cancer cell or normal cell, and tissue culture cells that have been surface-functionalized with anti-cancer antibodies will be the main players in our strategy. In principle, cells surviving repeated application of our designed *in vitro* selection pressures should contain easily identifiable genes encoding both proteins unique to the surface of the target cancer cell and antibodies that recognize the selected cancer cell surface proteins as antigens. As a proof of principle of our proposed cancer biomarker discovery approach, we will attempt to identify surface proteins unique to and antibodies against colon cancer cells. The discovery of new cancer cell surface biomarkers would substantially strengthen our ability to distinguish cancerous cells from normal cells in a clinical setting. Antibodies against cancer surface biomarkers, meanwhile, could be used directly in cancer diagnosis, or be functionalized to target therapeutic agents specifically to the desired cancer cells.