Overcoming Lung Cancer with Novel Computationally Boosted Antibody Biosensor

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Non-Small Cell Lung Cancer (NSCLC) is the most prominent form of Lung Cancer and kills at least 800,000 people each year. Early diagnosis of NSCLC yields higher survival rates among patients, in comparison to effective therapies alone. However, the research and development of such devices is long and expensive. In this project a computational approach consisting of two algorithms were created to create a boosted biosensor to screen for NSCLC. The first algorithm is a python-coded algorithm which finds the highest expressed protein bio-marker in tissue and serum. The bio-marker identified by the first algorithm was the survivin protein with 70% expression in tissue and 80% expression in serum. The second algorithm is a deep learning algorithm which boosted sensor sensitivity by classifying certain antibodies as super binders with respect to the survivin protein. The EP2880Y antibody was identified as a super-binder to the survivin protein. Using the predictions from the sequence of algorithms, a low powered chemiresistive carbon nano-tube biosensor was created with the EP2880Y antibody to target the survivin protein. The sensor detects the presence of survivin by measuring an increase in resistance. Using this information the experimenter created an excel spread sheet that analyzes the resistance values to give an output of increased risk or decreased risk of NSCLC. This sensor can be implemented in areas without proper medical facility and the algorithms can be used to replace long and expensive lab tests.

Awards Won:
Second Award of $2,000