



Scientific Abstract

SU2C Cancer Susceptibility Convergence Research Team: “Correlating Immunological Health to Cancer Susceptibility”



[This abstract was provided by the scientists when their application was accepted.]

It is now well established that the immune system can be mobilized to eliminate cancerous cells. Furthermore, people with inherited immunodeficiencies, or immune deficiencies that are induced by drugs that suppress the immune system, have a much higher rate than normal of certain kinds of malignancies. This suggests that individuals might be particularly susceptible to cancer if they have poor immune function, and that this might be detectable in a comprehensive analysis of their immune system.

The results of this analysis could be the basis for a new diagnostic test that could alert individuals to their increased risk and thus encourage them to be tested for cancer more frequently. It could also spur the development of drugs or other regimes that might boost the immune function of patients or of nominally healthy people.

At Stanford we have been developing and using technologies for the comprehensive immune monitoring of human beings for many years(2-20), and eleven years ago started a unique longitudinal cohort of older individuals (60+ years) who we bring back every year for a flu vaccine and intensive immune monitoring. Our standard analysis protocol includes whole blood gene expression, 95+ white blood cell subsets using mass cytometry, up to 62 serum cytokines using the Luminex platform and a multiplex panel of 8 in vitro cytokine stimulation assays. These are in addition to assaying the antibody titers after a standard inactivated seasonal flu vaccination.

All of these assays are done through our unique Human Immune Monitoring Center, directed by Prof. Holden Maecker, which allows for great efficiency and reproducibility. Of the eighty four older individuals who have participated in the Stanford-Ellison study, eight have been diagnosed with cancer during its course and five have have died of this disease, along with 13 from other causes. We see hints of impaired immune function in the antibody responses to flu vaccination in five subject who dies of cancer versus those who have died of other causes.

But we need to dig deeper into our data to query other immune components. In addition, we also want to add some powerful new T cell response repertoire assays that we have been developing as an additional metric for assaying flu vaccine responses and also our colleague Prof. Steven Quake has developed a novel way of analyze immunoglobulin sequences that shows a significantly diminished repertoire in older subjects (30) that we want to extend to all the members of this cohort.





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For all these purposes, it will be invaluable to collaborate with Dr. Jennifer Chayes and her teams at the Microsoft New England and New York research units on the analysis of this and other cohorts at Stanford to fully explore the possibility of having a robust immune signature for those at risk for cancer.

