TITLE:
The Use of Microfluidics and Transcriptomics to Implement Precision Medicine in Solid Organ Transplant

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RESEARCH PROJECT DESCRIPTION (brief overview of background, hypothesis, methods, role of medical student, funding and relevant publications -- SHOULD NOT EXCEED ~ 250 WORDS)

Transplant recipients are in desperate need of precision medicine. We believe the most urgent need, and likely a challenge with a solution in functional genomics, involves assessing a transplant recipient's overall mmunosuppression. Our overarching hypothesis is that advancements in T cell transcriptomics can be identified and utilized to more intelligently immunosuppress transplant patients. In the first specific aim, we will prove that we can properly capture specific subsets of T cells, CD2, CD3, CD4, and CD8, from the blood of healthy subjects. Then, the T cell will be exposed to various serum concentrations of tacrolimus ex vivo. This portion will demonstrate that we can detect mRNA transcripts corresponding to various immunosuppressed states. The second specific aim is conducting this genomic profiling on kidney transplant recipients. We will compare the standardly collected clinical information on the patient to the results of our transcriptomics. The culmination of the project will involve revealing how genomics of the specific types of T cells can more precisely reflect a patient's true immunosuppressed. Precision medicine will result in fewer complications related to over immunosuppression and improved graft function and life span by avoiding rejection due to under immunosuppression.

A medical student would be involved in conducting the laboratory experiments, contributing to the writing and presentation of the work.

As this work is in its early phases, there are no publications from it yet

I have received the $25,000 Faculty Development Award from the Department of Surgery. I am also applying for additional funding currently.