

**RAMP Project Abstract: BIRMINGHAM, ALABAMA**

**Project Title:** High-resolution phenotypic examination of SARS-CoV-2 S2-specific B cells

**Project Type:** Short-term Project 8-10 weeks On-site

**Proposed Project Dates:** Flexible 8 -10 weeks On-site between May 2023 – July 2023

**Project Site:** University of Alabama at Birmingham

**Project Overview:**

The Spike (S) of coronaviruses is the major target for antibody mediated protection from infection, however the S1 component of Spike, which includes the Receptor Binding Domain is undergoes substantial mutation as SARS-CoV-2 evolves, compromising the effectiveness of vaccines. In contrast, the S2 component of Spike is highly conserved across coronaviruses including SARS-CoV-2, SARS-CoV, and MERS-CoV, making it an attractive target for developing universal coronavirus vaccines. This project will utilize high dimensional flow cytometry to characterize B cells from individuals previously infected with COVID-19 or vaccinated against COVID-19 to determine the precise regions of S2 that are recognized by the B cells and their diverse phenotypes including subsets, activation state, and migratory potential.

**Project Summary:**

This project will utilize pre-existing peripheral blood mononuclear cell (PBMC) samples, established flow cytometry methodologies, and a custom panel of B cell probes that represent multiple regions of the S1 and S2 regions of SARS-CoV-2 Spike to determine precise B cell specificity and phenotypes. The scholar will develop experience with flow cytometry, finalizing the optimization of the specific flow cytometry protocol, which will then be used to stain and run the samples on the flow cytometer. The scholar will learn how to use flow cytometry analysis software for manual gating and clustering -based analysis of the resulting data and assess the data for group and longitudinal -based differences. Related manuscripts from the Kobie lab include: PMC9302814, PMC7904445, PMC8410022

In the event that COVID is not controlled, and the scholar will need to work remotely a member of the Kobie lab will conduct the staining and running of the samples on the flow cytometer, with the scholar sharing in the experience remotely. The scholar will work remotely to analyze the resulting data.

**Regulatory requirements for the project and plans for completing them:**

All regulatory requirements, including IRB approval for the project have already been completed.

**Expected Deliverables:**

- 1) Flow cytometry analysis of S2-specific B cells from ~140 samples.
- 2) PowerPoint slide presentation summarizing project and findings
- 3) Poster summarizing project and findings
- 4) Results that will be incorporated into a future manuscript

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