

RAMP Project Abstract: BIRMINGHAM, ALABAMA

Project Title: Identification of novel SARS-CoV-2 S2 neutralizing epitopes

Project Type: Long-Term Project (9 – 12 months)

Proposed Project Dates: May 1, 2023 – January 31, 2024

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 a variety of custom S2 proteins as probes to isolate S2 specific B cells from individuals with or without HIV for the generation of monoclonal antibodies that will be characterized for universal coronavirus activity.

Project Summary:

This project will utilize pre-existing plasma and peripheral blood mononuclear cell (PBMC) samples, established flow cytometry and molecular biology methodologies, and a custom panel of B cell probes that represent multiple regions of SARS-CoV-2 S2 to isolate and generate monoclonal antibodies to define novel epitopes that may inform future universal coronavirus vaccine development. The scholar will develop experience with systems serology, molecular biology, and anti-viral assays. Related manuscripts from the Kobie lab include: PMC9302814, PMC7904445, PMC8212047

In the event that COVID is not controlled, and the scholar will need to work remotely If the COVID-19 pandemic prevents conducting in person research by the RAMP scholar for short duration (<6 weeks total), a current member of the Kobie lab will conduct the needed bench-based research so project does not get delayed. The RAMP scholar will participate in this part of the process through daily zoom meetings, and continue conduct the analysis of the resulting data remotely with regular virtual meetings.

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) PowerPoint slide presentation summarizing project and findings
- 2) Poster summarizing project and findings for HVTN meeting and additional scientific conference
- 3) Results that will be incorporated into a future manuscript

Project Contact Person(s) (Name, Email): James Kobie, PhD jjkobie@uabmc.edu