



Fred Hutch Cancer Center

Boeckh Lab Experience

MILO MCHUGH

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About Me

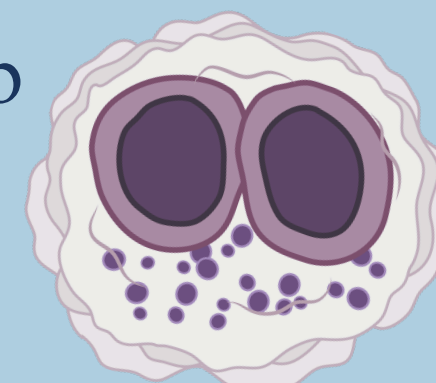
- Shoreline Community College Biotechnology Lab Specialist Program
- Favorite classes: Cellular Biology, Microbiology, Immunology
- Hobbies: Nature walks, Makeup, Beachcombing

I was motivated to apply to the LabLaunch program to gain exposure to a professional lab environment as well as the variety of positions and career paths available in the field.

Overview of My Lab

Boeckh lab

- Principal Investigator: Dr. Michael Boeckh, MD, PhD
- 8 people in lab, 5 people in clinical research with 1 overlapping member
- Infectious disease research in immunocompromised peoples
 - Particularly cytomegalovirus (CMV) and respiratory viruses in hematopoietic stem cell transplant (HSCT) patients
- Working with a variety of biospecimen samples
- Clinical research group follows patients of interest and coordinates research sample collection for processing in lab



Protocols and Assays

Many of the protocols and assays used in the lab are used to study humoral and cellular immunity

- Peripheral blood mononuclear cell (PBMC), peripheral blood stem cell (PBSC), plasma, and serum processing for internal research projects
- VirScan - Phage immunoprecipitation sequencing (PhIPSeq)
- Neutralization assay
- Electro chemiluminescence assay
- Flow cytometry
 - (using instruments from shared resources)



IDS Repository

- The Boeckh lab maintains a repository of biospecimens collected from the leftovers of clinical testing and research – earliest samples date back to 1977
 - When research is completed, a PI may choose to donate samples to the repository – samples of interest will be consolidated
- Samples can be linked to clinical data or used anonymously
 - Randomized clinical trial leftovers also available
- International Review Board (IRB) approval required to use samples from the repository
- Researchers outside of the Boeckh lab, or even outside of Fred Hutch, may request to use repository samples for their research
 - Incredible resource for specimens and data that would be expensive, time consuming, or otherwise impossible to collect

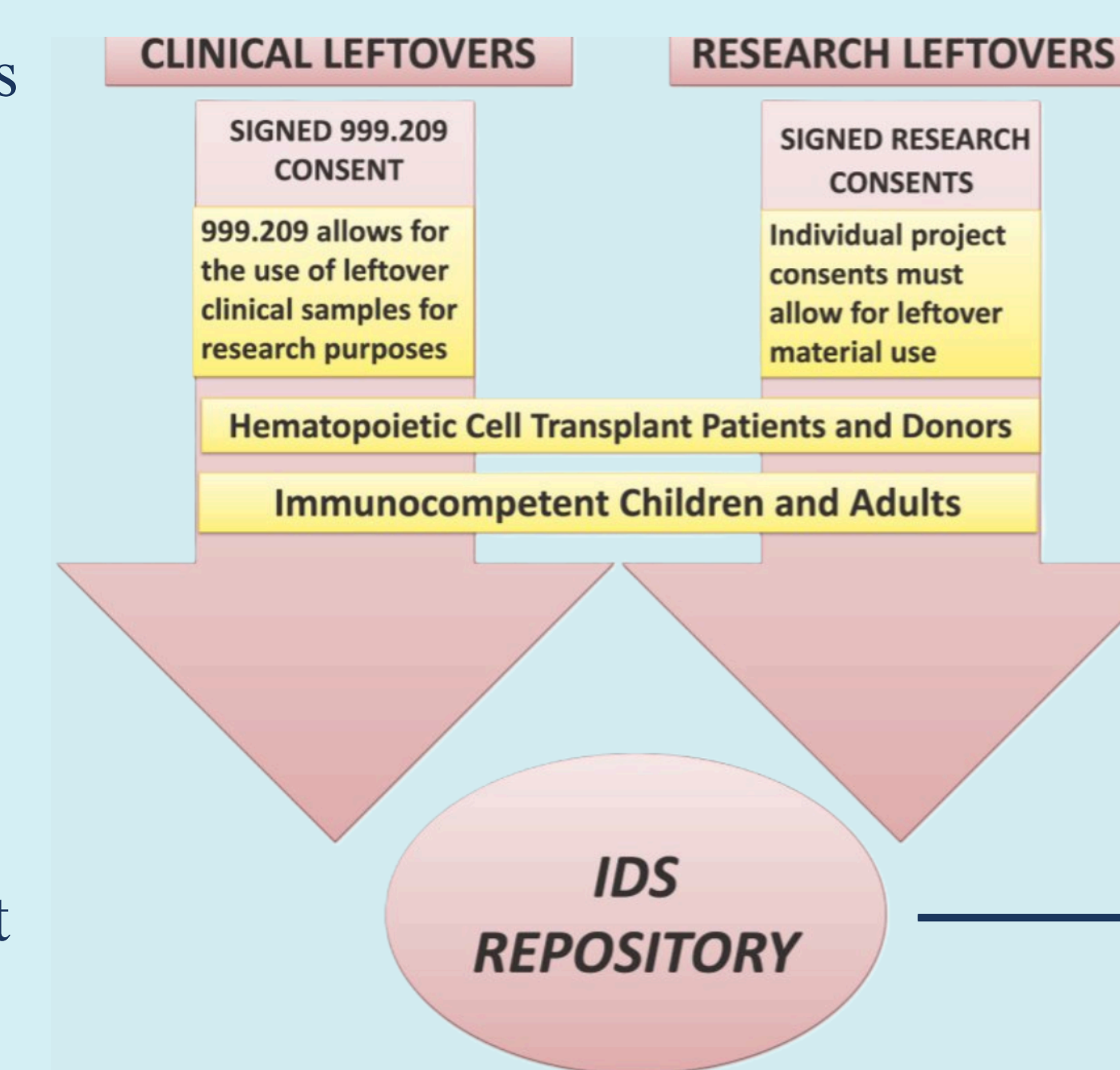
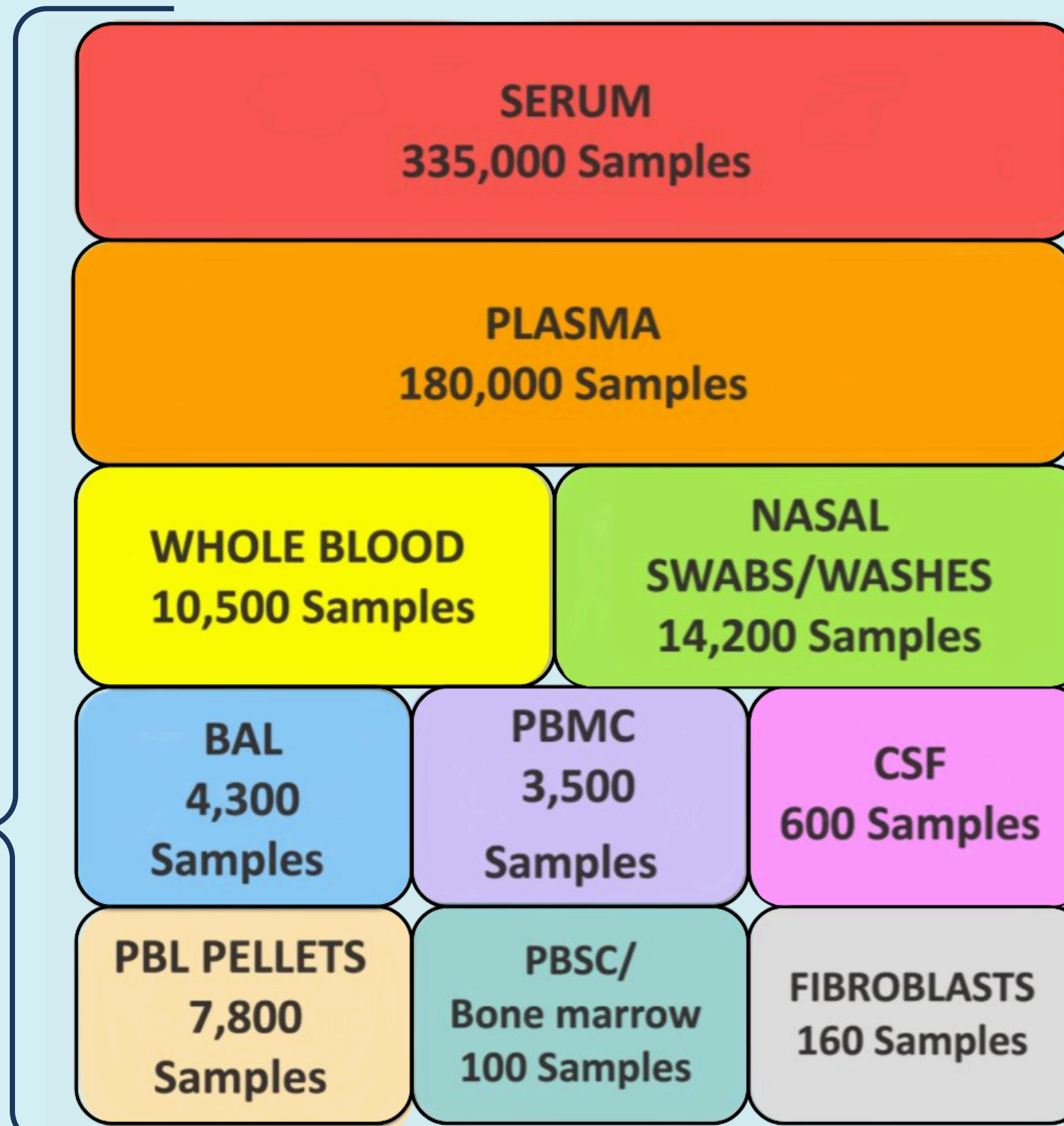


Figure shows where samples in the IDS come from and the variety of samples included

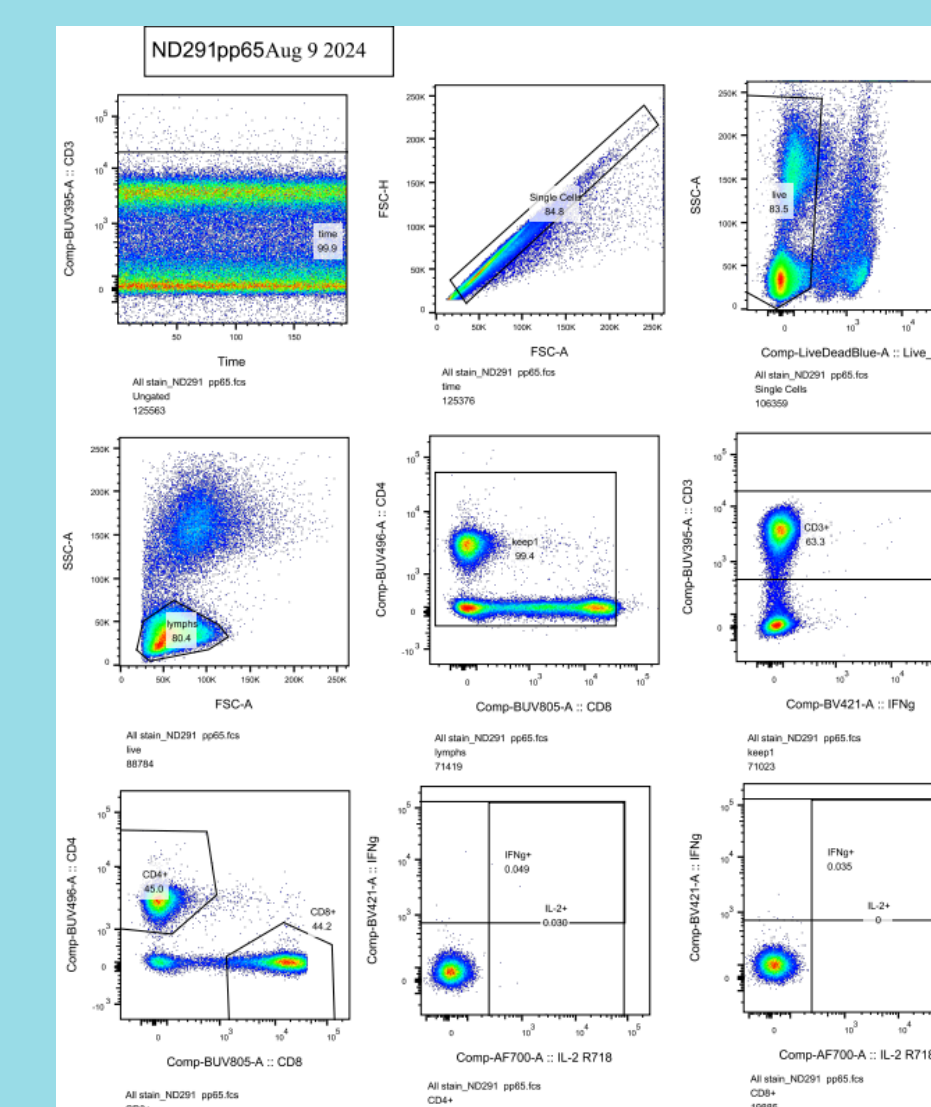


What I did at the Boeckh Lab

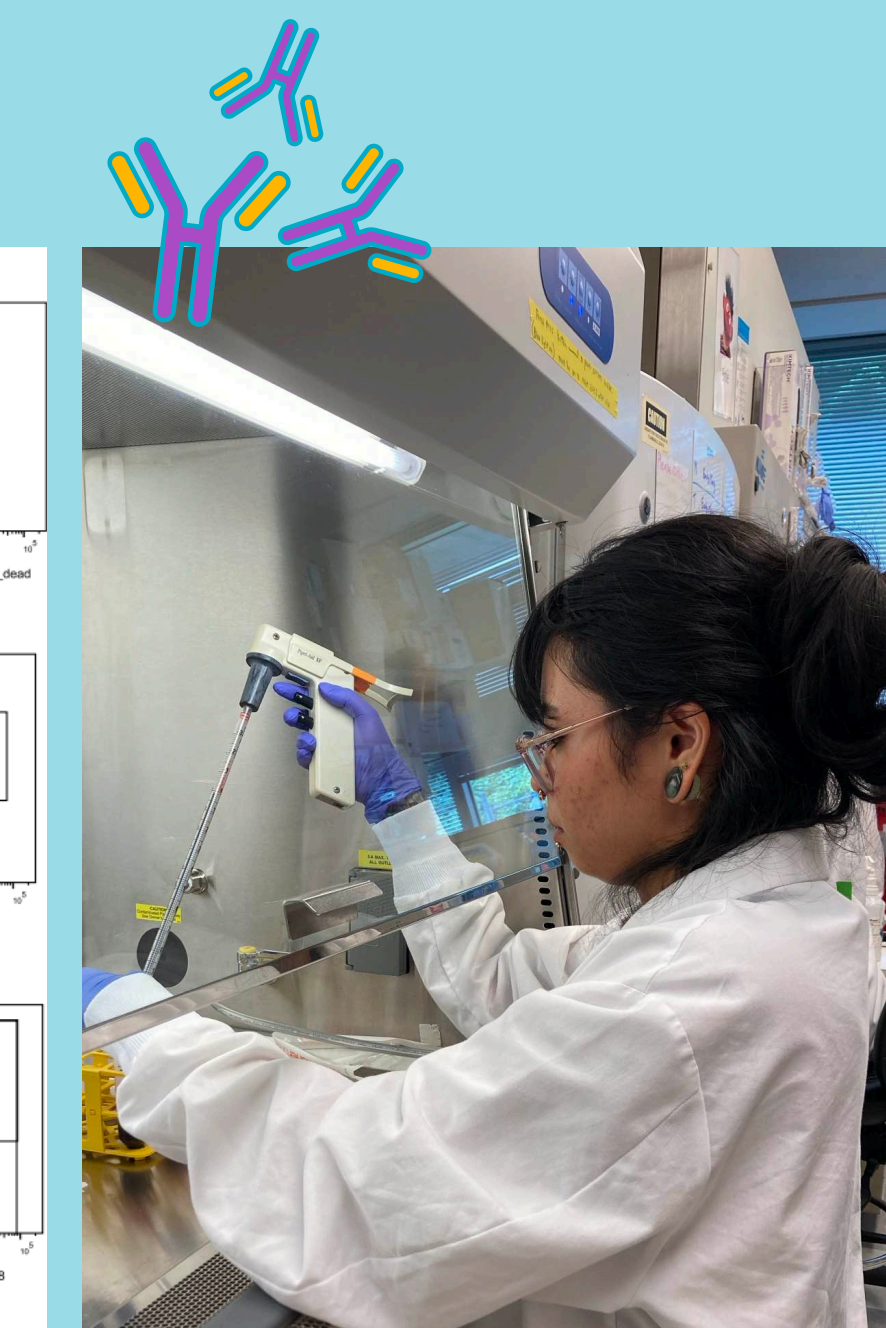


- Inventorying and consolidating samples for the Infectious Disease Sciences (IDS) repository
 - Clinical labs that donate leftovers were overwhelmed during the pandemic and transferred samples in red biohazard bags in freezers – samples needed to be sorted and added to the repository in an organized way
 - 1,800+ samples inventoried, estimated 3,700+ samples handled
 - Extracting and consolidating samples of interest from donated research materials
 - 5,000+ samples extracted

- Attended lab meetings where I witnessed the planning and discussions involved in progressing ongoing projects and research within a lab
- Furthered my understanding of the IDS repository by reading a paper that utilized samples from the repository, and presenting slides summarizing the research in a lab meeting
- Donated blood for PBMC processing practice and intracellular cytokine staining (ICS) assay
 - Stimulated PBMCs with viral peptides and costimulators to target the production of cytokines by activated T-cells
 - Cell surface proteins and cytokines stained for visualization using flow cytometry



A portion of data obtained from the ICS assay using flow cytometry



Isolating PBMC from whole blood in the biosafety cabinet

Lab Connection to Mission



The work and research done at the Boeckh group aim to further our understanding of the impacts of infectious diseases, especially in immunocompromised peoples, to find solutions for prevention and elimination of those diseases.

Acknowledgements

My Mentors:

- Terry Stevens-Ayers, MSc
- Hakim Mims, BS

I am sincerely grateful to Dr. Boeckh for providing the resources to make this learning experience possible. I would also like to thank everyone in the Boeckh group, both on the lab and clinical research team, for creating a welcoming learning environment where I felt supported as an intern, encouraged to ask questions, and included as a part of the team.