

Understanding the role of antibody-bound microbes in the female reproductive tract during vaginal dysbiosis

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Background

- The Langel Research Team seeks to better understand immunity at mucosal surfaces by studying the role of antibodies and antibody-producing plasma cells during disease, with a special emphasis on maternal and pediatric populations.
- Located in the Center for Global Health and Diseases (CGHD) and Department of Pathology at Case Western Reserve University School of Medicine in Cleveland, Ohio



Population

This work will utilize vaginal swabs from a diverse cohort of women with different grades of cervical dysplasia

Learning Objectives

- Recognize the role of the vaginal microbiome in women's health outcomes
- Apply scientific techniques including flow cytometry and magnetic cell sorting to basic science questions with translational implications
- Evaluate interactions between antibodies and microbiota
- Develop materials to disseminate research including presentations, posters, and manuscript components
- Gain exposure to and support grant-writing efforts

Activities

- Reviewed existing literature on the vaginal microbiome and sorting techniques
- Conducted optimization experiments to develop protocol for sorting antibody-bound microbes
- Consulted with other labs with expertise in relevant methodology
- Attended individual and joint research lab meetings
- Assist with animal studies in the lab

Methods

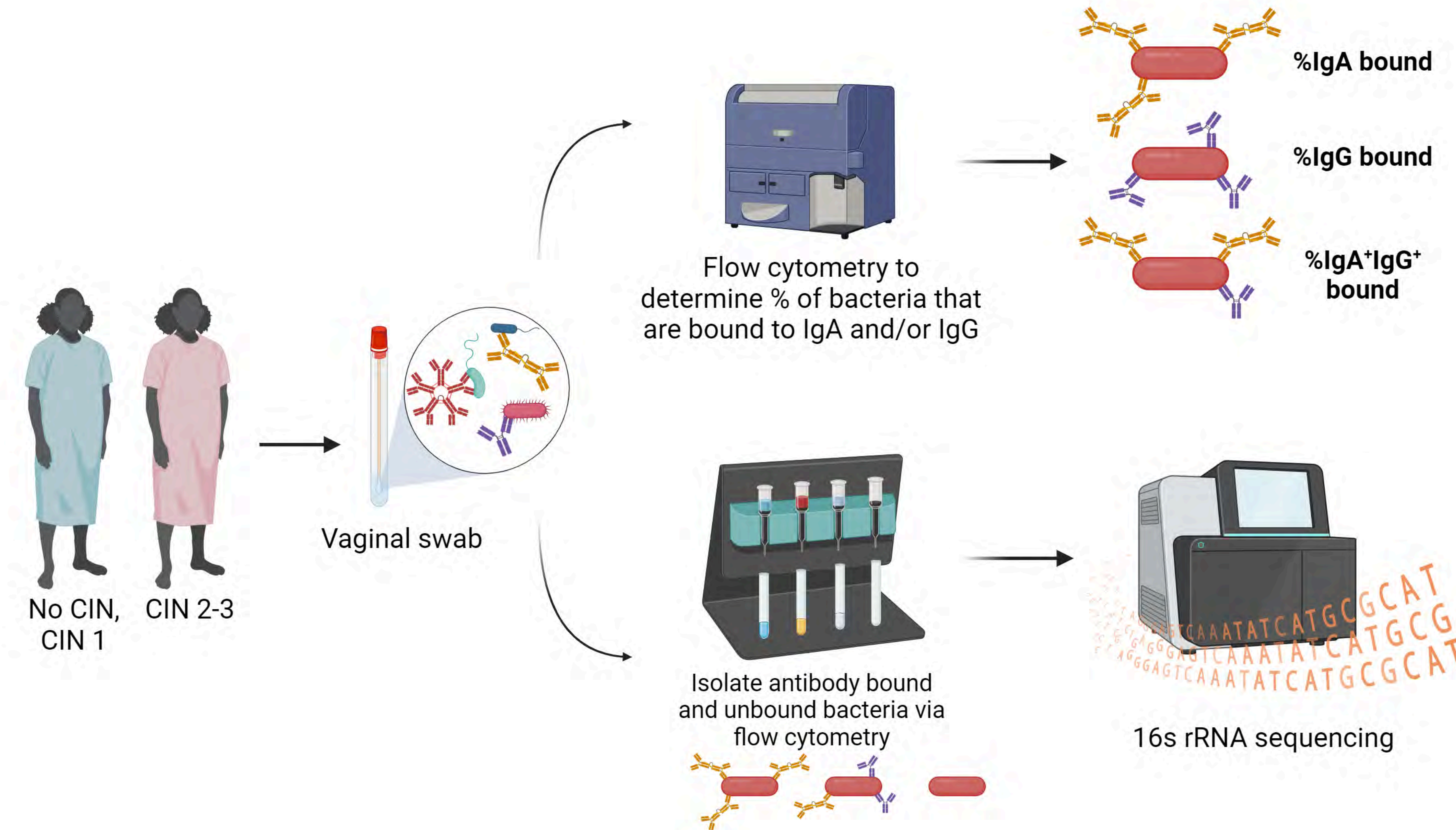


Figure 1. Proposed experimental plan to assess the role of antibody-bound and -unbound microbes in the vaginal microbiomes of women with different grades of cervical dysplasia

Results

Our preliminary data demonstrate that we can detect IgA+, IgG+, and IgA+IgG+ bacteria in vaginal swabs and observe differences in the abundance of various bacterial taxa bound or unbound to IgA

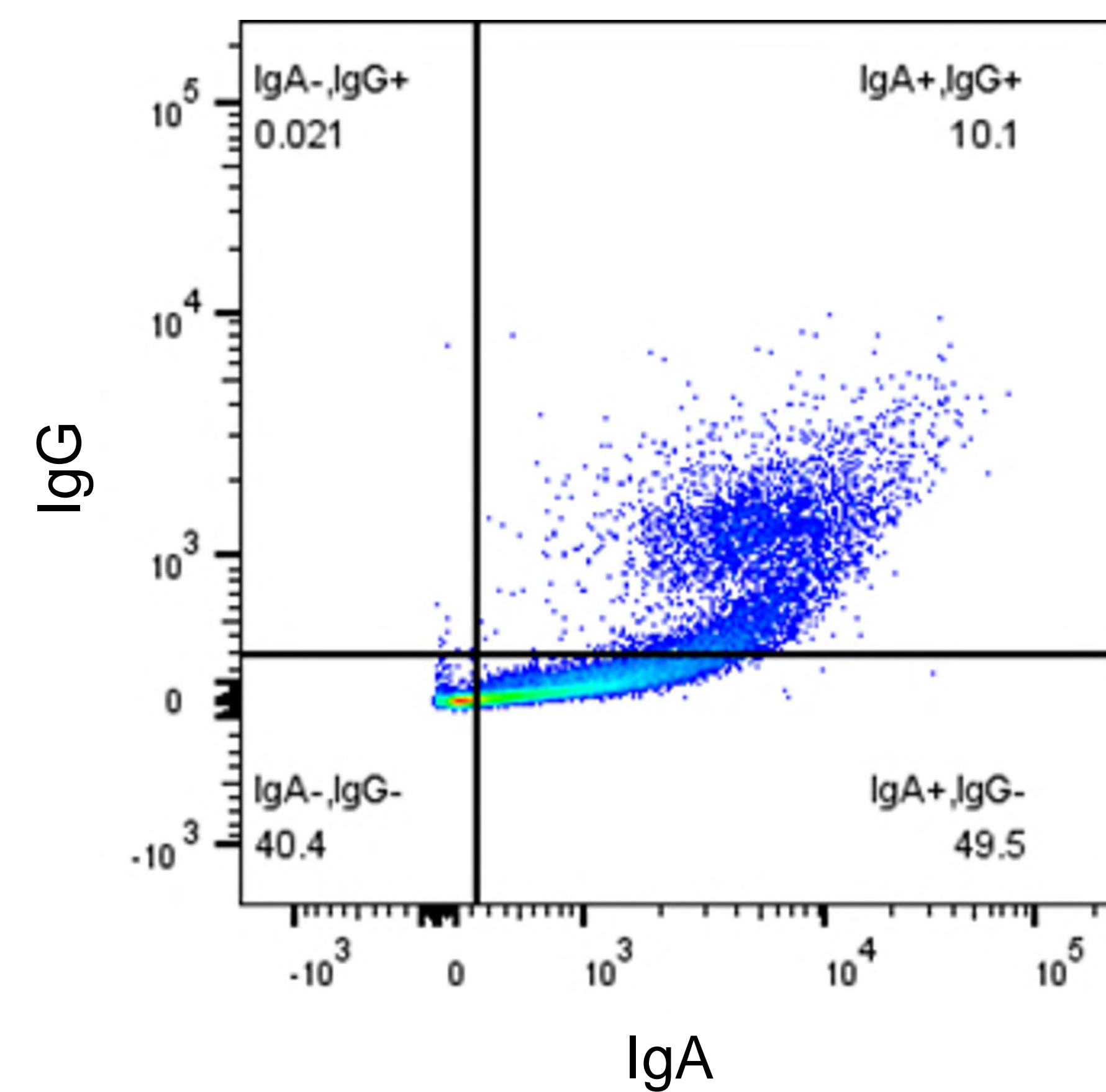


Figure 2. Percent bacteria bound to IgA, IgG, and both IgA and IgG

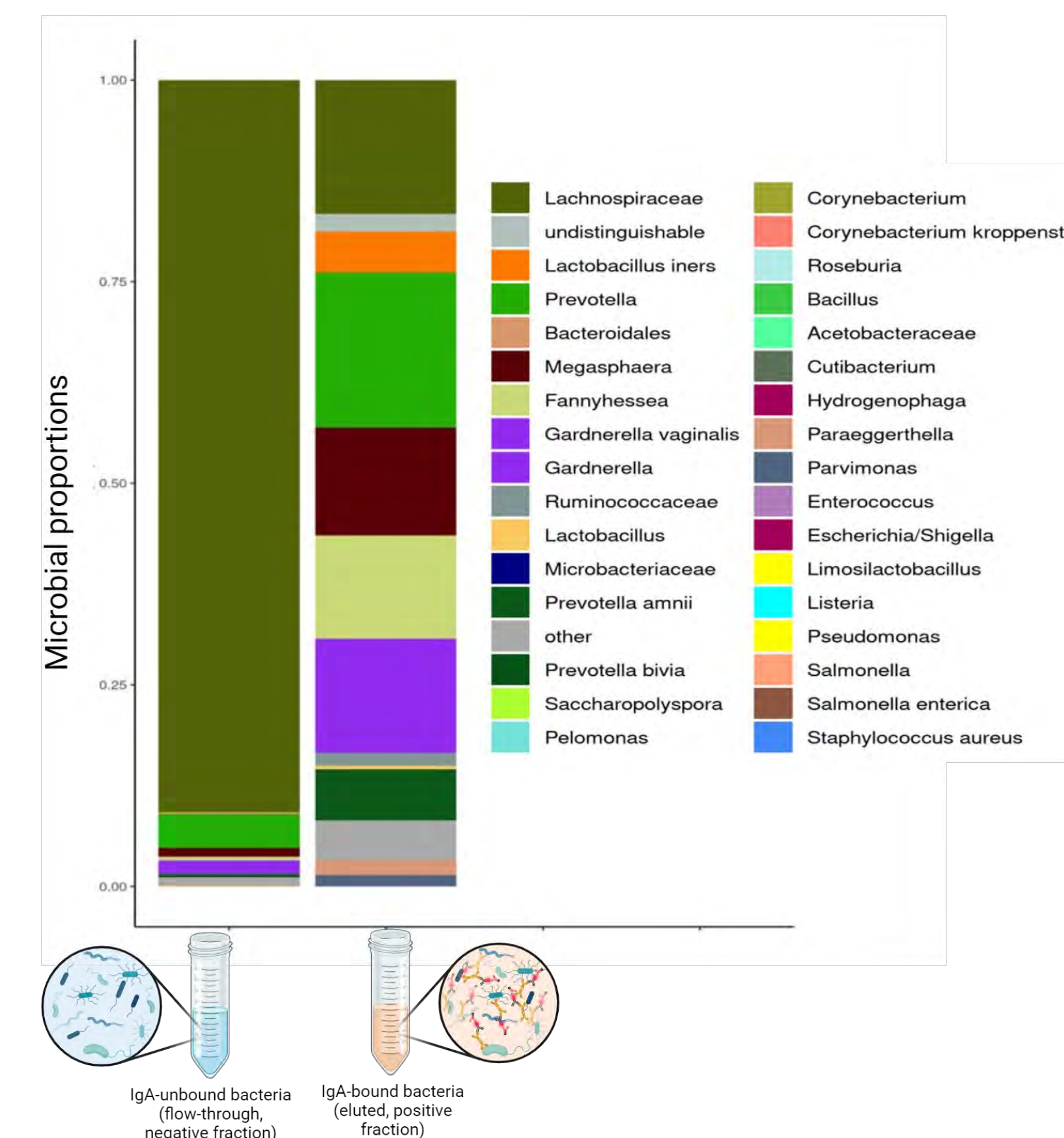


Figure 3. Abundance of different bacterial taxa bound or unbound to IgA

Deliverables

- Protocol for sorting antibody-bound and antibody-unbound bacteria from vaginal swab samples
- Presentation(s) for CGHD Women's Health Joint Lab Meeting and joint immunology lab meetings
- Abstract/LOI for The Harold and Barbara Rosenbaum Family Foundation Cervical Cancer Diversity in Prevention & Clinical Research Grant

Lessons Learned

- It can be time consuming to develop an experimentally sound protocol, as the process takes many iterations
- Methods in published literature are often not easily reproducible
- Communicating the significance of basic science research to funders and the public can be challenging

Public Health Implications

- Cervical cancer is the fourth most common cancer in women worldwide, and a leading cause of female cancer deaths
- In the U.S., cervical cancer disproportionately affects Black and Hispanic women
- Studies utilizing diverse cohorts have the opportunity to bridge gaps in underrepresentation in research while more effectively addressing the needs of those disproportionately affected
- This work will further our understanding of vaginal microbiome health vs dysbiosis, and their contributions to women's health → potential therapeutic strategies
- Methods validated in this study can be applied to other diseases of public and global health significance

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