



CAIRIBU UROBIOME RESEARCH INTEREST GROUP (U-RIG)

CAIRIBU U-RIG RESEARCH HOURS

EXECUTIVE SUMMARY 11/15/2024 U-RIG RESEARCH HOUR

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FEAT: JEAN-PHILIPPE GOURDINE, PHD, MSC,
EMMANUEL ELIJAH, MEDICAL STUDENT

BLADDER MICROBIAL CATABOLISM & HOST URINARY GLYCAN, A NEW PERSPECTIVE ON
OVERACTIVE BLADDER

UNDERSTANDING THE ETIOLOGIES OF URINE METABOLITES AND THEIR ROLE IN DIVERSE
DISEASE STATES

11/15/24 [3-4PM EDT]



Goal: Facilitate knowledge exchange and spur collaborations in the urobiome and adjacent fields

Summary

Dr. Jean Phillipe Gourdine's Presentation

Background

- Dr. Gourdine explained the context for his research, emphasizing the non-sterile nature of the urobiome and its dynamic composition.
- He cited that a diversity of microbes in the bladder can be detected in humans as early as in infancy.
- He focused on the bacterial component within the female bladder and the role of microbes in bladder health and diseases.

Urinary Metabolism and Glycans

- Dr. Gourdine is interested in understanding healthy bladder microbes and those associated with overactive bladder syndrome (OAB).
- He described the composition of urine, which includes metabolites such as urea, creatinine, and citrate, and their potential use by bacteria.
- He focused on the role of glycoproteins and glycosaminoglycans in the urinary microbiome and their potential digestion by bacteria.
- His preliminary data demonstrated the digestion of uromodulin by *Bifidobacterium longum*, suggesting a role in the metabolism of host glycans.
- He discussed the concentration of digested sugars in urine and the potential impact of genetic diseases related to glycosylation.

Questions and Discussion

- Participants inquired about the role of Prevotella in the urinary microbiome
- Dr. Gourdine suggested potential benefits of Prevotella.

Dr. Gourdine is Assistant Professor of Chemistry at Lewis & Clark College in Portland, OR. Previously, he was a senior research associate in Dr. Lisa Karstens' lab at the Oregon Health & Science University. Dr. Gourdine is a member of the American Society for Biochemistry and Molecular Biology, the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science, the American Chemical Society, and the Society for Glycobiology. A link to Dr. Gourdine's presentation at the March 2024 Year of Open Science Culminating Conference is available for viewing and download [HERE](#).

Emmanuel Elijah's Presentation

Background

- Emmanuel explained the concept of metabolomics and its application in understanding disease states through urinary metabolites.
- He described processes for assessing metabolomics, including liquid chromatography and mass spectrometry, and the use of molecular networking to identify metabolites.
- He highlighted the importance of urine as a non-invasive biomarker and its potential to reveal insights into the body's function and disease states.

Applications of Urinary Metabolomics in Disease Research

- Emmanuel presented results of studies on the impact of urinary metabolomics in various disease states, including pediatric obstructive sleep apnea, aortic stenosis, multiple sclerosis, and rheumatoid arthritis.
- He discussed the differences in urinary metabolites between males and females and the potential for metabolomics to reveal insights into bladder function and lower urinary tract symptoms (LUTS).
- He described the use of bioinformatics tools to identify origins of urinary metabolites and their impact on bladder health.
- He outlined the aims of his research, which include correlating urinary metabolites with symptoms, identifying their origin, and understanding their role in bladder health.

Questions and Discussion

- Participants inquired about the specificity of probabilistic estimates in identifying metabolite origins; Emmanuel explained the current focus on frequency of occurrence.
- Participants inquired about the representativeness of a single urine sample; Emmanuel agreed that multiple samples are needed for accurate analysis.
- Emmanuel further emphasized the importance of collaboration and the use of public data to validate metabolite findings.

Emmanuel Elijah is a medical school student at the University of California San Diego. As an undergraduate, he majored in Molecular Biology. He works in the laboratory of Lindsey Burnett, MD, PhD, an assistant professor and urogynecologist in the Division of Urogynecology and Reconstructive Pelvic Surgery at UCSD. In the Burnett Lab, Emmanuel is part of a team that studies urinary metabolites and their role in urologic diseases.