

RESEARCH SPOTLIGHT

OPTIMIZING DUET CO-CULTURE EXPERIMENTS

**Meet the Researchers Saying
Farewell to Resource-Intensive
Validation And Embracing Efficiency
in their Duet Co-Culture Experiments**

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When I first saw the presentation of Cerillo's Duet Co-Culture System, my immediate reaction was, "Well this solves all of my problems!" The Duet dramatically reduces the time it takes to set up interaction studies and and eliminate variability. A must-have for researchers exploring the microbiome.

Alan J. Wolfe Ph.D.

Department of Microbiology & Immunology
Loyola University Chicago

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UNIVERSITY OF CAPE TOWN



LOYOLA UNIVERSITY CHICAGO



VEDANTA BIOSCIENCES

01

Discover how Dr. Jo-Ann Passmore and Dr. Brian Kullin and The Mucosal Immunology Group (MIG) at the University of Cape Town, South Africa are using Cerillo's Duet Co-Culture Platform to study bacterial vaginosis to address women's health in Africa.

02

Watch our latest MicrobeMania Podcast where Dr. Alan J. Wolfe from Loyola University Chicago's Department of Microbiology & Immunology discusses groundbreaking research challenging traditional beliefs about the female urinary tract.

03

Learn how Greg Medlock, Director of Research at Vedanta Biosciences is using Cerillo's research platform with Opentron's lab automation system to power discovery of microbiome therapeutics.

DUET CO-CULTURE CHAMPIONS **ELEVATING WOMEN'S HEALTH**

Tackling the Prevailing Challenge of Bacterial Vaginosis in Africa

The Mucosal Immunology Group at the University of Cape Town is conducting research that focuses on addressing bacterial vaginosis (BV), a persistent challenge for women's health. Their team will use the Cerillo Duet Co-Culture system to isolate and test probiotics that could provide regionally relevant, affordable BV treatments. Their work is a significant step forward in improving women's health, particularly in Africa.



How The Mucosal Immunology Group will use Cerillo's Duet Co-Culture Research Platform

Our research group focuses on the bacteria involved in female genital tract health and disease. This is particularly important in Africa, which has some of the world's highest rates of bacterial vaginosis (BV). BV is a polymicrobial dysbiosis that is associated with increased risk of STI acquisition (including HIV), complications during pregnancy and other negative health outcomes. Unfortunately, current standard of care BV treatment options often only provide temporary resolution and relapse is the case for up to 80% of women. As a research group, we are interested in understanding the interactions between optimal bacteria (*Lactobacillus crispatus*) and BV-associated bacteria (*Gardnerella* spp., *Prevotella* spp., *Fannyhessea* and others).

Probiotics are a viable, sustainable supplemental treatment for vaginal health. Yet, most commercial products are unaffordable for many African women. Critically, nearly all marketed vaginal probiotics lack vaginal-origin bacterial isolates. Additionally, the few that do often include just a single strain. Growing evidence indicates that consortia of strains, not single isolates, more effectively restore healthy vaginal microbiomes, embodying the idea that the collective is superior to individual components. Geographic specificity in probiotic selection is also essential; strains from a specific region more effectively combat local pathogens. This highlights the importance of developing affordable, geographically appropriate probiotics containing multiple, vagina-derived bacterial strains.



Jo-Ann Passmore PhD



DUET CO-CULTURE CHAMPIONS

**The Mucosal Immunology Group
University of Cape Town, South Africa**



Brian Kullin PhD

In our quest to identify regionally-relevant, affordable probiotic candidates we have identified women in African populations with longitudinally stable, optimal vaginal microbiotas. We have isolated potential probiotic candidates from these women and are trying to understand their interactions with BV-associated bacteria from women in the same populations. Co-culture experiments are a crucial aspect of this and the Cerillo Duet Co-Culture System would allow us to build upon the basic proof of concept experiments we have done thus far (bacterial inhibition soft agar overlay assays, incubation in the presence of spent culture medium, etc).

We propose growing our probiotic candidates in the presence of various African *Gardnerella*, *Prevotella* and *Fannyhessea* spp. isolates in the duet co-culture system to answer the following questions:

1) What happens in a head-to-head competition assay? – Experiment: Inoculate *L. crispatus* and *Gardnerella*/*Prevotella*/*Fannyhessea* at the same time in separate wells and examine their respective growth kinetics. Variations – Is the growth outcome different when a consortium of *L. crispatus* strains is used? If so, what is the optimal consortium? Can we create a *L. crispatus* consortium that is able to inhibit a consortium of BV-associated strains? Key metrics for all analyses – Growth kinetics

2) Is pre-incubation of the probiotic with the pathogen required for the induction of inhibitory activity? – Experiment: Grow duplicate cultures of *L. crispatus* to mid-log phase and then inoculate the second duet co-culture well in each pair with a

BV-associated strain ('induced') or sterile media ('uninduced'). Harvest the supernatant from each and use in a spot test for inhibitory activity. Key metrics – inhibition activity (plus some growth kinetics data)

3) What metabolomic changes occur when the probiotic candidates are co-cultured in the presence of BV-associated bacteria? Experiment: Inoculate either individual *L. crispatus* or strain consortia together with different BV-associated bacteria in the second duet co-culture well (along with 'uninduced' controls). Compare the expression profiles (rna-seq), proteomes (LC-MS) and metabolomes (LC-MS/MS) of *L. crispatus* under the two different conditions to identify possible substances responsible for the inhibitory activity.

Results from these experiments will help us to better understand interactions between vaginal bacteria and identify priority candidates for probiotic development.



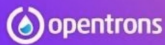
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episode #1



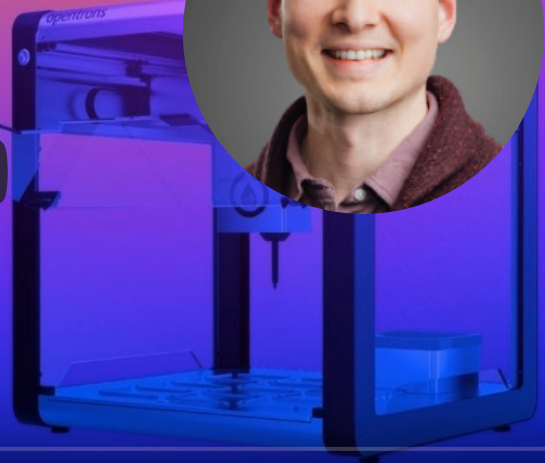
Alan Wolfe, Loyola

This MicrobeMania Podcast features an Interview with Dr. Alan J. Wolfe from the Department of Microbiology & Immunology at Loyola University Chicago. The Loyola Urinary Education and Research Collaborative (LUEREC), co-directed by Alan J. Wolfe, PhD, is spearheading groundbreaking research that challenges long-held beliefs about the female urinary tract. In 2012, LUEREC provided the first definitive evidence that bacteria colonize the normal female urinary tract, dispelling the age-old notion that urine is sterile. This revelation has opened new avenues for investigating diverse Lower Urinary Tract (LUT) disorders and holds the potential to revolutionize our understanding of urinary health. Visit <https://cerillo.bio/microbemanial/> for more thought leadership interviews and articles.



WEBINAR

High-throughput, low cost co-culture with the OT-2 and Stratus

[Watch Now](#)

Greg Medlock from Vedanta Biosciences shares how he is using automation to power discovery of microbiome therapeutics.

Vedanta Biosciences is leading the development of a potential new category of oral therapies based on defined consortia of bacteria isolated from the human microbiome and grown from pure clonal cell banks. The company's pipeline includes clinical-stage product candidates being evaluated for the prevention of recurrent *C. difficile* infection and inflammatory bowel diseases and a preclinical candidate for the prevention of Gram-negative infections. Each product candidate is a defined consortia of bacteria that have been lyophilized and filled in enteric-coated capsules.

Duet Co-Culture Research Simplified in a Single Plate

The Duet Co-Culture's porous barrier physically isolates populations while maintaining fluidic contact enabling researchers to observe and study individual microbial populations and measure the growth of one microbial population alongside other populations.

- ▶ Eliminates resource-intensive setup by providing an off-the-shelf, ready-to-use platform.
- ▶ Compatible with other automation systems for freedom and flexibility.
- ▶ Scalable, enabling high-throughput experiments for faster results and comprehensive data analysis.
- ▶ Standardized method for easier experiment replication and comparison.

