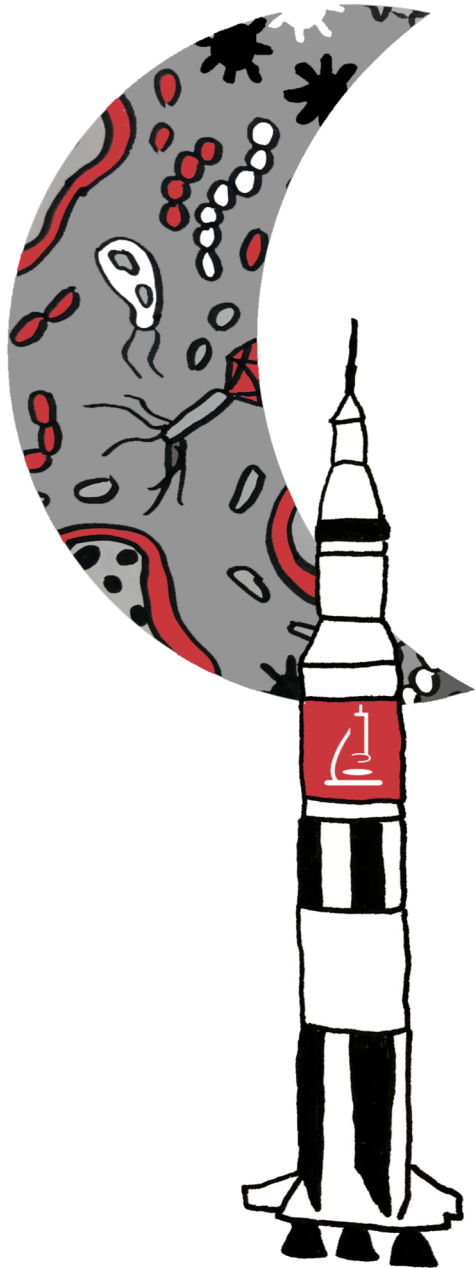




Interactions of commensal urinary lactobacilli with urinary pathogens

Tanya Sysoeva

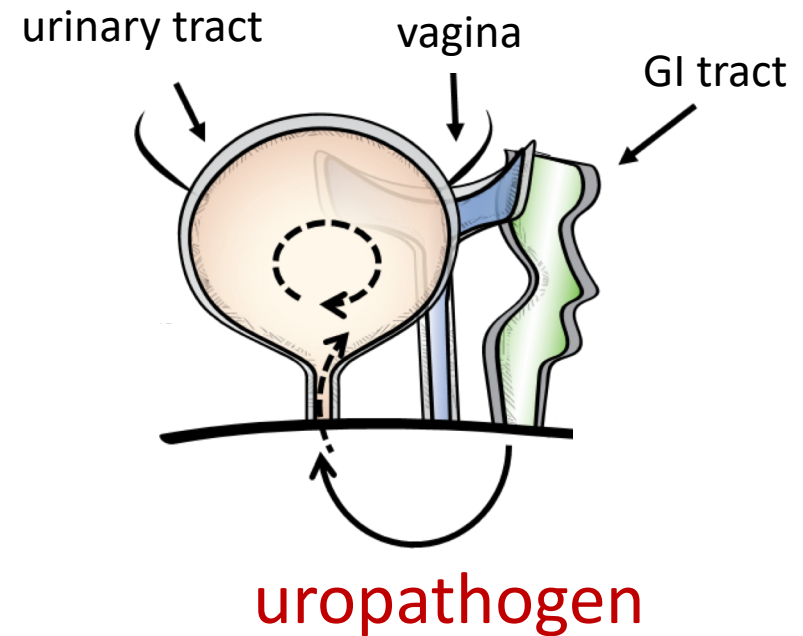


Urinary tract infection (UTI)

- 170 Mil worldwide and 6-7 Mil cases in the U.S. annually
- 15% of all antibiotic prescriptions
- increasingly multidrug resistant
- 20% of hospital-associated infections

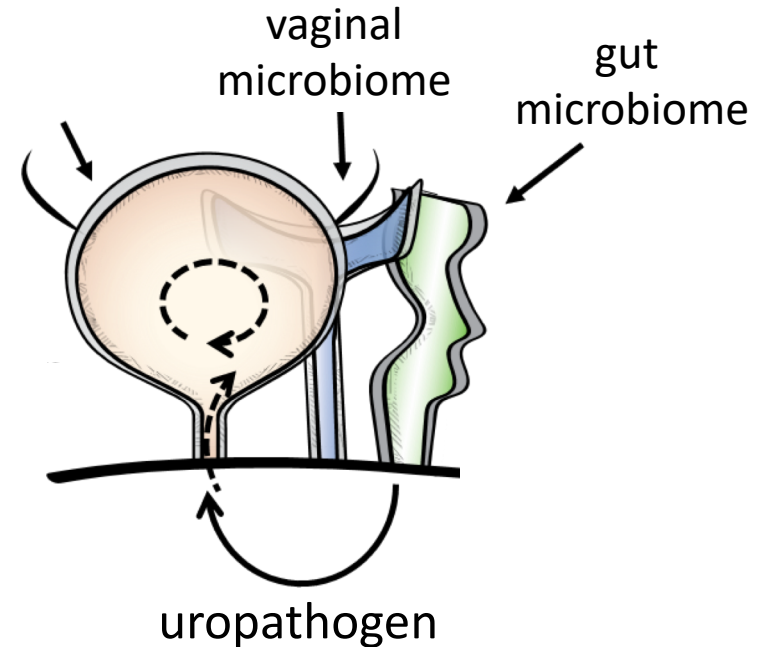
Urinary tract infection (UTI)

- UTIs are caused by enteric bacteria
- main causative bacteria (uropathogens):
 - uropathogenic *Escherichia coli* (UPEC)
 - *Klebsiella pneumoniae*
 - *Enterococcus faecalis*



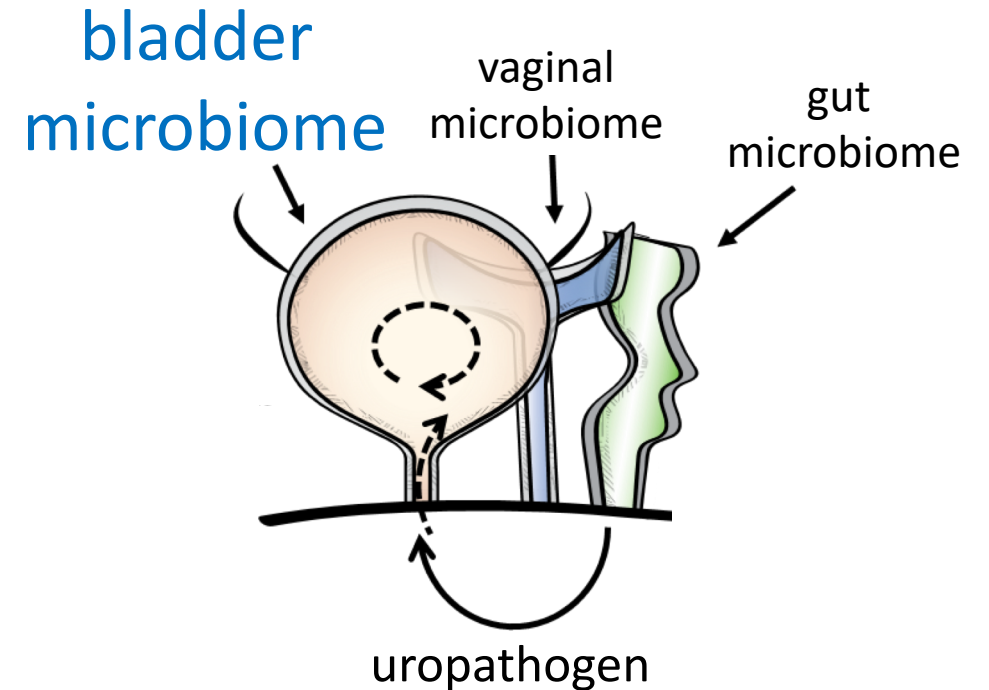
Urinary microbiome and UTI

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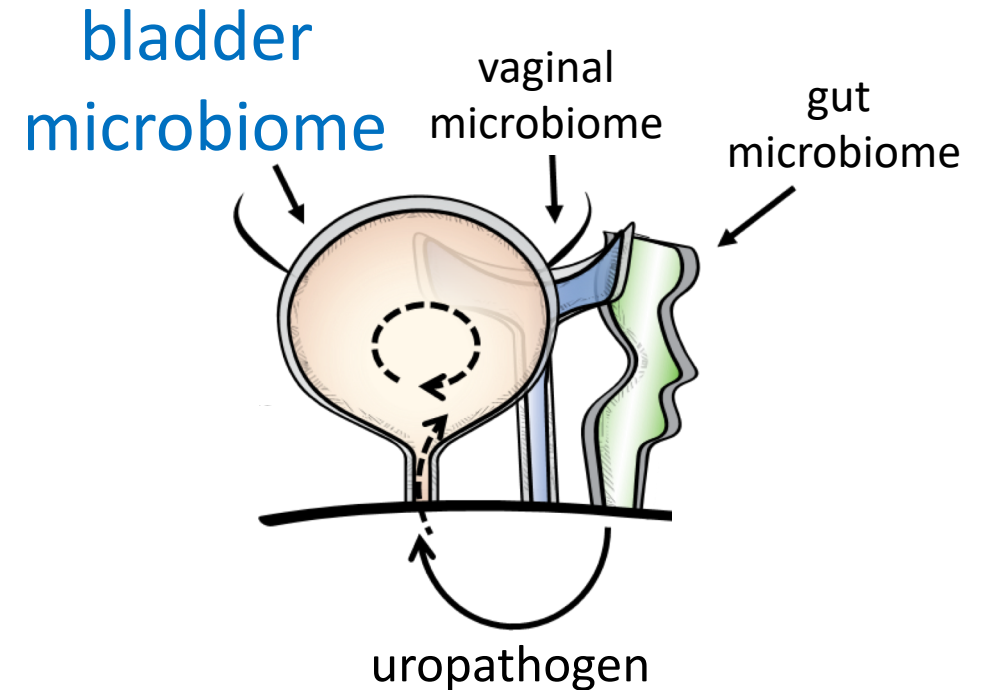
Urinary microbiome and UTI

- Urine is not sterile!
- Bladder microbiome contains a variety of bacteria
- Lactobacilli frequently dominate



Urinary microbiome and UTI

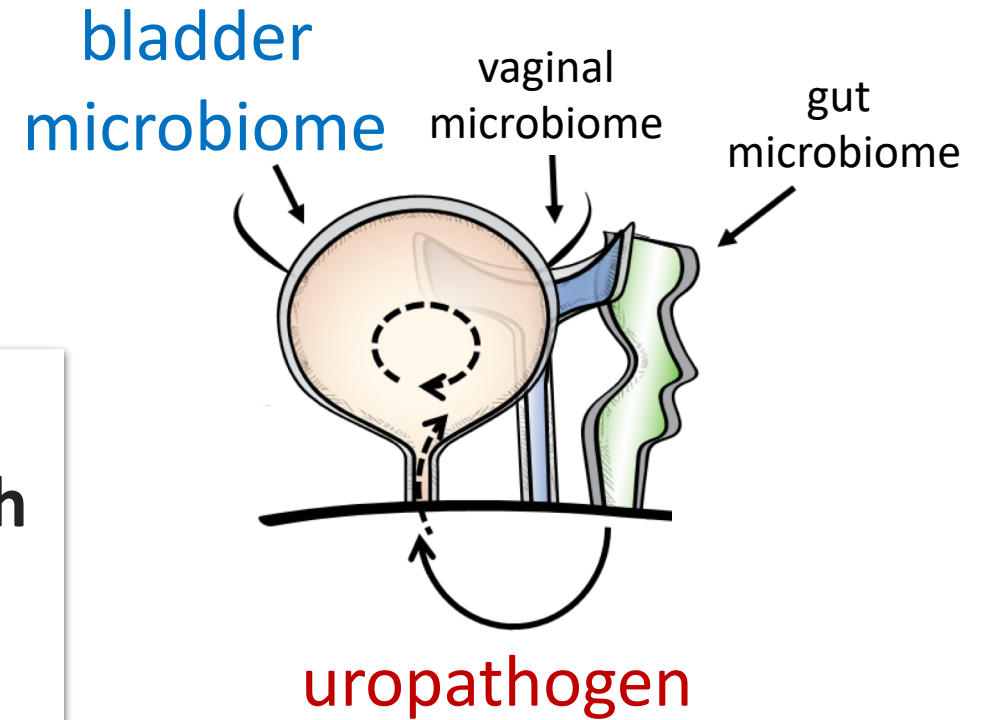
- urinary microbiome is variable among people; changing with time
- associated with benign urinary conditions and cancers



Urinary microbiome and UTI

- UTIs might depend on urinary microbiome

Can **bladder microbiome** interfere with **urinary tract infections**?



Urinary microbiome

- We collected a repository of urinary bacteria using EQUC method
- Have **27 Lactobacilli strains** from 7 different species



Lactobacilli – lactic acid forming bacteria
Food, probiotics, our microbiome



Lactobacilli as 'good bugs'

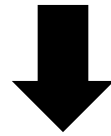
- food fermentations
- food preservation from spoilage
- probiotic for 'gut health'
- feed additives for livestock
- test for vaginal health 'probiotics'

Lactobacilli as 'good bugs'

Why?

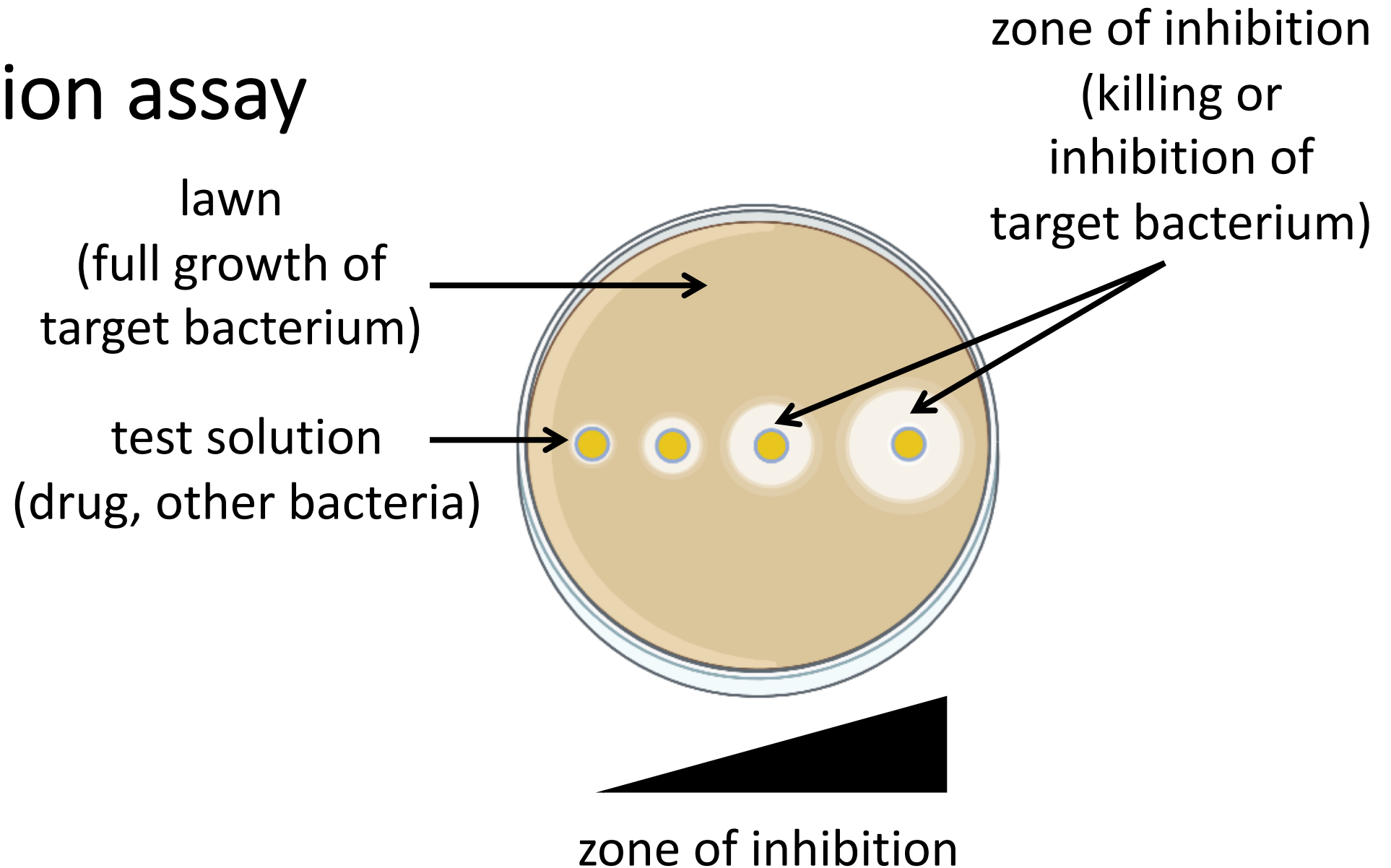
- lactic acid forming bacteria -> acidify the environment -> inhibit growth of other microbes
- form hydrogen peroxide -> inhibit growth of other microbes
- produce various toxins (bacteriocins) -> inhibit growth of other microbes

Can **bladder microbiome** interfere with **urinary tract infections**?

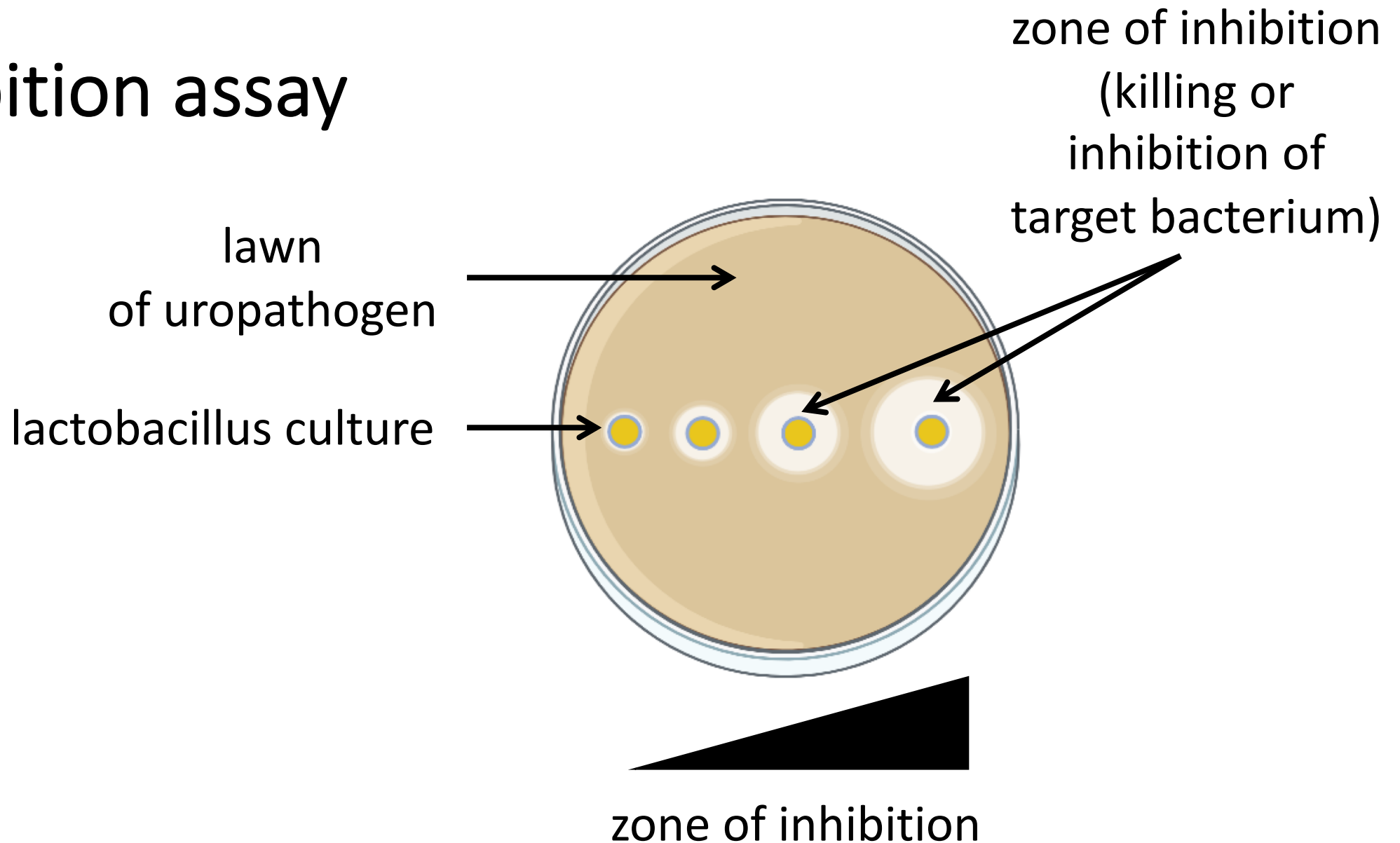


Can urinary lactobacilli inhibit urinary pathogens?

Inhibition assay



Inhibition assay



Unpublished data (not shown)

- Testing first urinary lactobacilli shows a wealth of interactions between urinary commensal bacteria and uropathogens, including multidrug resistant pathogens
- The interactions are not unique to selected isolates and appear to be more general amongst urinary lactobacilli

What will come out of this research?

- establishing functional interactions within urinary microbiome and potential impact of these interactions on UTI development
- analysis of the mechanisms of urinary bacterial interactions
- in a long run, these microbiological studies will identify whether it is possible to detect people predisposed to recurrent UTIs and find novel ways to prevent and treat UTIs via microbiome modulation

Acknowledgments



Sysoeva Lab

Lydia Delaney

Lauren Elam

Brad Land

Antonio Bradley

Katelyn Lott

Rebecca Sloan

Wren Jenkins

Ray Griffin

James Johnson

Chae Hee Lim

Naz Siddiqui

Cindy Amundsen

Duke University

Lisa Karstens

Oregon Health and
Science University

Mehreen Arshad

Northwestern University

RCEU Project
Lydia Delaney



NIH K12 (Duke KUR) grant



Thank you!

