Social Interactions between the variants in a biofilm during antibiotic stress

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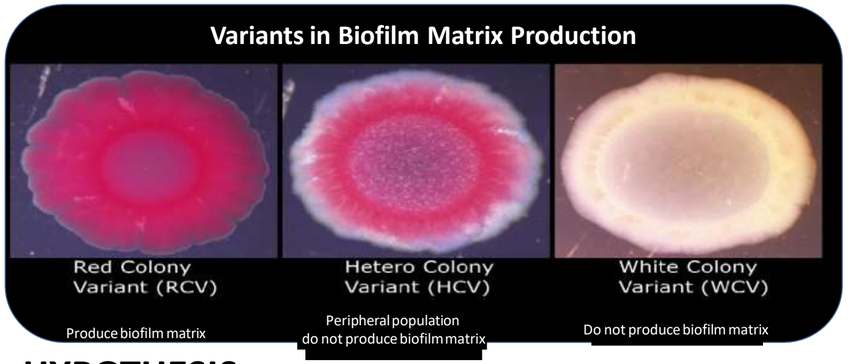
Abstract :Uropathogenic *Escherichia coli* (UPEC) is the major cause of urinary tract infections (UTI) in both community and health care settings. UPEC strains possess a superfluity of both structural and secreted virulence factors that contribute to their capacity to cause infection. Biofilm formation in UPEC are the major cause of chronic and recurrent urinary tract infections(rUTI). Bacterial subpopulations within biofilms have competing interests and needs. Deciphering the mechanisms of interactions within these microbial communities shows how bacteria can cooperate with each other to sort out a form of social conflict. The mechanism of biofilm to stress does not evolve from a specific gene or from a first-rated cell type, it emerges from the zestful of the community. In this poster, we will discuss the social behavior between the biofilm variants of UPEC with response to the antibiotic stresses

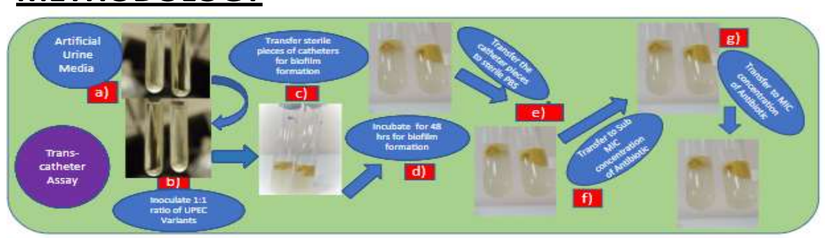
BACKGROUND



HYPOTHESIS

Cooperative/conflict strategy is used by the UPEC variants which determine chronic or recurrent infection in response to antibiotic stress.

METHODOLOGY

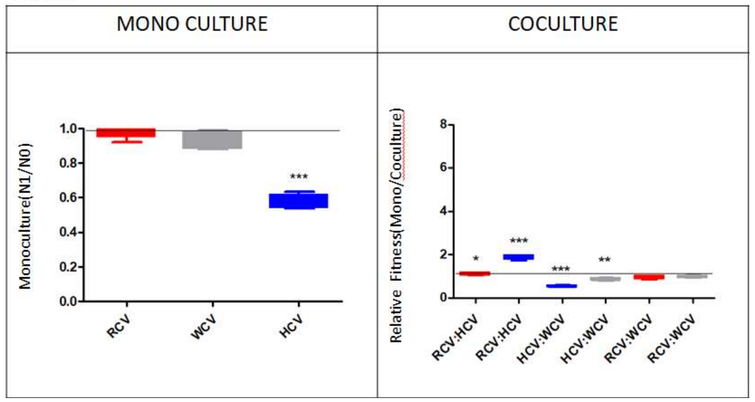


Trans-Catheter Assay

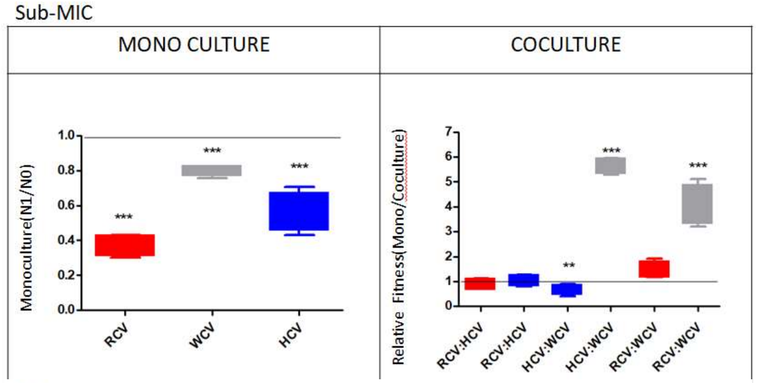
Bacterial strain used	UPEC UTI89
Variants transformed with	pKD3 and pKD4
Antibiotic used for the evolution experiment	Trimethoprim Sulfamethoxazole

Results

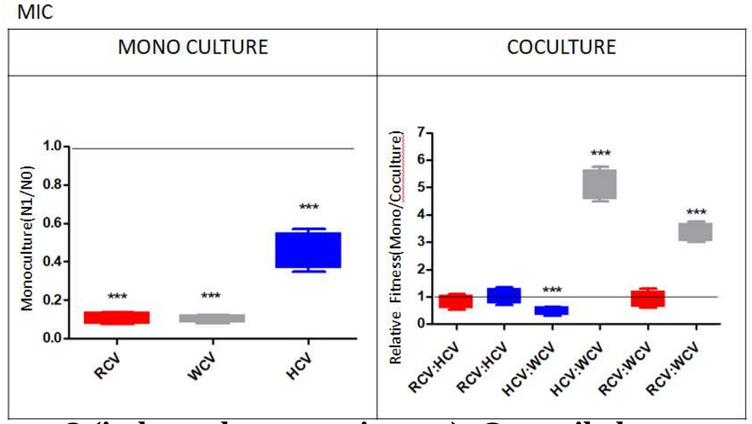
Control



Sub-MIC



MIC



***n* = 2 (independent experiments). One tailed *t* test was performed to determine significance *P < 0.05, **P<0.01, **P<0.001. Antibiotic used - Trimethroprim/Sulfamethoxazole (SXT) Concentration of 54 and 270 µg/mL**

- **More than 1 indicates mono culture fitness payoff**
- **Less than 1 indicates co-culture fitness payoff**

Calculations

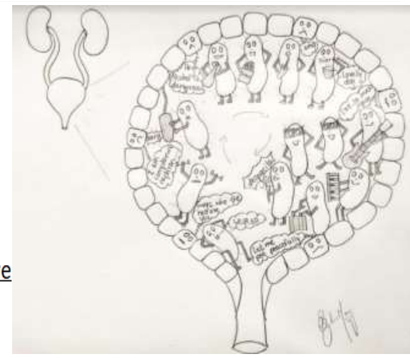
Normalization of Mono and Coculture= N1/N0

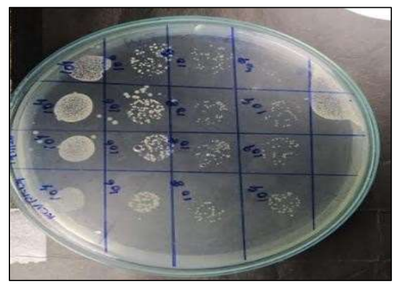
Where

N0-Initial CFU

N1-Final CFU

Relative Fitness= Normalization of Monoculture / Normalization of Coculture





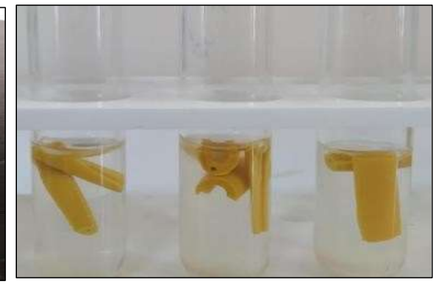


Plate showing serial dilution **Catheter in Artificial Urine Medium (AUM)**

CONCLUSION

- **RCV:HCV shows cooperative effect in treatment with antibiotics**
- **HCV exhibits egoistic effect in competition with WCV under stress conditions**

References

1.Thilo Kohler et.al., Cooperation and virulence of clinical *Pseudomonas aeruginosa* populations, 2009, PNAS

2.Mereic Diard et. al., Cooperation and conflict in microbial biofilms, 2007, PNAS

Acknowledgements: We thanks financial support provided by Science and Engineering Research Board, Dept. of Science and Technology, Govt. of India (CRG/2018/001827) to conduct this study. We thank SASTRA Deemed University for the infrastructure. We thank Harini R for the contribution towards poster preparation