

Investigation of the urobiome for the production of novel antimicrobials against uropathogenic *E. coli* (UPEC)

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BACKGROUND: Urinary tract infections (UTIs) are one of the most common bacterial infections globally with antibiotic treatment becoming increasingly less effective. The urobiome remains a relatively understudied niche as a source of potentially novel antimicrobials (e.g., bacteriocins). Improvements to bacterial culturing and sequencing techniques have highlighted the potentially rich source of alternative treatments and control strategies to target uropathogenic *E. coli* (UPEC).

MATERIALS AND METHODS: (a) BAGEL 4 was used for bioinformatic screening of the genomes of urobiome isolates to identify bacteriocin gene clusters (BGC).

(b) Expanded quantitative urine culture (EQUC) was used to culture mid-stream urine samples to isolate bacteria. Urobiome isolates were then tested for their ability to inhibit a bank of eight UPEC strains using the deferred antagonism assay.

RESULTS: (a) Preliminary bioinformatic screening in BAGEL4 for bacteriocin gene clusters (BCG) of 182 bacterial strains previously isolated from a catheterised urine sample resulted in an initial report of 243 potential areas of interest, following manual annotation the prospect was that 89 isolates contain 159 potential BCGs.

(b) A large bank of bacteria isolated from mid-stream urine samples using EQUC were screened against eight clinically relevant UPEC strains resulting in 38 hits. Further characterisation is needed to confirm type of antimicrobial activity and sequencing to identify the bacterial isolate.

CONCLUSION: This preliminary screening of the urobiome, indicates, that while urobiome research is still in its infancy, it is possible that the urobiome represents a rich and, as yet, largely untapped source of antimicrobials to target UPEC.

Keywords: Urobiome, UTIs, uropathogenic *E. coli*, Bacteriocins