

The purpose of the current study was to determine the effect of sublethal concentrations of nitrofurantoin, ciprofloxacin and trimethoprim on biofilm formation in 57 uropathogenic *Escherichia coli* strains (UPEC).

The MIC of nitrofurantoin, ciprofloxacin and trimethoprim was determined for 57 UPEC isolates. Biofilm formation for each isolate with and without sub-lethal concentrations of each antibiotic was then quantified, and the statistical significance of changes in biofilm formation was ascertained by way of a Dunnett's test.

The effects of sub-MIC antibiotics on biofilm formation of UPEC were variable. A total of 22.8% of strains were induced to form biofilm by nitrofurantoin, 12% were induced by ciprofloxacin and 19% were induced by trimethoprim; conversely 36.8% of strains had inhibited biofilm formation with nitrofurantoin and 52.6% of strains were inhibited by ciprofloxacin. Biofilm formation was reduced in 38.5% of strains in the presence of sub-inhibitory trimethoprim. A key finding was that even in cases where the isolate was resistant to an antibiotic as defined by EUCAST, many were induced to form a stronger biofilm when grown with sub-MIC concentrations of antibiotics, especially trimethoprim, where 6 of the 22 trimethoprim resistant strains were induced to form stronger biofilms.

These findings suggest that the use of empirical treatment with trimethoprim without first establishing susceptibility may in fact potentiate infection in cases where a patient who is suffering from a urinary tract infection (UTI) caused by trimethoprim resistant UPEC is administered trimethoprim. This emphasises the need for laboratory-guided treatment of UTI.