

Probing the Responsive Behaviour of Dynamic Covalent Interactions of Bacteria  
Responsive Hydrogels

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Catheter-associated urinary tract infections (CAUTI) are one of the most common types of healthcare associated infections and are known to cost the National Health Service (NHS) over £99 million annually. CAUTI infections are particularly prevalent in long term catheterised patients.

CAUTI infections are often caused by gram-negative bacteria such as *Escherichia coli* and *Proteus mirabilis*. Indwelling urinary catheters provide the optimal environment for colonisation of these uropathogens and enable biofilm formation on these medical devices. Once a biofilm has formed, these uropathogens use flagellum-mediated and twitching mobility to spread from initial site of infection to the urinary tract. Often these pathogens are urease positive and enzymatically digest urea present in the urine into ammonia and carbon dioxide resulting in an increase pH. The alkaline pH causes precipitation of divalent ions that become embedded in the biofilms. These biofilms are difficult to treat with commercially available antibiotics.

This project focuses on the synthesis of a dynamic covalent moieties with antibacterial targeting groups that can selectively dissociate at the elevated pH values associated with a CAUTI delivering antibacterial properties. These monomers will be incorporated into a HEMA polymer and their properties investigated.