

# pH-Responsive Switchable Antimicrobial and Antifouling Coatings for Prevention of Catheter Associated Urinary Tract Infections

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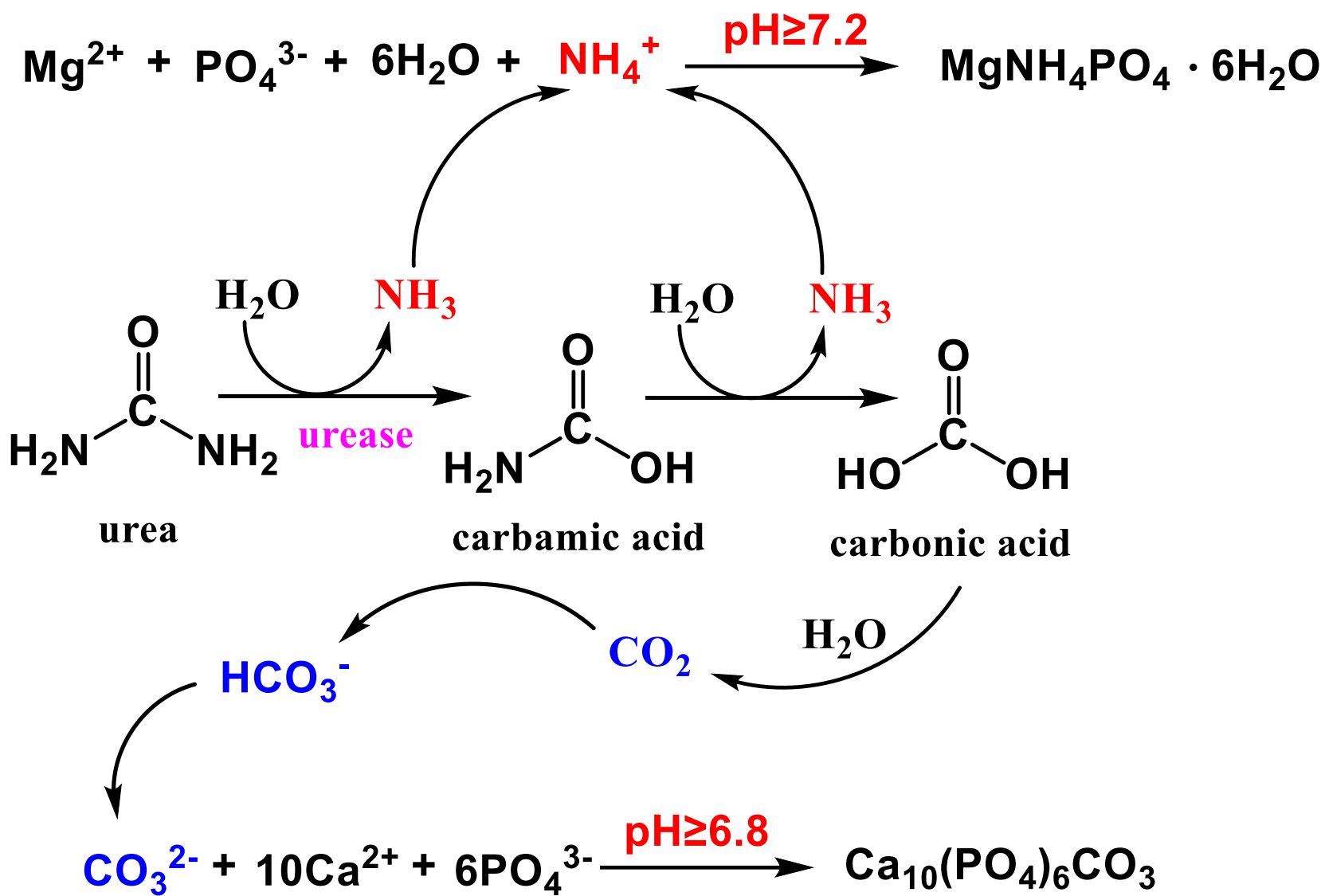
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## Background

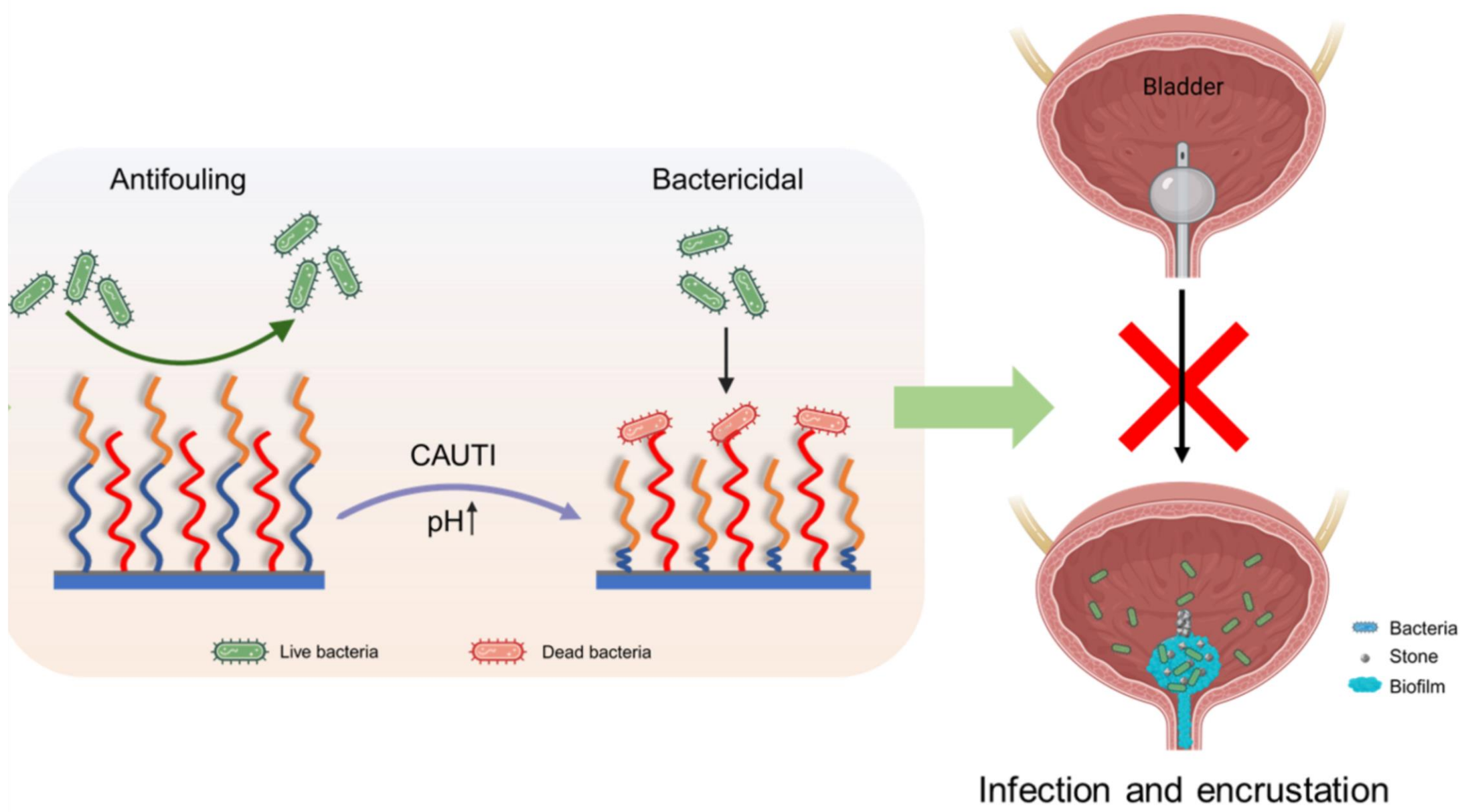
Catheter associated urinary tract infections (CAUTIs) are one of the most prevalent healthcare-associated infections, resulting from biofilm formation on catheter surfaces. Some bacteria such as *Proteus mirabilis* related to CAUTIs are urease-producing species which can form crystalline biofilms by increasing urinary pH, and eventually result in encrustation and blockage of catheters.



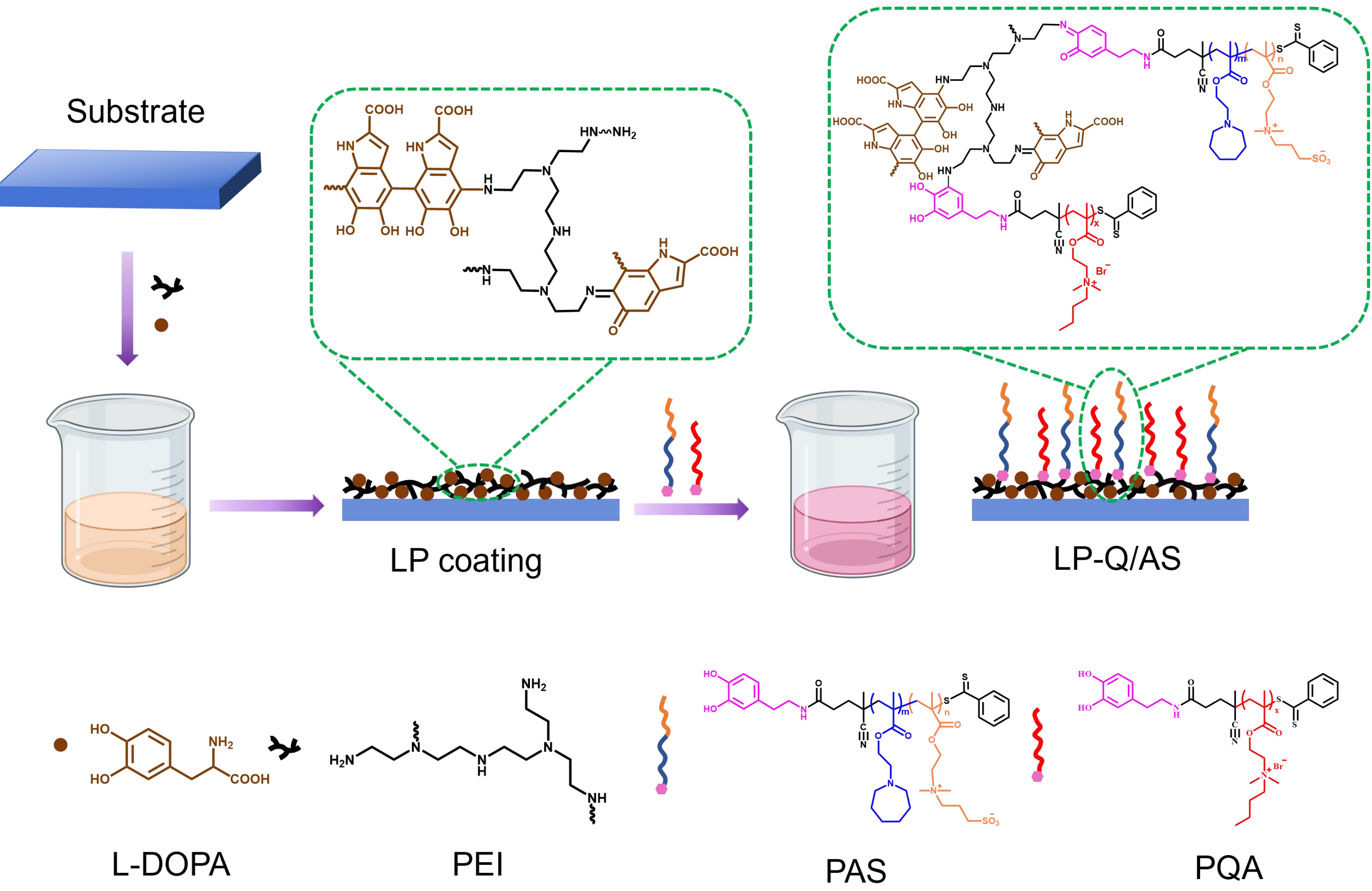
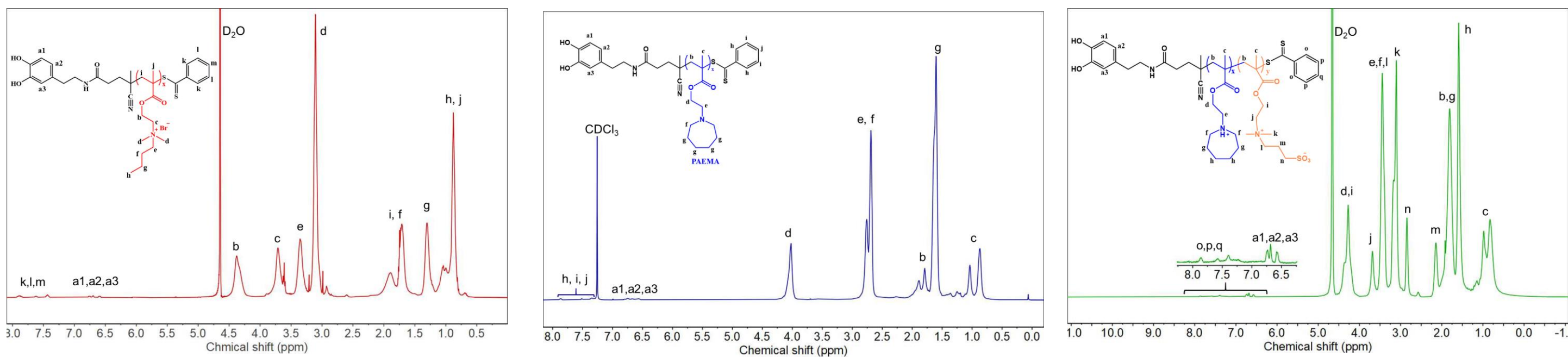
The mechanism of urease-catalyzed urea hydrolysis and formation of crystalline biofilm

## Our Design

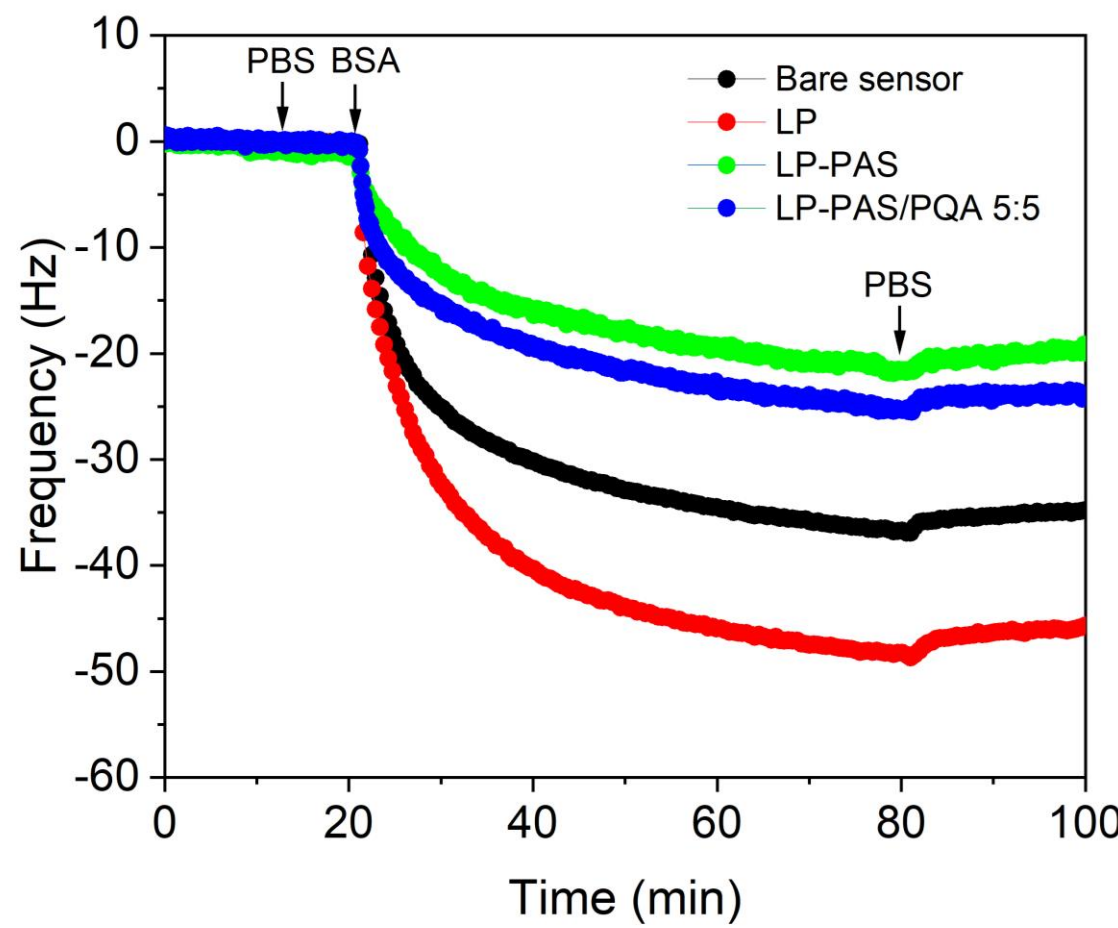
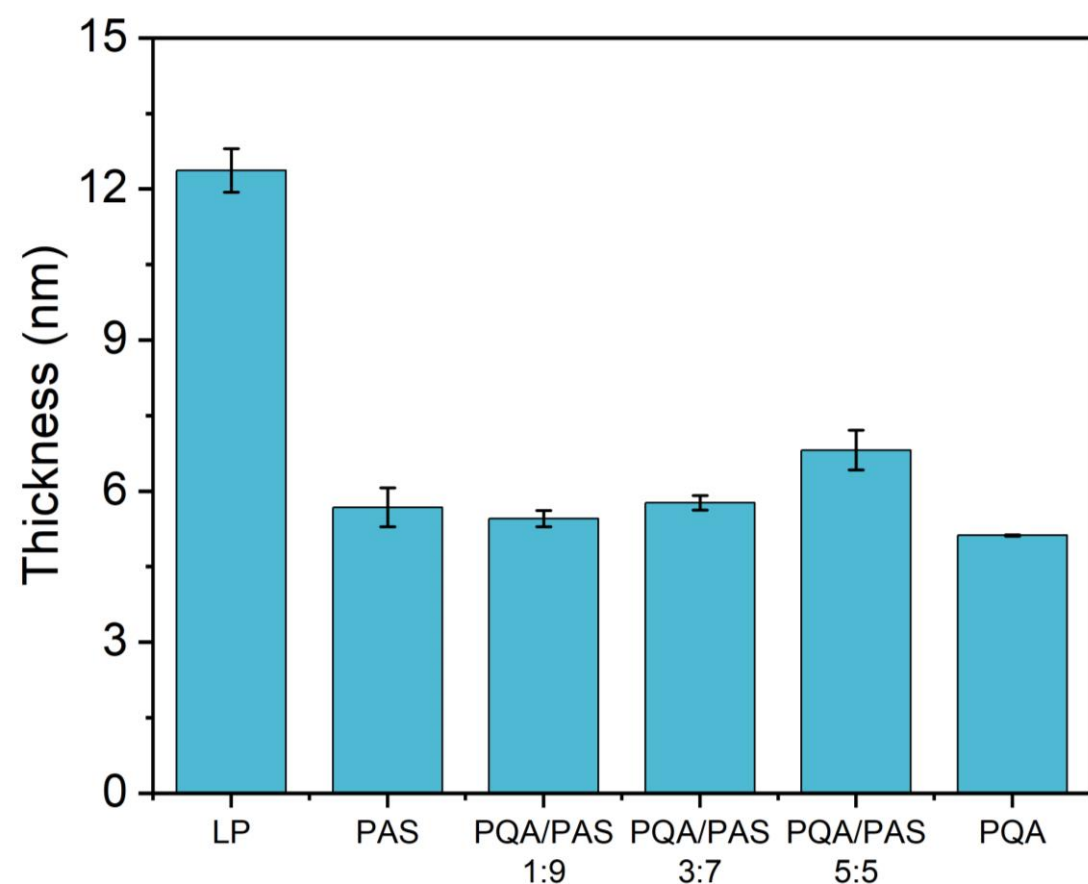
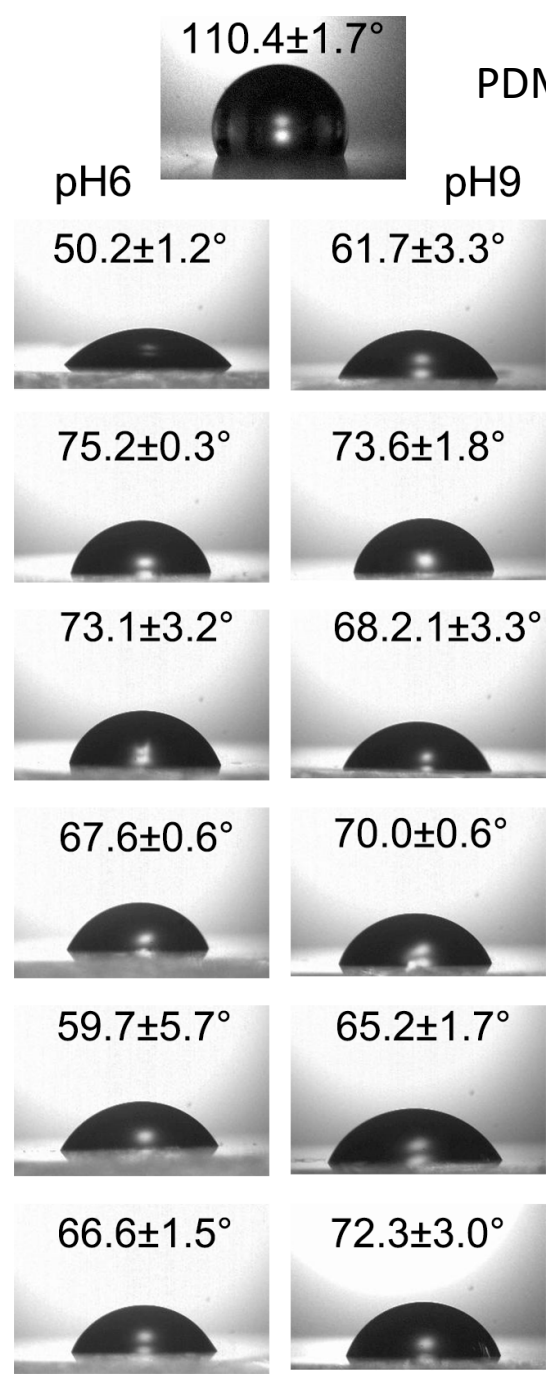
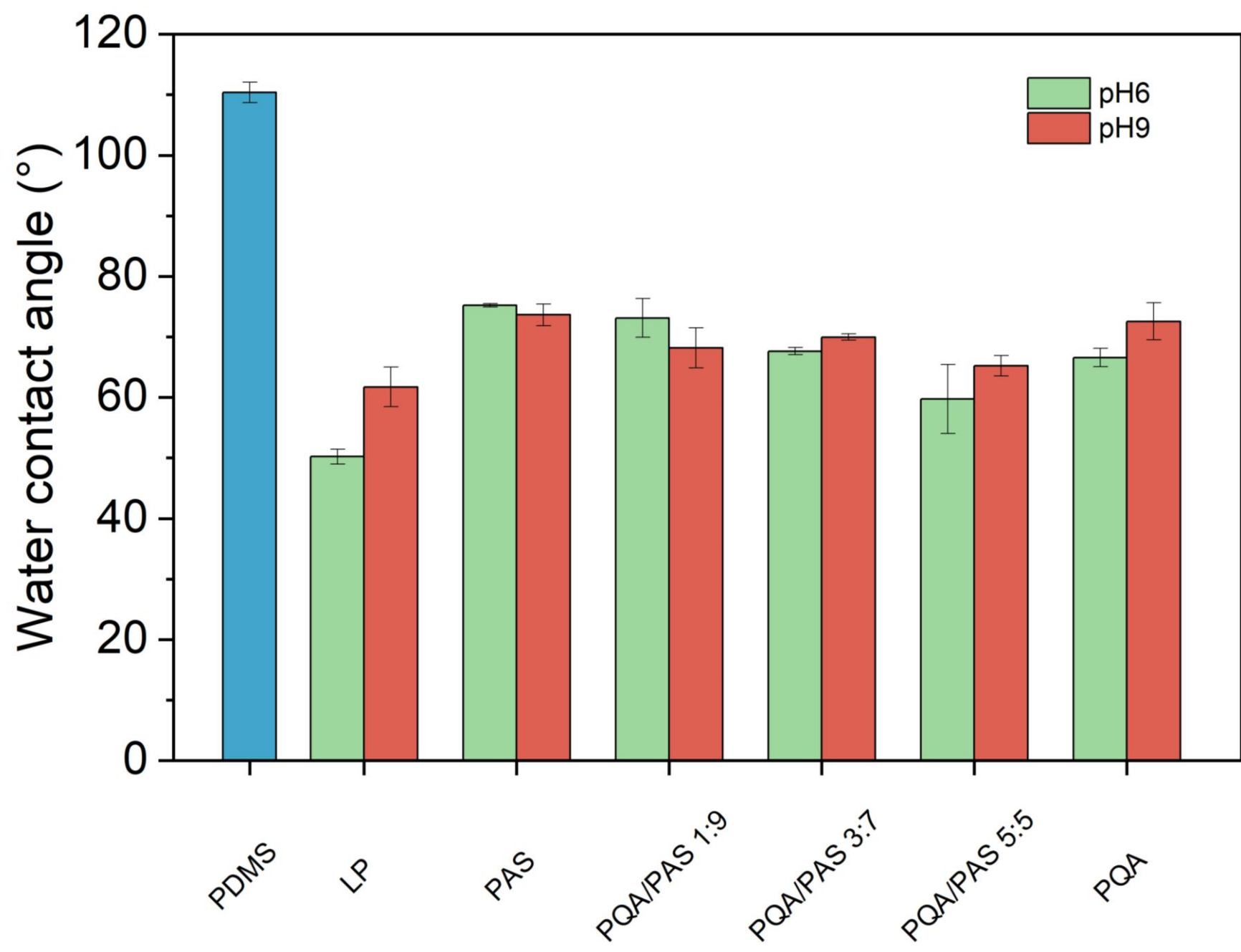
The aim is to design a smart coating that can respond to the elevated urinary pH when a CAUTI occurs, realizing switching between antifouling and bactericidal states, thus prevent catheter encrustation and blockage.



## Methods and Results



Schematic illustration for preparation of pH-responsive antifouling and antibacterial coating via a two-step method



## Conclusions & Outlook

- PQA and PAEMA-*b*-PSBMA were successfully synthesized through RAFT polymerization, with both polymers containing adhesive catechol end groups.
- The synthesized PQA and PAEMA-*b*-PSBMA were successfully grafted to the substrates via a simple two-step method.
- Next step, biological experiments will be studied.