Antibiofilm effects of exogenous nitric oxide against *Klebsiella pneumoniae*

Magdalena M. Duke,[1] Huan K. Nguyen,[1] and Mark H. Schoenfisch[1,2]

[1]Department of Chemistry, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA
[2]Eshelman School of Pharmacy, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA

Nitric Oxide (NO) is a diatomic free radical that plays an important role in the innate immune defense**.** Exogenous NO can exhibit potent antibacterial action without gathering resistance. *Klebsiella pneumoniae* is a Gram-negative bacterium which has demonstrated increasing number of life-threatening, multi-drug resistance infections. One of the primary virulent factors of *K. pneumoniae* is the production of a thick polysaccharide capsule that helps the bacteria evade immune cells. In addition, *K. pneumoniae* can form biofilms that further complicate treatment by antibiotics. Here, we investigate the antimicrobial effects of NO-releasing small molecules against seven strains of *K. pneumoniae* in both planktonic and biofilm forms. Combination of a NO-releasing molecule with antibiotics was investigated to determine whether a synergistic relationship existed. Biofilm growth conditions were optimized using glucose as the primary carbon source. Biofilm quantification assays showed that *K. pneumoniae* biofilms are virtually unaffected by antibiotics but may be eradicated at near planktonically relevant concentrations by NO donors.