Biofilms can grow on many natural and synthetic surfaces. The effect of biofilm growth in environmental, industrial and medical settings can be either beneficial, benign or harmful. Biofilm-related problems cost the United States industry billions of dollars annually by corroding pipes, reducing heat transfer or hydraulic pressure in industrial cooling systems, plugging water injection jets, and clogging water filters. In addition, biofilms cause major medical problems by infecting host tissues, harboring bacteria that contaminate drinking water, and causing rejection of medical implants. This presentation will focus on how to use electrochemistry to prevent biofilm related problems. There is a significant need to manage biofilm related health issues without excessive use of antibiotics. Electrochemical biofilm control is an emerging technology where surface properties of the inert metals are controlled to delay or prevent cell attachment or remove existing cells from that surface. Specifically, Dr. Beyenal will discuss how to apply electrochemical principles to manage wound infections and accelerate healing. The electrochemical scaffold and electrochemical bandage technology developed by his group eliminate biofilms and can be a strategy that can potentially be leveraged as a novel antibiotic-free approach to treat chronic wound infections. Finally, Dr. Beyenal will discuss future directions describing how to use electrochemistry for human health.

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