ELECTROCHEMICAL WOUND HEALING BY REMOVING BIOFILMS

by
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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 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.

Bio

Dr. Beyenal is known for his biofilm engineering expertise. His work involves healing wounds by removing biofilms and using electrochemistry for health, energy, and environment. The research in his laboratories has focused on the fundamental understanding of biofilm processes, their characterization, and applications of biofilm processes. His research has been funded by Office of Naval Research, National Science Foundation program, Department of Energy, National Institutes of Health, Department of Defense as well as industry. He and Zbigniew Lewandowski published a book entitled “Fundamentals of Biofilm Research” in 2014 and he received an NSF-CAREER award in 2010. Currently, he is a Professor at Washington State University, in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering.