

Emerging Biomaterials Strategies to Prevent Biofilm Infection

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Statement of Purpose:

Nosocomial infections are the fifth leading cause of death in the U.S. with >2 million cases annually (or ~10% of American hospital patients). About 60% of all such infections are associated with implanted medical devices causing >\$4.5 billion medical costs and ~95,000 deaths annually.

This presentation discusses past approaches to prevent biomaterials infections, which have largely failed to provide long term protection and which exacerbate chronic inflammation. Findings regarding the biofilm mode of adherent bacterial growth suggest that past approaches employing the release of toxic agents or antibiotics may not be wise and may actually exacerbate biofilm formation.

Emerging alternatives that biologically prevent bacterial biofilm formation are presented that are based on negating biofilm formation or controlling adherent bacterial virulence factors. Discussion of biomaterials that (a) prevent bacterial adhesion, (b) negate bacterial quorum sensing, (c) enhance macrophage phagocytosis of incoming bacteria, and even (d) perhaps immunize patients specifically against device-based infections will be presented.