Biofilms in Chronic Wounds

Biofilms consist of surface-associated microbial communities surrounded by an extracellular matrix. Biofilm growth provides protection for bacteria from antibiotics and antiseptics as well as host immune responses. Most, if not all, chronic non-healing human cutaneous wounds harbor biofilms. These biofilms are often polymicrobial and may include aerobic and facultative bacterial genera, such as *Staphylococcus* and *Pseudomonas*, as well as strictly anaerobic bacteria. The ability of biofilms to delay wound healing has been demonstrated in several animal models, although the mechanisms are poorly understood. One general mechanism by which would healing can be impaired is through oxygen depletion within the wound both directly by bacterial metabolism and indirectly by immune cell response. Oxygen depletion can also promote the growth of strictly anaerobic bacteria within the wound biofilm. Combating wound biofilms requires a biofilm-specific multifaceted approach, which may include debridement, biofilm-disrupting agents, and topical antimicrobial agents.