



Insights Into Periprosthetic Joint Infection Through a Biofilm Lens

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Arthroplasty-associated infection or periprosthetic joint infection (PJI), is a rare but increasingly diagnosed disease involving interactions of microorganisms with the arthroplasty and host's immune system. A small number of microorganisms is needed to establish infection, with microorganisms adhering to, and forming biofilms on, implants, providing protection from many antibiotics and the host. Causative microorganisms are frequently members of the skin microbiota inoculated at implant placement. A myriad of bacteria (and rarely fungi) cause PJI, most commonly coagulase-negative staphylococci, followed by *Staphylococcus aureus*, *Streptococcus* species, *Enterococcus* species, *Cutibacterium* species and Enterobacterales. Culture-negative rates vary and may be up to 45%. In the United States, hip and knee PJI incidence was 2.1% and 2.3% in 2017. PJI is costly and negatively impacts patient lives, with physical, social, and emotional effects. Accurate diagnosis is important because management differs from that of non-infectious arthroplasty failure; if PJI is present, defining its microbial etiology informs surgical management and selection of antibiotics. Our team has developed several strategies, including biofilm-sampling strategies, for PJI diagnosis. We have also performed advanced deep nucleic acid sequencing and proteomics analyses of PJI and non-infectious arthroplasty failure. PJI treatment is complicated and costly. Antibiotics alone, without surgical intervention, fail in most cases, and must be administered with surgical intervention. Novel potential treatment approaches for PJI being developed by our team will be overviewed.