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Preclinical multimodel imaging of bacterial infections and the potential for clinical translation

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Each year more than 70 billion standard units of antibiotic are prescribed to treat bacterial infections worldwide. In addition, at least 63,000 tons of antibiotics are consumed by livestock for growth promotion and disease prevention. The result of this overuse of antibiotics is a spiraling increase in resistance. In the United States and Europe, antibiotic resistant bacteria are responsible for more than 4 million infections and approximately 50,000 deaths annually. In addition, bacteria such as methicillin-resistant Staphylococcus aureus (MRSA) have increased in prevalence in hospitals over the last three decades. Such bacteria are particularly problematic in postoperative infections, exacerbating treatment through the development of biofilms, especially on medical implants which are extremely hard to treat without removal and replacement of the device. This presentation will show how non-invasive preclinical imaging (optical, PET and CT) is being used to better understand the establishment and development of bacterial infections in a number of defined animal disease models of bacterial infections, and how best to treat them. In particular, data will be shown as to how preclinical imaging can be used to monitor biofilms on orthopedic implants and how this technology might be translated into the clinic.

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