

# Hints for the development and testing of anti-infective biomaterials from a closer look at the complexity of the pathogenesis of implant infections

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## Abstract

Different estimates indicate that about 0.5-1.5 million types of medical devices have currently entered the global market. This broad variety of medical devices showcases the enormous potential expressed by biomaterials, which are nowadays offering unprecedented possibilities for prevention, diagnosis and treatment of human diseases. Notwithstanding, in many clinical applications, including indwelling and implantable devices, the biomaterials susceptibility to bacterial colonization and infection still represents an unresolved Achilles's heel. Even though rare, biomaterials associated infections represent a main adverse event that frequently compromises the functionality of medical devices, determining their failure. This particular type of infection is very challenging not only to diagnose but also to treat. Anti-infective biomaterials are conceived to generate a microenvironment hostile to bacteria and are currently regarded as the most promising strategy to prevent these infections. Over the years, the etiology and the pathogenesis of biomaterial associated infections have been the object of intense study, with the aim to unveil all factors that concur to the emergence, persistence and irreducibility of biomaterial associated infections. The latest findings from these investigative efforts reveal a scenery of increased complexity, but also provide important hints that should be taken in consideration when designing and testing new anti-infective biomaterials.

## Biography

Dr. Campoccia's research currently focuses on the pathogenesis of implant infections, on the interactions of bacteria with biomaterial surfaces and host cells, and on the design and evaluation of anti-infective biomaterials. His past research interests include biocompatibility of hyaluronic acid derivatives and human cartilage tissue engineering. **Higher education:** BSc in 1988 (Padua, Italy); PhD in 1996 (Liverpool, UK). **Employment:** after a 3-year period as *Guest Researcher* at the Department of Clinical Engineering (Royal Liverpool Hospital, Liverpool, UK) granted by Fidia Srl and Fab Srl (Abano, Italy), in 1995 he was appointed *Expert in Research Activity* and, in 1996, *R&D Project leader* (Project: "Artificial cartilage") at Fab Srl. In 1998, he became *Manager Quadro* at Distrex Spa (Padua, Italy). From 2000 to present, he has been *Dirigente Biologo (Senior Research Biologist)*, initially at the Laboratory of Biocompatibility of Implant Materials and, subsequently, at the Research Unit on Implant Infections of the IRCSS Istituto Ortopedico Rizzoli (Bologna, Italy). Dr. Campoccia has authored or co-authored 78 peer-reviewed publications in international journals (H-index: 36) and a book chapter.

