Title: Surface Modification Strategies for Designing Potent Antimicrobial Materials

Guest Editor(s): Anindya Basu
(Rajiv Gandhi Technical University, Bhopal, India)

Aims and Scope

Over the past few decades the Healthcare industry has witnessed a steady growth of the implantable biodevices. Such class of products might have an extensive portfolio ranging from Urinary catheters to breathing tubes to contact lenses/ocular implants to orthopedic/dental implants, etc.; and owing to this very reason there has been a steady growth of the Global Bioimplants Industry standing at over US$ 100 Bn today. With the aging world population's increasing reliance on such devices, it is expected to observe a perpetual growth of this sector for the years to come. However, safe usage of such biodevices is hindered by the implant associated infections which can often lead to increased healthcare costs and complications with regard to patient management. With the development of increasing number of antibiotic resistant bacterial strains the threat to safe application of such implants is seriously at stake.

The primary step in initiating these implant associated infections involves the colonization of the pathogenic bacteria and subsequent formation of biofilms on the surface of the target devices. The biofilms then keep on growing till it again disperse more bacteria to the host cells in the vicinity of the implant thereby rapidly spreading the infection. It is therefore imperative to design surface modification strategies that would prevent bacterial adhesion and colonization on the implant surfaces, whilst ensuring the safety of the patient. Over the years several antimicrobial coating strategies have been developed which can be broadly classified as Biopassive and Bioactive coating methods. The primary target of the former strategy is to prevent bacterial adhesion in the first place, while the latter deals with direct killing of the organisms coming in contact with the material surfaces. Bioactive coating methods may again be subdivided into surface chemistries related to covalent immobilization or controlled release of the antimicrobial entities. The design and development of such antimicrobial surfaces is associated with diverse challenges, some of which are mentioned below:

1. Design and development of antimicrobial entities suitable for coating the implantable material surfaces.
2. Design and development of surface coating chemistries / strategies for the intended purpose.
3. Development of Surface Analytical platforms for the proper quantification / characterization of the synthesized antimicrobial surfaces.
4. Scale-up strategies for the production of such antimicrobial materials.
5. Mechanism of action of the antimicrobial entities pre- and post- immobilization on the desired surfaces.
6. Stability and biocompatibility of the developed antimicrobial material.

In this special issue we invite review articles that are related to but not limited to the above-mentioned or related problems associated with "Surface Modification Strategies for Designing Potent Antimicrobial Materials".

Keywords:
Implant Associated Infections, Antimicrobial Surfaces, Surface Chemistry, Implantable Biodevices, Antimicrobial Coatings, Antimicrobial Materials.

Subtopics:
Antimicrobials
Antimicrobial surfaces
Mechanisms of Action for pre- and post- immobilized Antimicrobials
Surface Characterization techniques
Antimicrobial Peptides and Polymers

Schedule:

Manuscript submission deadline: September 2020
Peer Review Due: October 2020
Revision Due: November 2020
Notification of acceptance by the Guest Editor:
Final manuscripts due: December 2020