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## Antimicrobial Materials and Devices for Biomedical Applications

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**Abstract:** Bioaccumulation in sanitary devices, caused by opportunistic pathogens, intervenes negatively in the recovery of a patient since these are able to provoke a mild or life-threatening infection. Thus, surfaces of certain materials such as gauzes, catheters, sutures, *etc.*, which are adjacent or directly exposed to a healing zone, are prone to become sites for the growth, proliferation, and spread of pathogenic microorganisms. Although in surgical or healing processes, sterile materials are usually applied, the time of contact with biological interfaces is long enough to make the sterilization but not enough to control and prevent an infection since pathogens abound in the surroundings. Air, water, and soil can be potential vectors, without considering those factors related to iatrogenesis that also play a role in the opportunities for the patient's recovery. Within this context, engineered materials are currently being developed and explored towards devices and biomaterials with improved design, performance, duration, biocompatibility aiming to be safer for the user. The surface functionalization of materials with antimicrobial agents is a highlighted alternative to overcome this issue. This chapter addresses current antimicrobial materials, as well as strategies for obtaining antimicrobial surfaces and coating as well as their properties. In addition, the safety assessment of biomedical applications and international standards are discussed.

**Keywords:** Antimicrobial agents, Antimicrobial surfaces, Advanced materials, Biomedical devices, Biological evaluation, Bioactive molecules, Coatings, International standards, Safety assessment, Surface functionalization.

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