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Photocatalytic antimicrobial coatings

ABSTRACT. The application of photocatalytic antimicrobial coatings (PAC) to diminish the occurrence of healthcare-associated infections (HAI) is critically evaluated. There is little doubt that PAC have a microbiocidal action and, hence, must reduce the environmental burden of microbes wherever PAC are deployed, but the link thence to reducing HAI is not straightforward and needs to be carefully examined in order to ensure that PAC are deployed cost-effectively. The likely mechanism of the microbiocidal action is examined, especially with respect to the possible development of resistance. The relative merits of nanoparticulate versus monolithic films are discussed, as well as the choice of catalyst. Titanium dioxide is the preferred material, but suffers from the small overlap of its optical absorption with the visible spectrum. Efforts to increase the degree of visible light activation of catalysis are surveyed. The overall goal of this article is to provide the scientific and technical basis for the effectiveness of PAC in order to serve as a guide to appropriate decisions within healthcare environments.

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