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Biocompatibility, corrosion resistance and antibacterial activity of TiO₂/CuO coating on titanium

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Abstract

In this work, TiO₂/CuO coating was prepared on titanium (Ti) by combination of magnetron sputtering and annealing treatment. The microstructure, biocompatibility, corrosion resistance and antibacterial property of TiO₂/CuO coating were investigated in comparison with pure Ti and TiO₂ coating. The results show that TiO₂/CuO coating is mainly composed of TiO₂ and CuO. In vitro cytocompatibility evaluation suggests that no obvious toxicity appears on the TiO₂/CuO coating, and the coating stimulates the osteoblast spreading and proliferation. Compared with Ti and TiO₂ coating, TiO₂/CuO coating exhibits improved corrosion resistance and antibacterial ability against *S.aureus*. This study is the first attempt to apply the combination of magnetron sputtering and annealing treatment to introduce the Cu into TiO₂ coating for surface modification of Ti-based implant materials, which may provide a research foundation for further development of bioactive multifunctional coatings to meet the better clinical demand.

Keywords: Implant materials; TiO₂/CuO coating; Biocompatibility; Corrosion resistance; Antibacterial property.

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