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Effect of oxidation time on cytocompatibility of ultrafine-grained pure Ti in micro-arc oxidation treatment

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Abstract: Equal channel angular pressing results in ultrafine-grained pure titanium (Ti) with superior mechanical properties and no harmful alloying elements, which is expected to replace pure Ti and Ti alloys as a new generation of biomedical implant materials. To further improve the bioactivity of Ti surfaces, porous titania coatings were prepared on ultrafine-grained Ti through micro-arc oxidation (MAO) in Ca-, P-, and Si-containing electrolyte. The effects of oxidation time on the surface morphology, wettability, and roughness of ultrafine-grained Ti after MAO were investigated. The cellular compatibility of the modified coatings was evaluated through a cytotoxicity experiment, cell proliferation assay, and examination of the adhesion behaviour of osteoblasts. The results indicate that the specimens after the MAO treatment showed higher surface energy, larger surface roughness, and could better promote adhesion and spreading of osteoblasts than those before the treatment. Additionally, the

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