Supercritical CO₂ Assisted Drug Loading and Degradation Behavior and Osteogenicity of Magnesium Alloy Matrix Calcium-Phosphorus-Chitosan-Graphene Oxide Bone Material

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The aspirin(ASA) was loaded on the graphene oxide(GO) by SC-CO₂(supercritical CO₂) method and GO/ASA complex was obtained, then the CaP-CS-GO/ASA(calcium-phosphorus-chitosan-graphene oxide/aspirin) coating was deposited on the magnesium alloy matrix by electrophoresis. The degradation behavior of magnesium alloy matrix CaP-CS-GO/ASA by SC-CO₂ drug loading was studied by immersion experiment. The effects of the soaking solution and material coating on the proliferation of mouse osteoblasts 3T3E1 in vitro were detected by CCK-8 method. The results showed that the corrosion reaction of the magnesium alloy matrix CaP-CS-GO/ASA by SC-CO₂ drug loading in m-SBF was orderly controlled by electrochemical and finite-layer diffusion processes, charge transfer and semi-infinite diffusion processes with the increase of the immersion time. The ASA presence in the CaP-CS-GO coating promoted the proliferation, adhesion and growth of osteoblasts, and the obtained bone material had the good osteogenesis.

Keywords: Magnesium alloy matrix, degradation behavior, graphene oxide, coating, proliferation of osteoblasts

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