Journal of Biomedical Materials Research Part A / Volume 102, Issue 8 / p. 2644-2651

Original Article

Magnesium metal—A potential biomaterial with antibone cancer properties

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First published: 24 August 2013
https://doi.org/10.1002/jbm.a.34933

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Abstract

Reactive oxygen plays an important role in the pathogenesis of many serious illnesses, including bony cancer. Recently, it has been suggested that hydrogen (H_2), a selective antioxidant, can effectively scavenge free radicals. Biomedical magnesium (Mg) used for bone defect repair in the surgery of bony cancer could release H_2 because of the degradation, so Mg might have the potential to prevent bony cancer from metastasis and recurrence. In this study, alkali-heat treatment method was employed to modify the surface structure of Mg metal, so as to control the degradation of Mg metal and the H_2 releasing rate. Then the released H_2 was introduced to the Fenton Reaction system to detect its effect on scavenging free radicals. The modified Mg metal was employed as the substrate for bone cancer cell culture to study the effect of the H_2 releasing on scavenging free radicals in the cells. It is found that the H_2 released from the Mg degradation could scavenge free radicals both in the Fenton Reaction system and bone cancer cells. The effect on the scavenging free radical is proportional to the rate of H_2 releasing. It suggested that Mg might be a potential material with anti-bone cancer properties. It is hopeful to both repair the bone defect and prevent bony cancer from metastasis and recurrence for the bony cancer patients by biomedical Mg metal. © 2013 Wiley Periodicals, Inc. J Biomed Mater Res Part A: 102A: 2644–2651, 2014.

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