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Gegründet im Jahre 1869 von H. Hlasiwetz, J. Loschmidt, J. Petzval und J. Stefan

EINLADUNG

zum Vortrag von

Univ. Prof. Dr. Helga Lichtenegger

Universität für Bodenkultur, Institut für Physik und Materialwissenschaft

Bio-resorbable Mg implants and their impact on bone structure and mineralization

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Dienstag, 24. Mai 2016, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmanngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmanngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract:

Biodegradable bone implant materials are considered a great promise for future medical treatment, since they dissolve in the body and should be fully replaced by healthy bone tissue with time. In contrast to conventional static implants, where minimum interaction with the body fluid is the key for successful application, biodegradable implants are designed to be attacked by their environment and disintegrate. One of the greatest challenges is therefore the capability of the body to deal with the degradation products.

Mg based implants are a particularly promising class of materials for structural support after bone fracture, because the corrosion kinetic can be controlled by the alloy type and Mg is considered non-toxic: it even naturally occurs in bone in low quantities. The effect of a sudden local excess of Mg at the implant interface, however, represents a completely new and different situation. By using a combination of x-ray microbeam methods including scattering, fluorescence and absorption spectroscopy, we have shown that rat bone responds to the placement and resorption of Mg implants by alterations in nanostructure and mineralization. This includes local re-orientation of the collagen/mineral composite, an influence on the mineral particle size and deposition of Mg in the bone at the implant interface and around blood vessels. Our results suggest that a Ca substitution by Mg plays a major role in explaining the observed changes.

Further investigations of this kind will help to understand and predict the response of bone to implant degradation and potentially allow the tailoring of specific implant materials that match the bone's healing and remodeling capabilities in the best possible way.