

Biodegradable magnesium implants: ready to use or fake news?

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Mg and its alloys are a new class of load bearing metal implants because they degrade under physiological conditions. This amazing property offers significant advantages over classical, non-degrading implants which have to be removed upon the completion of the healing process. This is especially important for children but can offer also therapeutic potential for e.g. patients suffering from osteoporosis. However, it is not easy to deal with Mg-based implant materials.

One of the great challenges is to tailor the degradation in a manner that is acceptable for the biological environment. Here not only the alloy composition and microstructure is important but also the corrosion under physiological conditions. The correlated processes are highly complex in a living system and sufficient data describing the degradation in vivo is missing. Many chemical reactions take place in parallel and the living cellular environment can actively participate in the degradation process by altering not only the degradation rate but also the composition of the degradation layer underneath cells which is eventually remodeled into bone matrix. Therefore, we have to include the biological environment and response together with the microstructure and surface properties to tailor the degradation rate.

This presentation will outline how close the interplay is between microstructure, material degradation and biological response, and how close we are to a standardized therapies with Mg-based implants.