

Tailoring of Mg and Ti surfaces to win the race: osseointegration vs. bacterial colonization

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Abstract

Infection, tribocorrosion and lack of osseointegration are the major reasons for revision surgery and huge cost expenditure after joint replacements. In spite of the attractive bulk properties of Ti and Mg alloys though considered as a suitable alternative for conventionally used 316L stainless steel, Ti suffer from drawbacks such as biointertness and bacterial attachment, whereas, Mg fail due to poor corrosion resistance. As surface plays a major role for corrosion, cell and bacterial attachment; tailoring of the surface is the only solution to prevent failures of metallic implants. Our group is extensively working on the development of several surface-engineering techniques to impart the right chemistry, topography, physical and mechanical properties and evaluate their tribocorrosion, biocompatibility and antibacterial attachment. Amongst several surface modification methods are commercialized, till-date and there is no single treatment method, which has been successful in long term. This talk covers new strategies attempted by us such as Laser peening, Plasma treatment and EPD on Ti-6Al-4V and WE43 Mg substrates. The effect of surface changes is correlated with surface energy, wettability, corrosion, cell viability and antibacterial activity.

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