

TRAIN – Key note lecture

Thursday November 2nd, 4:30 pm TWINCORE Seminar room 0020

Development of novel biotolerant alloys for application in personalized medical implants

Dr. habil. Markus Weinmann H.C. Starck Tantalum and Niobium GmbH Senior Scientist Technology Scout; NBD - New Business Development Nb/Ta

Orthopaedic implant materials are exposed to high mechanical loading. Conventional materials based on stainless steel or cobalt-chromium alloys display adequate mechanical strength, but also toxicological concerns due to release of toxic or allergenic elements (particles or ions) resulting in inflammatory reactions in the adjacent tissues. Metal alloys based on titanium, niobium and tantalum represent higher biocompatibility with appropriate mechanical properties for avoiding stress-shielding and consecutive implant loosening. Application of specifically designed spherical Ti/Nb(/Ta) alloy powders in additive manufacturing, i.e. 3D metal printing processes such as selective laser melting (SLM) or electron beam melting (EBM), enable the production of components with a high degree in freedom of design. Accordingly, SLM or EBM of Ti/Nb(/Ta) alloys offer the possibility to fabricate patient-specific orthopaedic implants. The presentation gives an overview on the development of bio-compatible Ti/Nb(/Ta) alloys especially designed for application in 3D metal printing. Furthermore, the additively manufactured 3D structures are mechanically tested and the influence of differently grained alloy powders and bulk parts on the viability and proliferation of human cells (fibroblasts, osteoblasts) are examined.

Host: Dr. Michael Harder, corlife oHG





DSMZ

NIFE **4**