

歯と骨の分子疾患科学の国際教育研究拠点  
ーデント・メドミクスのインテリジェンスハブー

## 第11回GCOE海外研究者招聘講演会

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日時: 平成20年11月26日 15:30~17:30

場所: 難治疾患研究所1階 会議室

演題: 「A major change of understanding bone-titanium  
integration: Aging and functionalization of TiO<sub>2</sub>」

Osteoporotic fractures, degenerative changes in joints, and edentulous jaws are quite common clinical problems. Titanium implants are used as a reconstructive anchor in such disorders, despite the unsolved concerns of medical, societal, and cost issues. Here, we present an ultraviolet (UV) light-treated titanium surface with markedly increased osteoconductive capacity. The light-treated surface offered osteoblast-affinity environment, as demonstrated by enhanced migration, attachment, spread, adhesion, proliferation and differentiation of osteoblasts, as well as increased protein adsorption. New bone formation spread extensively onto the light-treated titanium with virtually no intervention by soft tissue, maximizing the bone-implant contact up to nearly 100%. The light treatment accelerated the establishment of implant biomechanical fixation by fourfolds. These cell-affinity properties strongly correlated with UV-catalytic removal of hydrocarbons from the TiO<sub>2</sub> surfaces. We have therefore developed a novel photofunctionalization of titanium enabling more rapid and complete establishment of bone-titanium integration. Additionally, we will discuss about another discovery of time-related biological deterioration of titanium after processing. This “aging-like change” of biological potential of titanium should have an immediate attention in research, commercial and therapeutic perspectives in the field