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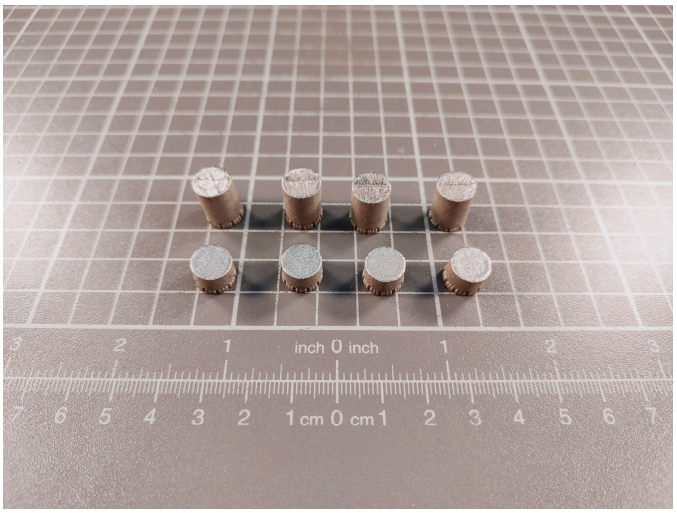
Surface modifications of three-dimensional titanium material used for implants in medicine



Additive manufacturing is a way for rapid prototyping of tailored people's musculoskeletal system replacement. The aim of the project is development and characterization of the advanced 3D printed Titanium alloy implants to significantly improve osseointegration and eliminate bacterial proliferation and biofilm production. The project is unique in modification of the 3D printed material surface and in application of selected coatings in nano-layers with use of combination of these elements Ti, Si, Zr, Ag. We have developed the technology that provides promising parameters from the point of view of material science and should be evaluated in *in vitro* and *in vivo* tests.

Application

- Development of surface treatment of the advanced 3D printed Titanium alloy for implants in medicine and its modification.

Needs

- Business partners
- Mediating communication with industrial partners

IP Status

- IP protection – utility model, related know how will be kept secret and provided based on confidentiality agreement.

Market Assessment

- Customers of the technology are potentially companies engaged in production of implants. End users are patients with implant made of metallic alloys.
- Example of hip replacement – 20,000 implanted annually in the Czech Republic, with an expected increase to 35,000 in future per population of 10.5 million with applicability also in EU.
- Certification will be on the side of the partner company.

Competitive Advantage

- The project is unique in modification of the 3D printed material surface with postprocessing methods (laser micromachining, PVD coatings) and in application of selected TiN coatings in nano-layers with use of combination of these elements Ti, Si, Zr, Ag – in comparison to certified TiN.
- The selected new type of TiN coating in combination with laser technology might prolong the lifetime of the implant, improve biocompatibility and other properties while maintaining the same or better mechanical features.

Project Leader

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