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Editorial: Functional Surfaces and Interfaces

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Editorial on the Research Topic

Functional Surfaces and Interfaces

Research dedicated to the most adequate biocompatible material for insertion in biological internal environment has led to the development of many alloys, starting with stainless steels or Mg based alloy (Froes and Qian, 2018). The implant biocompatibility is directly related with its corrosion resistance in the surrounding environment and to measure of how safe and compatible is with a biological system. Titanium and its alloys and the austenitic stainless steels such as 316 L have in general a good corrosion resistance, being widely used for implants. Nevertheless, in strong mechanical stressed or non-oxygenated environments, all alloys are susceptible to corrosion. Moreover, all metallic materials have limitless bioactivity abilities which are related to low osseointegration capabilities and at the end will lead to a rejection of the implant by the human body (Monsees). Material properties improvement by coating with suitable thin films represents a modern approach in material processing technologies, being recommendable to enhance qualities required also for biocompatibility. The recent rapid progress in biomedical requires materials of good mechanical properties and high resistance to wear and corrosion especially under the influence of dynamic loads along with high level of biocompatibility. These requirements can be satisfied by producing surface coatings of specified composition and structure (Vladescu et al., 2016). The clinical advantage of these coatings is due to their biocompatible properties which are dependent upon their composition and structure such as stoichiometry, surface morphology, mechanical strength, corrosion and wear resistance.

There is a wide variety of coating which could be used for biomedical applications such as oxides, carbides, oxynitrides or calcium phosphates (Prosolov et al.; Birlik et al.). Hydroxyapatite has been widely studied as coating for improving the fixation between bone and metallic implants, being the most biocompatible and bioactive coating due to its chemical similarity to the mineral component of human natural bone (Prosolov et al.; Vladescu et al., 2016). Various surface modification techniques are used to obtain biocompatible coatings, such as electrochemical deposition, laser deposition, plasma spraying, sol-gel, magnetron sputtering. By comparing all these methods, plasma spraying is currently the most commercially used method due to its high deposition rates and low cost (Vladescu et al., 2016).

In the other hand tissue engineering aims to bring together biomaterials, cells and signaling molecules within properly designed microenvironments in order to create viable treatment options for the lost or malfunctioning tissues (Monsees). Design and production of scaffolds and cell-laden grafts that can mimic the complex structure and function of native tissues are among the most important elements of tissue engineering strategy (Bayrak and Yilgor Huri). Therefore, tissue engineering and regenerative tissue remain a challenge. The present studies focuses on recent advancements in the development of strategies for interface engineering using different biomaterial surface modification techniques. Anyway, an artificial material, small or not, bulk or coated, after insertion into the

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human body suffers *in vivo* degradation, leading to the damage of integrity which is in detriment to their performance, which accelerate the device failure, electrical shorting, and following surgical removal. The degradation products can also migrate to the surrounding tissue or other functional organs and change their functionality. The main goal is to minimize the negative effect both on the human body and material and to delay or repeal the rejection process.

The article collection on *Functional surfaces and interfaces* topic contains 5 papers accepted based on their scientific quality, originality, technical merit and timeliness of submission. As the Guest Editors, we would like to express our gratitude and appreciation to all of the reviewers for their competent efforts, and to editors and publishers who have supported this Research Topic.

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