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HOW TO PROTECT BIOMATERIALS FROM THE IMMUNE SYSTEM?

Summary

Biocompatibility verification is required prior to implantation of any biomaterial into human body. This involves verification of its cytotoxic and carcinogenic effects, and confirmation of (only) weak activation of the immune system. A substantial number of biomaterials is currently used in medical procedures, however, many of them do not fulfill all biocompatibility requirements. Therefore nowadays materials aimed for medical application are being modified to improve their characteristics, and thus "hide" them more efficiently from the immune system. One of the most common, yet undesirable, responses to biomaterial/implant is inflammation. Because of this, numerous studies focus on immune cells and strategies to modify biomaterials in such ways that they induce only weak or mild, and short-lasting, activation of leukocytes. It has been documented that three approaches in particular are efficient in this regard – surface modification by its covering with biological substances/proteins, modification of surface porosity and addition of nanoparticles. Herein we described types of biomaterials, strategies of their modification and biomaterial impact on leukocytes. In particular, we focus on strategies used to minimize activation of the immune response.

Key words: biocompatibility, biomaterials, bone defects, inflammation, immune response, leukocytes