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New BEST - biomaterials enhanced simulation test

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This work presents the development of new *in vitro* testing method for biomaterials in the closest to hostile conditions. The objective of this BEST - biomaterials enhanced simulation test - is to provide maximal possible yet realistic control and monitoring of chemical, biological, cytological etc. reactions, and leading to decrease of animal testing. Recently no combined *in vitro* solution exists capable of answering the demands and needs of all stakeholders at reasonable costs, speed and safety. New challenges require more consistent and holistic approaches to ensure reliability and safety of the implants including those with ATMP, as well as primary cultures based TE/RM applications.

Here the design of the BEST methodology and test equipment is shown for the case of load-bearing implants such as orthopaedic and dental ones. The demonstration includes based porous coated biomaterials at different conditions showing the preferential potential for bone, cartilage or fibrous tissue formation. The testing is supported by time- and frequency-domains simulation with models *in silico*.

The results show the importance of proper application of relevant testing parameters vs. traditionally used protocols, leading also to reduction of specimens and faster screening of new materials formulations with new method.

Biography

Michael Gasik's scientific interests are mainly in biomaterials for hard tissue replacements (orthopaedic, dental) and CATMP. Multifunctional bioresorbable biomaterials with biofilm inhibition and new alternative testing methods (3R) are of a particular interest. MC member (Finland) in COST MP1005 "From Nano to Macro Biomaterials and applications to stem cells regenerative orthopaedic and dental medicine". Member of the Finnish board of Japanese Society for Promotion of Science. Honorary member of Technet Alliance. Participant in biomaterials activities such as BioTiNet and EFORT. Rapporteur for EU framework programs, ERA-NET and joint undertakings. Reviewer of national research programs in several countries and selected scientific journals.

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