BIOMATERIAL RISK ASSESSMENT AND PERSONALISED BIOMATERIAL TESTING: FROM NANOSCALE TO MACROSCALE

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Abstract

The increasing number of implantable biomedical devices and novel biomaterials creates a double pressure on the current framework on the biomaterial related risk management. The significant variation of the shape, size and mechanical properties of the organs between the patients necessitates the development of personalized solutions which can diminish the level of reaction by the host. However, beyond the anatomical match, the patient's immunological profile and the specific reactions to a given material must also be considered for better clinical outcomes. This is particularly relevant for new biomaterials where unforeseeable side effects due to the unintentional similarities with antigens or unknown biological effects are possible (such as synthetic polypeptides). The determination of patient specific components of the adverse immune reactions enables the development of safer personalized solutions. H2020 PANBioRA project aims to provide the necessary tools for such assessments for decreasing the complications related to the available implantable devices and facilitating the uptake of new biomaterials for clinical use. The multiscale approach in the project assesses biomaterials at antibody level, cell level, miniaturized organ and finally at macro level. This introductory talk will focus on the proposed risk management tools by PANBioRA system and the introduction of the current version and its components.

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Biography

Dr. Nihal Engin VRANA is CEO of SPARTHA Medical and an affiliated researcher in INSERM UMR 1121. He obtained his PhD in 2009 at Dublin City University as a Marie Curie ESR fellow. His major research interests are implants, antimicrobial coatings, tissue engineering, cell encapsulation, immunomodulation, real-time monitoring of implants, biomaterial assessment and cell biomaterials interactions. He has been the scientific coordinator of 2 European Projects (EuroTransBio Bimot and FP7 IMMODGEL) and he currently coordinates H2020 PANBioRA project (11 countries, 17 partners, www.panbiora.eu). He has published 73 articles in peer-reviewed academic journals (over 2200 citations, h index: 26), 8 book chapters and holds 5 European patents. He edited two books for Taylor and Francis on Cell Material Interactions (2015) and Immune response to Biomaterials (2018). His awards include ESB Translational Research award (2011), BPI i-Lab (2019) and Fond'Action Alsace Future Talents Award (2019) for SPARTHA Medical.