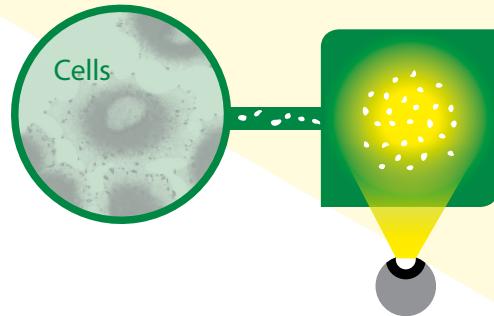


About PANBioRA

PANBioRA will provide a set of tools, composed of protocols and instruments standardising the evaluation of new biomaterials for aspects such as cyto- and genotoxicity. In addition, the project will generate a validated, general methodology to characterise biomaterials.



The biomaterial samples are introduced to confluent cell layers or bacterial colonies (spherical inset, magnified view of cells) via microfluidic connections (square compartment, bioreactor). A mini-microscope (bottom right) is mounted at the bottom of the bioreactor allowing real-time monitoring of cell viability.

PANBioRA's impact

PANBioRA's testing method will lead to a significant improvement in the risk assessment of biomaterials which will decrease the complications following implantation procedures and minimise risks related to the use of both established and new biomaterials.

Its wide application will decrease the rate of complications and ensure better clinical outcomes, leading to considerable savings in healthcare costs.

Moreover, PANBioRA will allow a wider population range to gain access to implant procedures, thus improving their welfare.

Partners



Dolmen Design and Innovation

BIODEVICE SYSTEMS



Biodevice Systems s.r.o.

Protobios LLC



Elvesys microfluidic Innovation center SAS

Steinbeis Advanced Risk Technologies Institute doo Kragujevac

Steinbeis Advanced Risk Technologies GmbH



Commissariat à l'énergie atomique et aux énergies alternatives



Pro-Active



Aalto University Foundation



Turgut Ozal Education SHA - Epoka University



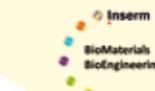
The University of Nottingham



Consejo Superior de Investigaciones Científicas



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For further information and to follow
our project progress please visit
www.panbiora.eu



PANBioRA

Personalised and generalised integrated biomaterial risk assessment



This project has received funding from the European Union's Horizon 2020 research and innovation under grant agreement No 760921

Motivation

PANBioRA – Personalised and/or generalised integrated biomaterial risk assessment, is a four-year “Research and Innovation Action” funded by the European Unions’ Horizon 2020 programme.

Biomaterial-based solutions find various applications in the healthcare system, e.g. in advanced therapy medicinal products or medical devices. However, the currently available methodologies are not sufficient for a proper risk assessment of all biomaterial applications.

The PANBioRA consortium will provide a more intelligent way of selecting the most suitable biomaterial for potential implants. By making personalised, pre-implantation diagnostics possible for the first time.

Objectives

The main objective of PANBioRA is to develop a method that allows the cost- and time effective assessment of

- a new biomaterial under healthy or disease state conditions (generalised testing) or
- a given biomaterial for a specific patient (personalised testing)

To achieve this goal, the PANBioRA consortium aims to develop a modular system using cross-disciplinary techniques that will predict the patient-specific response to a given biomaterial. The testing system will integrate different technologies (refined, miniaturised versions of existing methods and new evaluation technologies) into a single instrument that will be able to perform multiple analyses on cell and micro-tissue levels.

PANBioRA's Approach

The rating system developed within the PANBioRA project allows biomaterial risk assessment at nano-, micro- and milliscale ranges.

A microfluidic system integration combining several real-time monitoring means (electrochemical sensors, antibody-based cytokine detection, mini-microscopes) and data-fitting will provide more and continuous information using less biomaterial and smaller biological samples.

Beyond the different testing modules, the PANBioRA system includes computer simulations and multiscale modelling supporting the experimental system and contributing to the evaluation of risks that are difficult to

be assessed experimentally. Web-based modelling tools will perform the data analysis of the outputs from all modules and simulations.

In a final step, the risk assessment is reinforced by the PANBioRA risk radar, which includes experimental parameters generated by the different modules as well as external risk factors to monitor arising risks. This allows to individually and reliably decide on the implementation of a specific biomaterial.

Following the development and technical validation of the system pre-clinical tests relevant to biomaterial-related risks will be performed in order to prove the systems' efficacy.

Components of the PANBioRA Biomaterial Risk Assessment System

ANTIBODY TESTING

Patient-specific interactions between biomaterials and the immune system will be assessed using the ground-breaking Mimotope Variation Analysis technology.

BIOMATERIAL TESTING

Biochemical responses of cells to the presence of biomaterials will be monitored in real time and by integrated biosensors. In addition, PANBioRA includes cytotoxicity and genotoxicity tests with microscopic real-time monitoring capacities

CELL TESTING

Real-time electrochemical sensing will be used to determine the cellular response to a given biomaterial. A set of cytokines released to the extracellular environment will be used as biomarkers to assess the cell response to different biomaterials.

ORGAN ON A CHIP

Respiratory epithelium, gut and liver tissues will be miniaturized into organoids on chip to allow the determination of possible systemic and target organ-specific effects in both healthy and disease conditions.

