

DBMR Research Conference

Langhans Auditorium
Murtenstrasse 31, 3008 Bern

Date: Monday, April 8, 2024, 5 pm – 6 pm

Title: Addressing Complexity in TERM Cell/Material Interactions using High-Throughput Approaches: Applications on In Vitro Cancer Models

Speaker: Prof. Rui L. Reis, CEng, Msc, PhD, DSc, MD
Research Institute on Biomaterials, Biodegradables and Biomimetics, University of Minho,
Headquarters of the European Institute of Excellence on Tissue Engineering and Regenerative
Medicine

Bio: Rui L. Reis, PhD, DSc, Hon. Causa MD, Hon Causa PhD, FBSE, FTERM, member of NAE, FAIMBE, FEAMBES, is a Full Professor of Tissue Engineering, Regenerative Medicine, Biomaterials and Stem Cells at University of Minho (UMinho), Portugal. He is the Founding Director of the 3B's Research Group and Dean/President of the I3Bs – Institute for Biomaterials, Biodegradables and Biomimetics at UMinho. He is also the CEO of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine and has been the Global President of the Tissue Engineering and Regenerative Medicine International Soc. (TERMIS). He is Associate Editor of PNAS-NEXUS and is in the Editorial Board of several other relevant journals. He co-founded several companies that raised important private investments. His work has been cited more than 98000 times and he is listed in the annual Highly Cited Researchers 2022 and 2023 list from Clarivate. He has been awarded many important international prizes.

Abstract: The selection of a proper material to be used as a scaffold, as a proper matrix, or as a bioink in 3D bioprinting approaches to support or encapsulate cells is both a critical and a difficult choice that will determine the success or failure of any tissue engineering and regenerative medicine (TERM) strategy.

In our research group we have been mainly using natural origin polymers, including a wide range of marine origin materials, for many different approaches that allow for the regeneration of different tissues. Several innovative bioinks with quite specific properties were developed and proposed for several specific uses. We have also been optimizing the respective formulations for using these novel materials in distinct biomanufacturing strategies.

Furthermore, an adequate cell source should be selected. In many cases efficient cell isolation, expansion and differentiation methodologies should be developed and optimized. We have been using different human cell sources namely: mesenchymal stem cells from bone marrow, mesenchymal stem cells from human adipose tissue, human cells from amniotic fluids and membranes and cells obtained from human umbilical cords.

The potential of each biomaterials/cells combination and respective concentrations, as related to different manufacturing technologies, with details when appropriated focusing on bioprinting, to be used to develop novel useful regeneration therapies will be discussed. Several examples of TERM strategies to regenerate different types of tissues will be presented. The use of different cells and new ways to assess their interactions with different natural origin degradable scaffolds and bioinks will be described. A unique high-throughput platform to better understand material/cells interactions and optimise their performance and biological performance will be discussed. This rather innovative platform is based on the use of unique microfluidics-based approaches and allows for the engineering of novel complex in-vitro models, including 3D cancer disease models.

Prof. Rui L. Reis has been invited by Prof. Dr. Benjamin Gantenbein, Tissue Engineering for Orthopedics and Mechano Biology, Bone & Joint Program, Department for BioMedical Research, University of Bern.

The DBMR Research Conference takes place from 5 pm – 6 pm and will be followed by an apéro.

Next DBMR Research Conference

Monday, May 6, 2024, 5 pm – 6 pm

Speaker: Emma Hodcroft, PhD

Title: tba



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The logo of the University of Bern, consisting of a stylized lowercase letter 'u' with a superscript 'b' to its upper right.

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