

# DBMR Research Conference

Langhans Auditorium, Pathology  
Murtenstrasse 31, 3008 Bern

**Date:** Monday, June 5, 2023, 5 pm – 6 pm

**Title:** 4R medicine for diseased joints: Replace, Repair, Regenerate & Reprogram

**Speaker:** Prof. Dr. Jerome Guicheux, the Regenerative Medicine and Skeleton research centre, Inserm & Nantes University Hospital (FR)

**Bio:** Jérôme Guicheux (JG) received his PhD in cell biology and health sciences in 1997 at the Nantes University School of dental medicine. He was a research associate in the internal medicine and rheumatology department of the University Medical Center of Geneva (Switzerland) from 1997 to 2001. In 2001, he relocated to the Nantes University and was recruited as a tenured junior research scientist (CR) by the French national institute for health and medical research (INSERM). After being promoted and appointed INSERM junior Research Director (DR2)/full professor in 2008 and senior Research Director (DR1)/Full professor in 2019; he is currently director of the INSERM research Centre RMES « Regenerative Medicine and Skeleton ».

JG is the national coordinator of the INSERM French network dedicated to peripheral and spine OA (netwOArk). He is also a board member of several renowned associations: the Regenerate-Biospine, the Translational Research Committee of the International Cartilage Regeneration and Joint Preservation Society (ICRS), the research subcommittee for basic and translational research of The European Alliance of Associations for Rheumatology (EULAR), to name a few.

JG has secured more than 120 research contracts, coordinated 10 pluri-annual programs from the French ANR or French Medical Research Foundation (FRM) and served as coordinator and WP/task leader in several European grants from FP7, FP8 and H2020. JG has authored (updated 1st January 2023) more than 220 indexed publications and 10 patents and gave 125 invited lectures. He is a member of the world's top 2% most influential scientists according to the 2022 Stanford University Ranking.

His research focuses on the pathophysiology of osteoarthritis and disc degenerative disease and the regenerative medicine of skeletal tissues including bone, articular cartilage and intervertebral disc. JG has notably contributed to strengthen the relevance of stem cells (mesenchymal stem cells and induced pluripotent stem cells) and biomaterials (polysaccharide-based hydrogels and calcium phosphate-based bone biomaterials) for the regeneration of osteoarticular tissues.

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**Abstract:** The promising field of regenerative medicine aims to restore the function of damaged tissues including those constituting the skeleton. It also intends to conceive biomaterial- and cell-assisted therapeutic solutions for tissues that become ineluctably degraded with inflammatory conditions and aging. Considering the large number of diseases for which clinicians can only manage patients' symptoms using drugs or devices, regenerative medicine has for long been contemplated as a game-changer in medicine. Interestingly, recent advances in biomaterial sciences (biomimicry, hydrogels, 3D bioprinting...), developmental biology (cell fate and tissue modeling), and stem cell biology (reprogramming and differentiation) have paved the way to transformative regenerative strategies.

In this context, we recently propose to develop the concept of 4R medicine to diseased joints. Four "R" medicine refers to Replacement, Repair, Regeneration and Reprogramming.

1-Replacement. It involves using synthetic biomaterials for the prosthetic replacement of damaged joints (hip, knee, intervertebral disc).

2-Repair. It means exploiting the body's natural ability to spontaneously heal. The understanding of the molecular control of tissue formation and remodeling leads to the identification of biological cascades playing key roles in skeletal diseases.

3-Regeneration. It includes delivering regenerative cells (autologous or not) and/or biofactors (i.e. cytokines, growth factors, RNA) combined or not with advanced biomaterials to treat degenerated tissues with poor self-healing ability.

4-Reprogramming. It implies changing the natural fate of cells towards the exploitation of their capacity for tissue repair.

All these aspects of 4R medicine will be discussed with specific examples of recent breakthrough discoveries by our lab and others.

**Prof. Dr. Jerome Guicheux 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

Thursday, August 31, 2023

Hosted by the Stem Cell Research and Regenerative Medicine (SCRM) Platform Bern

Speaker & Title: tba



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