

Nanosensor-based profiling for functional stratification of mesenchymal stromal cells

Prof. Frank SCHILDBERG

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Yeung Kin Man Academic Building



Abstract

Mesenchymal stromal cells (MSCs) represent a promising cell source for bone regeneration; however, pronounced heterogeneity limits their predictable therapeutic performance. Reliable identification and enrichment of osteogenically competent MSC subpopulations remain major challenges. Spherical nucleic acid (SNA) mRNA nanoflare-based fluorescence sensors have emerged as a live-cell-compatible approach to probe intracellular molecular states and may enable functional stratification of MSCs. In this presentation I will present current work evaluating whether SNA sensors targeting osteogenesis-associated markers allow discrimination and enrichment of osteogenically induced MSCs and address MSC heterogeneity in vitro.

Biography

Prof. Frank Schildberg is Professor of Musculoskeletal Immunology and Head of the Research Unit at the Department of Orthopedics and Trauma Surgery at the University Hospital Bonn. He studied molecular biomedicine and after receiving his PhD from the University of Bonn in 2012, he transferred to Harvard Medical School for postdoctoral and junior group leader positions. Since July 2017, he has been Research Director at the Department of Orthopedics and Trauma Surgery at the University Hospital Bonn, before taking up a professorship at the same department in November 2023. The main focus of his research is in the field of osteo- and trauma immunology. The overall goal is to understand the cellular and molecular mechanisms of musculoskeletal immune responses in order to develop novel immunology-centered diagnostic and therapeutic options to better predict and treat musculoskeletal pathologies. Specifically, current studies are investigating immune responses in the context of implants and during bone homeostasis.