DBMR Research Conference

Seminar room EG050
Murtenstrasse 24, 3008 Bern

Date: **Monday, September 7, 2026, 5pm – 6pm**
Title: **Bacterial Outer Membrane Vesicles (OMVs): from biology to exploitation in Vaccinology and Cancer Immunotherapy**
Speaker: **Prof. Guido Grandi, Senior Professor of Microbiology and Clinical Microbiology, University of Trento, Italy**

Bio: Professor Guido Grandi is an internationally renowned microbiologist, molecular biologist, and vaccinologist with over four decades of experience spanning academia, industry, and research leadership. He graduated magna cum laude in Biological Sciences from the University of Rome in 1975 with a thesis on bacterial antibiotic resistance and carried out early research activities in the United Kingdom, Italy, and the United States.
He has held senior leadership roles in major biotechnology and vaccine organizations, including Head of the Biotechnology Centers of ENIRICERCHE (ENI), Director of the Biochemistry and Molecular Biology Department at Chiron Vaccines in Siena, and Senior Project Leader and Board Member at Novartis Vaccines and Diagnostics following the acquisition of Chiron. He also served as Director of the Life Sciences Department of the Italian National Research Council (CNR).
Since 2015, Professor Grandi has been Full Professor of Microbiology and Clinical Microbiology at the University of Trento. He is a member of the European Molecular Biology Organization (EMBO) and serves on several international scientific advisory boards, as well as reviewer and advisor for major research funding agencies worldwide. He is the recipient of two ERC Advanced Grants (2014-2019, 2019-2024) dedicated to Synthetic Biology approaches for next-generation vaccine platforms against infectious diseases and cancer.
His scientific output includes over 500 granted international patents, more than 200 peer-reviewed publications, and numerous book chapters and edited volumes. His research interests focus on structural vaccinology, microbial pathogenesis, bacterial surface protein interactions, and cancer biomarker discovery.

Abstract: Bacterial Outer Membrane Vesicles (OMVs) are spherical particles, ranging from 30 to 300 nm in diameter, released by all Gram-negative bacteria through budding of the outer membrane. In their natural context, OMVs perform a variety of important biological functions. More recently, they have attracted considerable attention as a promising platform for vaccine development due to several advantageous features:
(i) OMVs are potent natural adjuvants that promote strong Th1-skewed immune responses; (ii) through genetic engineering of the producing strains, OMVs can be decorated with heterologous antigens, enabling the simultaneous delivery of antigen and adjuvant in a single, ready-to-use vaccine formulation; and (iii) OMVs can be efficiently purified from bacterial culture supernatants.
Despite these advantages, optimal exploitation of OMVs requires specific technological improvements. The first part of this presentation will describe a novel OMV platform designed to overcome key limitations of existing approaches. This platform is based on non-pathogenic Escherichia coli strains engineered using synthetic biology strategies to produce high yields of OMVs with a minimized endogenous protein content ("proteome-minimized" OMVs). Furthermore, targeted modifications in lipopolysaccharide (LPS) biosynthesis pathway result in vesicles with reduced reactogenicity while retaining strong adjuvant properties. The platform also incorporates innovative approaches to ensure efficient expression and incorporation of heterologous antigens.

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The second part of the presentation will focus on the application of this OMV platform in vaccinology and cancer immunotherapy. Its potential in vaccine development will be illustrated through selected examples of candidate vaccines targeting bacterial and viral pathogens, currently advancing toward development. Finally, evidence will be presented demonstrating how the intrinsic adjuvant properties of OMVs can be leveraged in cancer immunotherapy.

Prof. Guido Grandi has been invited by the Platform for Stem Cell Research and Regenerative Medicine (SCRM).

Next DBMR Research Conference: Monday, October 12, 2026, 5pm-6pm

Speaker: Recipient of the Johanna Dürmüller-Bol DBMR Research Award 2025
Dr. Benedetta Coppe, Max Planck Institute of Immunobiology and Epigenetics (MPI-IE), Iovino Lab, Freiburg, Germany

Title: Heart to gonad axis: uncovering how cardiac injury alters male fertility and gametic information