DBMR Research Conference

Seminar room EG050
Murtenstrasse 24, 3008 Bern

Date: **Monday, June 1, 2026, 5pm – 6pm**

Title: **How eosinophils regulate inflammation and bone homeostasis via eosinophil peroxidase in rheumatoid arthritis**

Speaker: **Aline Bozec, PhD, Professor for Experimental Immunotherapy, Department of Medicine 3 – Rheumatology and Immunology, University Hospital Erlangen and Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany**

Bio: Dr. Bozec has a research background in the fields of immunotherapy and osteoimmunology, making a significant contribution to the understanding of immune system interactions with bone biology.
She was awarded her PhD in Biochemistry from Claude Bernard University Lyon I, France. She furthered her expertise through postdoctoral research at renowned institutions, including the Forschungsinstitut für Molekulare Pathologie in Vienna and the Spanish National Cancer Research Centre (CNIO) in Madrid.
In 2012, Dr. Bozec was appointed as a Junior Professor and leader of the Emmy Noether Nachwuchsgruppe at FAU, where she spearheaded pioneering research in osteoimmunology under the guidance of Prof. Dr. Georg Schett.
Dr. Bozec has authored over 85 peer-reviewed publications that examine the nexus of immunology and bone metabolism, with a particular emphasis on inflammatory bone loss, rheumatoid arthritis, and the role of diverse immune cells in bone homeostasis. Her research has been supported by substantial third-party funding, including grants from the European Research Council (ERC) and the Deutsche Forschungsgemeinschaft (DFG).
In addition to her research activities, Dr. Bozec is an active member of several professional societies, including the European Calcified Tissue Society (ECTS) and the American Society for Bone and Mineral Research (ASBMR). Additionally, she contributes to the academic community through teaching and mentoring at FAU, where she has participated in a variety of courses and seminars on immunology, chronic inflammation, and autoimmune diseases.
As a leader in experimental immunotherapy, Dr. Bozec continues to advance the field through her innovative research, with the goal of translating scientific discoveries into therapeutic strategies for treating autoimmune diseases and bone-related disorders.

Abstract: Eosinophils (Eos), which have traditionally been linked to helminth infections and allergic diseases, are increasingly recognized for their regulatory roles in tissue homeostasis and immune modulation. Recent evidence suggests that Eos may also contribute to the resolution of chronic inflammatory diseases, including rheumatoid arthritis (RA), particularly in the context of bone integrity and joint remodeling.
The regulatory potential of eosinophils in inflammatory arthritis was investigated by combining data from murine models and human samples. In a model of asthma-induced eosinophilia, a remarkable resolution of joint inflammation and protection from bone erosion was observed. This phenomenon prompted a more thorough investigation into the role of Eos in RA. A histological analysis of synovial biopsies from patients in remission revealed an increased presence of eosinophils compared to those with active disease, and this correlated with reduced systemic bone loss.

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In vitro assays have demonstrated the efficacy of Eos in inhibiting osteoclast differentiation and activity, in osteoclastogenic conditions with M-CSF and RANKL. The observed effects were, at least in part, attributable to the eosinophil secretome, which has been shown to encompass various peroxidase enzymes, including eosinophil peroxidase (EPX).
It was next hypothesized that EPX may serve as an unexplored regulator of macrophage function in RA. To assess this hypothesis, we conducted a study to examine the effect of EPX on the polarization of macrophages. The EPX exposed macrophages resulted in a distinct transcriptomic profile, indicative of alternative (M2-like) macrophage activation. This activation has been previously associated with the resolution of inflammation. Macrophages treated with EPX demonstrated heightened glycolytic and oxidative phosphorylation activity, elevated anti-inflammatory cytokine secretion, and substantial enhancement of efferocytosis capacity. These observations support the hypothesis that tissue repair and clearance of apoptotic neutrophils are facilitated by these mechanisms.
Collectively, these findings identify eosinophils as critical players in the regulation of bone resorption and immune resolution in RA. They can modulate osteoclastogenesis, and macrophage function, which offer novel therapeutic strategies through exploiting eosinophil biology to promote resolution in chronic inflammatory arthritis.

Hosts:
Prof. Dr. Benjamin Gantenbein, Tissue Engineering for Orthopedics and Mechano Biology, Bone & Joint Program, Department for BioMedical Research and Department for Orthopedics and Traumatology, Insel University Hospital, University of Bern
Prof. Dr. Nikola Saulacic, Cranio-Maxillofacial Research, Bone & Joint Program, Department for BioMedical Research and Department for Cranio-Maxillofacial Surgery, Insel University Hospital, University of Bern

Next DBMR Research Conference: Monday, September 7, 2026, 5pm-6pm