PhD Positions in the RU 5775 MagNet

PhD Student Positions (m/f/d) (65% E13 TV-L)

We are excited to announce PhD student positions within the newly funded DFG Research Unit *MagNet (Macrophage Niche Network Dynamics)*

The Research Unit MagNet aims to define macrophages as choreographers of tissue development, function, and integrity across different organs. This multidisciplinary consortium explores macrophage biology in health and disease using cutting-edge techniques such as spatial proteomics, 3D imaging, single-cell transcriptomics, and advanced mouse models.

About the Research Unit
MagNet encompasses seven tightly interconnected projects and one central project involving research groups from the University of Bonn, University of Erlangen-Nürnberg, and University Medical Center Hamburg-Eppendorf. The research themes cover macrophage-dependent mechanisms of tissue development, function, regeneration, and responses to environmental and developmental triggers. See also www.macrophagenetwork.com

Project Summaries

P1: Role of Macrophage-Derived ApoE in the Stem Cell-ness and Differentiation of Hematopoietic Stem Cells (Elvira Mass, Bonn)

This project investigates how macrophage-derived ApoE influences the maintenance and differentiation of hematopoietic stem cells (HSCs) in the fetal liver and bone marrow. The goal is to understand the paracrine signaling mechanisms that regulate HSC function during development.
Methods/Models: Work mainly in mice and ex vivo cell cultures, fate-mapping models, knockout mouse models, high-dimensional flow cytometry, 2D and 3D microscopy, differentiation and proliferation assays, metabolomics, transcriptomics

P2: Deciphering the Interrelation Between Kupffer Cells and Hepatocyte Polyploidization (2 positions: Eva Kiermaier, Erlangen and Elvira Mass, Bonn)

This project explores how liver-resident macrophages (Kupffer cells) regulate the polyploidization of hepatocytes during early postnatal development, contributing to liver metabolism and function.
Methods/Models: Work mainly in mice (Mass lab) and ex vivo cell cultures (Kiermaier lab), co-culture experiments, conditional knockout mice, 2D and light-sheet microscopy, proliferation assays, metabolomics, transcriptomics.

P3: Role of the Materno-Fetal IgG Bone Marrow Macrophage Axis for Early B Cell Development (Falk Nimmerjahn, Erlangen)

This project studies how maternal and endogenous IgG influence the development of bone marrow macrophages and early B cell maturation, impacting humoral tolerance and immune system function in newborns.
Methods/Models: Work mainly in mice and ex vivo cell cultures, fate-mapping models, knockout mouse models, high-dimensional flow cytometry, 2D and 3D microscopy, ex vivo and in vivo differentiation assays, single-cell sequencing.

P4: Role of Macrophage-Derived Apolipoprotein E in the Regulation of Small Intestinal Macrophage Longevity and Function (Andreas Schlitzer, Bonn)

This project investigates how macrophage-derived ApoE maintains small intestinal homeostasis by influencing macrophage longevity, enteric nervous system health, and epithelial barrier integrity.
Methods/Models: Work mainly in mice and ex vivo cell cultures, fate-mapping models, knockout mouse models, high-dimensional flow cytometry, 2D and 3D microscopy, spatial proteomics (CODEX)

P5: Understanding the Role of Macrophage-Fibroblast Networks in Extracellular Matrix Turnover and Recycling (Stefan Uderhardt, Erlangen)

This project focuses on the cooperative interactions between macrophages and fibroblasts in regulating the turnover of extracellular matrix components, particularly hyaluronic acid, to maintain tissue homeostasis and prevent degenerative diseases.
Methods/Models: Work in mice, ex vivo and in vitro cell cultures, knockout mouse models, high-dimensional 2D and 3D tissue microscopy, transcriptomics; 2D and 3D co-culture systems; AI-driven image reconstruction and quantification

P6: Unravelling the Role of IL-23 Secretion by Efferocytic Macrophages in Maintaining and Reestablishing Intestinal Homeostasis (Lidia Bosurgi, Hamburg)

This project investigates how IL-23 is secreted by phagocytic macrophages in the intestine. We aim to determine whether efferocytosis-driven IL-23 impacts intestinal regeneration and regulates the balance between tissue repair and fibrosis in inflammatory bowel disease.
Methods/Models: Work in mice, ex vivo and in vitro cell cultures, knockout mouse models, 2D and 3D microscopy, transcriptomics, 2D and 3D co-culture systems

P7: DNA Damage in Macrophages Controls Reciprocal Interactions with Host Tissue Cells (2 positions: Katrin Kierdorf, Freiburg, and Katrin Paeschke, Bonn)

This project explores the molecular mechanism of DNA damage in macrophages and their effects on signaling functions and interactions with metabolically active tissues like the liver and fat body, particularly under oxidative stress conditions.
Methods/Models: Work in Drosophila (Kierdorf lab), ex vivo and in vitro cell cultures (Paeschke lab), molecular cell biology techniques, 2D and 3D microscopy, transcriptomics, 2D and 3D co-culture systems

Z1: Data Management, Analysis, and Integration (Jan Hasenauer, Bonn)
This central project supports the entire research unit by providing data management infrastructure, bioinformatics analysis, and mathematical modeling to integrate findings across the different projects, facilitating the identification of conserved macrophage functions.

What We Offer:

- Enrollment in structured graduate programs
- Cutting-edge research training in macrophage biology, immunology, cell biology, and systems biology
- Collaborative and interdisciplinary environment with annual retreats, summer schools, international symposiums, and lab exchange opportunities
- Mentoring through Thesis Advisory Committees for scientific and professional development
- Salary: According to the German salary scale TV-L (EG 13, 65%)

- Benefits: Public sector supplementary benefits (VBL pension), public transport ticket, and potential for daycare support.
- Support for researchers with families

Qualifications:

- Master's degree (or equivalent) in immunology, cell biology, molecular biology, biochemistry, or related fields.
- Strong interest in macrophage biology, cell biology, innate immunity, and tissue development.
- Proficiency in English (spoken and written).
- Motivated, team-oriented, and enthusiastic about collaborative research.

How to Apply:

Please submit your application in a **single PDF file** (max. 5 MB) including:

1. Motivation letter
2. CV
3. Scanned academic degrees
4. List of publications (if applicable)
5. Contact details of two references

Indicate up to three preferred projects from the list of participating PIs.

Deadline: January 20th, 2025
Interviews: February 18th (1-5 pm) or 20th (8am-12pm), 2025
Start Date: April-October 1st, 2025 (or upon request)

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