

PhD Positions – Periodontal Remodelling and Systemic Diseases

Collaborative Research Centre (CRC/SFB 1739)

University Hospital RWTH Aachen, RWTH Aachen University

Welcome to RWTH Aachen University and University Hospital RWTH Aachen!

Are you interested in understanding how systemic diseases influence tissue regeneration and degeneration? Do you want to work at the interface of dentistry, medicine, biology, engineering, and translational research?

Join the newly funded Collaborative Research Centre (CRC/SFB 1739): “Soft tissue–alveolar bone crosstalk – Impact of systemic diseases on mechanisms of periodontal remodelling”, funded by the German Research Foundation (DFG).

We are recruiting highly motivated doctoral researchers to investigate how chronic diseases such as chronic kidney disease, cardiovascular disease, liver disease, hematological malignancies, and skeletal disorders affect the biological mechanisms that maintain periodontal health and tissue regeneration.

About CRC/SFB 1739

Periodontal remodelling is essential for maintaining oral health, preserving tooth support, enabling orthodontic treatment, and preventing tissue degeneration. However, increasing evidence demonstrates that systemic diseases profoundly influence periodontal homeostasis and regenerative capacity.

CRC/SFB 1739 brings together researchers from dentistry, medicine, life sciences, engineering, imaging, computational biology, and molecular medicine to establish a new interdisciplinary framework for understanding periodontal-systemic crosstalk and developing innovative diagnostic and therapeutic strategies.

The consortium includes more than 30 principal investigators and combines expertise from clinical dentistry, internal medicine, cardiovascular research, nephrology, oncology, imaging, stem cell biology, biomaterials, microbiology, systems biology and molecular medicine.

Doctoral researchers will contribute to projects addressing:

- Mechanisms of periodontal remodelling in health and disease
- Chronic kidney disease and periodontal crosstalk

- Cardiovascular disease and heart failure
- Liver disease and metabolic dysfunction
- Hematological malignancies
- Inflammation and immune regulation
- Stem cell biology and tissue regeneration
- Oral microbiome and biofilm research
- Advanced imaging technologies
- Omics technologies, proteomics, metabolomics and mass spectrometry
- Biomaterials and tissue engineering
- Experimental disease models
- Translational and clinical research

Depending on the selected project, PhD candidates will work with patient cohorts, experimental models, advanced imaging technologies, molecular biology, mass spectrometry, bioinformatics, biomaterials, or computational approaches.

Doctoral project

Promotor: Dr. Heidi Noels, Institute for Molecular Cardiovascular Research

https://www.researchgate.net/profile/Heidi-Noels?ev=hdr_xprf

<https://www.linkedin.com/in/heidi-noels-3a0622134/>

External Promotor: Prof. Dr. Ulrike Schulze-Späte, Department of Conservative Dentistry and Periodontology, University Hospital Jena)

Hyperlipidemic metabolic alterations and associated lipid-induced atherosclerosis are clinically linked to periodontal remodelling pathologies. Furthermore, animal models – also from our own data – could already confirm the impact of a lipid-enriched immunomodulatory diet on the development of disturbances in periodontal remodelling, resulting in periodontitis. However, the cellular and molecular mechanisms underlying the crosstalk of hyperlipidemia and associated atherosclerosis with periodontal remodelling and periodontitis are not fully understood.

In this project, we aim to unravel in more detail the role of innate immune activation in the pathophysiological crosstalk of hyperlipidemic metabolic alterations leading to disturbed periodontal remodelling and periodontitis. We will use a combination of patient sample analyses and *in vitro* studies (e.g. culture of primary cells and cell lines, molecular and cellular biology tools, metabolomics, RNAseq). Also, we will study the effect of hyperlipidemic metabolic alterations on periodontal remodeling by using respective established animal models of atherosclerosis and ligation-induced periodontal remodeling. Overall, this doctoral project will provide novel insights into the pathophysiological impact of hyperlipidemia on periodontal remodelling and periodontitis with a main focus on innate immune activation.

What You Bring

We are looking for ambitious and enthusiastic candidates who:

- Hold (or will soon obtain) an MSc degree in Life Sciences, Biomedicine or a related discipline (e.g. Biotechnology, Molecular Medicine, Biology, Biochemistry).
- Are highly motivated and scientifically curious.
- Have a strong interest in translational biomedical research, and the crosstalk of organs and diseases, with specific focus on cardiovascular disease, metabolic disease and periodontal remodeling.
- Experience in cell culture, and cellular-molecular biology tools.
- Interest in contributing to and learning the study of animal models of atherosclerosis (potential experience in animal handling and a FELASA certificate is of benefit).
- Enjoy working in interdisciplinary teams.
- Possess excellent communication skills.
- Have good written and spoken English skills.

What We Offer

As a doctoral researcher within CRC/SFB 1739, you will benefit from:

- A funded PhD position according to the German public service salary scale (TV-L E13 65%).
- Access to state-of-the-art research infrastructure.
- Participation in a newly established DFG-funded Collaborative Research Centre.
- Interdisciplinary supervision by leading experts in dentistry, medicine and life sciences.
- Structured doctoral training through the Integrated Research Training Group. Opportunities for international collaboration and scientific exchange.
- A vibrant and highly collaborative research environment.

Doctoral Degree Opportunities

Doctoral researchers will pursue a Dr. rer. medic. within the Medical Faculty of the RWTH Aachen, subject to the applicable doctoral regulations and admission requirements.

Integrated Research Training Group (IRTG)

All doctoral researchers will become members of the CRC 1739 Integrated Research Training Group (IRTG), which provides:

- Structured doctoral training
- Interdisciplinary supervision
- Scientific and transferable skills workshops
- Career development support

- International networking opportunities
- Research exchanges with collaborating institutions
- Mentoring and individual career planning

The IRTG is designed to foster interactions between dental, medical and basic science disciplines and to train the next generation of researchers in periodontal-systemic disease research.

About RWTH Aachen University

RWTH Aachen University is one of Europe's leading universities for science, engineering and medicine. University Hospital RWTH Aachen provides a highly interdisciplinary research environment and is internationally recognized for excellence in translational biomedical research, systems medicine and organ crosstalk research.

Interested?

For more information, contact **Dr. Heidi Noels** (hnoels@ukaachen.de).

To apply, submit your CV, motivation letter, and reference letter directly by email to Dr. Noels.

Planned starting date: October 2026

Application will be screened continuously from August 2026 on, until the position has been filled. Candidates in the prefinal selection round will have the opportunity to exchange with ongoing PhD students in the research group, if preferred.

application procedures can be found on the CRC/SFB 1739 website:
<https://www.ukaachen.de/kliniken-institute/sfb1739-weichgewebe-knochen-crosstalk/karriere/>