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Excellent Doctoral Training Enters Second Funding Phase: Medical Faculties at Heidelberg University Continue Successful Graduate Program in the field of Immunology

The German Research Foundation (DFG) funds continuation of Research Training Group (RTG) 2727 "Checkpoints of Innate Immunity in Cancer and Tissue Damage", with around €5,8 million.

How do the regulatory mechanisms of the innate immune system function, and how can these "check-points" be harnessed to improve immunotherapeutic strategies? These are the key questions addressed by the Research Training Group (RTG) 2727 "Check-points of Innate Immunity in Cancer and Tissue Damage", which is successfully entering its second funding period under the leadership of Prof. Adelheid Cerwenka, spokesperson of the Medical Faculty Mannheim, and Prof. Martina Muckenthaler, co-spokesperson of the Medical Faculty Heidelberg. Funding of approximately €5,8 million has been awarded for the next four and a half years.

The innate immune system forms the body's first and rapid line of defense against infections and cancer. A key role in this defense is played by so-called immune checkpoints—molecular switches that regulate immune cell activity via inhibitory or activating signaling pathways. "Cells of the innate immune system initiate, coordinate, and support immune responses. However, we still have limited understanding of how the responsiveness of these cells is regulated by checkpoints. As a result, the therapeutic potential of the innate immune system—for example in cancer treatment—has not yet been fully exploited," explains Prof. Adelheid Cerwenka, Managing Director of the Mannheim Institute for Innate Immunoscience (MI3) at the Medical Faculty Mannheim.

Understanding the regulatory mechanisms of immune checkpoints is important not only for cancer research: dysregulation of these molecular switches can cause immune responses to overshoot, potentially damaging the body's own tissues. "Our doctoral researchers will further investigate the function of these checkpoints, including their role in pathological inflammatory responses, such as in multiple sclerosis, or as adverse effects of immunotherapies, for example affecting the heart. This research will contribute to a better understanding of these conditions," says Martina Muckenthaler, Professor of "Molecular Medicine in Pediatric Oncology" at Heidelberg Faculty of Medicine.

During the first funding period, researchers investigated the function of innate immune checkpoints at multiple cellular levels, with a particular focus on Natural Killer (NK) cells and Macrophages. They identified key mechanisms such as cell–cell communication, metabolic regulation, and gene regulation. Their findings were published in leading peer-reviewed scientific journals.

Building on these achievements doctoral researchers in the second funding period will investigate innate immune checkpoints focusing particularly on cellular interactions across healthy, damaged and malignant tissues. "We anticipate that our insights into the regulation of immune cell activity will ultimately open up new therapeutic approaches by enabling the targeted inhibition or activation of checkpoints in cancer and inflammation-associated tissue damage," adds Adelheid Cerwenka.

To strengthen the translation of basic research into clinical applications, the Research Training Group supports tandem collaborations between doctoral candidates in medicine and PhD candidates conducting research at Heidelberg University's Faculty of Biosciences. The discipline-specific training offered within the Research Training Group is closely integrated with the outstanding graduate education programs provided by participating institutions. In addition to researchers from the Medical Faculties at Heidelberg University in Mannheim and Heidelberg, and the German Cancer Research Center (DKFZ) in Heidelberg, project teams from the University of Vienna (Austria) and the Karolinska Institutet in Stockholm (Sweden) are involved in GRK 2727. "The close collaboration with the University of Vienna and the Karolinska Institutet provides our doctoral researchers with opportunities to participate in workshops and undertake laboratory visits abroad—broadening their perspectives and strengthening international networks," adds Martina Muckenthaler.

Press release

01-Jun-2026
Source: Universitätsklinikum Heidelberg | UK Mannheim GmbH

Further information

- University Medical Centre Mannheim