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New Collaborative Research Centre at Ulm University Focusing on the factors that influence human aging

After a highly competitive process Ulm University has been awarded its fifth Collaborative Research Centre (CRC). The new CRC 1506 'Aging at Interfaces' addresses one of the most urgent medical challenges of our time: the aging of the human body and the diseases and constraints that are frequently associated with the aging process. The researchers within the CRC will be taking an interdisciplinary approach to studying the cellular and molecular interfaces that influence aging processes in tissues, organs and the entire organism. The new CRC is being supported by the German Research Foundation (DFG) initially through a four-year grant totalling around 11 million euros.

Demographic change is an inexorable part of any society. In many countries the proportion of the population aged 65 years or older continues to grow rapidly. One of the most important tasks for the medical and life sciences is to ensure that people in this age bracket can stay healthy as they age. 'When the human body ages, its tissues and organs suffer changes in structure and a loss of function. At the same time, the regenerative capacity of the body decreases and we observe an increase in age-related health disorders,' explains the CRC's Coordinator, Professor Hartmut Geiger, who is Director of the Institute of Molecular Medicine at Ulm University.

Despite intensive research into typical age-related disorders, such as Alzheimer's or cardiovascular disease, the underlying mechanisms are still insufficiently understood at the molecular and cellular levels. The new CRC aims to fill this gap in the research landscape. Scientists working within the CRC will be focusing on interfaces such as synapses or stem cell niches that mediate the interactions between proteins, cells and tissues. 'The new CRC considers aging to be a strongly interconnected and interdependent process. We believe that malfunctioning molecular interfaces can trigger or influence the aging process in tissues and organs,' explains the CRC's Deputy Coordinator Professor Karin Scharffetter-Kochanek, Medical Director at the Department of Dermatology and Allergic Diseases at Ulm University Medial Centre. A deeper understanding of the mechanisms occurring at such interfacial boundaries is thus crucial for improving the regulation of the aging process and may well pave the way for new therapeutic advances.

How does aging affect the nervous system? Why does the body's regenerative capacity deteriorate over the course of a life? To what extent does aging of the immune system and of connective tissue determine the state of our organs? Answers to these and other questions are being pursued by the researchers in the CRC's three main project areas whose focus is on the interfaces of the nervous system, the immune response and the aging of organs.
The 18 sub-projects within the new CRC cover a broad range of topics, including possible causes of neurodegenerative disorders such as Parkinson's disease, or the aging or rejuvenescence of haematopoietic stem cells, which influence the body's immune system. Other research projects will focus on identifying biomarkers that correlate with chronological and biological age or on studying the remarkable ability of the zebrafish for self-healing. Even at an advanced stage of its lifespan, the zebrafish can regenerate amputated body parts or cardiac muscle cells and may potentially provide important information for anti-aging strategies in humans. Researchers in the Collaborative Research Centre will also be studying sex-specific processes in DNA damage response or in the accelerated aging process that is frequently observed in people who are HIV positive.

The 29 researchers have access to human blood and tissue samples, some of which are from the population-based ActiFE-Ulm cohort of around 1500 persons aged 65 years or older living in the greater Ulm area. The scientists in the CRC will also be using animal models and computer simulations.
Ultimately, the aim is to transfer the fundamental knowledge acquired from the 'Aging at Interfaces' CRC into clinical practice and thus improve health outcomes for senior citizens. 'Our long-term goal is the development of new medicines or interventions that can slow the aging process at the cellular, molecular or epigenetic level, says Professor Hartmut Geiger in summary.

In order to achieve these ambitious objectives, the new Collaborative Research Centre is pooling the knowledge and resources of experts in neurology, dermatology, immunology and epidemiology as well as in a number of different fields of the physical and life sciences. In addition to Ulm University and Ulm University Medical Centre, other institutions involved in the new CRC include the Agaplesion Bethesda Geriatric Clinic in Ulm, the Universities of Tübingen and Aachen and the Weizmann Institute of Science in Israel.

'The field of gerontology and aging research is one of Ulm University's strategic research areas and is of key relevance to today's society. The new Collaborative Research Centre means that Ulm-based researchers will continue to make important contributions to a field that is of crucial importance to our future,' says Professor Michael Weber, President of Ulm University.

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Further information

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- AGAPLESION BETHESDA KLINIK ULM gGmbH
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