



Department of Orthopedic Trauma, Hand, Plastic and Reconstruction Surgery

Research in the Department of Orthopedic Trauma, Hand, Plastic and Reconstruction

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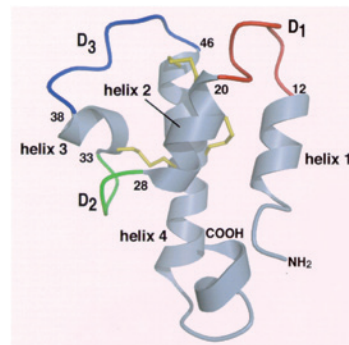
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Surgery mainly focuses on the inflammatory response after severe tissue injury by using various clinically relevant ex vivo and in vivo trauma models. In a retranslational approach from clinical “damage control surgery” of polytrauma patients, our group is especially interested in the “molecular damage control” and management after polytrauma, which is also a main topic of the Center of Musculoskeletal Research (ZMFU) and DFG Research Unit KFO 200, Ulm University.



Sampling of serum from polytrauma patients in the Trauma-Laboratory for analyses of the immune response.



Complement activation product C5a as a main target molecule for immune-modulation after severe tissue injury.

After polytrauma, the human body is exposed to numerous danger- and pathogen-associated molecular patterns (DAMPs/PAMPs). These molecular patterns are detected by the innate immune system and specific danger messages are transmitted to the cellular defense system (“first line of defense”). In parallel, an early activation of various protein kinase cascades occurs, especially of the complement system and coagulation system. The resulting fluid phase and cellular inflammatory reaction is accompanied by a complex neuro-endocrine stress reaction, which all intend to clear the “molecular danger.” In the clinical setting, this inflammatory response is known as systemic inflammatory response syndrome (SIRS), which can end in multi-organ failure and death.

In this context, the project of Berndson Schäfer investigates the early DAMP/PAMP sensing of trauma-released subcellular structures, such as dsDNA, ssRNA, mitochondria, mtDNA, histones and membrane fragments, and their potency to activate the coagulation and complement cascade as an early “master alarm” system to trigger the systemic inflammatory response. Furthermore, using in vivo models of multiple injury, the capacity of complement modulating therapeutic strategies (inhibition of C5a-C5aR interaction) are evaluated for beneficial local and systemic immune effects and their capacity to control the molecular danger response and to improve organ function and clinical outcome.

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Selected Publications:

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