Any insult, whether in form of trauma, bleeding, or microbial infection, triggers a tightly controlled cascade of events that typically serves to protect the patient, yet may lead to life-threatening complications when this fine-tuned mechanism becomes deregulated. To understand and facilitate restoration of such a harmful imbalance, our research covers a variety of topics, namely, intra-cellular reactions, cellular signalling, humoral regulatory systems, circulating mediators, oxygen saturation and bacterial translocation.

Prof. Soheyli Bahrami

Research that saves lives

Ludwig Boltzmann Institut
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Monitoring
Shock
Sepsis
Theragnostics

Ludwig Boltzmann Institut
für experimentelle und klinische Traumatologie
Repressing Inflammation Shock

An inadequate tissue oxygenation caused by micro/macro-perfusion disturbances and bleeding, triggers an inflammatory chain-reaction that may lead to organ dysfunction and other severe complications. The task at hand: to improve current protocols stabilizing the cardiovascular circulation and to develop new and more effective volume-replacement therapies and re-oxygenation strategies - all complemented by targeted immunomodulatory approaches. We strive to achieve the above goals by testing various infusion protocols and compositions of volume-replacement fluids as well as scrutinizing a variety of vasoactive and anti-inflammatory substances.

Therapies that fit Sepsis

Sepsis syndromes have very complex pathophysiological blueprints: they are extremely difficult to diagnose, are too multifaceted to be uniformly classified and they stubbornly resist existing therapeutic approaches. It has been demonstrated that variations in genes and proteins that are responsible for the regulation of immunoinflammatory reactions are tightly correlated with the risk of developing sepsis and the magnitude of its severity. Our aim is to decipher these key regulatory mechanisms and interactions. We specifically focus on characterizing septic biomarkers and their application for prognostication of developing sepsis syndromes and predicting outcomes in septic patients.

Prompt & Precise Monitoring

“The focal point of the research group lies in translating the most promising experimental diagnostic and therapeutic procedures to clinical practice.”

Prof. Soheyl Bahrami

The LBI institute has made significant achievements in the field of bedside monitoring and diagnostic as it has helped to characterize and introduce a number of markers into intensive care practice. The most prominent examples include S100B (s100 calcium-binding protein) for the monitoring of head-brain trauma, D-Lactate for non-invasive diagnosis of intestinal permeability disruption, a combo of IL (interleukin)-6 and LBP (lipopolysaccaride binding protein) for characterization and differentiation of inflammatory reactions and the most recently established application of NT-proCNP (N-Terminal pro-C Type Natriuretic Peptide) in diagnosis and prognosis of septic complications in the ICU.

“Sepsis is not an ordinary disease. Due to its multi-source origin, constantly fluctuating immuno-inflammatory responses and diversity of gender/age-related symptoms or lack thereof, sepsis syndromes should be renamed Chameleon-Syndromes”.

Dr. Marcin Osuchowski

Stopping bleeding Theragnostik

“The best treatment strategy should combine diagnostics with therapeutics. Why? Because accurate diagnostic tests help to precisely identify patients who will benefit most from a given medication. The use of theragnostics in routine clinical practice could eliminate situations in which patients undergo needless or even harmful treatments. Such an approach will also dramatically reduce the soaring costs of intensive care and beyond”

Dr. Herbert Schöchel

We have recently demonstrated that bedside application of modern thromboelastometry enabled a rapid detection of early coagulation disturbances in polytraumatized patients, facilitating the implementation of a highly personalized therapy that meets the individual needs of each of the patients. This theragnostic approach not only markedly reduced the ICU mortality but simultaneously decreased the total volume of blood products used to resuscitate these individuals. Another excellent example of an accurate thromboelastometric testing comes from the field of severe traumatic brain injury: frequent monitoring of clot strength identified trauma patients with a high risk of death - prompting life-saving therapeutic decision-making.