The primary objective of the Center for Trauma Research, led by Prof. Heinz Redl, is to improve diagnostic and therapeutic measures in trauma care - specifically in the areas of intensive care (led by Prof. Soheyl Bahrami) and tissue regeneration.

The Research Center is located within the Lorenz Böhler Trauma Center in Vienna, Austria since 1973. Furthermore, a joint laboratory was established in Linz, Upper Austria, in conjunction with the Red Cross Bloodbank, devoted to human adult stem cell research. The LBI Trauma Institute pioneers translational research in Austria for over 40 years.

Univ. Prof. Heinz Redl

Research that saves lives

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The overall goal is a patient-targeted immuno-modulation, also considering the age and gender related differences to prevent septic complications at least in some trauma patients at the ICU.”

Projects in the area of Intensive Care cover the following topics:

Trauma ● Ischemia ● Reperfusion ● Shock
(Pre-) Clinical ICU ● Trauma ● Sepsis Monitoring
Sepsis ● Severe Sepsis ● Septic Shock
Molecular Mechanisms of Trauma & Sepsis

In attempting to improve the response to therapies we investigate the underlying mechanisms in the development of multiple organ failure. Several biomarkers which specifically indicate physiological and disease processes have been introduced to the clinics. We successfully identified the accuracy of NT-proCNP in predicting septic complications, verified D-lactate for non-invasive diagnosis of intestinal permeability changes, introduced S100B for grading traumatic brain injury and implemented the combined use of IL-6 and LBP for risk stratification in trauma patients. We also established a novel bleeding management via rapid Thromboelastometry, thereby improving haemostasis and survival rate in trauma patients.

We accelerate wound healing by using growth factors or special wound dressings. In addition, we utilize stem cells from various sources as well as physical approaches to promote tissue regeneration.”

Projects in the area of Tissue Regeneration cover the following topics:

Cartilage & Ligament

For the tendon/ligament area, improved repair through degradable biomaterial/autologous stem cell combinations is pursued. Improvements to current clinical autologous chondrocyte transplantations are made and microfractures as well as the differentiation of chondrocytes and the crosstalk of stem cells with cartilage material are studied.

Neuroregeneration

When facing spinal cord injuries, the overall goal is to avoid secondary damage, fill cavities for partial regeneration and to document protein changes. As far as peripheral nerve repair is concerned, both improvements at the lesion site as well as preservation of the accompanying brain areas by improved rehabilitation are the focus of our interest.

Fibrin tissue sealant is used as a matrix to deliver growth factors (protein or gene therapy) or cells with special emphasis on angiogenesis, vascularisation and wound healing. Cellular therapy is based on joint efforts with the Linz based blood bank, using human derived materials and GMP facilities. Further, physical therapeutic approaches like shock wave or light therapy are studied. In addition to skin regeneration, also hernia repair is researched by a dedicated group.

Advanced imaging technologies enable state of the art support of various studies. These strategies include non-invasive tools such as in vivo fluorescence, luminescence, μCT, MRI, Laser-Doppler imaging as well as gait analysis.

Bone regeneration is studied with regard to improved osteosynthesis materials and bone replacement. This is achieved through the application of scaffolds, growth factors and stem cells. Special emphasis is put on degradable and injectable materials. Furthermore the mechanisms of osteogenic differentiation are studied as well as prevascularized and cell seeded tissue scaffolds.