



ZMB Zentrum für Medizinische Biotechnologie

Business Strategies

The establishment of the “Center for Medical Biotechnology” focuses the University activities in the area of Tissue Engineering, cartilage, bone and tumor research. Scientists and clinicians from three different clinical disciplines (Maxillofacial Surgery, Orthopedic Surgery, Trauma Surgery) work together on different aspects of Tissue Engineering with emphasis on regenerative therapy and understanding of pathologies of the musculoskeletal systems.

Core Technologies and Services

- **Orthopedic Surgery:** Distribution and interaction of individual structural components, i.e. collagens, and their impact on stability and organization of the extracellular environment in physiological and pathophysiological situations. Regenerative medicine: chondrogenic and osteogenic differentiation of adult mesenchymal stem cells, osteoclastogenesis, bone and articular cartilage biology and pathophysiology, i.e. fracture healing and callus differentiation. Interaction of the peripheral nervous system with bone and cartilage in OA and RA
- **Trauma Surgery:** In the lab for experimental trauma surgery (head: Prof. Dr. Denitsa Docheva) we study the fundamentals and the complex relationships of diseases of connective tissue. The main focus lies on the regenerative medicine of the cartilage, tendons and menisci. The key element of regenerative medicine is the optimal combination of stem cells with biomaterial, which imitates the natural extracellular matrix of connective tissue. Research on biomaterials and their biological compatibility are important aspects of this principal.
- **Development of biodegradable biomaterial for regeneration of articular cartilage and meniscus,** based on cell-free matrices of collagenous origin. Clinical trials. Investigation of the reciprocal effect between mechanical stimulation and growth of adult stem cells.
- **Oral and Maxillofacial Surgery:** Investigation in the field of tumor biology; with a special interest on cell-cell/cell-matrix interaction and cell cycle control in oral squamous cell carcinoma (OSCC) and the influence of ECM components on invasiveness of tumor cells. Examination of the functional impact of aberrant cellular signaling processes during OSCC tumor progression.