filled with bioactive glass; Group BG/ASC: Defects were filled with bioactive glass seeded with ASCs.

RESULTS: The defect size was significantly greater in Group C compared to all other groups. Bone density was significantly lower in Group C compared to Group G and Group BG/ASC. Bone regeneration score of Group C was significantly lower than other groups. Bony bridging and mature bone formation with havers canals was only observed in Group BG/ASC.

CONCLUSIONS: In the current study bioactive glass, which is a suitable filler for bone defects, was demonstrated to be a biocompatible construct stimulating radiologically and histologically evident bone regeneration similar to autologous bone grafting.

12.20 THE MIF SUPERFAMILY IN ADIPOSE TISSUE INFLAMMATION AND WOUND REPAIR

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INTRODUCTION: Impaired wound repair represents a major health risk and a substantial burden to healthcare systems worldwide. While the factors that may facilitate wound repair may be manifold, subcutaneous adipose tissue plays a central, yet underappreciated role as it is a dynamic organ situated in immediate proximity to the skin and participates in wound repair inter alia by the secretion of soluble factors. The macrophage migration inhibitory factor (MIF) is a pro-inflammatory cytokine that was earlier described in the context of chronic adipose tissue inflammation. D-dopachrome tautomerase (DDT, MIF-2) was only recently added to the MIF protein superfamily and although its exact functions are unknown, DDT is considered a functional homologue of MIF. The purpose of the present study was to investigate the expression of adipose tissue-derived MIF and DDT in wound healing disorders and elucidate their functions on dermal fibroblasts and cell mobilization.

MATERIALS AND METHODS: Subcutaneous adipose tissue samples were collected from wounds that showed delayed healing accompanied by classical signs of local inflammation. Subcutaneous tissue from healthy donor sites served as controls. Protein and mRNA expression were measured and their paracrine effect on the migration and proliferation of human dermal fibroblast was assessed in vitro. Finally, macrophage mobilization was evaluated by an in vivo cell tracking experiment.

RESULTS: Adipose tissue from wound healing disorders showed increased MIF expression whereas DDT was down-regulated. MIF is localized in adipocytes and infiltrated macrophages. DDT, by contrast, is primarily found in macrophages. While adipose tissue-derived MIF inhibited fibroblast proliferation, DDT supported fibroblast proliferation. Both family members recruited macrophages but the effect of MIF was more pronounced.

CONCLUSIONS: MIF and DDT show a hitherto unknown reciprocal role in adipose tissue adjacent to non-healing wounds, which may gain importance in therapeutic strategies (e.g. MIF antibodies / recombinant DDT) in the future.

12.30 IN VIVO TRACKING OF ADIPOSE-DERIVED MESENCHYVAL STROMAL CELLS DURING PHYSIOLOGICAL WOUND REPAIR

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INTRODUCTION: There is increasing interest in the use of adipose-derived mesenchymal stromal cells (ASCs) for wound repair. However, the location of administered ASCs, as well as their migration, engraftment and survival are still poorly defined. Prior to assessing the benefit of ASCs in vivo models of wound healing, an appropriate tracking system needs to be established to follow administered cells. This study aimed to assess the possibility of in vivo tracking of ASCs labelled with green fluorescent protein (GFP) and firefly luciferase (fLUC).

MATERIALS AND METHODS: ASCs were isolated from rat inguinal adipose tissue and transduced with a dual lentivector to express both GFP and fLUC. In vitro, flow cytometry and bioluminescence imaging
(BLI) were performed to detect GFP and fLUC positive cells, respectively. For in vivo tracking, wounds created on the hind paws of rats received either a single injection of ASCs systemically into the tail vein (2x10^6 ASCs) or locally into each wound (105 ASCs). ASC distribution was followed in animals by BLI 3h and 48h post ASC injection.

RESULTS: In vitro experiments demonstrated that ASCs were successfully transduced to express both GFP and fLUC without influencing their phenotype (CD90+, CD29+, CD31- and CD45-). In vivo, 3h post-injection, ASCs were detected in the lungs of animals treated systemically with a decrease in signal seen from 3h to 48h, but no luminescent signal was detected in the wound. However, locally administered ASCs remained strongly detectable after 48h at the wound site.

CONCLUSIONS: Using a physiological wound repair model we show that GFP/fLUC labelling allowed ASC to be tracked in vivo. However, as the majority of ASCs are filtered out in the lungs, further studies using a model of severe wounds (e.g. ischemia and hyperglycemia) should be performed to determine whether ASC homing is affected by strong inflammatory cues.

12.40 IN SITU ADIPOSE TISSUE ENGINEERING WITH OLEIC ACID LOADED BIOSPHERES

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INTRODUCTION: Currently autologous fat transfer is considered as a gold standard procedure for soft tissue augmentation. However, this technique presents some disadvantages: unpredictable results, need for multiple-surgery or need for fat donor site. Therefore, we developed a new injectable that would permit in situ fat augmentation. The concept is that biodegradable microspheres are going to be loaded with oleic acid that will be released over a few months. Once outside of microspheres, oleic acid is internalized by the adipocytes, and the adipose tissue volume will increase locally. In this preliminary study, we evaluated the safety and efficacy of our product in comparison to current soft tissue fillers.

MATERIALS AND METHODS: Synthesis of the poly-lactic glycolic acid (PLGA) microspheres with and without oleic acid loading was carried out by the oil-in-water emulsion. The microspheres were sized between 10 to 50 microns. We injected in the inguinal fat pad of 36 mice, 0.1.ml of loaded microspheres and compared to non-loaded microspheres, hyaluronic acid and industry-available PLGA filler. We compared the efficacy of our product by 3D Ct-scan, assessed inflammatory cytokines and free fatty acids presence in animal sera at different experimental time points (from DAY 0 to DAY 90).

RESULTS: 3D computerized tomography evidenced fat pad volume enhancement after 15 days of injection, remaining stable after one month. Circulatory inflammatory cytokines assessed by the ELISA-Multiplex, demonstrated that microspheres did not increase systemic inflammatory reaction, neither the blood free fatty acids.

CONCLUSIONS: We demonstrated a volume increase of the inguinal fat pad after oleic acid loaded microspheres injection. In our future experiments, we will assess the quality of the soft tissue increased by our product: local inflammation reaction, vasculogenesis, size and number of adipocytes. Furthermore, we will assess the long-term effect to confirm that our product is completely desorbed after 3 months.

12.50 ADIPOSE CELL DERIVED REGENERATIVE THERAPY (ACRT): A NEW APPROACH OF LIPOTRANSFER IN SCAR TREATMENT

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INTRODUCTION: Regenerative properties of autologous lipotransfer are recently described in patients with atrophic and painful scars. In this regard preliminary results of an European multicentre study (Germany, Netherlands) underline the aspect of regeneration and possible reconstruction of the subcutaneous layer using a certain lipotransfer technique (ACRT = adipose cells derived therapy) in symptomatic scars and post-traumatic soft tissue defects.