cells (HUVECs). Following incubation, the tissue architecture was characterized through immunostaining, histology and imaging using confocal microscopy.

RESULTS: Endothelial cells exhibited high viability (>90%) as measured via confocal microscopy using Hoechst 33342 and propidium iodide staining. Following 7 days of incubation, the necessary structural integrity of the endothelial monolayer lining the lumen was achieved. This was proven by the formation of a well-defined network of actin-filaments, stained with Alexa Fluor 488 phalloidin. Additionally, the diffusional permeability of this conduit was evaluated using fluorescent labeled dextran molecules. Future studies are focused on perfusing the lumen with media with a digital-control peristaltic pump.

CONCLUSIONS: We have successfully developed a novel method to generate a vascularized conduit while maintaining precise spatial control over the deposition of different biomaterials. The developed vascular graft has the potential to aid in flap based tissue reconstructions when combined with a tissue-engineered construct.

10.10 BENFOTIAMINE: A PROMISING REGIMEN TO TREAT DIABETIC COMPLICATIONS. ITS EFFECTIVENESS IN THE HEALING PROCEDURE OF DEFECTS IN DIABETIC ANIMAL MODELS

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INTRODUCTION: Diabetic foot ulcers are the most common cause of hospitalization for diabetic patients in the western world; it is estimated that 15% of diabetics will develop a chronic foot ulcer during their lifetime. Diabetic neuropathy, peripheral arterial disease and impairment in microvascular circulation are implicated in the formation of diabetic ulcers. Benfotiamine, a lipid-soluble, synthetic derivative of thiamine, has a well-known role in reducing the effects of hyperglycemia and oxidative stress, and has already been used to manage successfully diabetic complications. The main objective of this experimental study was to investigate the effect of benfotiamine on the healing procedure of defects in diabetic rats.

MATERIALS AND METHODS: Sixteen diabetic Wistar rats were included in the study. Eight animals were treated with benfotiamine orally with a dose of 80 mg/kg/day for 8 weeks (Group A), while another eight diabetic rats were left untreated (Group B). By the end of the eighth week, a skin defect of 1.2 x 1.2 cm was created on the back of all animals in both Groups. On the seventh postoperative day, the defects were clinically and histologically assessed, following surgical excision of the wound area. Macroscopical and histopathological characteristics, i.e. epithelialization, cell type and proliferation, collagen deposition and neovascularization) were recorded and analyzed by two independent pathologists.

RESULTS: The qualitative variables describing the healing process were quantified in a single score. There was found no statistical difference in the two groups of rats as far as the overall score of healing was concerned (p=0.936). Epithelialization, number and type of cells, collagen deposition and neovascularization did not show any statistical significance between the two groups of animals either.

CONCLUSIONS: Benfotiamine has been shown to have beneficial effects in the treatment of diabetic retinopathy, neuropathy and nephropathy. Its effectiveness in wound healing has not been proven in our animal study.

10.20 MULTIPOTENT ADULT PROGENITOR CELLS SUPPORT LYMPHATIC GROWTH IN WOUND HEALING AND LYMPHEDEMA

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INTRODUCTION: Lymphedema is a lifelong condition caused by lymphatic system deficiency. Current treatment strategies focus on symptom alleviation rather than functional restoration of lymphatic system failure. In addition, defective lymphatic growth is an important aspect of
impaired wound healing. Recently, stem/progenitor cell transplantation has emerged as an approach for lymphatic regeneration, however, it remains undetermined whether this is effective on different anatomical levels of the system.

MATERIALS AND METHODS: We used a complement of mouse models to test the potential of mouse and human multipotent adult progenitor cells (MAPCs) for lymphatic growth from the lymphatic capillary to the precollector level.

RESULTS: MAPCs differentiated into lymphatic endothelial cells (LECs) and trophically supported LEC proliferation, migration and sprouting in vitro. In vivo, in addition to supporting blood vessel growth, MAPC transplantation significantly induced lymphatic capillary regrowth in wounds and functionally restored lymph drainage across skin flaps by stimulating capillary and precollector vessel growth mostly through paracrine effects.

CONCLUSIONS: MAPC transplantation represents a powerful remedy for lymphatic growth at different anatomical levels and hence an appealing approach to treat wounds and lymphedema.

10.30 INTRATISSULAR EXPANSION AND LAYERED FAT GRAFTING IN AUTOLOGOUS BREAST RECONSTRUCTION

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INTRODUCTION: Breast reconstruction involves the use of autologous tissue or implants. However, fat grafting seems the ideal technique because of its minimally invasive character but the challenge is to reconstruct a 3D, homeostatic tissue construct using a liquefied tissue (liposapirate) as building blocks.

MATERIALS AND METHODS: Total breast reconstruction (n=7) was performed with intratissular expansion and serial lipofilling sessions. Mean age of the patients was 41 years old (22–53). A prepectoral positioned expander created skin expansion and induced the formation of a peri-prosthetic capsule with boundary conditions between the outer skin envelope and the well-vascularized capsule. The vascular plexus in the outer layer of the capsule functioned as a vascular source. Serial deflation and fat grafting sessions were initiated at 8 weeks with an interval of three months until the desired volume was obtained. The expander was removed during the last session. The fat grafting procedure consisted of manual liposuction and processing following the Coleman protocol. An average of 644cc (range 415 _ 950cc) of liposapirate material was injected to reconstruct the breast with an average of 4 (range 3–5) fat grafting sessions. Average follow-up was 14 months (range 9–29 months).

RESULTS: All patients completed the treatment successfully with a pleasing, stable, prepectoral breast reconstruction. Magnetic resonance imaging examination showed a mean breast volume of 378cc (range 218 _ 557cc) and retained no tissue necrosis. One infection occurred which necessitated temporary removal of the expander. There were no adverse effects related to the lipofilling procedures.

CONCLUSIONS: In a selected group of patients we have been able to reconstruct an aesthetically pleasant and stable breast mound with intratissular expansion and fat grafting with rather predictable results. Further refinements include the incorporation of a nutritional matrix to enhance the survival rate of fat grafts and reduce the number of fat graft sessions.

10.40 PARACRINE FACTORS FROM HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS IMPROVE WOUND HEALING, SCAR QUALITY, AND ANGIOGENESIS IN A PORCINE BURN MODEL

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INTRODUCTION: Burn injuries are a serious threat to patients and often require surgical treatment. Split-thickness skin grafting aims to achieve rapid wound closure but requires a well-vascularized wound bed. The cell-free secretome