



IFATS

International Federation for Adipose Therapeutics and Science

Laboratory Listing

Laboratory Name: Institute for Plastic Surgery - SIU School of Medicine

Contact Name: Michael Neumeister, MD, FRCSC, FACS

Address: 801 N. Rutledge, Springfield, IL 62794

Telephone: 1-217-545-7018

E-mail: mneumeister@siumed.edu

Lab Facilities Description (250 words):

The Institute for Plastic Surgery has approximately 2400 square feet of laboratory space in the 801 building of SIU School of Medicine.

1200 square feet are dedicated to rodent microsurgery with 4 operating microsurgery microscopes (Leica Wild 650, Leica M295, Zeiss F125, and Leica Wild M680 equipped with a Sony PDW-10MD video camera with one 31 inch monitor and one 46 inch monitor).

800 square feet of lab space are dedicated to molecular biology and other bench assays. Equipment includes a Biorad C1000 Thermocycler, Fisher Scientific Isotemp hybridization oven, and Baker Sterile Gard BCL2 cell culture hood.

The remaining 382 square feet are dedicated to tissue engineering and cell culture. Equipment includes a BSLII biosafety hood, four CO2 controlled Forma Series II incubators, an Olympus CK40 inverted light microscope and an Olympus IX 51 inverted fluorescent microscope with Infinity Lite camera attachment.

The Core facility at SIU has a Becton-Dickinson FACSAria II high-speed cell sorter, ABI 1 Step Plus Real Time PCR machines, Bioluminescence Imager, Leica LSCM confocal microscope, fluorescent microscopes, Faxitron X-ray machine, Syngene G:Box iChemi XT chemiluminescence imaging system, Hitachi S-3000 scanning electron microscope, and Hitachi H-7000 transmission electron microscope.

Animal Facilities (Yes/No): Yes

Type(s) of Animal(s): Mice, Rats, Hamsters, Gerbils, Guinea Pigs, Chinchillas, Frogs, Rabbits, Cats, Dogs, Chickens, Sheep, and Pigs

Type of Research: Tissue Engineering, Composite Tissue Allograft, Nerve Studies, Stem Cells, LGR5 and LGR6, ADSC

Funding: Our Lab is currently funded by Memorial Medical Center, Plastic Surgery Foundation, and American Foundation for Surgery of the Hand, American Society for Surgery of the Hand, and Department of Surgery at SIU.

Research Fellowship Available: (Yes/No): Restricted to funded researchers

Primary Investigator's Name: Michael Neumeister, MD, FRCSC, FACS

Project Title:

Basic Science Projects:

1. ADSC Transplantation Potentiates Tissue Reorganization and Repair

Interest in adipose-derived mesenchymal stem cells (ADSC) in promoting tissue regeneration is currently under investigation. However, its effect on skin regeneration during tissue expansion in the setting of a radiated field has yet to be determined. We hypothesize that ADSC transplantation will decrease tissue damage and enhance the efficiency of tissue expansion in animals treated with radiotherapy.

2. The Development of a Plastic and Reconstructive Surgical Research Division and Center for Tissue Engineering at Memorial Medical Center

This funding will be used to establish a joint SIU/MMC Surgical Research Core where discarded human skin and/or tissue after burn wound debridement can be harvested, tissue banked, clinically catalogued, cultured and assembled into hybrid autografts. These unique hybrid autografts will, for the first time, utilize the patient's own isolated autologous progenitor cells in combination with an acellular patient-derived matrix system from the wound bed itself. This engineered hybrid autograft will provide patients with a self-assembled skin substitute that provides both a rapid tissue barrier as well as immunomodulatory function.

3. Adipose-Derived Mesenchymal Stem Cell Transplantation Decreases Capsule Formation during Tissue Expansion with Radiotherapy

We hypothesize that ADSC transplantation can promote tissue expansion and decrease capsule formation around tissue expander after radiotherapy. The therapeutic mechanism may be due to the reduction in collagen deposition and the accumulation of myoblasts.

To test this hypothesis, we will set up a model with radiation given during tissue expansion. ADSC transplantation will be given to the experimental group and its effect on expansion and capsule formation with irradiated skin will be evaluated. The therapeutic mechanism of ADSC transplantation will also be explored.

4. The TRAIL Flap: Bridging the Gap Between Breast Cancer Treatment and Reconstruction via a Gene Therapy Flap

In this study, we propose a method for combining localized TRAIL gene therapy with a traditional flap technique commonly used in breast reconstructive surgery. A gene-

modified TRAIL flap will be fabricated by intravascular infusion of TRAIL expressing adenovirus (Ad/g-TRAIL) into the flap after isolating it from the body to limit systemic transfection. The therapeutic efficacy of this gene-modified flap will then be tested in a nude rat xenograft cancer model.

5. The anti-neoplastic effect of aminosterol squalamine on melanoma

Squalamine, a recently discovered aminosterol, has been shown to be effective as both an antibiotic and anti-viral as well as maintaining antineoplastic properties. This intrinsic antineoplastic effect of squalamine has been studied in the literature for its clinical capacity to reduce small cell lung cancer progression. Here, we suggest an additional role of squalamine in inducing the destruction of malignant melanoma via induction of apoptosis and/or necrosis of melanoma cells through angiogenic inhibition. It is with these funds, we offer a potential novel therapy using squalamine as an injectant adjuvant for the treatment of cutaneous melanoma.

Clinical Projects:

1. A Two-Part Study of BOTOX® Therapy for Ischemic Digits

This is a 2-part pilot study examining the short- and long-term efficacy of botulinum toxin type-A [Btx-A (BOTOX®, Allergan, Inc.)] in relieving pain due to Raynaud's disease/phenomenon. Primary objective is to examine the short-term effectiveness of Btx-A injection compared to placebo in treating pain associated with digit ischemia due to Raynaud's disease/phenomenon. Secondary objective is to describe the long-term efficacy of Btx-A injection in treating pain associated with digit ischemia due to Raynaud's disease by measuring patient satisfaction and quality-of-life changes over time.

Funded by Memorial Medical Center Foundation and American Society for Surgery of the Hand

2. Vascularized Composite Allotransplantation of the Hand and Upper Extremity

The primary focus of the study will be to establish a hand transplantation program which will offer this vascularized composite allotransplantation to 5 patients over 3-5 years utilizing a steroid-sparing immunosuppression regimen, to closely follow outcomes for 2 years post transplant, and to utilize new methods immune system and functional recovery monitoring via laboratory testing, histology, and medical imaging.

Funded by Memorial Medical Center Foundation

3. A Prospective, Randomized Trial of Antiviral Prophylaxis in a Population of Burn Patients

This study is a prospective, randomized, controlled clinical trial of antiviral prophylaxis for Herpes Simplex Virus in burn patients. The primary outcome of the study will be to determine if antiviral prophylaxis reduces the incidence of Herpes Simplex Virus infection and/or reactivation in the burn population. We will also evaluate if viral HSV outbreak prolongs hospital stay or time to healing. Patients will be randomized into a treatment and control group. The treatment group will be treated with prophylactic Acyclovir for two weeks. All patients will be monitored for serologic and clinical evidence of HSV infection during their hospitalization.

Funded by SIU School of Medicine

4. **Simple Nailbed Lacerations - Are Functional and Cosmetic Outcomes of Surgical Repair Equivalent to Observation Alone?**

The study objective is to demonstrate that conservative management (i.e. observation with dressing care) is not inferior to traditional nailbed laceration repair with respect to functional and cosmetic outcomes in patients with simple nailbed lacerations, not involving the germinal matrix, with or without non-displaced distal phalangeal tuft fractures. Two groups will be included in the study: those treated conservatively versus those treated with standard sutured surgical repair. The hypothesis is that observation alone, after initial irrigation and trephination (if required), will provide comparable functional and cosmetic outcomes to traditional sutured nailbed laceration repair. Funded by SIU School of Medicine Department of Surgery

Brief Project Description: see above

Opportunity for student degree program (Yes/No): No

Funding available from supervisor – if yes, include details: No

Link to Lab Publications: <http://www.siumed.edu/surgery/plastics/index.htm>