Influential leaders in the field of wound healing science present an intimate, interactive 3-day program of innovation and idea exchange.

WOUND HEALING: Science + Industry
A forum for open exchange of ideas and innovations

June 27-30, 2014
Caribe Hilton
San Juan, Puerto Rico
13th Annual Symposium

Program Founder
Peter Sheehan, MD

Program Chairman
Chandan Sen, PhD
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Special Thanks
Tanya Rhodes, PhD
Tamar Tennenbaum, MD, PhD
Angela Kujath & Jeff Niezgoda, American College of Hyperbaric Medicine
The Wound Healing: Science & Industry Symposium was founded in 2001 by Dr. Peter Sheehan, who has been the Program Chairman until recently. The Symposium provides a unique collaboration between academia and industry in a setting and scale conducive to professional interaction. The presentation topics have been selected by the program and are based on research developments and emerging trends that have immediate impact on the field of wound care. Researchers from both Industry and Academia are encouraged to attend and present their scientific and clinical research in platform or poster format.

The Wound Healing: Science & Industry Symposium is not a CME event. Because CME excludes industry employees, companies cannot share their science and technology with academia. The Wound Healing: Science & Industry Symposium makes this possible. It is one of the few venues where industry can present their research and development ideas without intellectual restrictions. And, conversely, it allows academic scientists and clinical researchers in the field of wound healing to have personal interactions with industry.

Dr. Chandan K. Sen is a tenured Professor of Surgery, Executive Director of The Ohio State University Comprehensive Wound Center and Director of the Ohio State University's Center for Regenerative Medicine & Cell Based Therapies. He is also the Associate Dean for Innovation at The Ohio State University Wexner Medical Center. Dr. Sen has published over 300 full length scientific articles and is currently rated at H-index of 70 with roughly 2000 citations in the literature annually. He is the Editor of the Wound Healing Society journal Advances in Wound Care. In addition, Dr. Sen is the Editor of the journal Antioxidants & Redox Signaling (current impact factor 7.2).

The 3-Day symposium will feature 10 symposia in half-day sessions:
Saturday, June 28, 2104
Sunday, June 29, 2014
Monday, June 30, 2014
PROGRAM OVERVIEW (continued)

TARGET AUDIENCE
Scientists, Physicians, Podiatrists, Surgeons, Nurses, Related wound care providers

PURPOSE
• A symposium for discussion of wound healing
• Allow participants to form an audience as well as make presentations
• Dissemination of present and future developments in the biology, the treatments, and the technology involved in wound healing.
• A collection of opinions expressed and scientific presentations in the area of wound healing.

OBJECTIVES
At the conclusion of this 3-day symposium, the participant should be able to:
• Discuss biological foundations that influence wound diagnosis and treatment choices.
• Identify causes to determine factors that retard progression of wound(s) through normal healing phases.
• Apply various clinical scenarios in which emerging wound treatment modalities would be appropriately applied.
• Recognize and distinguish applicable treatment standards to utilize in deciding a course of therapy.
• Utilize physical and biological markers to differentiate wounds that would benefit from various wound treatment options.
• Apply analytics in order to appropriately diagnose key etiological factors and perform appropriate treatment interventions.
## AGENDA

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**Session 1**

**INFLAMMATION**

- **8:00** Tamar Tennenbaum: Ophthalmic Wound Healing
- **8:20** Sashwati Roy: Micromanaging Diabetic Wound Inflammation
- **9:00** John Lantis: Pharmaceutical-Grade Manuka Honey
- **9:20** Q&A

**Session 2**

**FIBROSIS AND SCARRING**

- **10:00** Seok Jong Hong: Epidermal Regulation of Scarring
- **10:20** Oluyinka Olutoye: Keloids: A New Approach to an Old Problem
- **10:40** Matthew Yudt: Scar Inhibition
- **11:00** Traci Wilgus: Fetal Wound Healing
- **11:20** Q&A
- **11:40** Break / Exhibit

**Session 3**

**BIOFILMS**

- **12:00** Garth James: Microflora Balance
- **12:20** Chandan Sen: Does Wound Biofilm Really Impair Closure?
- **12:40** William Luria: Topical Silicones and Biofilm
- **1:00** Q&A
- **1:15** Adjourn

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**Session 4**

**NOVEL MECHANISMS**

- **7:30** Kathleen Rodgers: Pharmacotherapy
- **7:50** Tamar Tennenbaum: The Skin in Diabetes
- **8:10** Frank Sieg: Isolated Honey Proteins in Neuronal Migration & Neuropathy
- **8:30** Q&A
- **8:50** Break / Exhibit

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**Session 8**

**DEVICES**

- **7:30** Jonathan Rosenblum: Biological Ultrasound
- **7:50** Katherine Baquerizo Nole: Epidermal Blister Device
- **8:10** Jeffrey Niegoda: Acoustic Cavitation
- **8:30** Kris Kieswetter: NPWT and Installation Therapy
- **8:50** Q&A
- **9:10** Break / Exhibit

**Session 9**

**LOWER EXTREMITY ADVANCES**

- **9:30** Michelle Skornicki: Economic Burden of Foot and Venous Ulcer
- **9:50** Chandan Sen: The Hypoxic Wound
- **10:10** Alireza Vaziri: Arterial Revascularization in Wound Management
- **10:30** Q&A

**Session 10**

**WOUND CARE – PROVIDERS**

- **10:50** Scott Covington: The Future of Wound Care Providers
- **11:00** Q&A
- **11:15** Chandan Sen: Closing Remarks
- **11:20** Adjourn - Symposium Concludes
Annex, Brian H., MD  
Professor of Medicine  
University of Virginia  
Presentation: Will therapeutic angiogenesis ever become a treatment option for critical limb ischemia?

Baquerizo Nole, Katherine, MD  
Enter Scientist  
Department of Dermatology & Cutaneous Surgery  
University of Miami - Miller School of Medicine  
Presentation: Suction Epidermal Blister Grafting

Bergquist, Stephen, MD  
Certified Wound Specialist Physician & Medical Director  
Department of Dermatology & Cutaneous Surgery  
Wound Management, Jackson TN  
Poster Presentation: Treatment of Stage III and Stage IV Pressure Ulcers with Dehydrated Human Amnion/Chorion Membrane

Chaudhry, Hina, MD  
Associate Professor of Medicine & Director, Cardiovascular Regenerative Medicine  
Mount Sinai School of Medicine  
Presentations: (1) Un-brake-ing the Heart Via Cell Cycle Activation of Cardiomyocytes; (2) Fetal Maternal Stem Cell Trafficking and Cardiac Repair

Covington, Scott D., MD, FACS, CHWS  
Chief Medical Officer  
Healogics Corporation  
Presentation: The Role of the Woundist and the Future of Woundology

Ganesh Barki, Kasturi, PhD  
Postdoctoral Researcher  
The Ohio State University  
Poster Presentations: (1) Mixed-Species Biofilm Compromises Wound Healing By Disrupting Epidermal Barrier Function In A Full Thickness Burn Wound Model (2) Topical Selinexor, a Selective Inhibitor of Nuclear Export (SINE) Displays Efficacy in Porcine Acute and Ischemic Wound Healing Models
FACULTY (continued)

Gilbert, Thomas W., PhD  
Vice-President, Research & Development  
ACell, Inc.  
Presentation: The Use of MatriStem in Wound Management

Gurtner, Geoffrey, MD  
Professor of Surgery & Materials Science & Engineering  
Stanford University  
Plenary Lecture: Stem Cells and Wound Healing

Hong, Seok Jong, PhD  
Research Assistant Professor  
Northwestern University  
Presentation: Epidermal regulation of scarring  
Poster Presentation: In vitro and in vivo models for wound healing and hypertrophic scarring

James, Garth, MD  
Associate Research Professor  
Center for Biofilm Engineering (CBE)  
Montana State University  
Presentation: Distribution of bacteria and metabolites in chronic wounds

Kieswetter, Kristine, PhD, MBA  
Senior Director, Innovation & Strategic Marketing  
Kinetic Concepts, Inc. (KCI)  
Presentation: Negative Pressure Wound Therapy with Instillation – Tissue Formation & Characteristics

Lantis, John C., MD, FACS  
Vice-President Department of Surgery  
Mt Sinai St Luke’s and Roosevelt Hospitals  
Presentation: Medical grade honey selectively reduces biofilm over planktonic bacteria and may have a role in assisting wound closure of chronic venous leg ulcers.  
Poster Presentations: (1) Medical grade honey selectively reduces biofilm over planktonic bacteria and may have a role in assisting wound closure of chronic venous leg ulcers; (2) How medical grade honey affects the relationship between bioburden and wound size in critically colonized venous leg ulcers.

Li, Wei, PhD  
Professor  
Director of GMCB (Genetics, Molecular & Cell Biology) Graduate Program  
Department of Dermatology & USC-Norris Comprehensive Cancer Center  
The University of Southern California, Keck Medical Center  
Presentation: Topical Recombinant Hsp90 Protein to Promote Skin Wound Healing

Luria, William Leonard, MD  
Medical Director  
One Unlimited, Inc.  
Presentation: Topical Silicones and Biofilm

Niezgoda, Jeffrey A., MD, FACHM, MAPWCA, CHWS  
President & Chief Medical Officer  
AZH / WebCME  
Presentation: The Clinical Impact of Low Frequency Ultrasonic Therapy: Acoustic Streaming and Cavitation

Olutoye, Oluyinka O., MB ChB, PhD  
Professor of Surgery, Pediatrics and Obstetrics & Gynecology  
Baylor College of MedicineSouthern@ TCH  
Co-Director of the Texas Children’s Fetal Center  
Texas Children’s Hospital  
Presentation: Keloids: A New Approach to an Old Problem?

Ranjan, Amaresh Kumar, MD PhD  
Postdoctoral Fellow  
Mount Sinai Hospital  
Poster Presentation: Healing The Broken Heart with Cyclin A2

Rodgers, Kathleen, PhD  
Associate Professor, USC School of Pharmacy  
University of Southern California  
Presentation: Use of Protective Arm of the Renin Angiotensin System in Regenerative Medicine

Rosenblum, Jonathan, DPM  
Director, Diabetic Foot Service  
Shaarei Zedek Medical Center, Jerusalem, Israel  
Presentation: Biological Effects of Ultrasound compared to Electric Stimulation
FACULTY (continued)

Roy, Sashwati, PhD
Associate Professor of Surgery
Director of Laser Capture Molecular Analysis Facility
The Ohio State University
Presentation: Tiny players managing diabetic wound inflammation

Sayeed, Nazish, MD, PhD
Assistant Professor
Houston Methodist Research Institute
Presentation: Atavistic Reprogramming of Adult to Stem Cell Phenotypes

Schultz, Gregory, PhD
Professor, Obstetrics & Gynecology
Director, Institute for Wound Research
University of Florida
Presentation: Healing Through Chemistry

Sen, Chandan K., PhD
Professor & Vice-Chairman (Research) of Surgery
Associate Dean (Research), College of Medicine
Executive Director, Comprehensive Wound Center
The Ohio State University
Presentations: (1) Does Wound Biofilm Really Impair Closure? (2) The Hypoxic Wound

Skornicki, Michelle, MPH
Manager, Health, Economics & Outcomes, Medical Affairs
Organogenesis, Inc.
Presentation: Burden of Diabetic Foot Ulcers and Venous Leg Ulcers for Medicare and Private Insurers

Sieg, Frank, PhD
Consultant
Watson & Son Ltd
Presentation: A manuka honey protein has neuroregenerative properties but is not effective in peripheral neuropathy

FACULTY (continued)

Tenenhaus, Mayer, MD, FACS
Clinical Professor, Plastic & Reconstructive Surgery
University of California at San Diego Medical Center
Presentation: Adipose-Derived Stem Cells: Bench to Bedside

Tennenbaum, Tamar, MD, PhD
Founder & CEO
BioTen Pharma Ltd
Presentations: (1) From the bench to the bedside: novel insights in diabetes wound healing; (2) Opening our eyes – a new paradigm shift in ophthalmic wound healing

Vaziri, Alireza, MD
Associate Director, Vascular Medicine, Associate Director, Noninvasive Vascular Laboratory
St. Elizabeth’s Medical Center
Presentation: Arterial Revascularization in Wound Management

Wilgus, Traci, PhD
Assistant Professor, Department of Pathology
The Ohio State University
Presentation & Poster Presentation: Using cutaneous fetal wounds to understand skin regeneration and fibrosis

Yudt, Matthew, PhD
Director, Global Medicine Development Group
Pfizer Pharmaceuticals, Inc.
Presentation: Reducing scar severity via antisense knockdown of CTGF
Annex, Brian H., MD
Professor of Medicine
University of Virginia

Brian Annex received his M.D. degree from Yale University in 1985. He completed his residency in Internal Medicine at Tufts New England Medical Center and Duke University for his cardiology and research training. Dr. Annex then did an interventional cardiology fellowship at William Beaumont Hospital. He returned to join the faculty at Duke as an Assistant Professor in 1993 until his departure to the University of Virginia in July, 2008 where he was recruited to serve as the George A. Beller, M.D./Lanthane Distinguished Professor of Cardiovascular Medicine and Chief of the Division of Cardiovascular Medicine at the University of Virginia. He has published over 120 peer reviewed articles. He maintains ongoing NIH funding with 4 RO1 equivalents. He now directs a division of approximately 40 faculty.

Dr. Annex is an established, translational, physician-scientist with a long standing interest in the area of peripheral arterial disease. He has been recognized as a thought leader in the area of gene therapy/therapeutic angiogenesis for peripheral arterial disease (PAD). He continues to actively work in the area of PAD and examines critical elements of angiogenesis and vascular remodeling. He has in parallel collaborated with commercial partners in the development and advancement of novel therapeutics for PAD. Over the past decade he has been involved in leadership roles in more than 10 Phase I (and first in-human) and several large Phase II clinical trials. He is frequently asked to provide plenary session level talks at leading national meetings. He completed more than 5 years of service on the NIH Study Section: Clinical and Integrative Cardiovascular Science, including serving as the Chairman of that section for almost two years.

Bergquist, Stephen, MD
Postdoctoral Researcher
The Ohio State University

Stephen Bergquist is a board certified wound specialist physician and medical director of the wound management center in Jackson, TN. Despite an internal medicine background, he works full time in the wound center and is actively involved in the growth and development of the wound management field. Dr. Bergquist is an active member of the ‘Wounds’ journal editorial advisory board. His love for educating others led him to become adjunct medical faculty for the University of Tennessee and his expertise is sought after as a national speaker and investigator for clinical trials. He is an active member of the Association for the Advancement of Wound Care (AAWC), Wound Healing Society (WHSC) and American Board of Wound Management (ABWM). Dr. Bergquist is passionate about the holistic care of his patients, inclusive of their state of mind, spirit and body, and is always looking for the best clinical care.
Hina Chaudhry is a cardiologist, scientist, and entrepreneur. She is currently Associate Professor of Medicine and Director of Cardiovascular Regenerative Medicine at Mount Sinai School of Medicine. Chaudhry, Hina, MD

Associate Professor of Medicine &
Director, Cardiovascular Regenerative Medicine
Mount Sinai School of Medicine

Hina Chaudhry is a cardiologist, scientist, and entrepreneur. She is currently Associate Professor of Medicine and Director of Cardiovascular Regenerative Medicine at the Icahn School of Medicine at Mount Sinai, New York. She holds a B.S. in Chemistry and a B.S. in Biology with a thesis in Physics from MIT, and obtained her M.D. with Honors from Harvard Medical School. She completed her fellowship training at the Hospital of the University of Pennsylvania, where she received the American Heart Association's highest award for cardiology fellows, the Clinician-Scientist Award, one of ten awarded nationally. She was also the top-ranked cardiology fellow in the U.S. for the National Institutes of Health (NIH) National Research Service Award. She then joined the faculty at Columbia University where she held an endowed chair as an Irving Scholar, Columbia University’s highest award for its young medical faculty. She won AstraZeneca’s Young Cardiovascular Investigator Prizes in 2004 and 2006 amongst many other awards during her time at Columbia. In March 2008, she was recruited to Mount Sinai School of Medicine.

In addition to clinical patient care and teaching, she runs a basic science research program investigating mechanisms of cardiac regeneration. Her findings regarding key genetic regulators of cell division in the heart and the use of stem cells will help pave the way for growing new heart muscle cells in patients after a heart attack. She has several patents issued and pending for methods to prevent degeneration of heart tissue after heart attack or during heart failure. She is also the founder and chief scientific officer of VentriNova, Inc., a biotech start-up company funded by both an NIH business grant (with the highest score obtained nationally over a 5-year period for National Heart, Lung and Blood Institute business grants) and the Venture Capital firm Broadview Ventures, aimed at developing clinical treatments based on her research findings. In December 2008, she was selected for the "Genius" Edition of Esquire Magazine as one of 28 American Innovators of the Year. She won the "Best Manuscript Award 2012" from the Editorial Board of Circulation Research at the American Heart Association November 2012 for a "breakthrough finding" of fetal-derived placenta stem cells that are able to repair the injured heart. She has been named a TEDMED Innovation Scholar 2013 and her start-up VentriNova was selected as one of the top 10 women-led healthcare companies in the US by Springboard Enterprises for 2014 and won a National Innovation Award 2014 at the TechConnect World Innovation Summit 2014.

that can be provided. His background includes military service as a pilot, Bachelors degree in Theology, and medical training at The American University of the Caribbean and University of Alabama.

Covington, Scott D., MD, FACS, CHWS

Chief Medical Officer
Healogics Corporation

Scott Covington, Executive Vice President of Medical Affairs and Medical Advisory Board member for Healogics®, oversees medical affairs and assists the staff for over 560 Wound Care Centers. Dr. Covington is the Course Director for the Introduction to Hyperbaric Medicine and Problem Wound Management Course.

A general surgeon with over 20 years of wound care experience, Dr. Covington lectures throughout the U.S. and internationally on wound care and hyperbaric medicine. Certified by the American Board of Surgery and a fellow in the American College of Surgeons, Dr. Covington completed his undergraduate and medical education at the University of North Carolina, Chapel Hill. He trained at the University of Texas, Houston in General Surgery; he was a Thomas G. Cronin Fellow in Wound Healing Research. Dr. Covington is a Certified Hyperbaric and Wound Specialist by the American College of Hyperbaric Medicine and a Wound Healing Society member.

Ganesh Barki, Kasturi

Postdoctoral Researcher
The Ohio State University

Kasturi Ganesh Barki received her MBBS in 2000 in Medicine & Surgery from Gulbarga University Karnataka in India and her Postdoctoral Researcher in 2014 in Wound Inflammation & Wound Biofilm at The Ohio State University in Columbus, Ohio. Dr. Ganesh Barki actively participate in understanding and characterization of the structural composition of wound biofilm, which is critical for developing novel therapies for future wound biofilm management. She received many awards and honors, included the Young investigator award for best Oral presentation at the SAWC in 2013 and 2014, and the best poster presentation at the 5th Annual Translational to Clinical (T2C) Wound Care Conference in 2011. Dr. Ganesh Barki is a Member of the American Physiological Society and of the SOCRA - Society of Clinical Research Associates.

Gilbert, Thomas W., PhD

Vice-President, Research & Development
ACell, Inc.

Thomas Gilbert currently serves as the Vice President of Research & Development at ACell, Inc. Dr. Gilbert previously served as Assistant Professor of Surgery, Cardiothoracic Surgery, and Bioengineering at the University of Pittsburgh and was a faculty member of the McGowan Institute for Regenerative Medicine. His research includes the study of processing and use of extracellular matrix scaffold materials (including...
Dr. Lantis lectures extensively nationally and internationally on the role of the active anti-inflammatory agents in the treatment of chronic wounds and the importance of the management of bioburden in limb salvage.

Dr. Lantis has co-authored numerous other professional organizations. Dr. Lantis runs an NIH and DoD funded laboratory examining how physical stimuli (mechanical and chemical) alter the human response to injury. This has led to the development of new technologies for which Dr. Lantis has received a faculty position in Surgery at Columbia University College of Physicians & Surgeons.

Dr. Lantis joined the faculty at St. Luke’s-Roosevelt Hospital in 2005, after 4 years in practice at New York Presbyterian Hospital. In 2007 he accepted the position of the Vice-President of the New York Vascular Surgery Society, and a member of the Peripheral Vascular Surgical Society, and the Society of Vascular Surgeons.

His clinical practice includes endovascular and open limb salvage, with a multi-disciplinary approach to wound closure and limb preservation, carotid artery surgery and stenting, endovascular abdominal and thoracic aortic aneurysm repair. He has strong interest in the pathophysiology of chronic venous disease and its minimally invasive treatment. Publications include; WOUNDS, Diabetes Care and Annals of Vascular Surgery.

His current basic science research is in the area of the treatment of bio-burden in chronic wounds and minimal response to balloon angioplasty. While the principal investigator on multiple chronic wound trials, he has explored the role of various treatments for wound closure; including negative pressure wound therapy, growth factors, and skin substitutes.

His clinical trials interests also include the world of vascular surgery as well where he focuses on topics such as varied as the endovascular treatment of small aortic aneurysms, to novel delivery systems for anti-neointimal hyperplasia agents. Dr. Lantis lectures extensively nationally and internationally on the role of the active agents in the treatment of chronic wounds and the importance of the management of bioburden in limb salvage.
**Li, Wei, PhD**  
Professor  
Director of GMCB (Genetics, Molecular & Cell Biology) Graduate Program  
Department of Dermatology and USC-Norris Comprehensive Cancer Center  
The University of Southern California, Keck Medical Center

Wei Li received a BS degree in 1988 and a PhD degree in 1991 from the Department of Developmental Biology and Cancer at the Albert Einstein College of Medicine, Bronx, New York City. Following a two-year post-doctoral/instructor fellowship with Dr. Joseph Schlessinger (Professor and Chairman, the Department of Pharmacology at New York University Medical Center), Dr. Li joined the faculty of the Ben May Institute for Cancer Research at the University of Chicago in the fall of 1994 as an Assistant Professor. He was recruited to University of Southern California (USC) Keck School of Medicine in 1999. He rose to full professor in 2006 and is currently a Professor and Director of the GMCB Graduate Program at USC. His research interest focuses on wound healing and cancer progression. His lab is the first to identify the important role for the SECRETED form of heat shock protein-90 (Hsp90) in skin wound healing.

**Luria, William Leonard, MD**  
Medical Director  
One Unlimited, Inc.

Leonard Luria is a Board Certified Plastic and Reconstructive Surgeon who is now in Private Practice in Tampa, Florida for the past 22 years. Dr. Luria is a graduate of Hobart College in Geneva N.Y. 1970, and received his MD degree from Far Eastern University in Manila in 1975. He did an Internship at Coney Island Hospital, affiliated with Maimonides Medical Center and Down State Medical Center in New York. Dr. Luria completed general Surgery and Plastic Surgery residency training at Buffalo, NY, which was part of the Upstate Medical Center. The training in Buffalo included rotations at Buffalo Children's Hospital, Buffalo V.A. Hospital and a Breast Surgery training at Roswell Park Memorial Institute.

Dr. Luria has been involved in primary cancer research at Roswell Park, Mt. Sinai Hospital’s Radiation Oncology Department in New York City and at USF Dep of Surgery. He has been on the faculty of both Upstate Medical Center and University of South Florida Department of Surgery, teaching both medical students and residents, and has been a speaker in the Department of Social Services at USF and School of Public Health.

Dr. Luria has authored several chapters in text books and has over 15 peer reviewed articles in the White Journal PRS, Key Issues in Plastic Surgery, The Journal of the FMA and Mosby Year book. He has been the Editor of the Hillsborough County Medical Society Monthly Journal and an Editor for the Florida Medical Association Journal. Dr. Luria has been the President of the Florida Society of Plastic Surgery and has been the President of the Board of Health Care Risk Management. And the President of Lancer Indemnity, RRG. He is the Medical Director for One Unlimited, Inc. He serves on several other Boards including the Life Center of Tampa.

Over the past 10 years, Dr. Luria has been the Medical Director for One Unlimited, Inc., DBA, Skin Wisdom, Inc., where he has been working with Fred Runnels of Beta Labs, and Walter Dandliker, the past chairman of the Department of Biochemical at Scripps Clinic Laboratories to create the Skin Wisdom Skin Care Line or products and ALLENIENCE, a patented family of Silicons.

**Niezgoda, Jeffrey A., MD, FACHM, MAPWCA, CHWS**  
President & Chief Medical Officer  
AZH / WebCME

Jeffrey Niezgoda is the President & Chief Medical Officer of Web CME, an international education company providing wound care education over the internet to thousands of healthcare providers, and AZH, a Houston based company offering clinical hyperbaric and wound care services. For the previous 18 years, Dr. Niezgoda held the position of Medical Director of the Center for Comprehensive Wound Care and Hyperbaric Oxygen Therapy at St. Luke’s Medical Center in Milwaukee Wisconsin and served as the President and Chief Medical Officer of Hyperbaric & Wound Care Associates. He is the President of the American College of Hyperbaric Medicine and Vice President of the American Professional Wound Care Association. Dr. Niezgoda holds an M.D. from the Uniformed Services University of the Health Sciences, F. Edward Herbert School of Medicine, Bethesda, Maryland, and is a 1981 graduate of U.S. Air Force Academy.

**Nole, Katherine Baquerizo, MD**  
Entry Scientist  
Department of Dermatology & Cutaneous Surgery  
University of Miami – Miller School of Medicine

Katherine L. Baquerizo Nole works in wound healing research under the mentorship of Dr. Robert Kirnner in the University of Miami, Miller School of Medicine. Her experience includes several industry sponsored and investigator initiated studies in chronic ulcers, including venous leg ulcers, diabetic foot ulcers and pyoderma gangrenosum. Dr Baquerizo Nole holds Medical and Specialist Degrees from San Marcos University in Lima, Peru, and a 6-month fellowship in Dermatopathology at the Wake Forest Medical School. She has clinical experience in rural medicine, clinical dermatology and wound healing. Dr Baquerizo Nole has served in the Editorial Board of
the main dermatological journal in Perú, Folia Dermatológica, and as organizer of a yearly Skin cancer screening in her home country. Dr. Baquerizo Nole’s interests are in wound healing, atypical wounds, and dermatopathology.

Olutoye, Oluyinka O., MB ChB, PhD
Professor of Surgery, Pediatrics and Obstetrics & Gynecology
Baylor College of Medicine Southern @ TCH
Co-Director of the Texas Children’s Fetal Center
Texas Children’s Hospital

Oluyinka Olutoye is Professor of Surgery, Pediatrics and Obstetrics & Gynecology at Baylor College of Medicine and is Co-Director of the Texas Children’s Fetal Center at Texas Children’s Hospital, in Houston, Texas. Dr. Olutoye completed his medical school education in Nigeria and received his Ph.D. in Anatomy from Virginia Commonwealth University. He completed his general surgery residency at the Medical College of Virginia Hospitals in Richmond and his pediatric surgery residency at Children’s Hospital of Philadelphia. Dr. Olutoye has done postdoctoral research in the Wound Healing Laboratory at the Medical College of Virginia Hospitals and the Center for Fetal Diagnosis and Treatment at the CHOP. His research interests include the role of the fetal inflammatory response in scarless fetal wound healing and surgical correction of fetal anomalies. Dr. Olutoye is a Fellow of the American College of Surgeons, American Academy of Pediatrics and the West African College of Surgeons.

Ranjan, Amaresh Kumar
Postdoctoral Fellow
Mount Sinai Hospital, New York

Amaresh Ranjan received his M.Sc. in 2003 in Biotechnology from Madurai Kamraj University in Madurai, India, and a Ph.D also in Biotechnology, in 2011, from the National Centre for Cell Science in Pune, India. Dr. Ranjan has published many publications, notably on Methods in Molecular Biology, Science Transnational Medicine, Heart Lung and Circulation, and RNA Biology. He is currently a Postdoctoral Fellow at Mount Sinai Hospital in New York.

Rodgers, Kathleen, PhD
Associate Professor, USC School of Pharmacy
University of Southern California

Kathleen Rodgers is an Associate Professor at the School of Pharmacy at the University of Southern California. Since joining the University of Southern California in 1986, Dr. Rodgers has been interested in applied research. Her research to understand postoperative healing has led to several modalities for postoperative adhesion that are currently marketed worldwide.

Dr. Rodgers’ research has also involved the understanding of the cellular and molecular mechanisms by which the protective renin angiotensin system (PRAS) stimulates tissue regeneration and reduces inflammation. This has led to a platform of technologies to treat diseases that cause significant health care burdens. Her expertise is to generate and conduct development plans to optimize product delivery and efficacy in a safe manner. Her focus is to provide translational assistance from the bench to the patients leading to products from her laboratory based upon the PRAS in advanced clinical trials for the acceleration of healing of injured tissues.

Rosenblum, Jonathan, DPM
Director, Diabetic Foot Service
Shaarei Zedek Medical Center, Jerusalem, Israel

Jonathan Rosenblum is the Director of the Diabetic Foot Service at Shaarei Zedek Medical Center in Jerusalem, Israel. He is the parliamentary liaison responsible for bringing the Podiatry Law in Israel to fruition. Dr Rosenblum serves as a consultant to numerous Israeli medical startups in a variety of fields. He has lectured worldwide on multiple topics related to Podiatric Medical and Surgical care.

Roy, Sashwati, PhD
Associate Professor of Surgery
Director of Laser Capture Molecular Analysis Facility
The Ohio State University

Sashwati Roy, PhD is an Associate Professor of Surgery and Director of laser capture Molecular Analysis facility at the Ohio State University Columbus Ohio. She received her Ph.D in 1994 in Physiology and Environmental Sciences. She completed her postdoctoral training from University of California, Berkeley. Her research interest include wound inflammation, mechanisms of resolution of diabetic wound inflammation, role of miRNA in tissue repair processes. Dr. Roy has over 150 peer review publications. She is an expert in significance of macrophage and inflammation in chronic wounds. Dr. Roy’s research is currently funded by National Institute of Health (NIDDK, NIH) funded to investigate on the role of inflammation in diabetic wounds.

Sayed, Nazish, MD, PhD
Assistant Professor
Houston Methodist Research Institute
Nazish Sayed earned his MD degree from the University of Bombay, India. He trained in Internal Medicine and then obtained a PhD degree in Physiology and Pharmacology at UMDNJ, New Jersey Medical School. He completed his postdoctoral training at Columbia University where he worked to develop novel therapeutic approaches for asthma and understand the basic mechanism for mediating airway smooth muscle contractility. He continued his postdoctoral training at Stanford University to gain additional experience in cardiovascular and regenerative medicine, focusing on developing reagents and protocols for a non-integrative strategy of generating human-induced pluripotent stem cells (iPSCs).

Dr. Sayed is an assistant member of the Houston Methodist Research Institute. His focus has been to understand the role of innate immunity in reprogramming and regeneration. Dr. Sayed is a member of American Heart Association (AHA) study sections and of several national and international societies, including the AHA and the International Society of Stem Cell Research.

Dr. Sayed’s research focuses on understanding the role of innate immunity in reprogramming and regeneration. The goal of his research is to transfer basic bench research into clinical applications, using a vertically integrated approach with an amalgam of molecular, cellular, and biochemical tools. The aims of his research are to incorporate the newly acquired knowledge that innate immunity is required for nuclear reprogramming into the fields of transdifferentiation and vascular regeneration. His research is a logical extension of his previous work and interests in translational research in vascular biology. Major Areas of Research vascular biology, stem cells, transdifferentiation, innate immunity, cancer.

Schultz, Gregory, PhD
Professor, Obstetrics & Gynecology
Director, Institute for Wound Research
University of Florida

Gregory Schultz is a Professor of Obstetrics and Gynecology and Director of the Institute for Wound Research at the University of Florida. Dr. Schultz completed a PhD in Biochemistry from Oklahoma State University and Postdoctoral training in Cell Biology at Yale University. His research focuses on defining the molecular regulation of normal wound healing and identifying the molecular imbalances that lead to fibrosis or to chronic wounds, with an emphasis on bacterial biofilms and rapid, point-of-care detectors for biomarkers. Dr. Schultz has published over 300 research papers, chapters and review articles, which have been cited more than 7,000 times. He has served as PI or Co-investigator on grants totaling over $35 million. He is an inventor on 22 patents, a co-founder of two biotech companies in the area of wound healing, and a consultant for multiple pharmaceutical and wound care device companies. Dr. Schultz served as a member of the National Pressure Ulcer Advisory Panel and as President of the Wound Healing Society from 1999-2001.

Sen, Chandan K., PhD
Professor & Vice Chairman (Research) of Surgery
Associate Dean (Research), College of Medicine
Executive Director, Comprehensive Wound Center
Director, OSU Center for Regenerative Medicine & Cell-Based Therapies
The Ohio State University

Chandan Sen is a tenured Professor of Surgery, Executive Director of The Ohio State University Comprehensive Wound Center and Director of the Ohio State University’s Center for Regenerative Medicine & Cell-Based Therapies. Dr. Sen is also the Associate Dean for Innovation at The Ohio State University Wexner Medical Center. He has published over 300 full length scientific articles and is currently rated at H-index of 70 with roughly 2000 citations in the literature annually. He is the Editor of the Wound Healing Society journal Advances in Wound Care. In addition, Dr. Sen is the Editor-in-Chief of the journal Antioxidants & Redox Signaling (current impact factor 7.2), the Editor of Advances in Wound Care, and Section Editor of (microRNA), Physiological Genomics.

Skornicki, Michelle, MPH
Manager Health, Economics & Outcomes, Medical Affairs
Organogenesis, Inc.

Michelle Skornicki earned her Bachelor’s degree in mathematics from Hamilton College in 2006 and went on to pursue a Master of Public Health (MPH) at Boston University, concentrating in epidemiology and biostatistics. She has worked in health outcomes since 2007 and has been working at Organogenesis, Inc. since 2012. Her research interests include chronic diseases, pharmacoconomics modeling, and patient quality of life. She lives in Boston, Massachusetts.

Sieg, Frank, PhD
Consultant
Watson & Son Ltd

Frank Sieg has been a consultant for the Manuka honey company, Watson & Son Ltd (Manukamed), since 2012. The research has isolated and characterized a honey protein fragment with surprising metabolic stimulating activities. Dr. Sieg is also managing director and Chief Scientist of CureNZ Ltd.

Dr. Sieg’s research interest is in Neurobiology focused on the annotation, characterization and pre-clinical development of Neural Regeneration Peptides (NRP’s). These molecules will make a huge impact on various neural repair strategies involving treatment of severe neurodegenerative diseases and injuries. His R&D biotech career in New Zealand involves Plant & Food Research (Bioinformatics), Neuren Pharmaceuticals (Head of Discovery), the Liggins Institute (Head of Neuroscience). Dr. Sieg
is working on developing a short peptidomimetic, called NRP2945 as a therapeutic treatment for the indication progressive Multiple Sclerosis. CuroNZ intends to be in clinical trials in 2015.

Dr. Sieg has invented 16 PCT-patents, 4 world-wide granted patents (Neural Regeneration Peptides concerning) that are in the respective National phases and 4 pending US-provisional patents. Moreover, he has authored 20 internationally peer-reviewed journal articles.

Tennenbaum, Tamar, MD, PhD
Founder & CEO
BioTen Pharma Ltd

Tamar Tennenbaum is the founder and CEO of BioTen Pharma Ltd. She is an established biotech entrepreneur, a physician and a scientist specializing in discovery and development of innovative pharmaceuticals addressing major medical needs in the fields of wound healing, Oncology and Dermatology. Dr. Tennenbaum holds an MD from the Hebrew University Hadassah Medical School, Jerusalem in Israel, and a PhD in cell biology and pharmacology from the Pharmacology Department at the Hebrew University, Jerusalem in Israel. Following a post-doctoral position as a visiting associate at NCI, NIH, Dr. Tennenbaum joined Bar-Ilan University where she established the Molecular Dermatology unit. In 2002, as a spin-off of her academic career, Dr. Tennenbaum established HealOr (2002-2011), a company specializing in development of novel therapeutics addressing the pathologies associated with wound healing and dermatology disorders. As a founder, inventor, and CEO, Dr. Tennenbaum played a key role in raising over $50 million of venture and partner financing leading the commercial strategy, portfolio development and the intellectual property strategies of the company with more than 140 patents submitted and more than 35 patents granted. Dr. Tennenbaum led the successful translation of advanced leading drug candidates from scientific research at preclinical stage to Phase 3 clinical trials in various wound healing indications. In addition to her startup companies, she also serves as an advisor to leading pharmaceutical companies in the areas of wound healing and dermatology. She is an acknowledged specialist in epithelial physiology and pathology, gene therapy and PKC signaling. Dr. Tennenbaum is the laureate of prestigious awards and grants and an author of over 50 scientific publications and book chapters in peer review journals.

Vaziri, Alireza, MD
Assistant Professor Department of Pathology
The Ohio State University

Dr. Vaziri earned his Doctorate of Medicine degree from Tehran University of Medical Sciences in Iran in 1993. He completed an Internal Medicine Residency at Baystate Medical Center/Tufts University School of Medicine in Springfield, Massachusetts followed by a Vascular Medicine Fellowship at the Cleveland Clinic, Ohio. Prior to joining to St. Elizabeth’s Medical Center, he worked as a Vascular Medicine specialist at Ochsner Medical Center in New Orleans, Louisiana.

Dr. Vaziri’s main interest is the diagnosis and management of peripheral arterial disease and venous thromboembolic disease with an emphasis on non-invasive vascular imaging. He is also interested in atypical vasculopathies and hypercoagulable disorders. He is board certified by the American Board of Internal Medicine and American Board of Vascular Medicine. He speaks English, French and Persian.

Wilgus, Traci, PhD
Assistant Professor Department of Pathology
The Ohio State University

Traci Wilgus is an Assistant Professor in the Department of Pathology at The Ohio State University. Dr. Wilgus studied skin cancer as a graduate student and earned her PhD from Ohio State. She completed post-doctoral training in the Department of Surgery at Loyola University Medical Center. She was a junior faculty member at University of Illinois-Chicago before accepting a tenure-track position at Ohio State in 2008. Her lab studies the role of inflammation and angiogenesis in wound healing and skin carcinogenesis, and are particularly interested in understanding the mechanisms that regulate scarless healing in fetal skin. Dr. Wilgus is an active member of the Wound Healing Society and she is a current member of the Board of Directors. She frequently reviews manuscripts and grant proposals on wound healing and sits on the editorial boards for Ostomy Wound Management and Advances in Wound Care.

Yudt, Matthew R., PhD
Director, Global Medicine Development Group
Pfizer Pharmaceuticals, Inc.

Matthew Yudt is currently an early clinical sciences project lead in the Global Innovative Pharmaceuticals business unit at Pfizer. In his current role, he supports a number of therapeutic areas including the anti-scarring program. Dr. Yudt’s role also covers scientific technical evaluations, medical and clinical development planning, alignment with commercial forecasting, and business development opportunity assessments. Dr. Yudt spent 8 years in drug discovery at Wyeth in the Women’s Health research group, focusing on discovery of steroid and nuclear hormone receptor modulators for a number of medical conditions. Dr. Yudt received a bachelor’s degree in Chemistry from Penn State and a PhD in Biophysics from the University of Rochester in 1999. Following
ABSTRACTS

Healing The Broken Heart With Cyclin A2

Scott D. Shapiro,1* Amarendra K. Ranjan,1 Yoshiaki Kawase,1 Richard K. Cheng,1 Rita J. Kara,1 Romit Bhattacharya,1 Gabriela Guzman-Martinez,1 Javier Sanz,1 Mario J. Garcia,3 Hina W. Chaudhry1
1 George Washington University School of Medicine, Washington, D.C.; 2 Mount Sinai School of Medicine, New York, NY; 3 Albert Einstein College of Medicine, New York, NY.

* Equal contributions.

Adult mammalian cardiomyocytes have limited proliferative potential. The lack of clinically significant proliferation interferes with the healing of damaged heart tissue caused by heart disease. Hence, understanding cell cycle re-entry of cardiomyocytes is critical for the development of regenerative therapies for heart disease. Our previous work has successfully demonstrated that viral delivery of cDNA encoding CCNA2 (Cyclin A2) induces cardiac regeneration and restores cardiac function significantly in rodent model of myocardial infarction (MI). We undertook these studies to determine if CCNA2 could induce cardiac regeneration in a large animal model of MI, and sought to understand the cellular mechanism of regeneration.

We used a catheter-based approach to occlude the left anterior descending artery in swine, which resulted in substantial myocardial infarction. A week later, we performed left lateral thoracotomy and injected adenovirus carrying complementary DNA encoding CCNA2 or null adenovirus into peri-infarct myocardium. Six weeks after treatment, we assessed cardiac contractile function using multimodality imaging including magnetic resonance imaging. Ventricular sections at sacrifice were analyzed for fibrosis and markers of proliferation. Adenoviral CCNA2 was also used to transfected adult mammalian cardiomyocytes in vitro and cell division was analyzed by time-lapse microscopy.

Myocardial CCNA2 expression was confirmed after gene transfer and was absent in controls. LV angiography demonstrated ~31 and ~11% enhancement of EF in treated animals and control animals, respectively (P = 0.031). With 2D echocardiography analysis, we noted ~33 and ~10% enhancement of EF in treated versus control animals (P = 0.041). 3D echocardiography imaging resulted in ~27 and ~8% enhancement of EF-treated and control animals, respectively. With MRL, which is widely considered the “gold standard” for measurement of cardiac function, there was ~18% enhancement of EF in treated animals and a ~4% decrease in control animals (P = 0.035). Histologic studies demonstrate in vivo evidence of increased cardiomyocyte mitoses, increased cardiomyocyte number, and decreased fibrosis in the experimental pigs. Time-lapse microscopy images of murine adult mammalian cardiomyocytes transfected with the same adenoviral CCNA2 injected into porcine hearts demonstrate that 2.63 ± 2.48 % of adult cardiomyocytes undergo complete cell division compared to 0.178 ± 0.518 % of adult cardiomyocytes transfected with null adenovirus.

These data highlight a novel pathway to cardiac regeneration in a large animal model of MI that is not dependent on stem cell transplantation.

a post-doc at the NIEHS in RTP North Carolina, he began his career in industry at Wyeth in 2001. Dr. Yudt has also served as an adjunct faculty at Villanova University teaching several courses in Molecular Endocrinology and Molecular Pharmacology.
In vitro and in vivo models for wound healing and hypertrophic scarring

Seok Jong Hong, Robert D. Galiano, Thomas A. Mustoe

Cutaneous wound healing is a fundamental biological process essential to the continuity of life. Wound repair is a complex and dynamic process which consists of inflammation, angiogenesis, and tissue formation and remodeling. Derangements in healing can lead to excessive scar formation, for which therapeutic options are limited. The Plastic Surgery Division Research Laboratory for Tissue Repair and Regenerative Surgery at Feinberg School of Medicine, Northwestern University, aim to bring together scientists and clinicians with the ultimate goal of developing new therapeutic strategies for wound healing, tissue repair and regeneration that could be successfully applied to clinical practice. The laboratory consists of a multidisciplinary team of enthusiastic people: plastic surgeons, molecular biologists, microbiologists, bioengineers. We have developed many in vitro and in vivo models for the wound healing and Scar model research, such as wound healing, hypertrophic scar, ischemia, ischemia-reperfusion models in rabbits; bacterial biofilm models in rabbits and mice; split wound healing model in mice; skin flap models in pigs; burn wound models in rabbits; human ex vivo culture model; organotypic culture. We perform research in the following areas: application of the mesenchymal stem cells including adipose derived stem cells for wound/tissue repair and regeneration; the role of bacterial biofilm in impaired wound healing; chronic skin wound healing mechanisms in the context of ischemia, diabetes and aging; mechanisms of hypertrophic scar development and therapies for scar reduction; the use of in-situ bioreactors to allow controlled tissue growth for tissue and organ replacement.

Treatment of Stage III and Stage IV Pressure Ulcers with Dehydrated Human Amnion/Chorion Membrane

Stephen Bergquist, MD, CWSP
Wound Management Center, Jackson Madison County General Hospital, Jackson, TN

Hospital-acquired pressure ulcers (HAPUs) are a national concern and associated with increased morbidity, treatment cost, and reimbursement issues. HAPUs can increase the length of hospital stay by an average of 10.8 days.1 The average hospital cost associated with stage IV HAPUs and related complications averages $129,248 for one admission.2 Stage III and IV pressure ulcers (PUs) that occur during hospitalization are considered preventable, thus hospitals no longer receive higher Medicare payments for care of HAPUs. Effective treatments which promote rapid healing create potential for tremendous cost savings. Our purpose was to evaluate the clinical and cost-effectiveness of dehydrated human amnion/chorion membrane (dHACM) allografts as a treatment for Stage III and IV PUs. Included were 4 patients with PUs (2-Stage III, 2-Stage IV) treated with biweekly dHACM application after sharp debridement as needed, followed by standard dressings. Weekly wound assessment and dressing change was performed. In both Stage III cases, PUs of 8.6 cm2 and 2.53 cm2 were completely healed within one week, after one dHACM application with treatment costs of $1271 and $636 respectively. Two Stage IV cases: 1 PU of 9.25 cm2. Complete healing occurred with 4 dHACM applications in 8 weeks at a cost of $8981. One PU of 4 month duration. Initial wound size was 17.2 cm2 decreased to 1.56 cm2 with 6 applications by 15 weeks with cost of $16,690. Cost-effectiveness of dHACM for treatment of PUs is influenced by increased healing rates, velocity of healing, and subsequent reduction in risk for further complications. Wound size appropriate grafts further reduce waste and cost per treatment. Although larger studies are needed to confirm our findings, dHACM appears to be a clinical and cost-effective treatment option for Stage III and IV PUs and should be considered for treatment of HAPUs.

References


Medical grade honey selectively reduces biofilm over planktonic bacteria in chronic venous leg ulcers.

(ManukaMed, New Zealand)

Introduction: Chronic venous leg ulcers (VLUs) affect millions of people in the United States, resulting in enormous burden to those affected. VLUs are often critically colonized, preventing the natural course of healing. Basic science research supports that medical grade honey, topically applied, may aid in wound healing primarily by decreasing this bacterial load. Therefore, for the first time ever we sought to study the effects of topical honey in vivo on the planktonic bacteria and biofilm in chronic VLUs.

Methods: A prospective, cohort study of 20 patients, enrolled between May, 2013 and December 2013, was undertaken to study the effectiveness of topical honey in reducing bacterial load in chronically infected VLUs. For four weeks, patients were treated with weekly topical honey and, after an initial run in week, weekly debridement. All patients were in concordance with overlying multi-layer compression wraps. Serial wound scrapings and biopsies were performed to test for quantitative biofilm and planktonic bacterial counts.

Results: The topical honey had a more profound effect on wound biofilm than planktonic bacteria. When honey was applied without debridement there was a 30% reduc-
**ABSTRACTS (continued)**

How medical grade honey affects the relationship between bioburden and wound size in critically colonized venous leg ulcers.

(ManaakaMed, New Zealand)

Introduction: Chronic venous leg ulcers (VLUs) are often critically colonized and it is understood that this colonization inhibits the wound closure process. Some studies on medical grade honey have demonstrated a positive effect on chronic wounds, while not addressing its actual mechanisms of action. We sought to investigate if the salutary effects of topical honey on wound healing can be explained by a reduction in either biofilm or planktonic bacteria.

Methods: We undertook a prospective, twelve week study of 20 patients who had critically colonized VLUs. The study was designed to assess the effectiveness of topical honey in reducing wound size and its relationship to both planktonic and biofilm bioburden. Patients were treated with weekly topical honey, sharp debridement, and multi-layer compression. Quantitative measurements of planktonic and biofilm bacteria were obtained at 5 time points during the first four weeks.

Results: There was an average 57% reduction in wound area (mean: 21cm² to 9cm², median: 12cm² to 2.1cm²) after 4 weeks of treatment. There was no further reduction in average wound size over the remaining 8 weeks. During the first 4 weeks of therapy there was a 59% reduction in biofilm and a 10% reduction in planktonic bacteria from baseline.

Conclusion: A notable reduction in wound area was demonstrated after just four weeks of treatment with topical honey. This period of time coincided with a reduction in biofilm, but not in planktonic bacteria. Clinically this data supports 4 weeks of honey therapy and highlights the fact that the beneficial effects of honey on wound healing may originate from additional mechanisms of action, outside the reduction of biofilm alone. The study also raises the question as to the direct correlation of planktonic bacteria with wound healing.

Topical Selinexor, a Selective Inhibitor of Nuclear Export (SINE) Displays Efficacy in Porcine Acute and Ischemic Wound Healing Models

Tami Rashal1, Christine Kitsos2, Sharon Friedlander2, Wen Chen1, Joel Ellis1, Brian Austad1, Inessa Solomon1, Karnataka Ganesh Reddy1, Sudharnar Roy1, Chandan Sen1, Michael Kaufman1, Sharon Shacham1, Dilara McCauley1

1. Karyopharm Therapeutics, 1 Mercer Rd. Natick MA 01760
2. BMR Solutions, 40 Solkolov St, Herzeliya, Israel
3. The Ohio State University, Wexner Medical Center, Comprehensive Wound Center, Columbus Ohio 43210

Background: Inefficient wound healing in patients with diabetes, physically disabled patients, or patients with vascular diseases can result in the development of chronic wounds. Novel therapies targeting this complex disease are required for this unmet medical need. Selinexor is a potent, small molecule inhibitor of Exportin1 (XPO1) that mediates the nuclear export of ~200 eukaryotic proteins and a small subset of RNAs, including many known to play fundamental roles in inflammation (NF-κB pathway regulatory proteins IκBα, IκBε, RelA, p100 and COMMD1, HSCARG, and FOXO).

Methods: Longitudinal incision or punch biopsy excision wounds were created in normal domestic pigs or normal pigs in which surgical flaps were created to induce ischemia. Selinexor was applied topically at concentrations of either 1 μM, 3 μM or 10 μM daily or biweekly. Surface planimetry and ultrasound was used to assess wounds during in-life phase. Wound biopsies were analyzed microscopically using histological and immunohistological staining. Animals were sacrificed at 12, 14 or 19 days.

Results: In acute incision and ischemic wound models, reduced inflammation, accelerated fibroblast/myofibroblast differentiation and increased epidermal migration were observed in selinexor treated animals compared to vehicle. Additionally, ischemic wound models showed increased blood flow and neoangiogenesis in selinexor treated wounds. Exposure of topical selinexor was observed in surrounding tissues without measurable levels of selinexor in the plasma after serial sampling.

Conclusions: The observed efficacy in acute and impaired wound healing models with no measurable plasma exposure and no observed surrounding tissue toxicity suggest that topical selinexor may provide the breadth of activity necessary to treat chronic wounds. Clinical development of topical selinexor as a novel therapeutic for the treatment of wound healing in lower extremity diabetic foot ulcers is planned.
Mixed-Species Biofilm Compromises Wound Healing By Disrupting Epidermal Barrier Function In A Full Thickness Burn Wound Model


Comprehensive Wound Center, Davis Heart & Lung Research Institute, Center for Regenerative Medicine and Cell Based Therapies, Ohio State University Wexner Medical Center

Current understanding of wound biofilm, including bacterial mechanisms of pathogenesis and host responses, is limited by the availability of appropriate chronic models of wound biofilm infection where cascading mechanisms may be studied longitudinally over time. This work reports the first chronic (8 weeks) pre-clinical model of wound biofilm infection aimed at addressing long-term host response. Domestic Yorkshire pigs (N=64) were subjected to full-thickness burn (2”x2”) using a microprocessor controlled electrically heated burning device. A clinically relevant mixed-species infection approach was adopted, combining Acinetobacter baumannii 19606 and Pseudomonas aeruginosa PAO1 to co-infect post-burn wounds. SEM demonstrated aggregates of bacteria attached to the surface of the burn wounds that were embedded in EPS indicative of biofilm matrix, analogous to wound tissue biofilm in pressure ulcer patients. Closure, as appreciated by visual inspection i.e., current standard of clinical care, of biofilm infected wounds was comparable to that of control wounds. However, transepidermal water loss (TEWL) a quantitative measure of skin barrier function, was markedly elevated (p<0.05, n=4) in biofilm-infected wounds indicating leaky skin. This observation is clinically significant as it highlights that visually closed wounds may be complicated by the presence of failed leaky skin which is likely to lead to post closure complications such as infection and/or wound reopening. Key tight junction proteins zona occludens-1 (ZO-1) and ZO-2 were down regulated (p<0.05, n=4) in biofilm-infected burn wounds. We report that ZO-1 and ZO-2 are direct targets of miR-146a. Topical delivery of miR-146a and miR-106b mimics to the intact skin compromised skin barrier function as manifested by increased TEWL (p<0.05, n=3). The notion that biofilm may induce host skin miRs to compromise skin barrier function is novel and sets the stage for intervention strategies with the goal to restore skin barrier function in biofilm infected wounds. (NIH NR013898, GM077185, GM069589 and DoD W81XWH-11-2-0142).

Using cutaneous fetal wounds to understand skin regeneration and fibrosis

TA Wilgus and BC Wulff

Department of Pathology, The Ohio State University, Columbus, OH 43210

Wound repair results in the formation of a permanent scar in mature skin, but wounds created at early stages of development heal scarlessly. The exact mechanisms leading to scarless repair have not been fully identified, but unique characteristics of fetal fibroblasts are believed to be important. We hypothesize that fibroblast alterations resulting from normal skin development drive scar formation. To identify genes that might regulate scarless and fibrotic healing, global microarray analysis was performed on cultured murine fibroblasts derived from embryonic day 15 (E15) skin, which heals scarlessly, and embryonic day 18 (E18) skin, which heals with a scar. Several genes involved in cellular proliferation, movement, signaling and inflammation were differentially expressed, suggesting that baseline gene expression changes occur in developing skin. However, the in vivo wound healing response cannot be effectively modeled using cultured fibroblasts. In order to compare fibroblasts from scarless or scar-forming wounds directly, wound healing studies were performed in mice expressing green fluorescent protein (GFP) under the control of the collagen1a1 promoter (col-GFP mice). Using fluorescence microscopy, GFP-positive cells were identified in the dermis of E15 and E18 skin and in 7 day wounds. To confirm that GFP-expressing cells were fibroblasts, E15 and E18 skin were enzymatically digested and fluorescence-activated cell sorting (FACS) was used to isolate GFP-positive cells. Expression of fibroblast markers was confirmed in cells from the GFP-positive fraction. Additionally, GFP-positive cells were adherent and displayed the typical fibroblast morphology when cultured. These preliminary data suggest that the col-GFP mice can be used as a tool to examine fibroblasts in scarless (E15) and fibrotic (E18) wounds. Ongoing studies are being performed to identify unique gene expression patterns in fibroblasts from scarless and fibrotic wounds. Ultimately, these studies could lead to the discovery of novel regulatory networks in fibroblasts that control scarless and fibrotic healing.
It is the policy of the Wound Healing: Science & Industry Symposium to ensure objectivity, balance, independence, transparency, and scientific rigor in our educational activities. All faculty participating in the planning or implementation of a sponsored activity are expected to disclose to the audience any relevant financial relationships and to assist in resolving any conflict of interest that may arise from the relationship. Presenters must also make a meaningful disclosure to the audience of their discussions of unlabeled or unapproved drugs or devices.

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<td>Board Member: One Unlimited Inc.</td>
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<td>Medical Director: One Unlimited Inc.</td>
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<td>Consultant: Chairman Claims Review, Lancet RRG</td>
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<td>Niezgoda, Jeffrey A., MD</td>
<td>No Relevant Financial Relationships</td>
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<td>Olutoye, Oluwinka O., MB ChB, PhD</td>
<td>No Relevant Financial Relationships</td>
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<tr>
<td>Ranjan, Amaresh, PhD</td>
<td>Grant/Research Support: Mount Sinai Hospital New York</td>
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<td>Employee: Mount Sinai Hospital New York</td>
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<td>Rodgers, Kathleen, PhD</td>
<td>Grant/Research Support: Dermasciences</td>
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<td>Consultant: Dermasciences</td>
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- FACULTY DISCLOSURE
Rosenblum, Jonathan, DPM
Grant/Research Support: BRH Medical, NanoVibronix Inc., FlowAid Inc.
Consultant: NanoVibronix Inc.
Scientific Adviser: BRH Medical

Roy, Sashwati, PhD
Grant/Research Support: NH & Industry Funding
Stock Shareholder: Nutrify
Employee/Officer/Board Member: WHS, ARS
No off-label use to disclose

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Grant/Research Support: American Heart Association
No off-label use to disclose

Schultz, Gregory, PhD
Grant/Research Support: MedLine, Kinetic Concepts Inc. (KCI), Smith & Nephew
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Scientific Adviser: MedLine, Kinetic Concepts Inc. (KCI), Hollister
No off-label use to disclose

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No off-label use to disclose

Sieg, Frank, PhD
Consultant: Watson & Son Ltd
No off-label use to disclose

Tennenbaum, Tamar, MD, PhD
Grant/Research Support: BioTen Pharma Ltd
Consultant: Johnson & Johnson, Asava Biotech
Stock Shareholder: BioTen Pharma Ltd, Tencure
Employee/Officer/Board Member: BioTen Pharma Ltd, Tencure
No off-label use to disclose

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No off-label use to disclose

Wilgus, Traci, PhD
No Relevant Financial Relationships
No off-label use to disclose

Yudt, Matthew, PhD