

International Wound Infection Institute Guest Session

Slough: Investigation and Identification, Clinical Significance, and Management

WELCOME TO THE
INTERNATIONAL WOUND
INFECTION INSTITUTE

*The International Wound Infection Institute is for health care professionals
with an interest in wound infection.*

EWMA 2019

5 – 7 JUNE 2019 · GOTHENBURG, SWEDEN



 International Wound
Infection Institute

<http://www.woundinfection-institute.com/>

PRESENTERS



Gregory Schultz

Dr. Gregory Schultz is Professor of Obstetrics and Gynecology and Director of the Institute for Wound Research at the University of Florida. Dr Schultz has authored 400 scientific publications that have been cited over 17,000 times. He is PI or Co-investigator on grants totaling over \$35 million, and is an inventor on over 30 patents in the area of wound healing. He served as President of the Wound Healing Society from 1999 to 2001.



Terry Swanson

Terry Swanson was admitted as a Fellow of AWMA in 2010 for her significant contribution to wound management at a state, national and international level. She is the current Vice Chair of the International Wound Infection Institute and chaired the development and publication of the 2016 IWII Consensus Document Update on Wound Infection.



Dot Weir

Dot has been a registered nurse for 42 years; 38 of those dedicated to the practice of wound and ostomy care. She has practiced in acute care, home care and long term care, spent 7 years in industry and has practiced in outpatient care since 2001. She has been Board Certified by the Wound, Ostomy and Continence Nurses Certification Board since 1985 (CWON) and The American Board of Wound Management since 2004 (CWS).



Donna Angel

Donna Angel is a Nurse Practitioner in Wound Management at Royal Perth Hospital, Perth Western Australia since 2006. She graduated from Edith Cowan University in 1993 with BS Nursing and a Nurse Practitioner certification in 2005 and Masters of Science in Nursing in 2010 both from Curtin University.

OVERVIEW OF SESSION

Topic	Presenter	Country
1. Introduction and brief information about the International Wound Infection Institute	Gregory Schultz	United States
2. Slough research project overview	Gregory Schultz	United States
3. Tissue types and identification	Terry Swanson	Australia
4. Wound cleansing	Dot Weir	United States
5. Debriding and de-sloughing management strategies	Donna Angel	Australia

BRIEF INFORMATION ABOUT THE IWII

WELCOME TO THE INTERNATIONAL WOUND INFECTION INSTITUTE

The International Wound Infection Institute is for health care professionals with an interest in wound infection.

The IWII aims to provide up to date research and evidence relating to prevention, identification and management of wound infection. The website provides links to examples of publications that we believe we will be of interest to clinicians.

<http://www.woundinfection-institute.com/>

WHAT WE PROVIDE



UP-TO-DATE CLINICAL INFORMATION

The IWII aims to provide up to date research and evidence relating to prevention, identification and management of wound infection. The website provides links to examples of publications that we believe we will be of interest to clinicians.



ACCESS TO WOUND INFECTION EXPERTS.

The IWII committee represents expertise in prevention and management of wound infection globally. We welcome enquires at any time – please use the ‘contact us’ tab if you would like to contact us. Please ensure that your message clearly identifies your question and if there is a particular member you wish to speak to.



NEW PROJECTS ON WOUND INFECTION

IWII work on a range of projects related to wound infection. Completed projects and relevant consensus/best practice documents can be located in the resources section.



ACCESS TO A NETWORK OF PROFESSIONALS

Membership of IWII is global and we welcome new members at any time. Please use the contact us tab of you would like to be a member. Membership allows you free access to the website, up to date news and a quarterly newsletter.



CONFERENCES

[Wounds Australia](#): 4th – 7th Nov 2020

[Wounds UK](#): 5th – 7th Nov 2018

[EWMA](#): 5th – 7th June 2019

[WUWHS](#) – 8th – 12th March 2020



OPPORTUNITIES TO SHARE CLINICAL EXPERIENCES

We are eager to hear of any projects that you may have developed and implemented which you would like to share with a global audience. Additionally If you have an idea for a project please contact us to discuss working together.

RESOURCES

The Institute has been instrumental in producing a number of internationally acknowledged documents such as the review and extension of the TIME framework as well as publications in the International Wound Journal, Journal of Wound Care, Wounds International and other relevant journal. Other available resources include a curriculum outline on wound infection and several reviews and commentaries. The following resources focus on the latest evidence, research and education in wound infection prevention management. These are free to download and use in practice.

EVOLUTION OF THE WOUND INFECTION CONTINUUM IWII WOUND INFECTION IN CLINICAL PRACTICE

This article discusses some significant changes made to the wound infection continuum, including changes in terminology used to describe phases of wound infection, and distinction between early (covert) signs of local infection and the overt classic Celsian signs.

IWII WOUND INFECTION IN CLINICAL PRACTICE

This update provides an opportunity to explore contemporary advances in wound infection knowledge and practice. Since 2008, scientific and clinical understanding of chronic wound infection has developed significantly. This update is also available as a translation in both [Chinese](#) and [Latin American Spanish](#).

MULTI-RESISTANT INFECTIONS: A GLOBAL CONCERN

A presentation by Associate Professor Geoff Sussman on antimicrobial resistance.

TEN TOP TIPS: REDUCING ANTIBIOTIC RESISTANCE

Geoff Sussman, Terry Swanson, Joyce Black et al write in Wounds International 2014;5(4)

SLOUGH: WHAT IS IT? HOW DO WE MANAGE IT?

A presentation by Terry Swanson, Jenny Hurlow, Greg Schultz and Jacqui Fletcher.

TEN TOP TIPS: MANAGING SURGICAL SITE INFECTIONS

David Keast, Terry Swanson et al write in Wounds International 2014;5(3).

TEN TOP TIPS: UNDERSTANDING AND MANAGING BIOFILMS

David Keast, Terry Swanson, Keryln Carville, et al write in Wounds International 2014;5(2)

WOUND INFECTION MADE EASY

Terry Swanson, Lorraine Grothier and Greg Schultz provide an update on recognising and managing wound infection in different wound types. Published on Wounds International

EXTENDING THE TIME CONCEPT

The long-awaited update on the TIME principles in wound bed preparation, available in [English](#), [French](#) and [Spanish](#). This has had significant exposure and is referenced in leading documents and journal articles internationally since its publication.

SURGICAL SITE INFECTION. QUALITY STANDARD 49

NICE (2013)

SURGICAL SITE INFECTION. CLINICAL GUIDELINE 74

NICE (2008)

**SURGICAL SITE INFECTION.
CLINICAL GUIDELINE 74**

NICE (2008)

**YOUR QUESTIONS
ANSWERED**

Critical questions on wound infection, focusing on microbiology, answered by Professor Prashini Moodley.

**WOUND INFECTION IN
CLINICAL PRACTICE**

An international consensus, now available in [Chinese](#), [English](#), [French](#), [German](#), [Italian](#), [Japanese](#) and [Spanish](#).

**WOUND INFECTION
REFERENCES**

A list of useful articles.

**THE WOUND INFECTION
INSTITUTE: A NEW GLOBAL
PLATFORM FOR THE CLINICAL
MANAGEMENT OF INFECTED
WOUNDS**

An introduction to the IWII, published in 2008 at the World Union of Wound Healing Societies, Toronto

**INFECTION CONTROL MADE
EASY**

An excellent guide, courtesy of *Ostomy Wound Management*.

JOIN US

- Log onto our web site
- Become a member
- Use our materials
- Participate in our projects
- Let us know what you would like to see from us
- Contact us
- Get your friends to join

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Slough:

What is it ? How do we manage it ?

Terry Swanson
Jenny Hurlow
Greg Schultz
Jacqui Fletcher



Australian
Wound
Management
Association
meeting 2014

Major Unanswered Questions About Slough

1. **What is slough (we need a clear clinical definition)?**
2. **What does slough look like on a wound bed (photo encyclopedia)?**
3. **What are the major molecular components that comprise slough?**
4. **What is the relationship between slough formation and biofilms?**
5. **Can we remove slough and biofilms and stimulate healing of wound?**

IWII HAS JUST LAUNCHED A MAJOR MULTINATIONAL COLLABORATIVE RESEARCH PROGRAM FUNDED BY FIVE MAJOR WOUND CARE COMPANIES TO ANSWER THESE KEY QUESTIONS

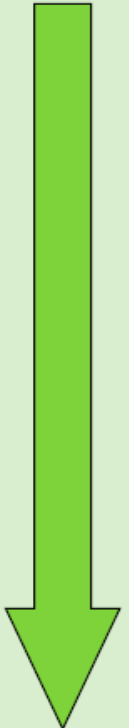
What Is The Best Definition Of “Wound Slough”?

Slough is defined as devitalized tissue made up mainly of fibrin, white blood cells and debris that collects in the wound bed (Brown, 2013). It can indicate the presence of infection, ischaemia or a dehydrated wound bed (Atkin, 2014).

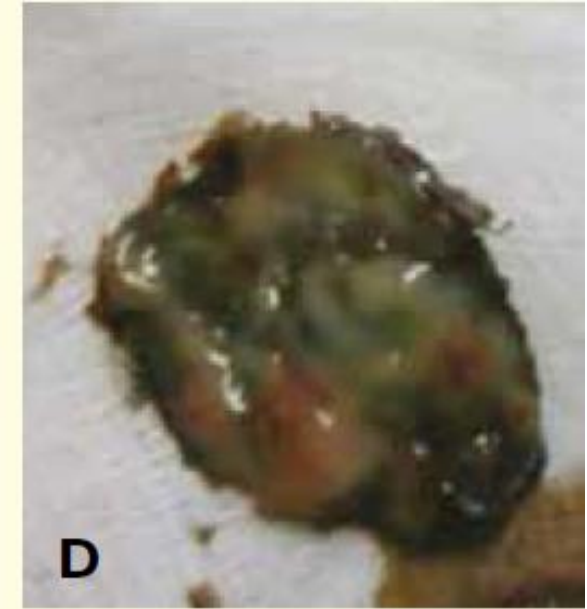
Different types of devitalized tissue appear in the wound bed, ranging from superficial slough, thick slough, dehydrated tissue and necrotic hardened eschar. However, the presence of slough interrupts granulation and delays healing. It can also be a focus of infection as bacteria can thrive in it (White and Cutting, 2008). Slough and devitalised tissue can stimulate the overproduction of matrix metalloproteases (MMPs) and this slows the healing process.

Journal of Community Nursing 2015 Vol 29, No 4, 79-80

Types of and colour of nonviable tissue

Colour	Moisture content (range)	Consistency	Adherence to wound bed
Cream/yellow	Moist or wet 	'Mucinous'/slimy soft	Non-adherent
Tan/brown		'Gelatinous' soft	Loosely adhered
Grey/blue May be seen with topical application of some silver antimicrobial dressings		Stringy/clumpy firm	Firmly adhered
Green May be seen in the presence of <i>Pseudomonas aeruginosa</i> – local infection		Fibrinous firm to hard	Separating edges
Black (in addition to full-thickness NVT) May also be seen in the presence of specific bacterial local infection		Dry and dehydrated	'Leathery' hard

What Are These Shiny “Sloughy” Substances on Wound Beds?

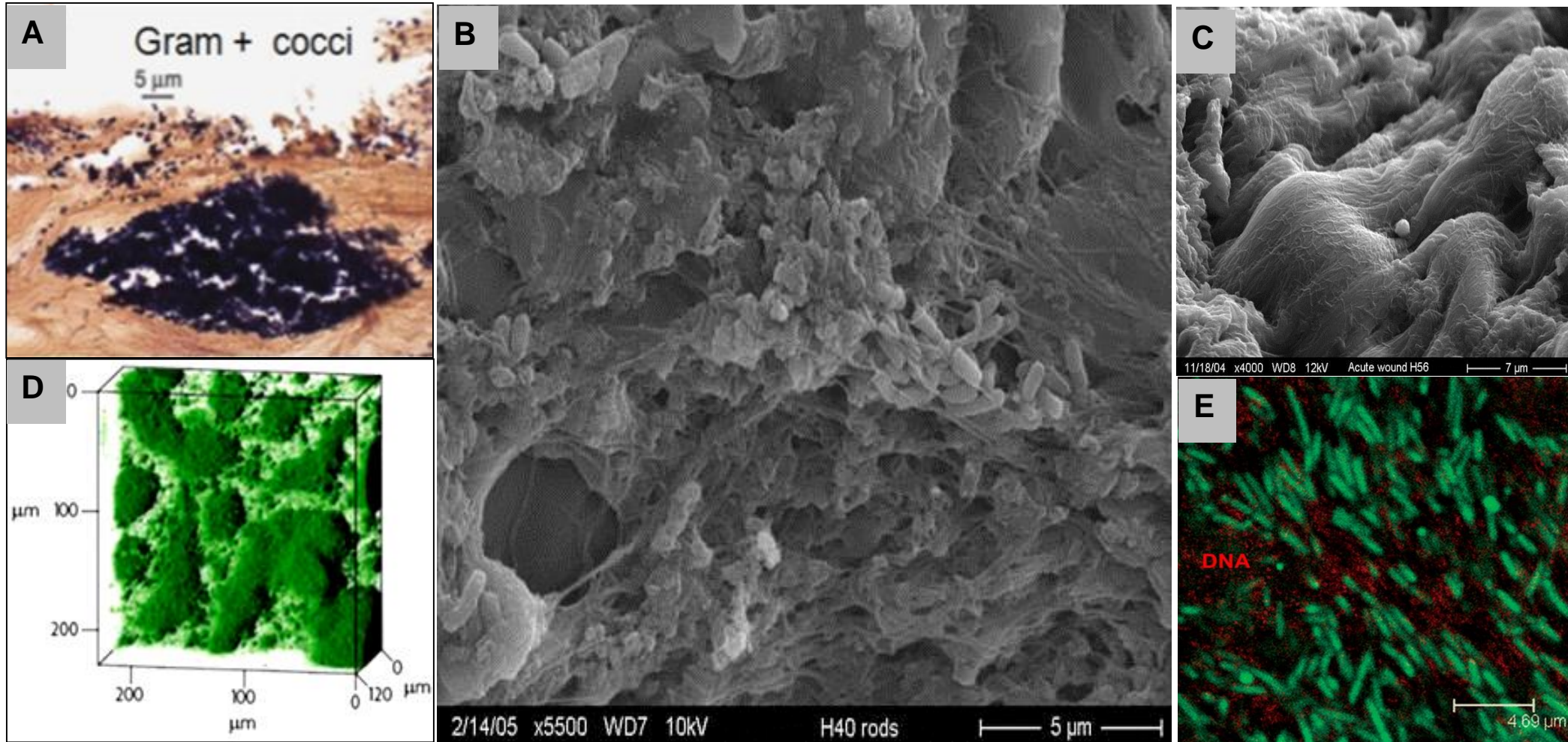


What is This Filmy Wound Slough? Is this Biofilm? Mainly Fibrin - Surrogate Biomarker for Inflammation



Courtesy of
Dr Randy Wolcott

Biofilms Identified in >80% of Biopsies of Chronic Wounds but in Only 6% of Acute Wounds



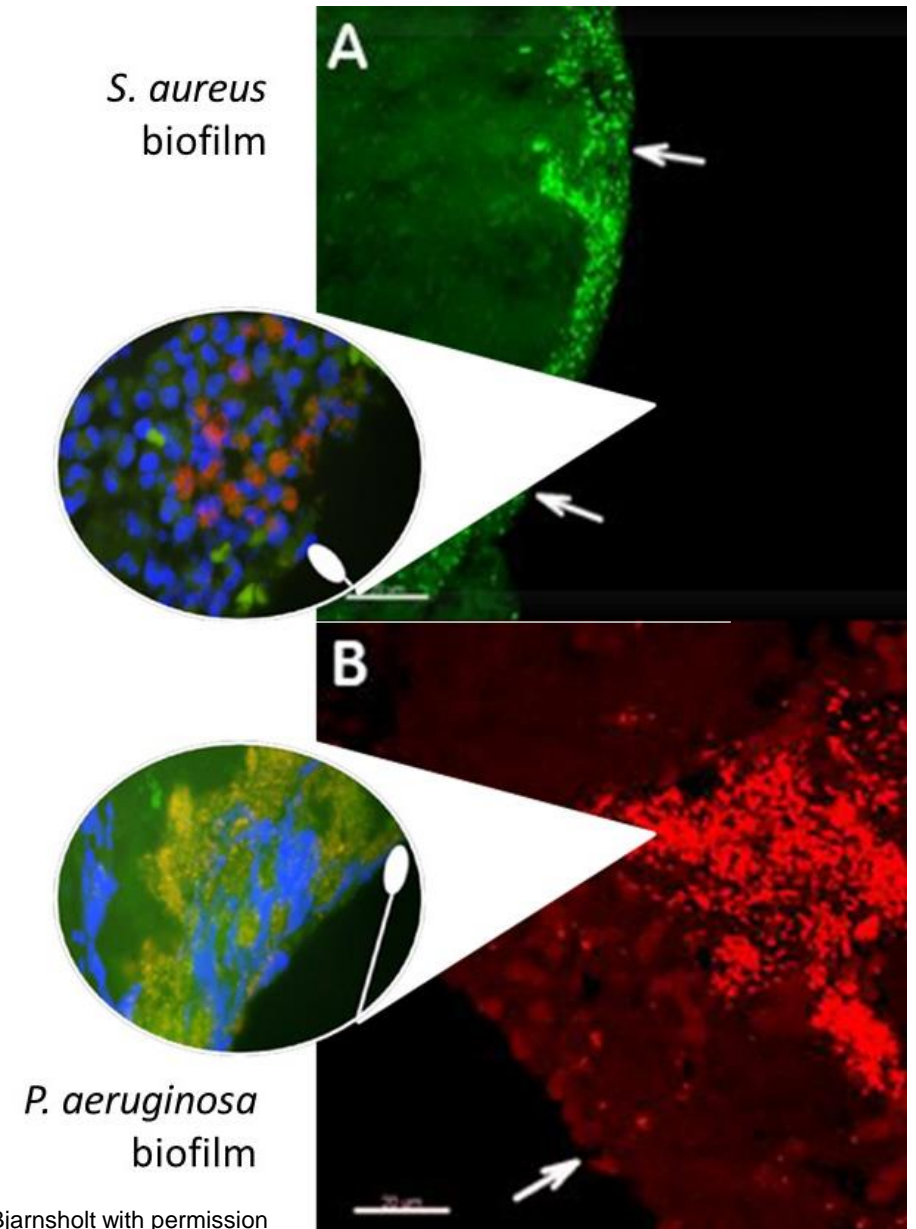
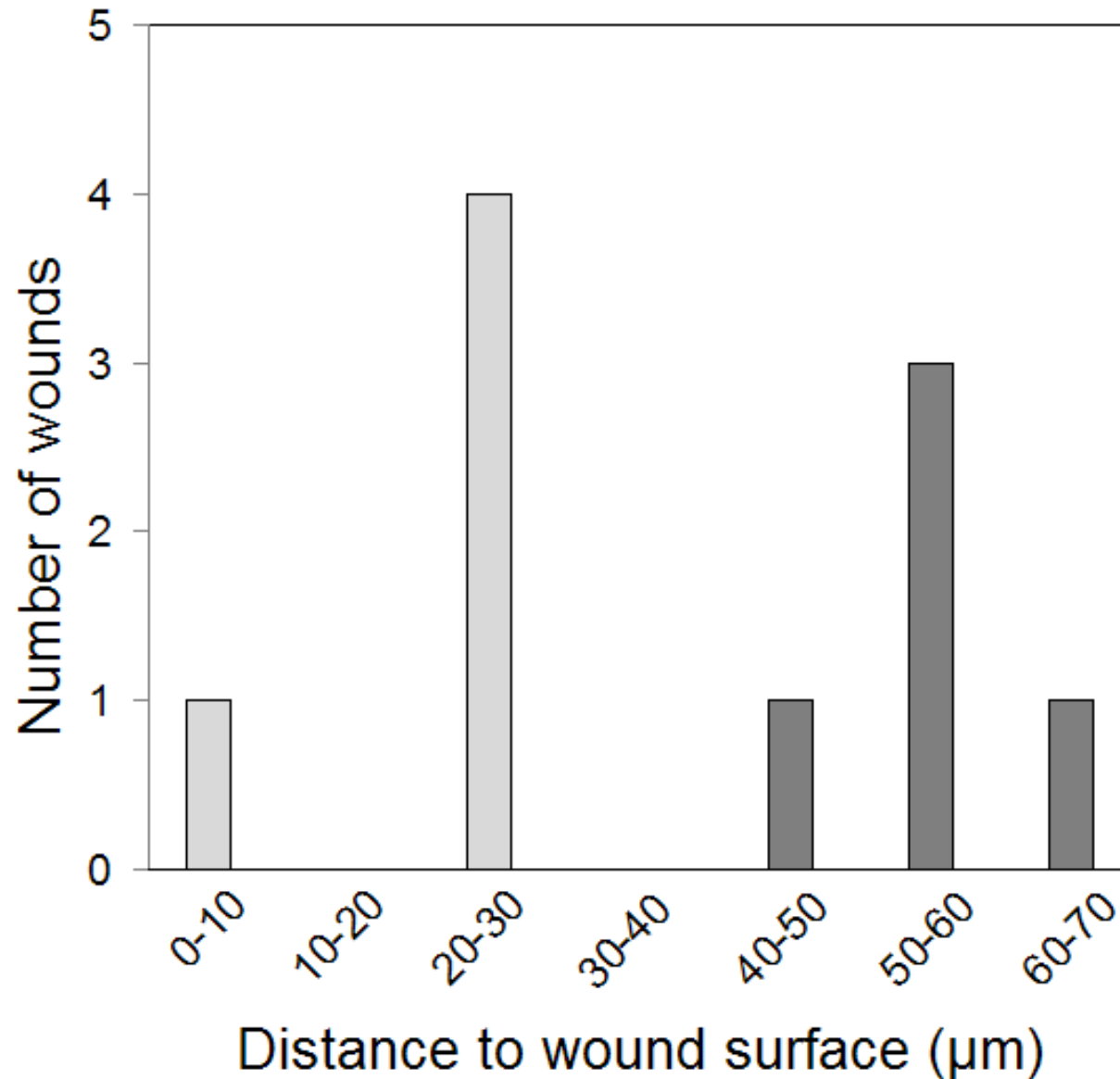
Panels A, B & C: G. James, E. Swogger, R. Wolcott, E. Pulcini, P. Secor, J. Sestrich, J. Costerton, P. Stewart. *Wound Rep Regen*, 16:37-44, 2008

Panel D: HC Flemming, J Wingender *The Biofilm Matrix*, *Nature Rev Microbiol*, 8:623-633, 2010

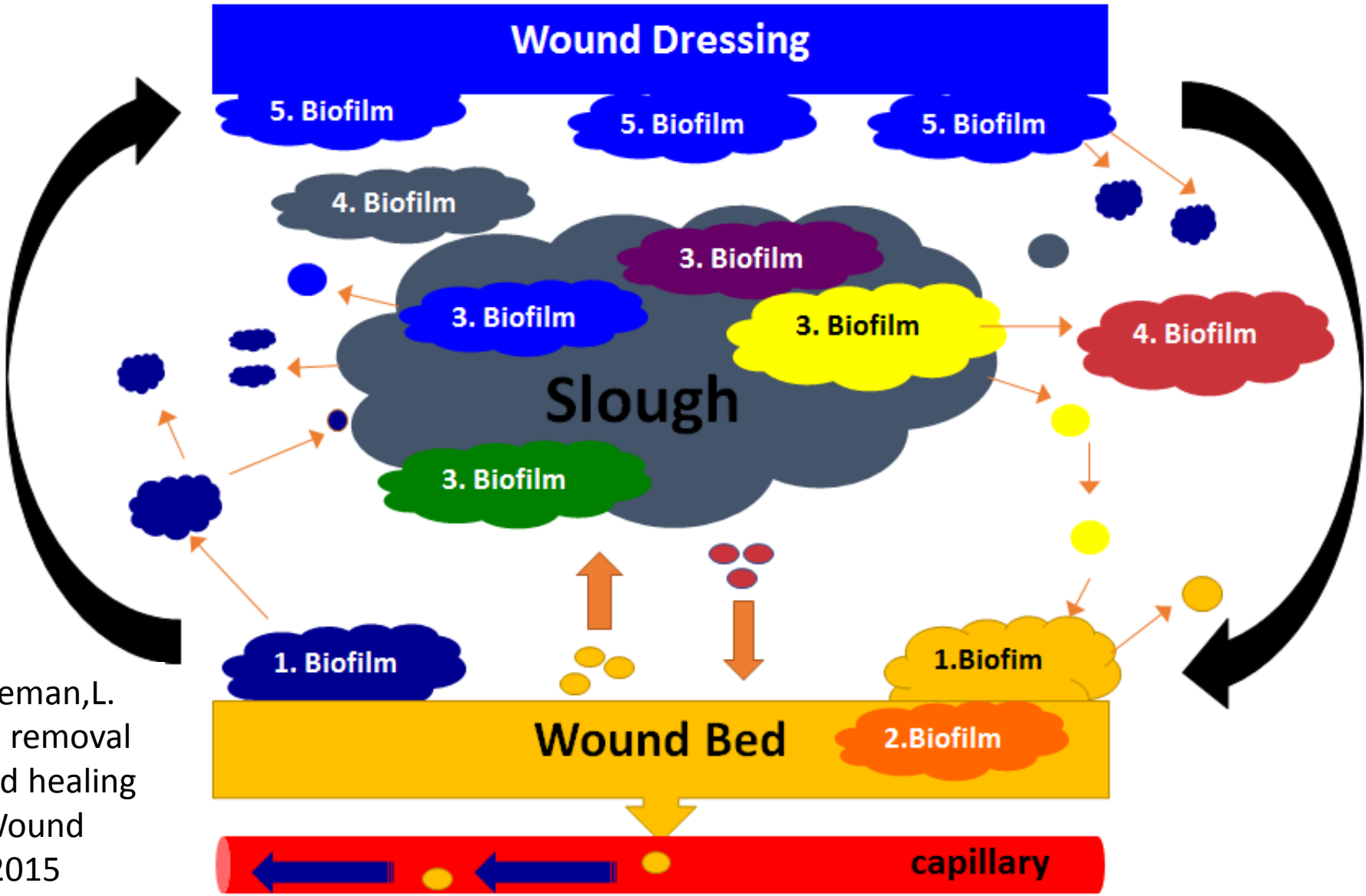
Panel E: SR Schooling, A Hubley, TJ Beveridge. *J Bacteriol* 191:4097-4012, 2009

M. Malone, T. Barjnholt, A. McBain, G. James, P. Stoodley, D. Leaper, M. Tachi, G. Schultz, T. Swanson, R. Wolcott. Prevalence of biofilms in chronic wounds: a systematic review and meta-analysis of published data, *J wound Care, J Wound Care*, 25(12): 1-12, 2016

Distribution of Bacterial Species in Wound Beds



Biofilm Bacteria Are Present In Multiple Locations



Pervical, SL and Suleman, L.
Slough and biofilm: removal
of barriers to wound healing
by desloughing. J Wound
Care, 24:498-510, 2015

1-Surface of wound bed; 2-Deep in wound bed; 3-Slough; 4-Wound fluid; 5-Wound dressing

Can you see
slough or biofilm
in this wound?

Photo provided by Dr Matthew Malone



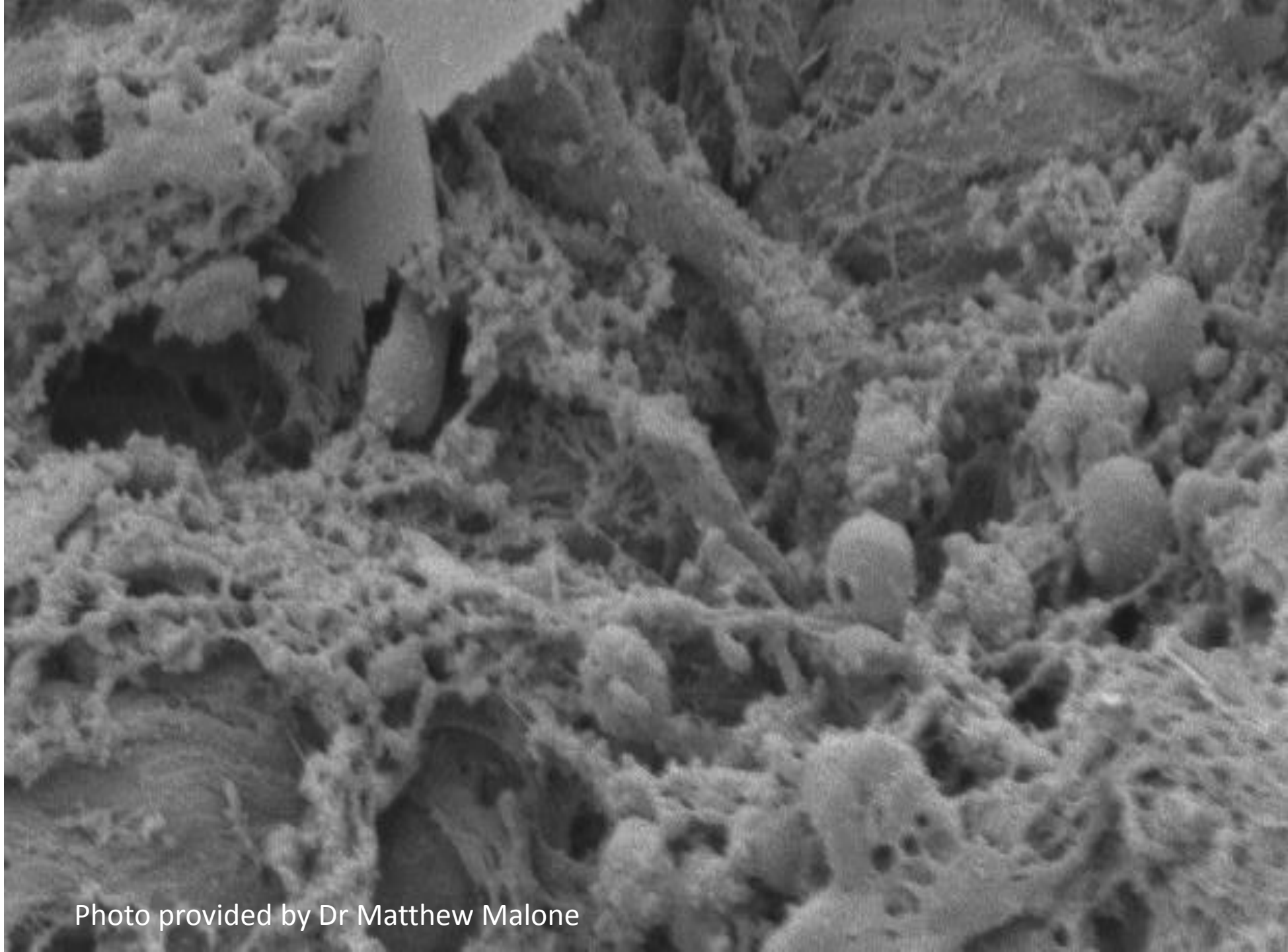


Photo provided by Dr Matthew Malone

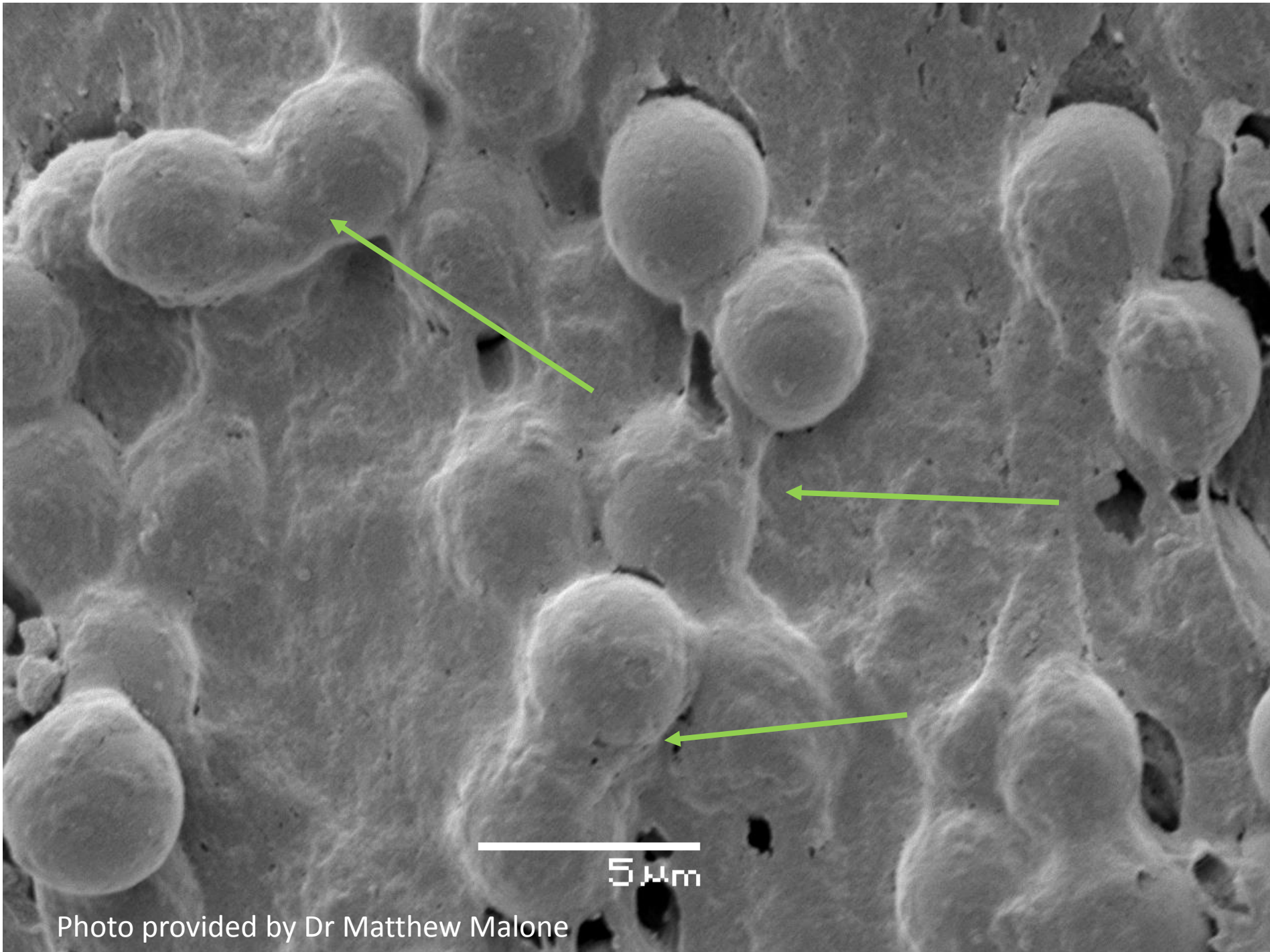


Photo provided by Dr Matthew Malone

IWII Slough Research Program

- 1. What is slough (we need a clear clinical definition)?**
 - Will use a modified Delphi process to achieve a consensus definition**
- 2. What does slough look like on a wound bed?**
 - Will generate a “photo encyclopedia” of examples of wound slough**
- 3. What are the major molecular components that comprise slough?**
 - Will use proteomics and immunochemistry to identify molecules**
- 4. What is the relationship between slough and bacterial biofilms?**
 - Will perform SEM, TM, LM, and functional biofilm assays**
- 5. Can we remove slough and biofilms and stimulate healing of wound?**
 - Will correlate wound healing with removal of slough and biofilms**

IWII Slough Project Leaders



Lindsay Kalan, PhD

Dr. Lindsay Kalan is an Assistant Professor at the University of Wisconsin-Madison in the School of Medicine and Public Health. She obtained her PhD in Biochemistry from McMaster University where she studied the evolution of antibiotic resistance in the environment and clinic.



Gregory Schultz, PhD

Dr. Gregory Schultz is Professor of Obstetrics and Gynecology and Director of the Institute for Wound Research at the University of Florida. Dr Schultz has authored 400 scientific publications that have been cited over 17,000 times. He is PI or Co-investigator on grants totaling over \$35 million, and is an inventor on over 30 patents in the area of wound healing. He served as President of the Wound Healing Society from 1999 to 2001.