



DISCOVER THE POWER OF SILVER
DRESSINGS WITH **AG OXYSALTS** —
THE EVOLUTION IN MANAGING
INFECTED WOUNDS

1 JULY
2021

HELEN THOMASON

LUNCHTIME
13:00 - 13:45

Discover the power of silver dressings with Ag Oxysalts™ Technology

Dr Helen Thomason will present:

- Why biofilms are difficult to treat
- The differences in silver technology
- How Ag Oxysalts™ Technology can create a favourable wound environment for healing.

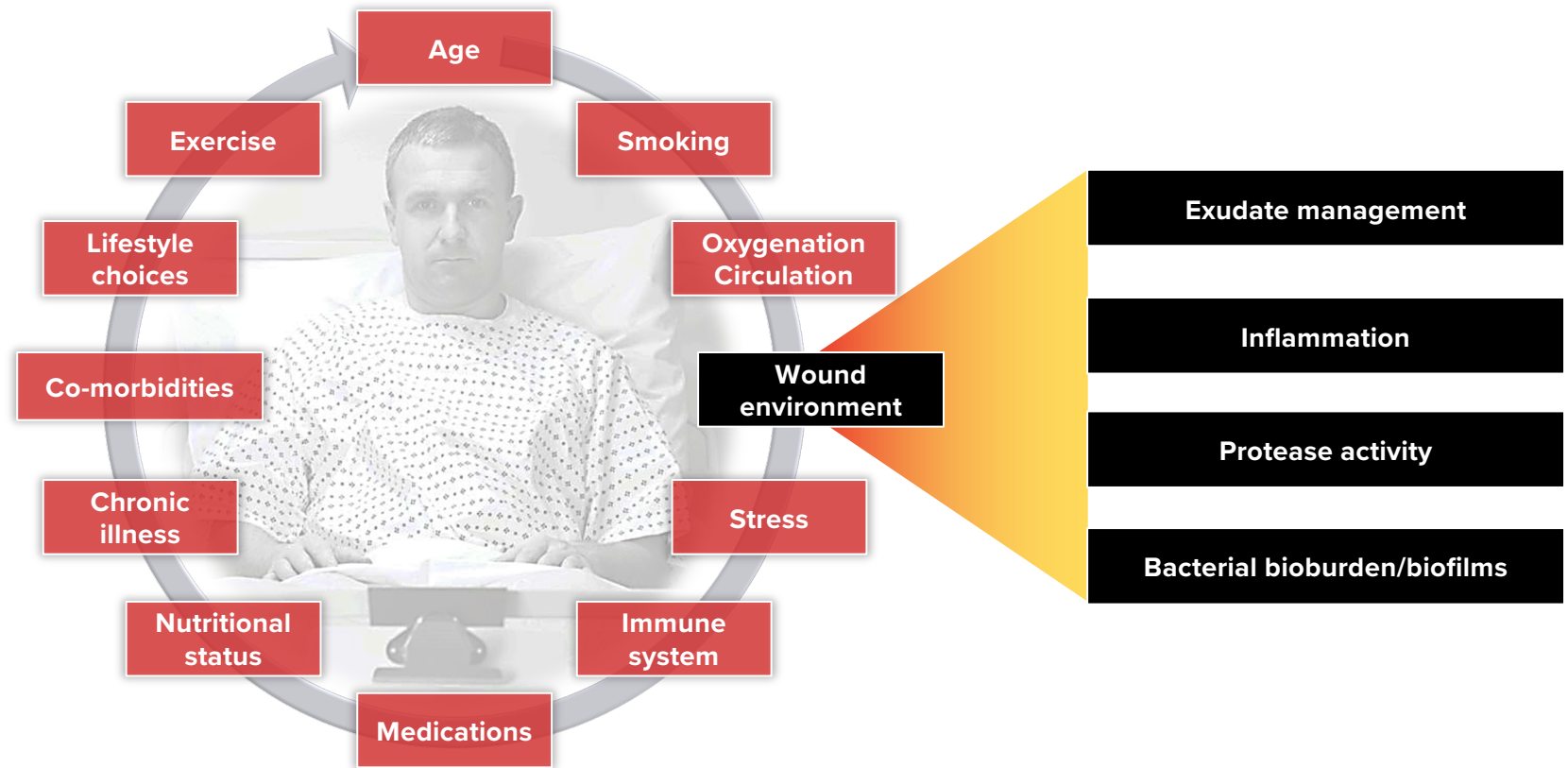


Disclaimer

- Prior to the use of any 3M Therapy System, it is important for the provider to consult treating physician and read and understand all instructions for use, including safety information, dressing application instructions, and therapy device instructions.
- Specific indications, contraindications, warnings, precautions, and safety information exist for these products and therapies. Please consult a clinician and product instructions for use prior to application.
- This information is intended for healthcare professionals only. 3M recommends that clinicians participate in device in-service and training prior to use.
- Scientific research was conducted by 3M employees and consultants.
- Follow local institutional protocols for infection control and waste disposal procedures. Local protocols should be based on the applicable federal, state and/or local government environmental regulations.

The compromised patient

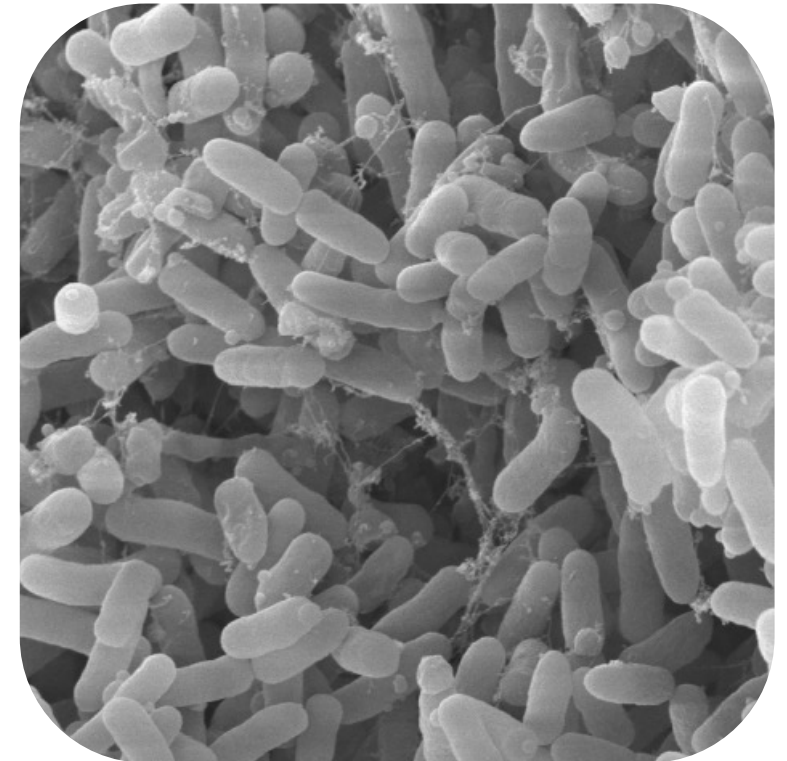
Factors that impact healing



Picture: Cullen B: Adopted from Guo S, DiPetro LA (2010) Factors affecting wound healing. *J Dent Res* **89**(3): 219–29

Wound infection & biofilm

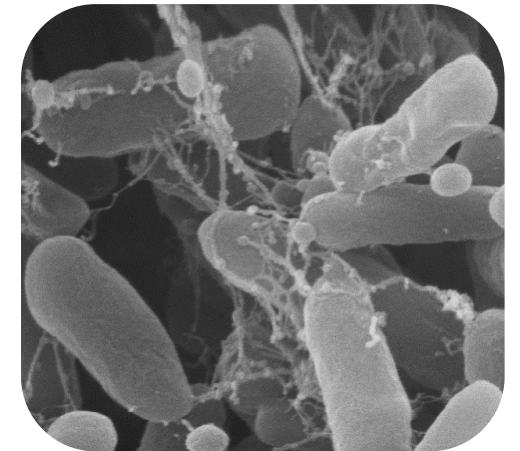
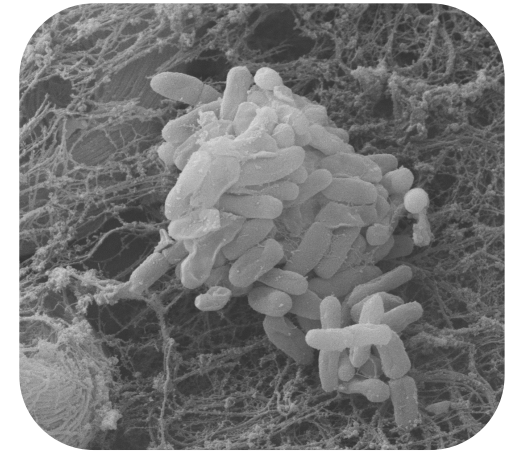
- Planktonic microorganisms: free-floating single cells
- A biofilm is a **community of microorganisms, irreversibly attached** to a surface and enclosed within an **extracellular matrix** composed of extracellular polymeric substances
- Bacteria within a biofilm are **sessile** and exhibit **increased tolerance** to host immune response and antimicrobial agents.



Complications associated with biofilms

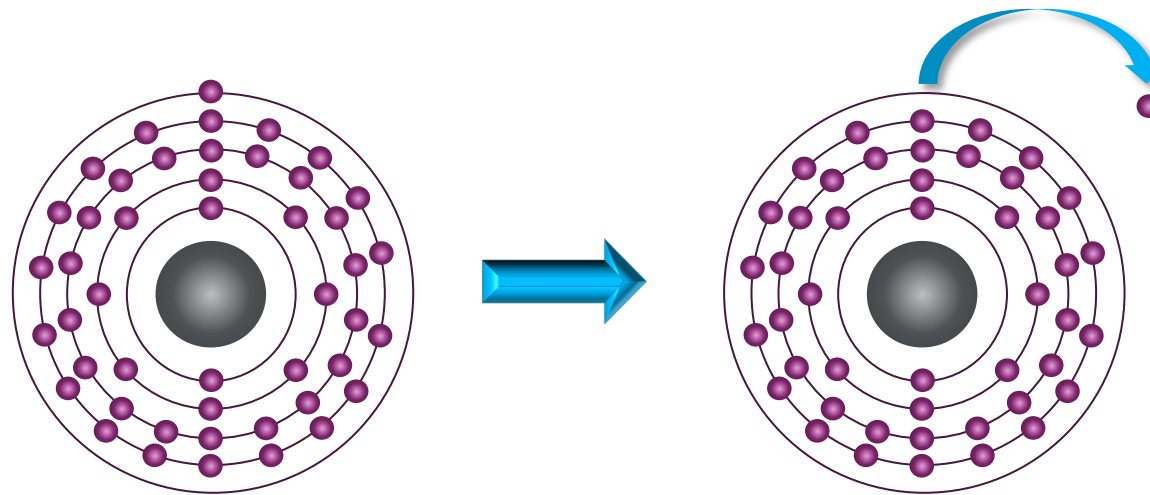
1. Bacteria adhere to a surface
2. Secrete an extracellular polymeric substance (EPS)
3. Bacteria within a mature biofilm exhibit slow growth
4. Biofilm can quickly reform

Potent antimicrobials are required for effective anti-biofilm treatment.



Antimicrobial action of silver

For silver to gain antimicrobial efficacy it must lose electrons to become ionic silver



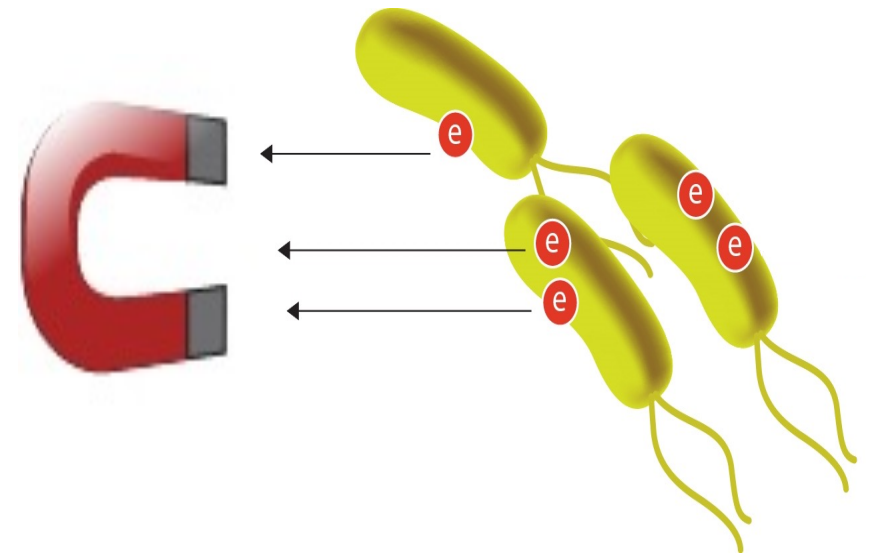
Metallic silver (Ag^0)

Ionic silver: Ag^1+

Antimicrobial action of silver

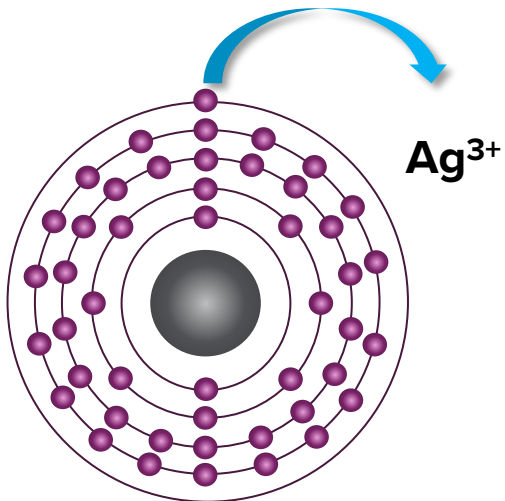
Ionic silver (Ag^{1+}) kills bacteria by scavenging electrons from bacterial cells:

- Disrupts the cell wall
- Interferes with DNA replication
- Disrupts enzymes and proteins essential for survival.

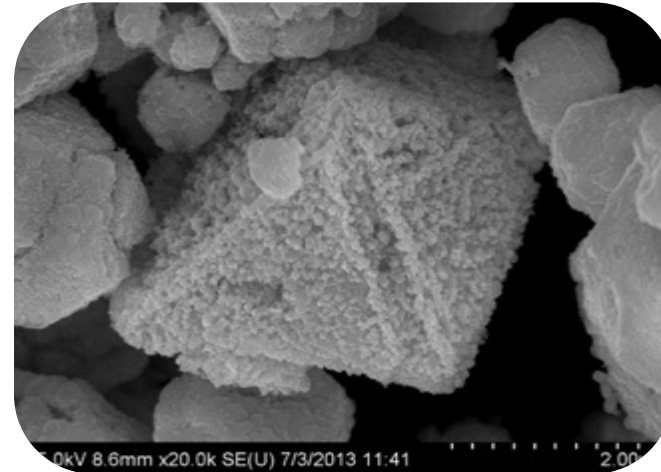


Ag Oxysalts™ Technology

- Proprietary silver technology: silver oxynitrate or $\text{Ag}_7\text{NO}_{11}$
- Ag Oxysalts™ Technology breakdown to produce Ag^{1+} , Ag^{2+} , Ag^{3+} .

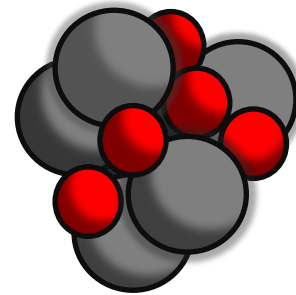
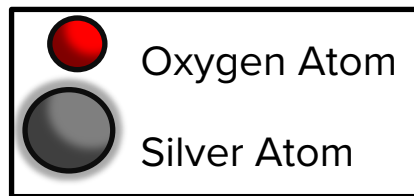


Ionic Silver: Ag^{3+}

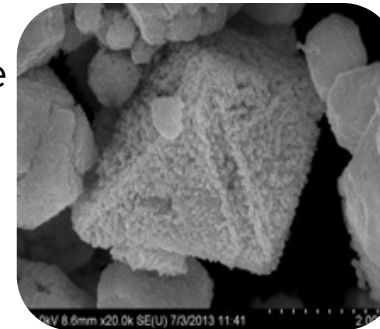


Ag Oxysalts™ Technology

- The higher valent states of silver have greater reduction potentials (V) and oxidising power.



Exposure
to fluid
→



Ag 1+

$E^\circ = 0.80$

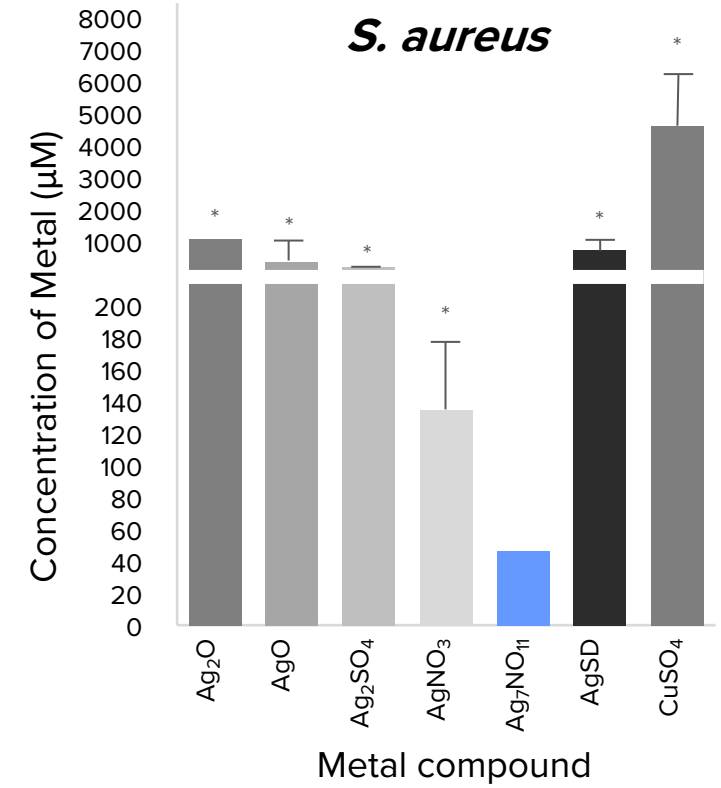
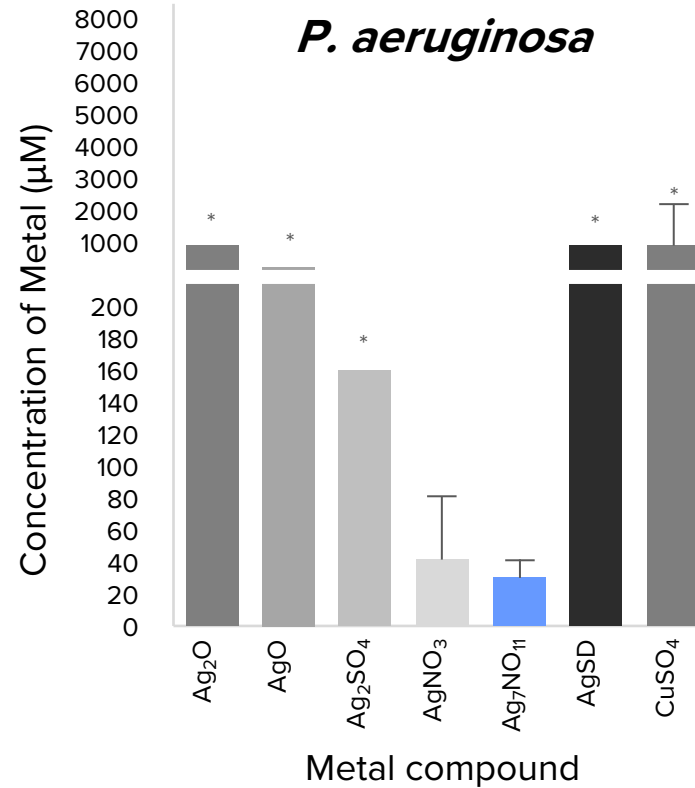
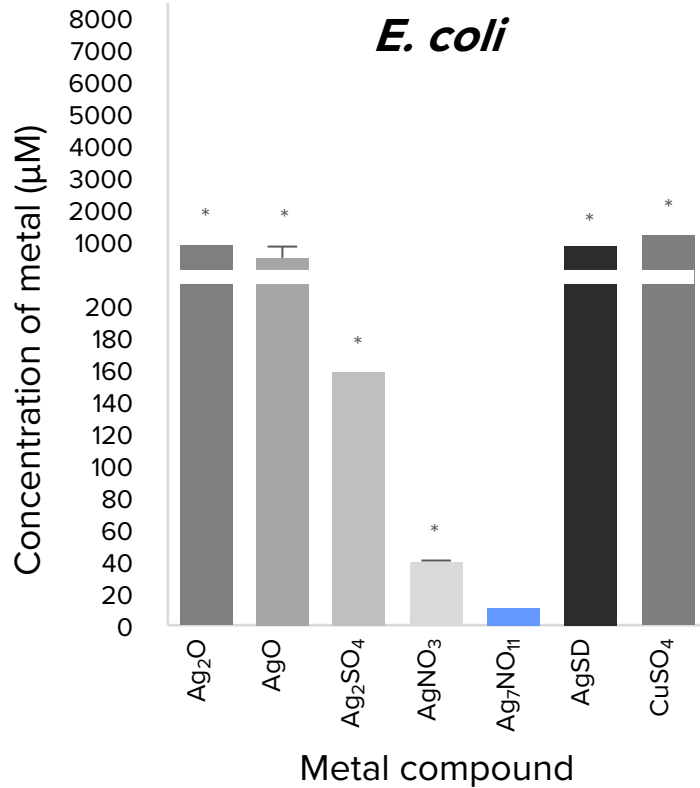
Ag 2+

$E^\circ = 1.98$

Ag 3+

$E^\circ = 1.80$

Ag Oxysalts™ Technology kills bacteria within a biofilm

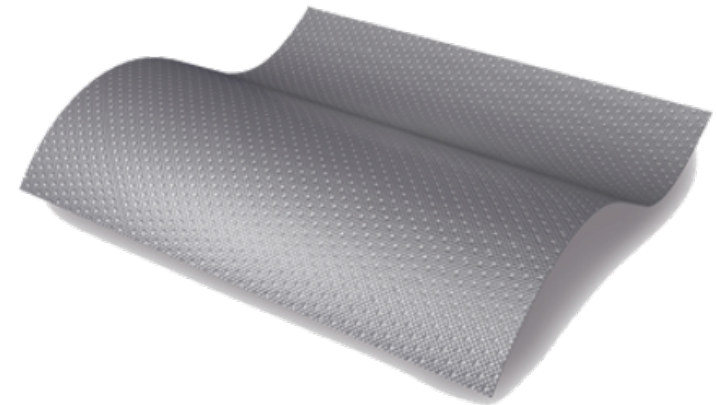


All silver stock solutions were prepared at equal molar concentrations of Ag molecules

Lemire JA, et al (2015) Silver Oxynitrate, an unexplored silver compound with antimicrobial and antibiofilm activity. *Antimicrobial Agents Chemother* **59(7)**: 4031–9

3M™ Kerracontact™ Ag dressing

- Advanced silver wound contact layer composed of three layers:
 - Two non-adherent polyethylene mesh wound contact layers
 - One polyester core
- All three layers coated with Ag Oxysalts™ Technology
- Silver content = 40mg/100cm².



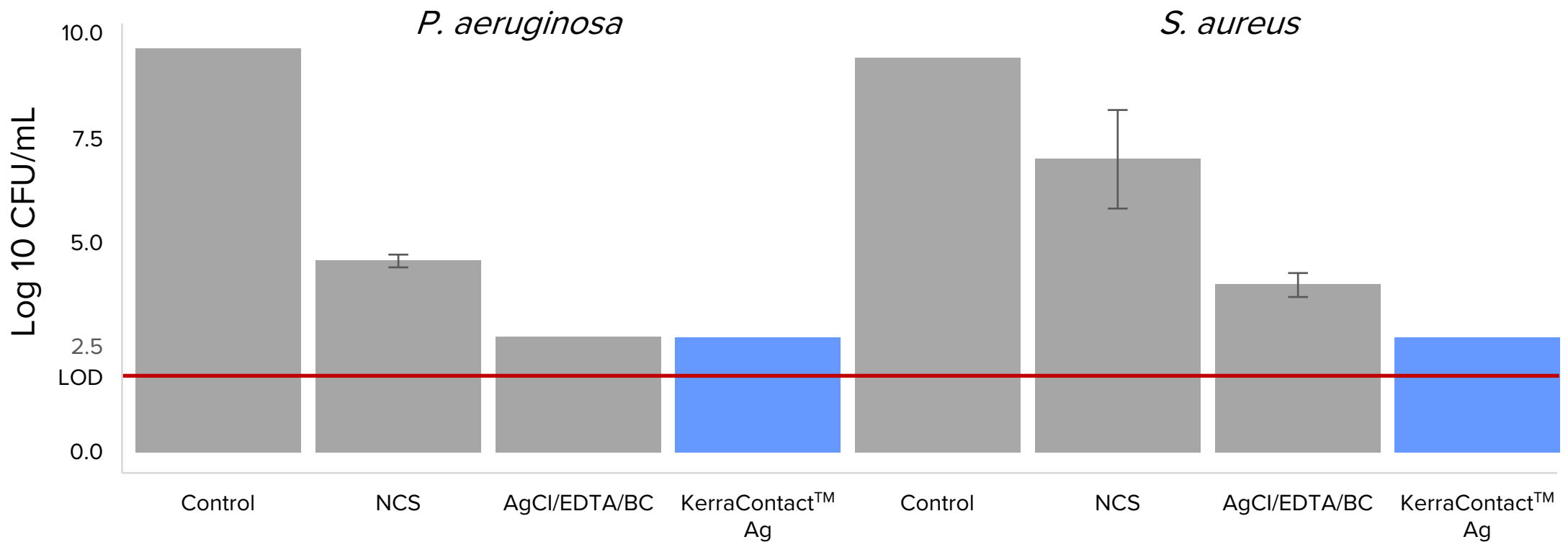
Antimicrobial efficacy



Kalan LR, et al (2017) Targeting biofilms with multidrug-resistant bacteria with silver oxynitrate. *Int J Antimicrobial Agents* **49**: 719–26

Effectiveness against biofilm

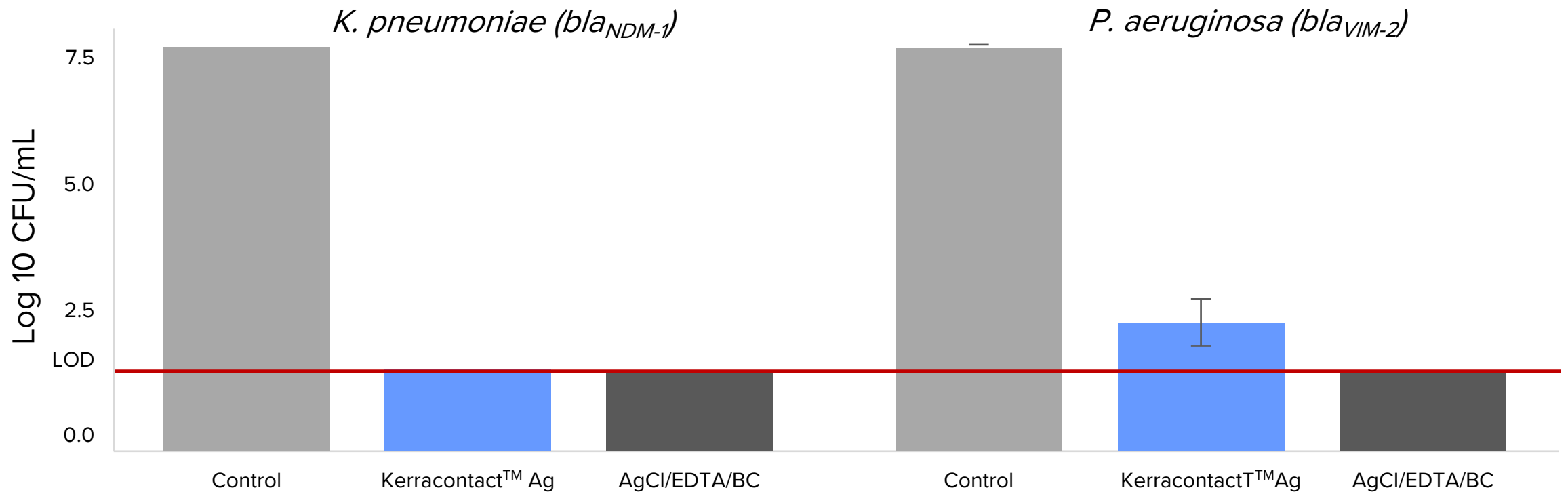
Mature *in vitro* biofilms treated for 4 hrs with wound dressings



Kalan LR, et al (2017) Targeting biofilms with multidrug-resistant bacteria with silver oxynitrate. *Int J Antimicrobial Agents* **49**: 719–26

Effectiveness against multi-drug resistant biofilm

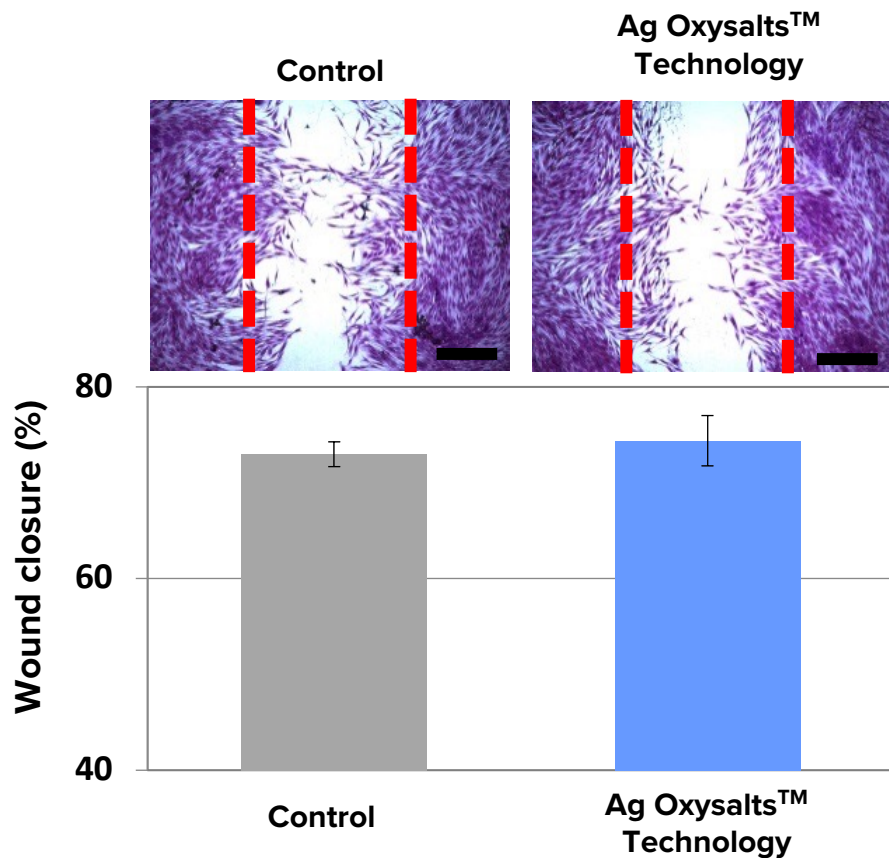
Mature multi-drug resistant biofilms treated with wound dressings for 24 hrs



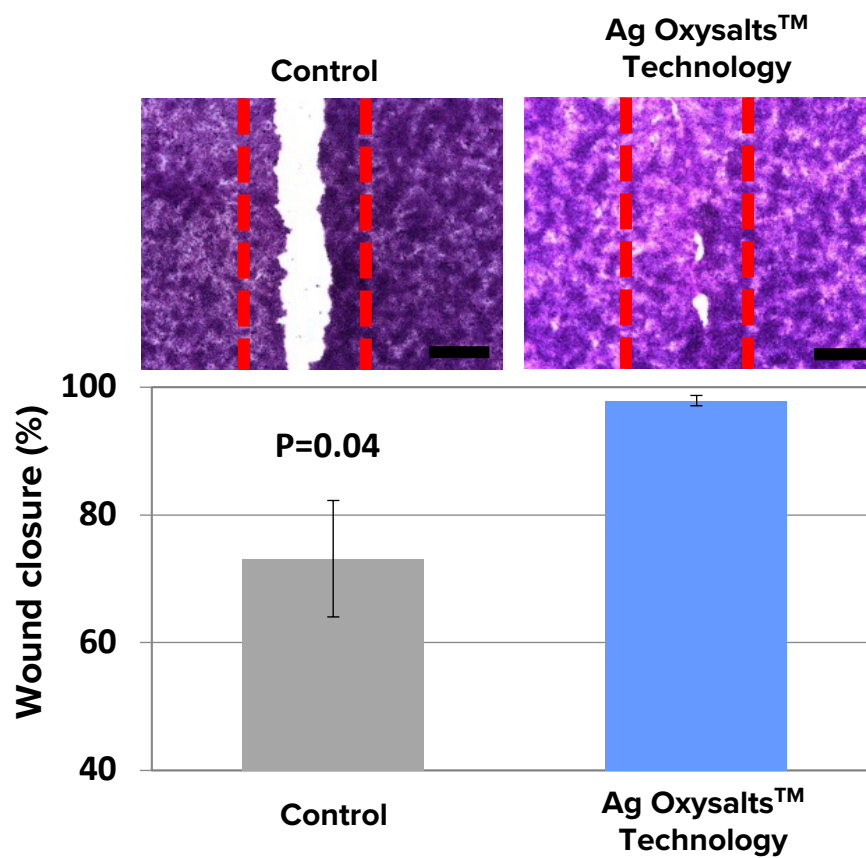
Kalan LR, et al (2017) Targeting biofilms with multidrug-resistant bacteria with silver oxynitrate. *Int J Antimicrobial Agents* **49**: 719–26

Healing independent of infection

Fibroblasts



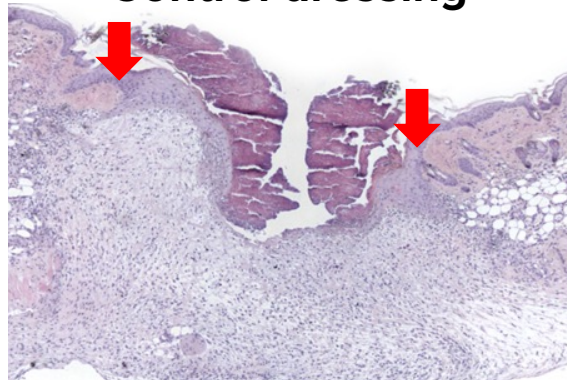
Keratinocytes



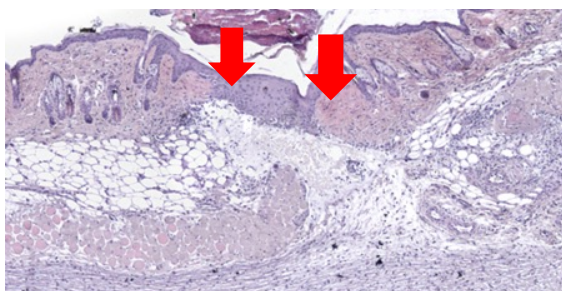
Thomason HA, et al (2018)
Silver oxysalts promote cutaneous wound healing independent of infection.
Wound Repair Regen **26(2)**: 144–52

Healing independent of infection

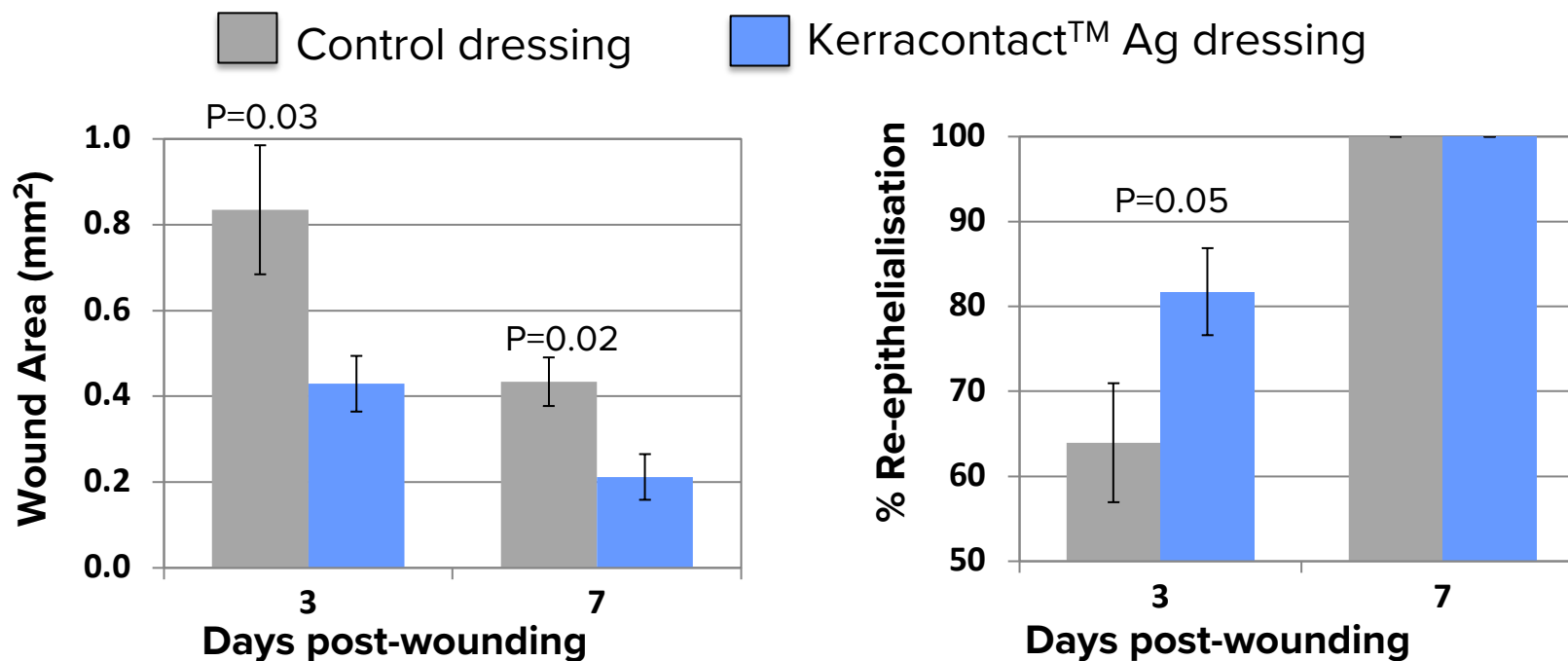
Control dressing



Kerracontact™ Ag dressing



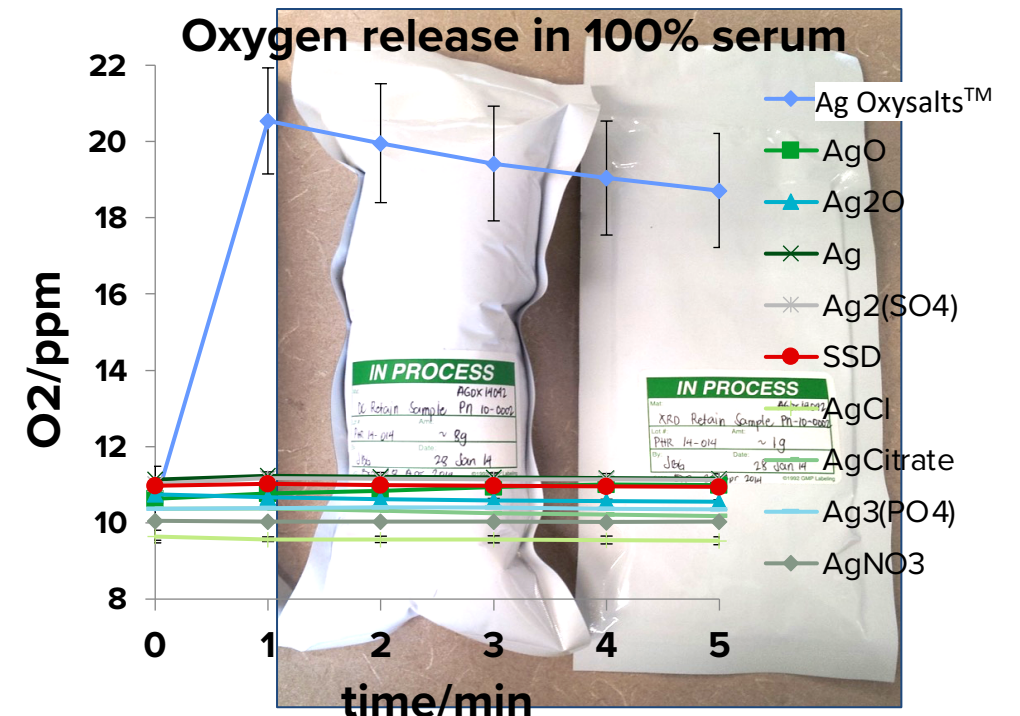
Murine incisional wounds treated for 3 days with wound dressings



Thomason HA, et al (2018) Silver oxysalts promote cutaneous wound healing independent of infection. *Wound Repair Regen* **26(2)**: 144–52

Ag Oxysalts™ Technology produces oxygen

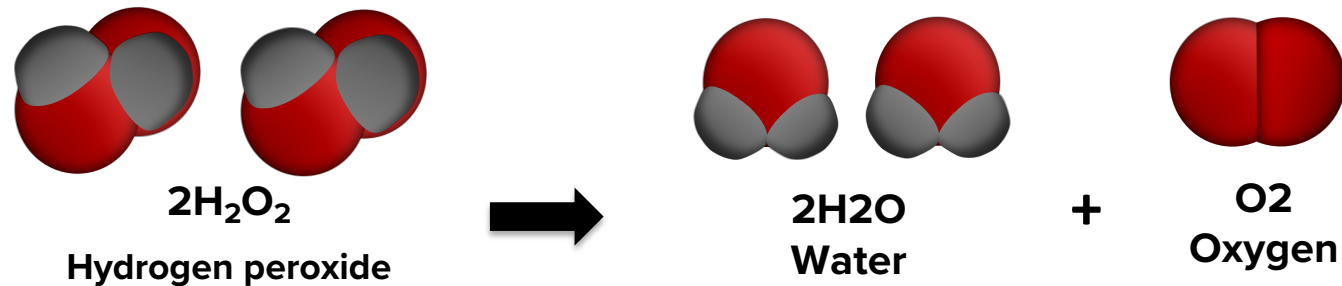
- All aspects of wound repair require adequate oxygen
- Systemic and topical oxygen therapies promote healing
 - Increase angiogenesis
 - Enhance inflammatory cell activity
 - Down-regulates pro-inflammatory cytokines
 - Up-regulates growth factors
 - Potentiates effects of antibiotics.



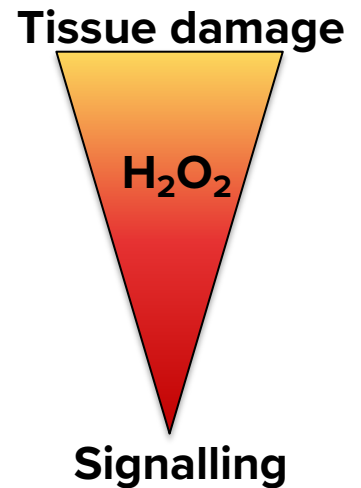
Thomason HA, et al (2018) Silver oxysalts promote cutaneous wound healing independent of infection. *Wound Repair Regen* **26(2)**: 144–52

The role of hydrogen peroxide (H₂O₂) in wound healing

- Silver catalyses hydrogen peroxide breakdown to oxygen and water.



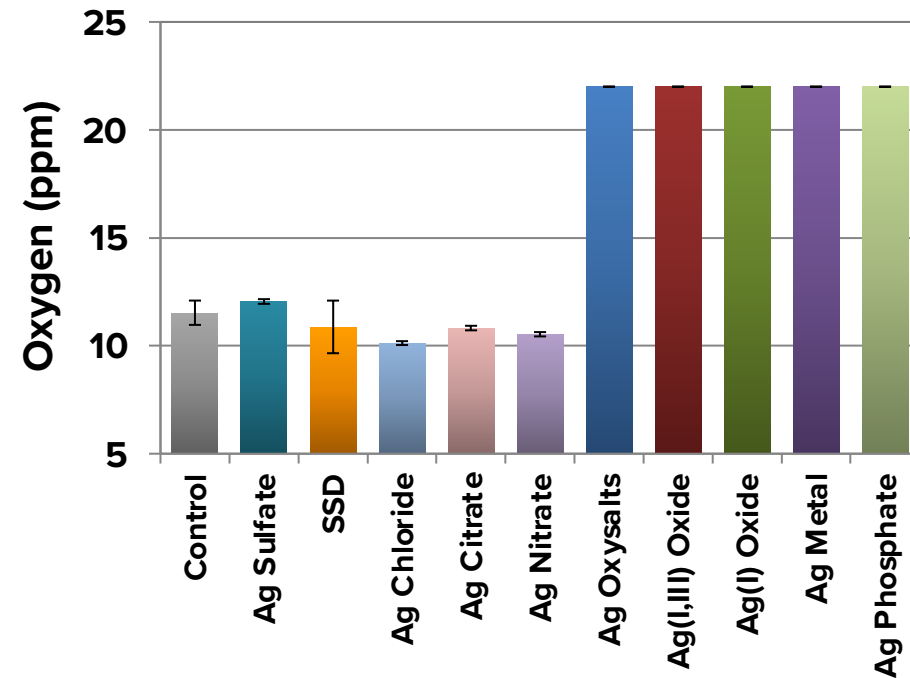
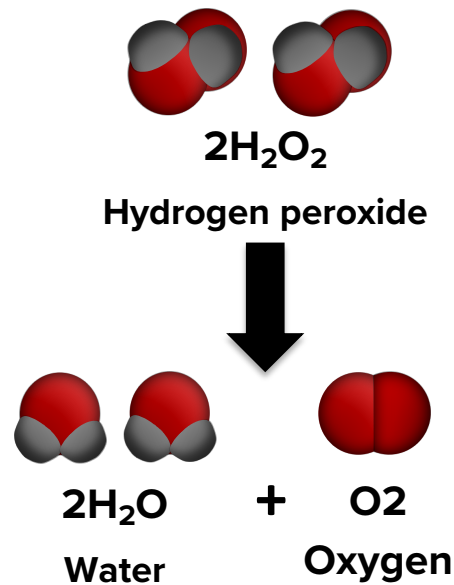
- Low concentrations promote healing but high concentrations inhibit healing
- In chronic wounds excess levels create a hostile wound environment and cause tissue damage.



Thomason HA, et al (2018) Silver oxysalts promote cutaneous wound healing independent of infection. *Wound Repair Regen* **26(2)**: 144–52

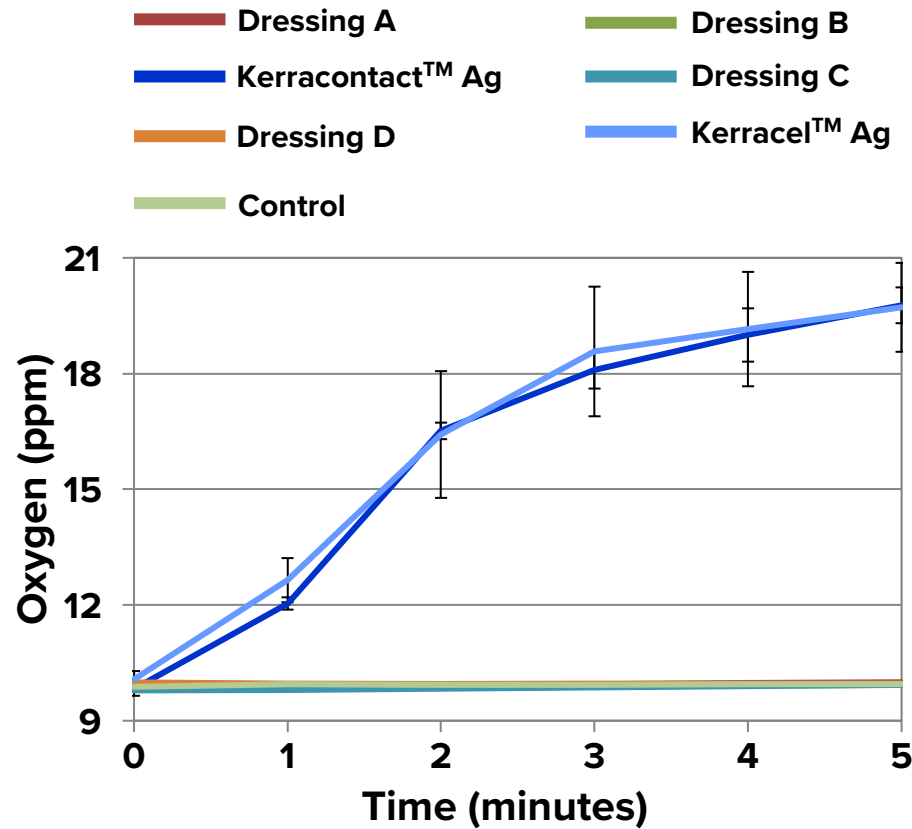
Ag Oxysalts™ Technology catalyses H₂O₂ breakdown

- Silver catalyses hydrogen peroxide breakdown to oxygen and water.



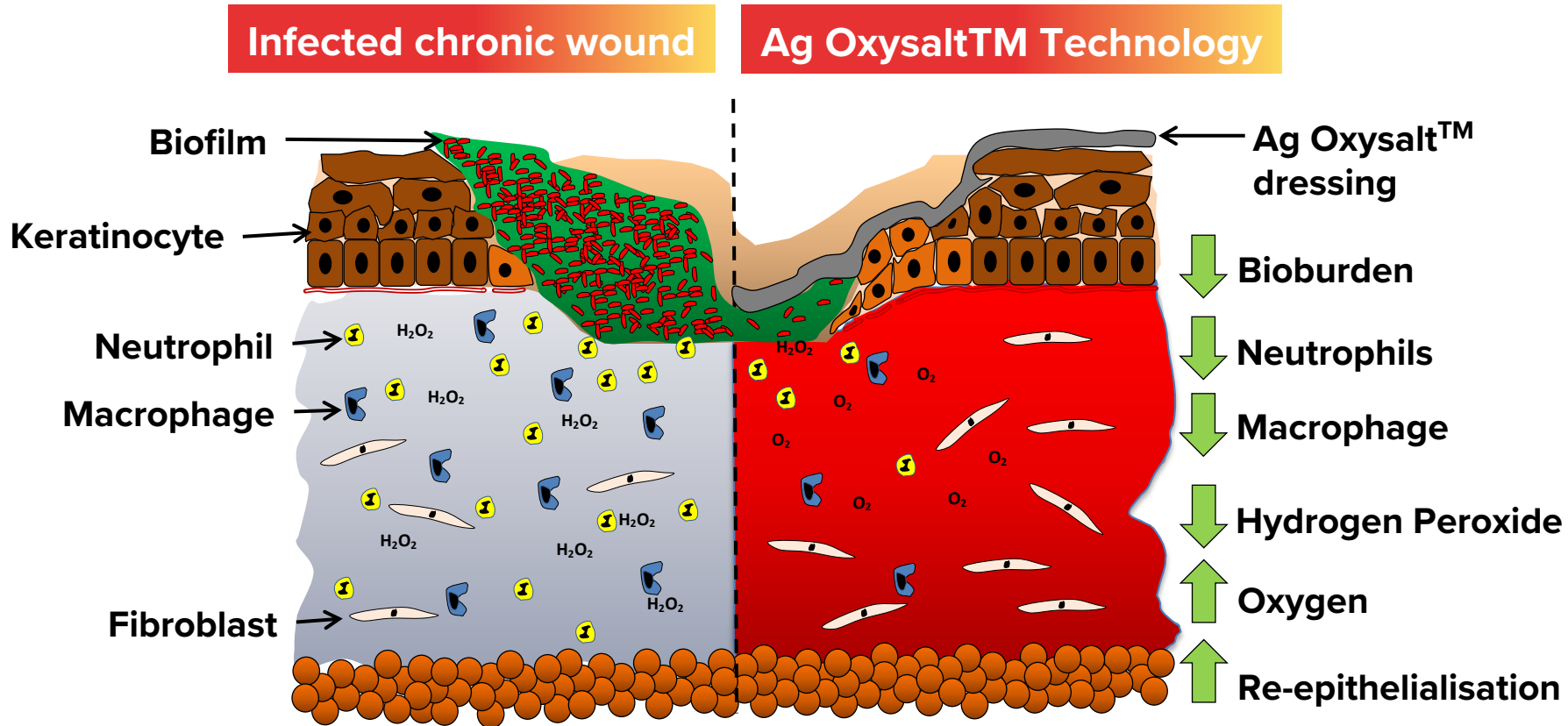
Thomason HA, et al (2018) Silver oxysalts promote cutaneous wound healing independent of infection. *Wound Repair Regen* **26(2)**: 144–52

Ag Oxysalts™ Technology Catalyses H₂O₂ Breakdown

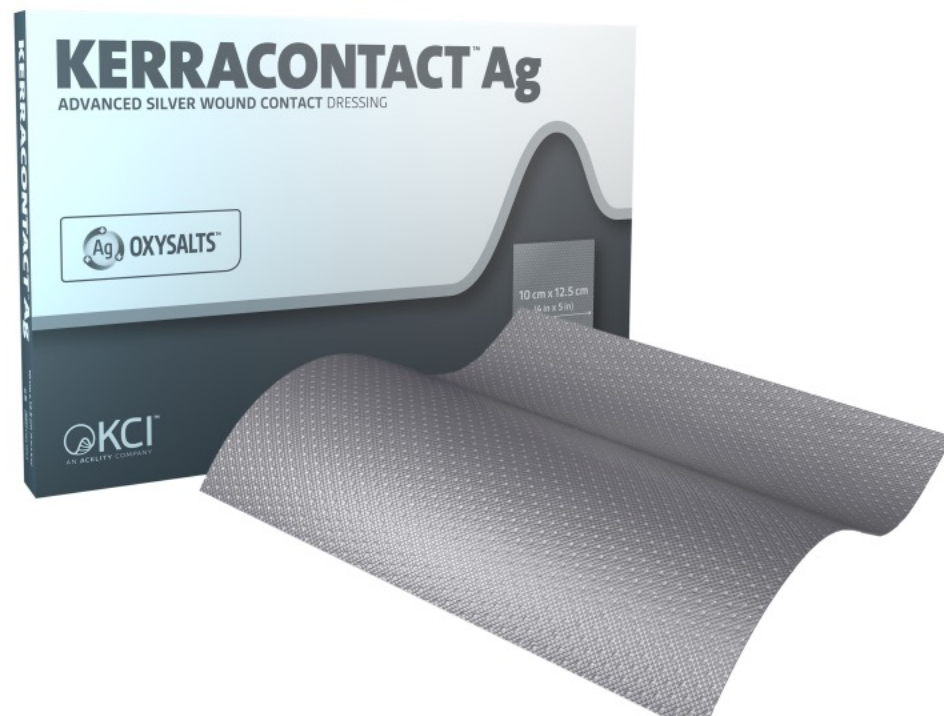


Thomason HA, et al (2018) Silver oxysalts promote cutaneous wound healing independent of infection. *Wound Repair Regen* **26(2)**: 144–52

Rebalance the wound environment



www.kciuk.co.uk/healthcare-professionals/uk-product-catalog/catalog/kerracontact-ag-dressing





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