**BACKGROUND**

Early intervention to manage combat wounds, particularly burn wounds, is a necessity. Immediate evacuation for skilled interventions is not always possible. The need of the hour is to close the time gap between burn injury and burn treatment in the field setting to decrease morbidity and mortality. Under these settings, infection, particularly with biofilm forming bacteria, presents a significant challenge due to their recalcitrance to treatment with standard-of-care interventions.

Persisting bacterial phenotypes such as small colony variants (SCV) are a subset of antibiotic tolerant bacterial cells that are often biofilm forming in nature. The key to managing such hostile biofilms of persisting bacteria is complete eradication and one approach is to dismantle the structural framework of these biofilms. Extracellular DNA (eDNA) is a major component of the biofilm. DNase treatments can eradicate standard biofilms but not persisting biofilms. Our work showed that, fragmented extracellular DNA (dDNA) released from a persisting strain of *Pseudomonas aeruginosa* (PAO1ΔwspF) biofilm was responsible for resistance to disruption by DNase. We reported that a DNase resistant SCV biofilm of *Pseudomonas aeruginosa* (PAO1ΔwspF strain) can be disrupted by Aurintricarboxylic acid (ATA), a chemical inhibitor of covalent binding between eDNA and protein. In our preclinical porcine burn wound model, we found that topical ATA treatment significantly reduced biofilm formation capacity and compromised in vitro SCV-PA biofilm formation. (A) Digital images of burn wound re-epithelization. Representative H&E images showing significant complete epithelialization of GelATATM treated wounds that was evident by d56 compared to control Acticoat. Scale=2000um. Inset =200um. (n=12 wounds in 3 pigs).

**Objectives**

To test the efficacy of GelATATM wound care dressing (ATA incorporated into a polymer-based gel) against polymicrobial persisting biofilm infection in a preclinical porcine burn wound model.

**Methods**

- In vivo testing: Eight 2"x2" full thickness burn wounds were made on the dorsum of (70-80lbs) female domestic white pigs (n=12 wounds in 3 pigs).
- Polymicrobial SCV biofilm infection was established with *Pseudomonas Aeruginosa* (PAO1ΔwspF) and *Staphylococcus Aureus* (S. aureus rexB) at 10^4 colony forming units (CFU)/ml which are clinical isolates.
- Wounds were treated with either placebo dressing (ActicoatTM) or GelATATM once weekly, at day 28 GelATATM was switched to ElastogelTM alone until day 56.
- Progression of burn wound healing was followed using noninvasive imaging (1) digital photography (2) Trans Epidermal Water Loss (TEWL).
- Tissue biopsy for histology and Scanning Electron Microscopy (SEM).

**Results**

- GelATATM disrupted wound biofilm

**Conclusion**

This work presents first in vivo evidence for the efficacy of GelATATM in disrupting persisting biofilm and promoting functional wound closure in a pre-clinical porcine burn wound model.

**References**

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**GelATATM Wound Care Dressing Against Hostile Wound Infection by Hyperbiofilm Forming Bacteria**

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