Abstract

Introduction: Chronic wounds are commonly associated with biofilms and exaggerated inflammation resulting in non-healing. "Bioflammacides" are a recently described group of compounds used in the treatment of chronic and recalcitrant wounds. "Bioflammacides" target biofilms and inflammation aiding a change in the wound environment enabling cutaneous wound healing.

Aim: This study aims to evaluate the effects of two targeted "active" topical dressings, ; a bioflammacide gel (Flavonix®), and a nanocrystalline silver sheet (Acticoat®), on the wound healing events in an *in vivo* rat chronic wound model.

Methods: A chronic wound model was created in 128 Sprague-Dawley rats, modifying previously described methods by combining burn and excisional wounds. Wounds were inoculated with a bacterial broth (*Pseudomonas aeruginosa* and *Staphylococcus aureus*) on POD 4. The wounds were then assigned to the following treatment groups on POD 7; Flavonix®, Acticoat® and a negative control. An additional non-inoculated control group (no bacterial or other broth) was included. Eight animals were assigned to each group at each time point. The study was conducted over 21 days and the categorical variables assessed were epithelial gap, cellular proliferation at the wound edge at Days 10,14 and 21 and semi-quantitative culture for bacterial load at Days 10 and 21.

Results: Both Acticoat® and Flavonix® showed improved wound healing compared to the control group. Epithelial gap distances were significantly

different between the Acticoat® group and the negative control group at Day 21 (p = 0.0350) (8mm vs. 12.8mm). Cellular proliferation profiles were most modulated in the Flavonix® treated group at Day 21 in comparison to the negative control group (p=0.013)(1.45 vs. 8.65) Bacterial load based on semi-quantitative culture showed significant differences in *Pseudomonas aeruginosa* counts at POD 21 with all treatment groups except Acticoat® but failed to show a significant change with the *Staphylococcus aureus* counts in any groups.

Conclusion: Flavonix® and Acticoat® both demonstrated similar effects on wound healing events in our chronic wound model with significant differences being noted between the treated groups and negative controls in epithelial gap reduction and cellular proliferation profiles. Bacterial burden in the form of a mixed species biofilm was not convincingly altered by any of the treatment groups, but this did not alter the wound in its ability to close, suggesting that inflammatory balance plays an important role as a common pathway in cutaneous healing.