

EFFECTS OF SUCROSE OCTASULFATE DRESSING ON WOUND HEALING IN A RAT WOUND MODEL

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BACKGROUND & OBJECTIVES

- Wound dressing is of significant importance to promote cutaneous wound healing process.
- **UrgoStart** is a non-occlusive and non-adherent healing matrix dressing which reduces healing time of chronic wounds such as venous leg ulcers and diabetic foot ulcers as reported in randomized controlled trials^{1,2,3,4}. UrgoStart dressing is composed of **Technology Lipido-Colloid (TLC)** with **Nano-Oligo-Saccharide Factor (NOSF)** which in contact with wound exudate forms a gel and creates a moist environment enabling the key cells involved in the repair process to exert their action.



The aim of this study was to investigate the effects of UrgoStart dressing on wound healing in a rat skin defect model, in comparison with the neutral TLC dressing UrgoTul.

References:

- 1: Schmutz JL, Meaume S et al., *Int. Wound J.*, 2008, 5(2): 172-182
- 2: Meaume S, Truchetet F et al., *Wound Repair Regen.*, 2012, 20(4): 500-511
- 3: Munter KC, Meaume S et al., *J. Wound Care*, 2017, 26(sup2): S4-S15
- 4: Edmonds M, Lazaro-Martinez JL et al., *Lancet Diabetes Endocrinol.*, 2018, 6(3): 186-196.

METHODS

- 12 male Wistar Han rats 10-12 weeks old (275-300g), caged individually with Aspen brick as enrichment – n=6/group
- Controlled conditions of temperature (22-25°C) and relative humidity (45-55%), under inverted 12-hour light/dark cycle
- Excisional wound model and treatments:
 - full-thickness excision (epidermis, dermis and hypodermis) in the middle dorsum region with sterile 12 mm biopsy punch
 - piece of UrgoStart* or UrgoTul dressing placed on the wound and held in place with surgical tape Urgoderm
 - dressings changed 3 times per week until complete closure
- Assessment of wound healing:
 - colour photos of the wound made at each dressing change with a fine-line ruler placed at the wound level at the time of imaging
 - unhealed wound areas quantified using ImageJ software
 - presence of granulation tissue, exudate and reepithelialization evaluated
- Histology performed after healing of the wound with H&E staining to score the presence and the size of new blood vessels at the level of the scar area and at the edge

*UrgoStart Contact.

RESULTS & DISCUSSION

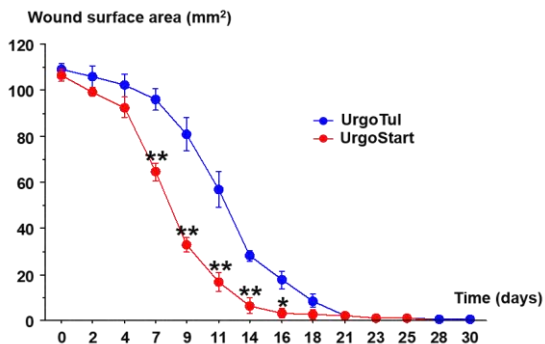


Figure 1: Evolution of wound surface area (mm²) of excisional wounds in UrgoTul and UrgoStart treated groups during the experiment. Determination was made using ImageJ software. Values are expressed as mean±SEM (n=6). *p<0.05 and **p<0.01 (Mann-Whitney U-test)

UrgoStart dressing:

- ✓ significantly improved wound healing compared with UrgoTul between Days 7 and 16
- ✓ significantly promoted earlier elimination of exudates, faster sprouting and tissue epithelialization
- ✓ reduced the time to wound closure by 5.5 days compared with UrgoTul
- ✓ significantly promoted tissue vascularization compared with UrgoTul

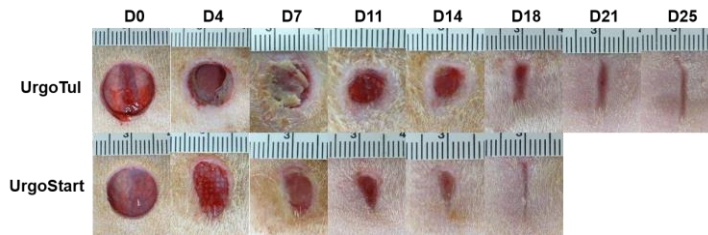


Figure 2: Representative photographs of the macroscopic observations of the 12 mm diameter excisional wounds of rats between D0 and D25 in UrgoTul and UrgoStart treated groups.

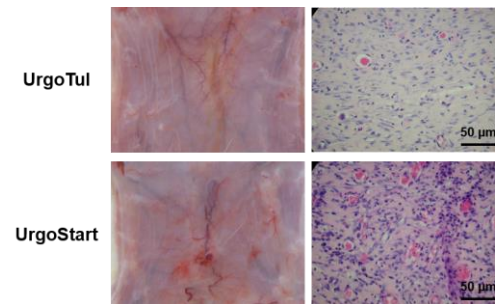


Figure 3: Representative macroscopic internal view of skin samples taken after complete wound healing of excisional wounds in UrgoTul and UrgoStart treated groups (left) and representative microscopic view (x400) after H&E staining showing the vascularization and the size of blood vessels in the scar area (right). The scale bar represents 50 µm.

CONCLUSION

Sucrose octasulfate dressing UrgoStart significantly improved the wound healing of full-thickness excision-elicited wounds in a healthy rat model. The local microscopic observations are consistent with an improvement of the local vascularization network. It would be interesting to evaluate the effect of this dressing on wounds induced in diabetic animals mimicking more or less features of delayed healing.