DERMASPIN: CONTACTLESS IN-SITU NANOFIBER COVERAGE FOR BURN WOUNDS IN PROLONGED FIELD CARE

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AFWERX CONTRACT SUPPORT

PRECLINICAL FEASIBILITY | Selected development-stage scaffolds supported sustained skin-cell metabolic activity; burns treated with DermaSpin Solution progressed toward closure through Day 21.

OPERATIONAL NEED

MATREGENIX

A U.S. nanofiber company developing materials and point-of-care delivery systems for regenerative medicine. DermaSpin extends that platform to portable, no-touch wound coverage.

MILITARY RELEVANCE
Field-forward care may involve delayed evacuation, limited specialty wound-care resources, and irregular wound geometry.
Opportunity: rapid, conformal coverage without touching the wound.

THE TECHNOLOGY

Portable investigational electrospinning system for in-situ deposition of a conformal nanofibrous primary wound dressing.

1 LOAD
Proprietary water-based formulation in a single-use cartridge.

2 DEPOSIT
No-touch high-voltage electrospinning at approximately 20 cm.

3 COVER
Conformal matrix intended to remain in place for approximately 5–7 days.

STUDY DESIGN

IN VITRO — DEVELOPMENT-STAGE SCAFFOLD SCREEN
- HaCaT keratinocytes + HDFa dermal fibroblasts
- Direct contact; Days 1, 3, 7; n=8
- Mean ± SD; ANOVA/Tukey; α=0.05

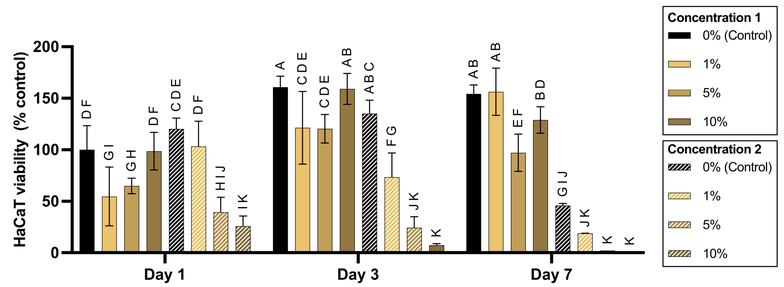
IN VIVO — PRELIMINARY RAT BURN MODEL
- DermaSpin Solution macroscopic wound progression
- H&E: untreated control vs DermaSpin Solution

FORMULATION | DermaSpin uses a proprietary water-based formulation. Cell studies evaluated development-stage scaffold conditions.

CELL COMPATIBILITY — IN VITRO

Selected development-stage scaffold conditions sustained metabolic activity in keratinocytes and dermal fibroblasts through Day 7 in direct-contact culture.

A. HaCaT keratinocytes



HaCaT metabolic viability (% control), Days 1, 3, and 7. Mean ± SD; n=8. Different letters denote significant differences (ANOVA/Tukey; α=0.05).

B. HDFa dermal fibroblasts

HDFa metabolic viability (% control), Days 1, 3, and 7. Mean ± SD; n=8. Different letters denote significant differences (ANOVA/Tukey; α=0.05).

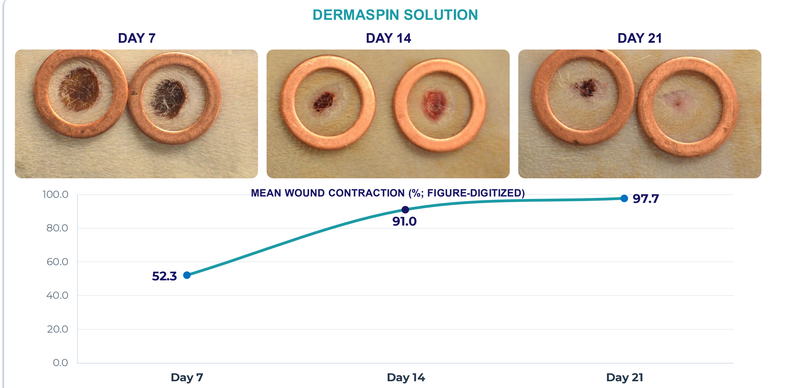
INTERPRETATION
- The assay measures metabolic activity; it does not directly quantify proliferation, attachment, or cell number.
- Selected conditions retained strong Day-7 signal in both cell types.
- A separate quantitative attachment assay was not identified.
- Non-GLP, development-stage scaffold evidence; not validation of the current proprietary water-based investigational formulation.

WHAT THE DATA SUPPORT

SUPPORTED Sustained keratinocyte and fibroblast metabolic activity on selected development-stage DermaSpin scaffolds through 7 days.

NOT ESTABLISHED Direct attachment or proliferation, clinical safety, or efficacy of the current proprietary water-based formulation.

IN VIVO BURN-WOUND FEASIBILITY



Representative DermaSpin Solution-treated wounds at each study endpoint. Group-level mean contraction increased from approximately 52% at Day 7 to 98% at Day 21. Means were digitized from the reported plot because raw efficacy values were unavailable; no superiority claim is established.

Control and DermaSpin Solution H&E sections show narrowing epithelial gaps from Day 14 to Day 21. Means were digitized from vector bar geometry; original three-group comparisons were not significant.

RESULT
DermaSpin Solution-treated wounds progressed toward closure through Day 21. These preliminary data support feasibility—not accelerated, superior, equivalent, or noninferior healing.

MILITARY IMPACT & TRANSLATION

- **Operational concept:** portable, rapid, conformal coverage for field-forward and prolonged-care settings.
- **Translation:** IRB/HRPO-authorized early-feasibility study (up to 20 subjects) preparing to enroll as of 24 May 2026; no human outcomes available.
- **Status:** investigational device; not approved for commercial distribution.

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CAUTION
Investigational device. Limited by Federal law to investigational use. DermaSpin is not approved for commercial distribution. Safety and effectiveness have not been established. Preclinical findings do not establish clinical efficacy. The views expressed are those of the authors and do not reflect official U.S. Government policy; reference to a commercial product does not imply endorsement.