

Topical Mast Cell Stabilizer Cromolyn Sodium Reduces Post-burn Hypertrophic Scars in the Female Red Duroc Pig

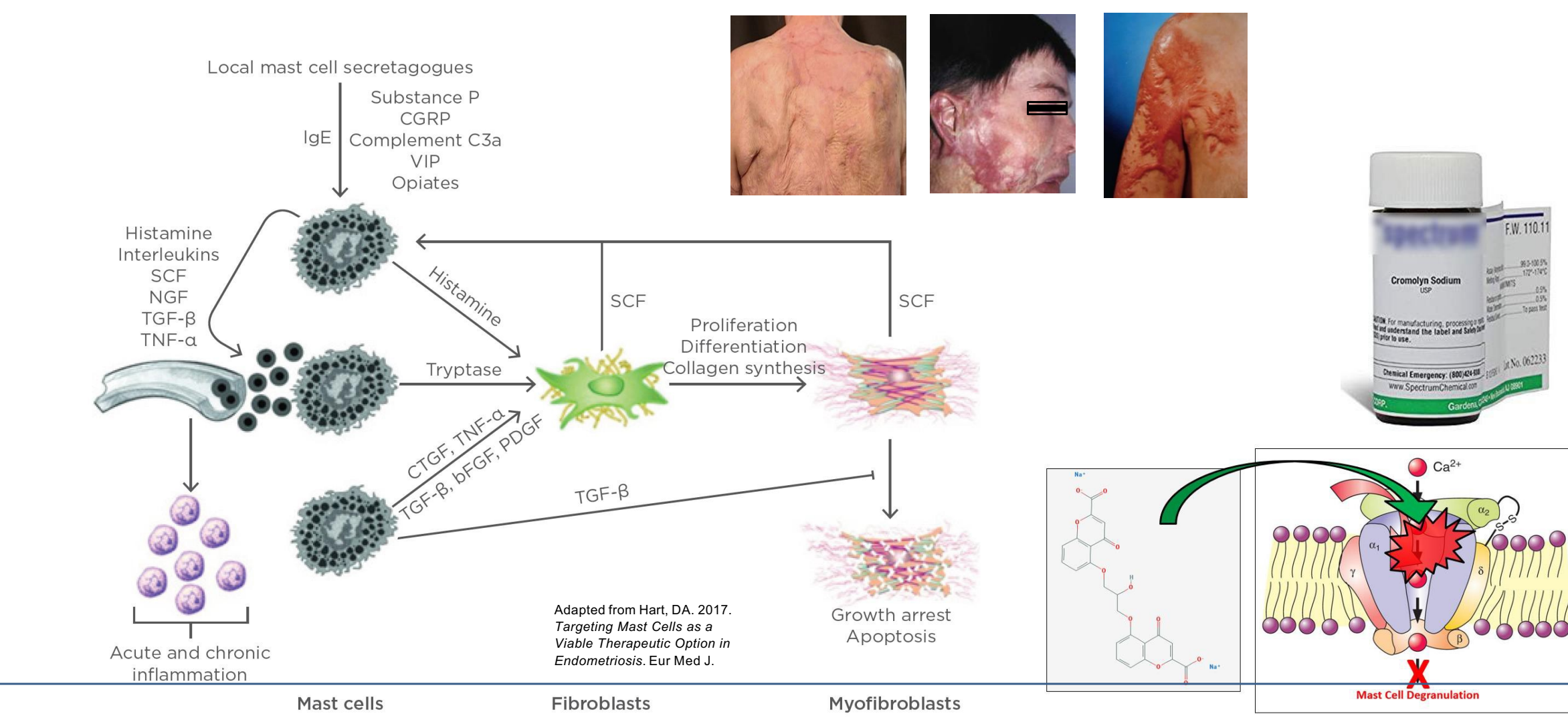
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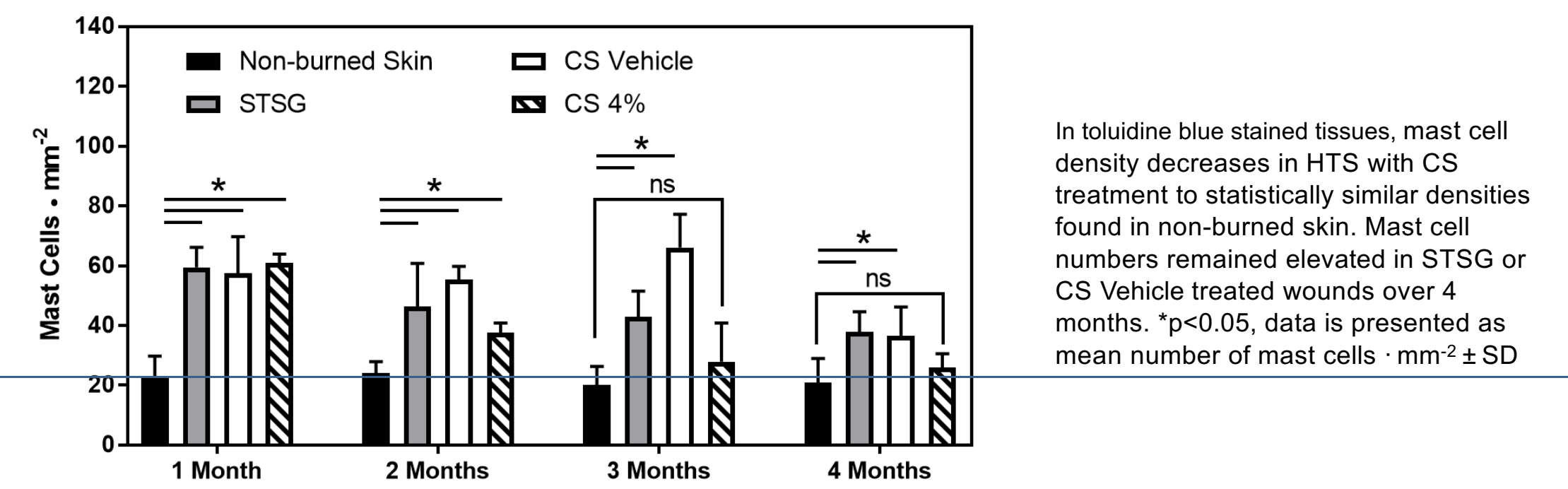
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BACKGROUND

Painful, motion-limiting **hypertrophic scars (HTS)** form subsequent to protracted wound healing in patients with severe full-thickness burns and pose difficult treatment challenges. Newer evidence points to **mast cells (MC)** as important regulators of intricate signaling cascades during the initiation and progression of post-burn scars. Previous investigations have demonstrated increased mast cell densities in burn wounds and during the formation of HTS.^{1,2} Mast cells release a wide array of mitogenic cytokines and potent proteases that contribute directly to myofibroblast differentiation and excessive proliferation in burn wounds; further prolonging fibrotic pathology.³ **Cromolyn sodium (CS)** is an FDA-approved mast cell stabilizer known to inhibit degranulation and has been successfully used to relieve detrimental symptoms associated with mast cell activation. Here, we show that CS may be an effective conjunctive therapy to prevent pathological fibrosis following severe burn injury.



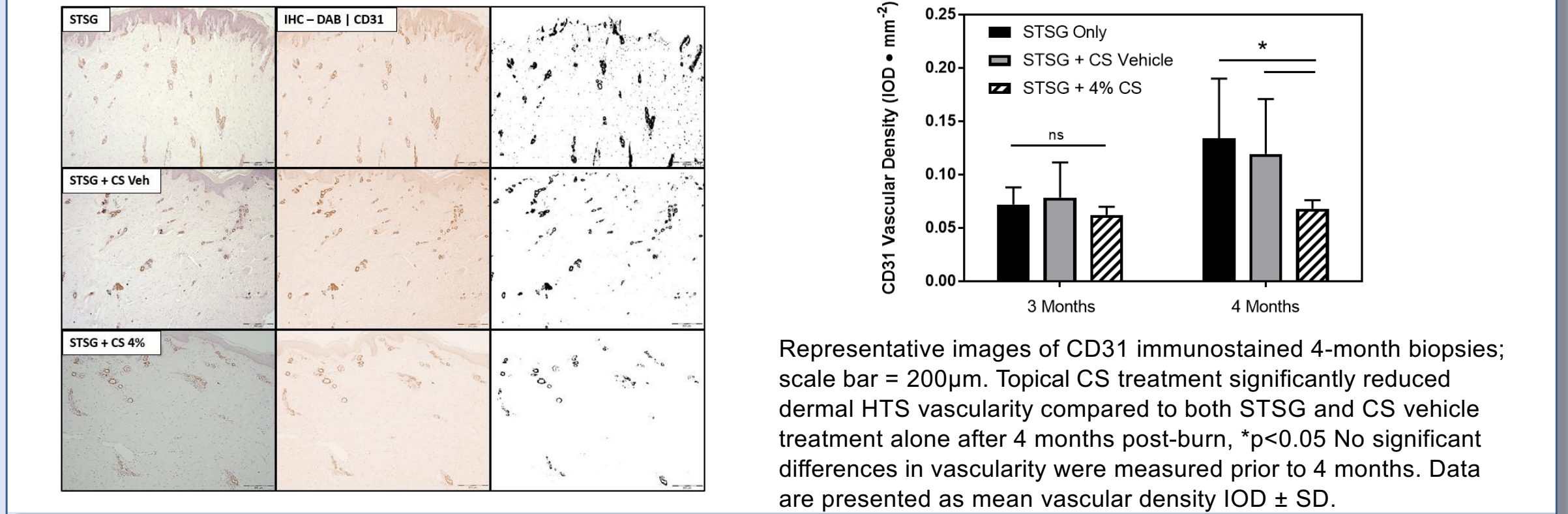
Cromolyn Sodium Reduces HTS Mast Cell Density



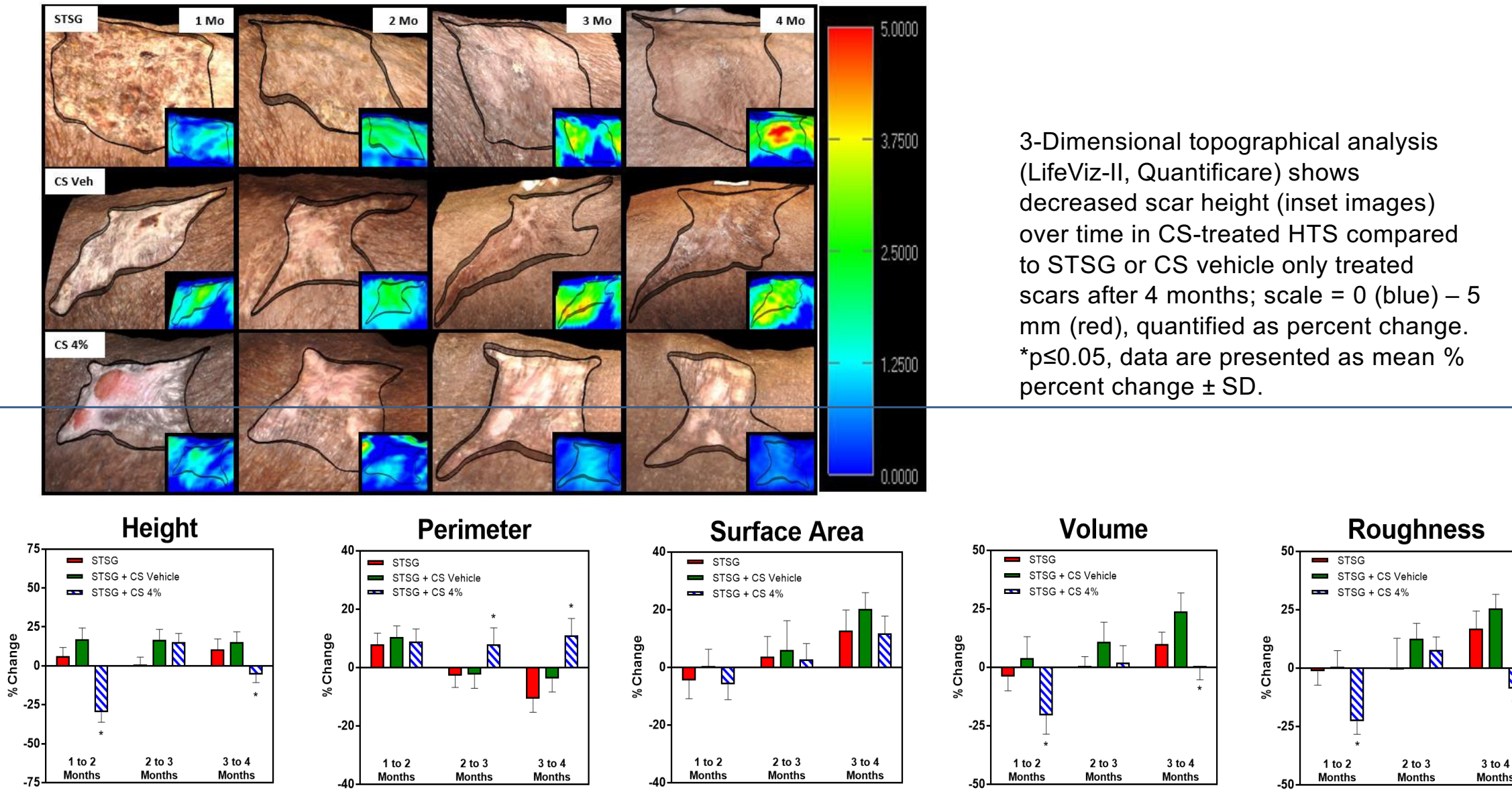
In toluidine blue stained tissues, mast cell density decreases in HTS with CS treatment to statistically similar densities found in non-burned skin. Mast cell numbers remained elevated in STSG or CS Vehicle treated wounds over 4 months. *p<0.05, data is presented as mean number of mast cells · mm⁻² ± SD

RESULTS

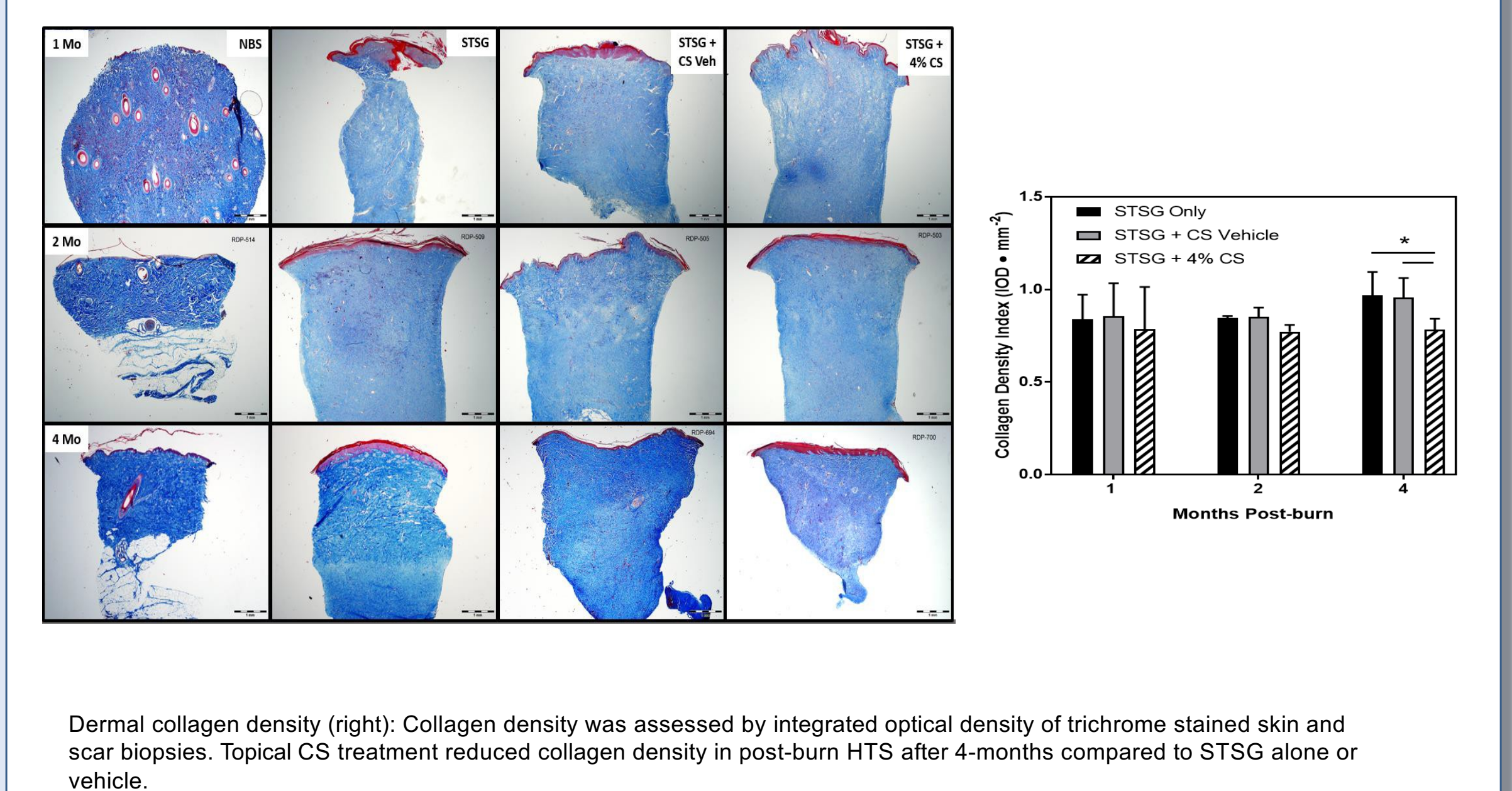
HTS Vascularity is Diminished Following CS Treatment



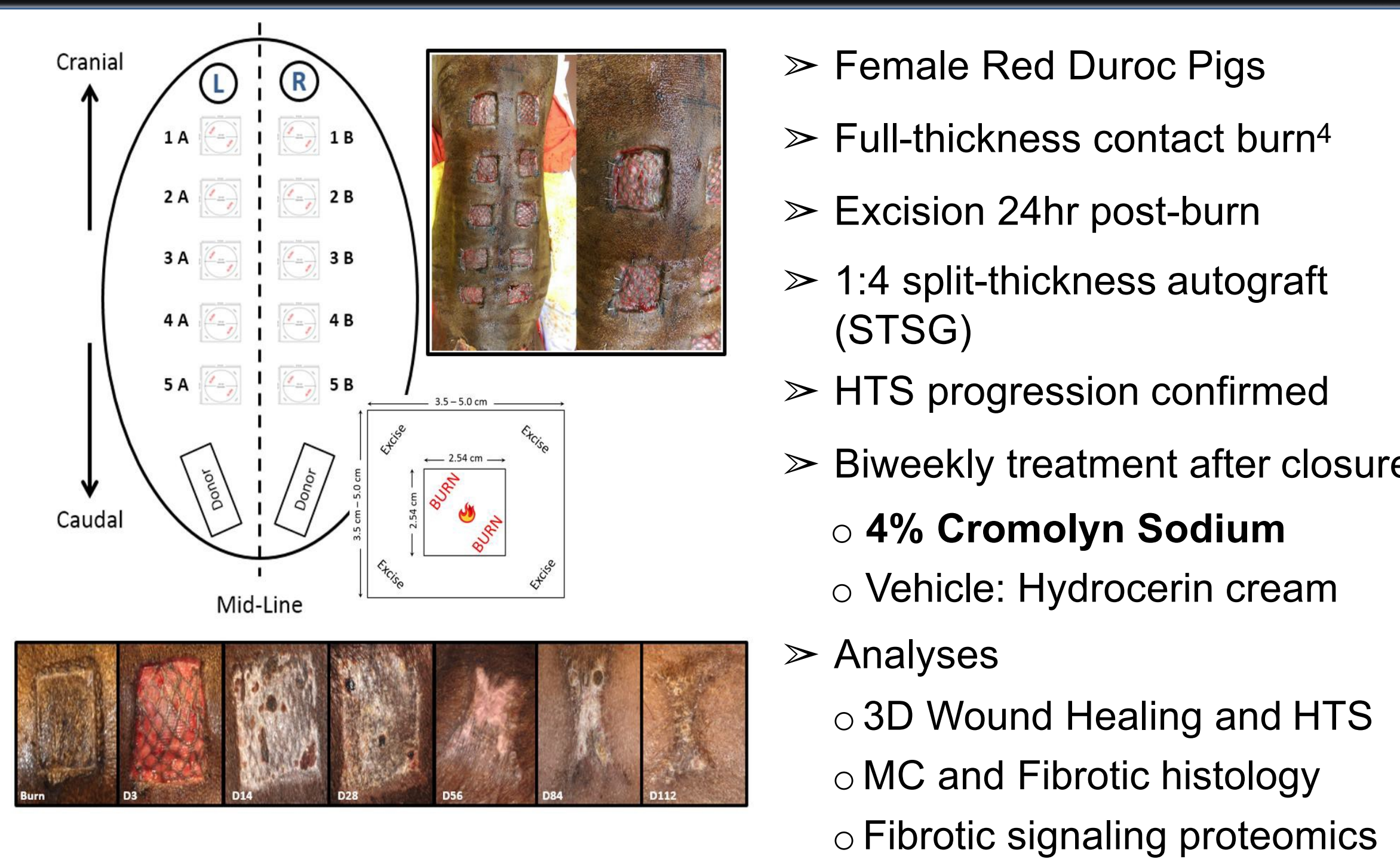
Post-burn HTS Morphology is Improved with Topical CS



CS Treatment Reduces Dermal Collagen Density

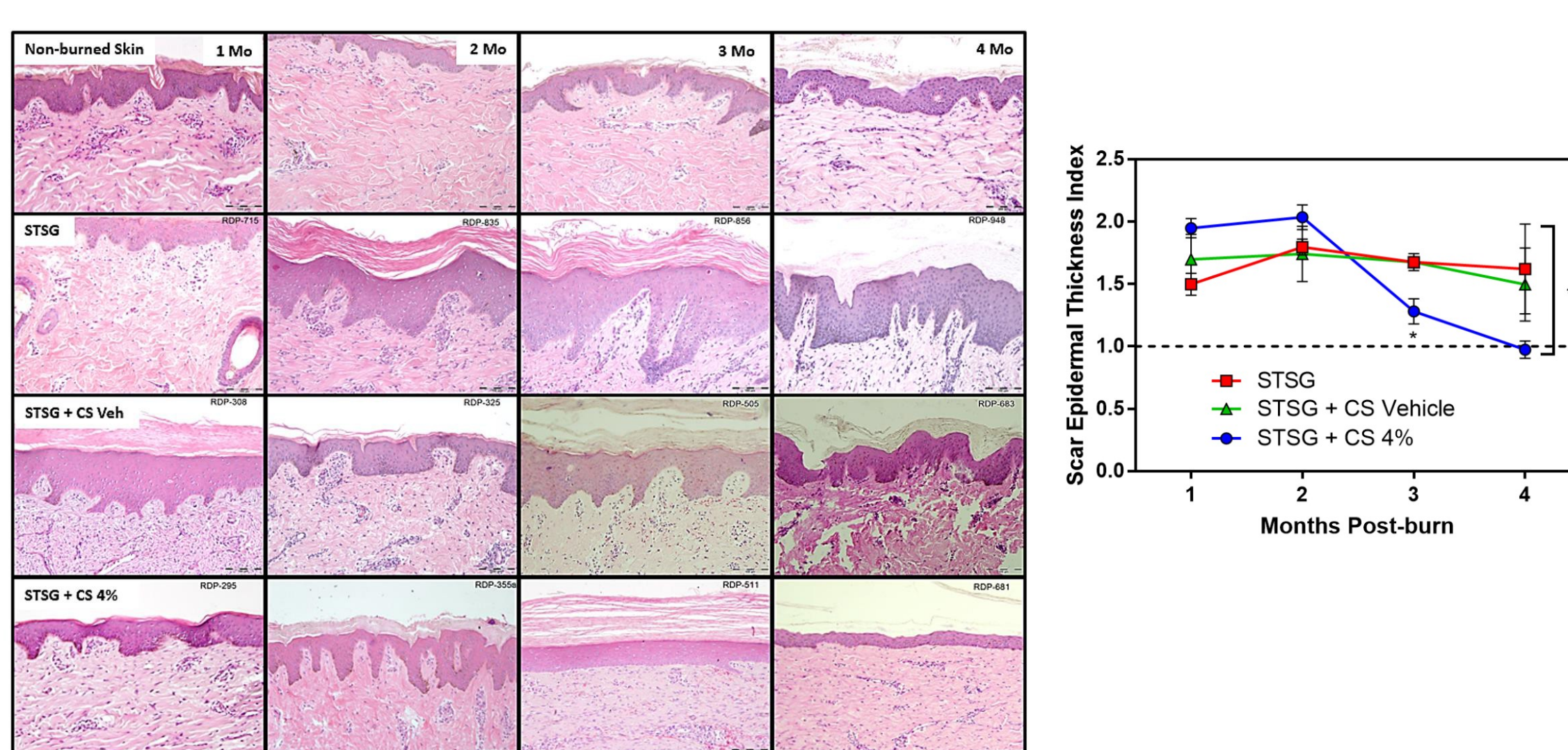


METHODS



- Female Red Duroc Pigs
- Full-thickness contact burn⁴
- Excision 24hr post-burn
- 1:4 split-thickness autograft (STSG)
- HTS progression confirmed
- Biweekly treatment after closure
 - 4% Cromolyn Sodium
 - Vehicle: Hydrocerin cream
- Analyses
 - 3D Wound Healing and HTS
 - MC and Fibrotic histology
 - Fibrotic signaling proteomics

Topical Cromolyn Reduces HTS Epidermal Hyperplasia



CONCLUSION

- Cromolyn sodium improves post-burn wound healing by reducing mast cell density and reduces subsequent collagen deposition in the healing wound.
- Mast cell stabilization with topical cromolyn sodium reduces HTS pathophysiology and may provide beneficial adjuvant anti-scarring therapy following a severe burn.

References & Acknowledgements

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- This study was conducted with the support of the Institute for Translational Sciences at the University of Texas Medical Branch, supported in part by a Clinical and Translational Science Award (UL1TR000071).
- This research was supported by SHC grants 71000, 71001, 70900, 84080, 71009 and the National Institutes of Health NIGMS grants, R01 GM112936-01, R01 GM056687-14, T32 GM008256, P50 GM00338, and NIDILRR 5DP09045-01-00.
- We would like to thank Heather Powell (The Ohio State University), Ye Wang, Robert Cox, Sam Jacob, Hal Hawkins, and William Wheeler for their contributions to this work.