SLI-F06, a Fibromodulin-based Therapeutic Peptide, Enhances Wound Healing in Diabetic Rodent and Pig Models

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BACKGROUND

Current wound care dressings and devices do not target the cellular migration and contraction defects in diabetic wounds to promote "better, faster repair".

Over 20 years of research studying scarless fetal repair have led us to develop **SLI-F06**. This **fibromodulin (FMOD)**-derived peptide effectively reduces scar size in multiple small and large animal models through, in part, enhanced fibroblast and endothelial cell migration, myofibroblast differentiation, and contraction.

METHODS

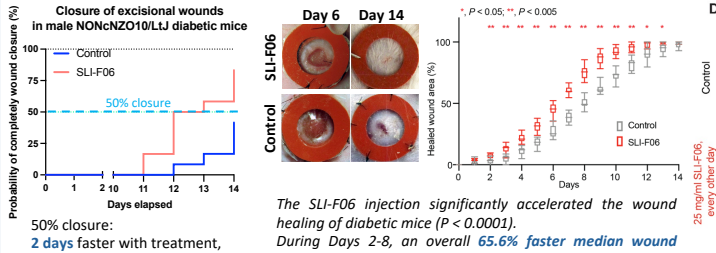
We used a **NONcNZO10/LtJ type-2 diabetes mellitus (DM) mouse model**. Two excisional, full-thickness wounds (6-mm diameter) were created on the back of each mouse. We injected SLI-F06 (25 mg/ml) **intradermally** at four points around the wound edge every other day for 14 days. Then we used a **streptozotocin-induced diabetic Yorkshire pig model**. 1.5x1.5-cm square wounds were created on the back of each pig. 110 ml/cm^2 of 25 mg/ml SLI-F06 in a hydroxypropyl cellulose excipient was **topically** applied twice/week for 3-4 weeks until all treated wounds healed. Wound healing was documented and analyzed by 2D / 3D digital photography, and myofibroblast conversion (assessed by a-SMA staining) were accessed histologically.

Next, we isolated **dermal fibroblasts from the diabetic pig skin**, and tested cell proliferation, migration, myofibroblast conversion and invasion. Similar tests were performed on human immortalized dermal fibroblast BJ-5ta as well.

DISCLOSURE

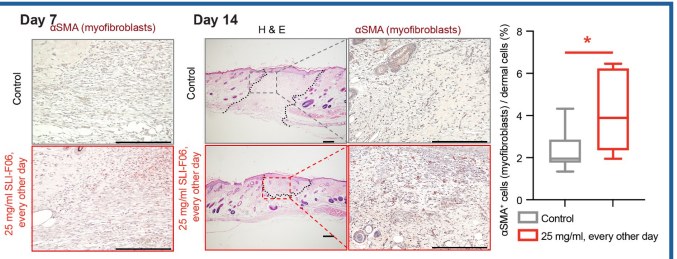
Drs. Zhong Zheng, Kang Ting, and Chia Soo are inventors of fibromodulin-related patents assigned to UCLA. Drs. ZZ, KT, and CS are founders of Scarless Laboratories Inc. and Saint Therapeutics. Scarless Laboratories Inc. has licensed fibromodulin-related patents from the UC Regents, who also hold equity in the company. Saint Therapeutics is a sublicensee of Scarless Laboratories Inc. Drs. ZZ, KT, and/or CS are also officers of Scarless Laboratories, Inc. and/or Saint Therapeutics.

RESULTS

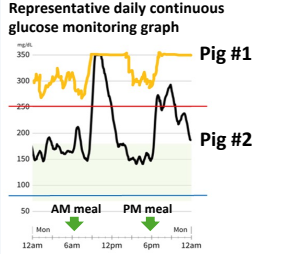


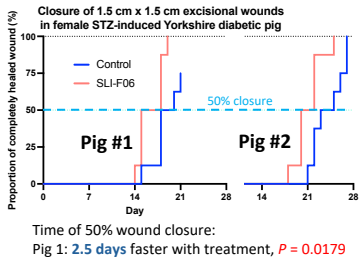
50% closure:
2 days faster with treatment,
P = 0.0156

The SLI-F06 injection significantly accelerated the wound healing of diabetic mice (P < 0.0001).
*During Days 2-8, an overall **65.6% faster median wound healing rate** with treatment was achieved.*



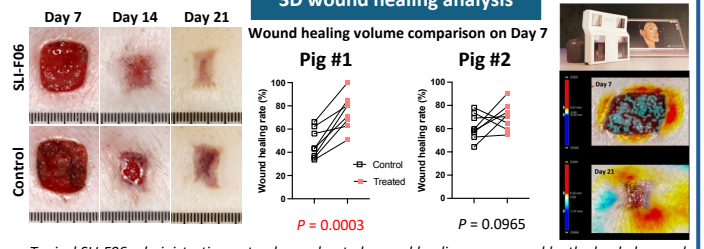
Myofibroblast conversion within the scar was significantly enhanced by SLI-F06 (p<0.05).





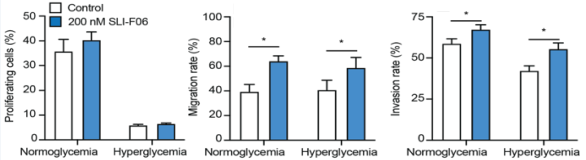
Time of 50% wound closure:
Pig 1: **2.5 days** faster with treatment, *P* = 0.0179
Pig 2: **3 days** faster with treatment,, *P* = 0.0222

3D wound healing analysis

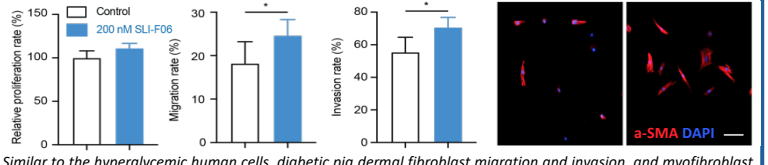


Topical SLI-F06 administration not only accelerated wound healing as assessed by the healed wound area / volume, but also increased the proportion of wounds with complete closure.

Human BJ-5ta fibroblast



Diabetic pig fibroblast



Similar to the hyperglycemic human cells, diabetic pig dermal fibroblast migration and invasion, and myofibroblast conversion (assessed by a-SMA staining) were significantly enhanced by SLI-F06, but not fibroblast proliferation .