



Human-adipose Xenografts Improve Burn Wound Healing in Mice

Fuat Baris Bengur, MD; Shawn J. Loder, MD; Lauren Kokai, PhD; J Peter Rubin, MD

University of Pittsburgh, Department of Plastic Surgery, Pittsburgh, PA



INTRODUCTION

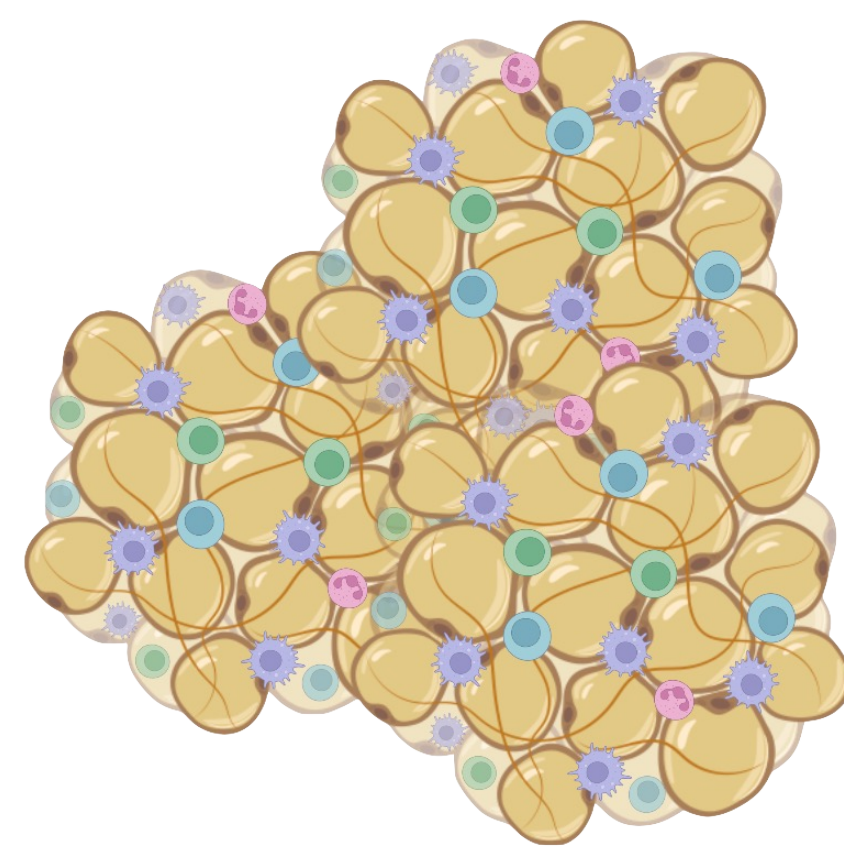
Acute treatment of complex burns is a critically unmet need.

Adipose and adipose-derived stem cell therapies have met success in the treatment of thermal injuries; however, the exact mechanism or effective agent is still under exploration.

Improve revascularization

Reduce fibrosis

Reduce scar thickness



Promote anti-inflammatory cytokines

Increase proliferation of fibroblasts

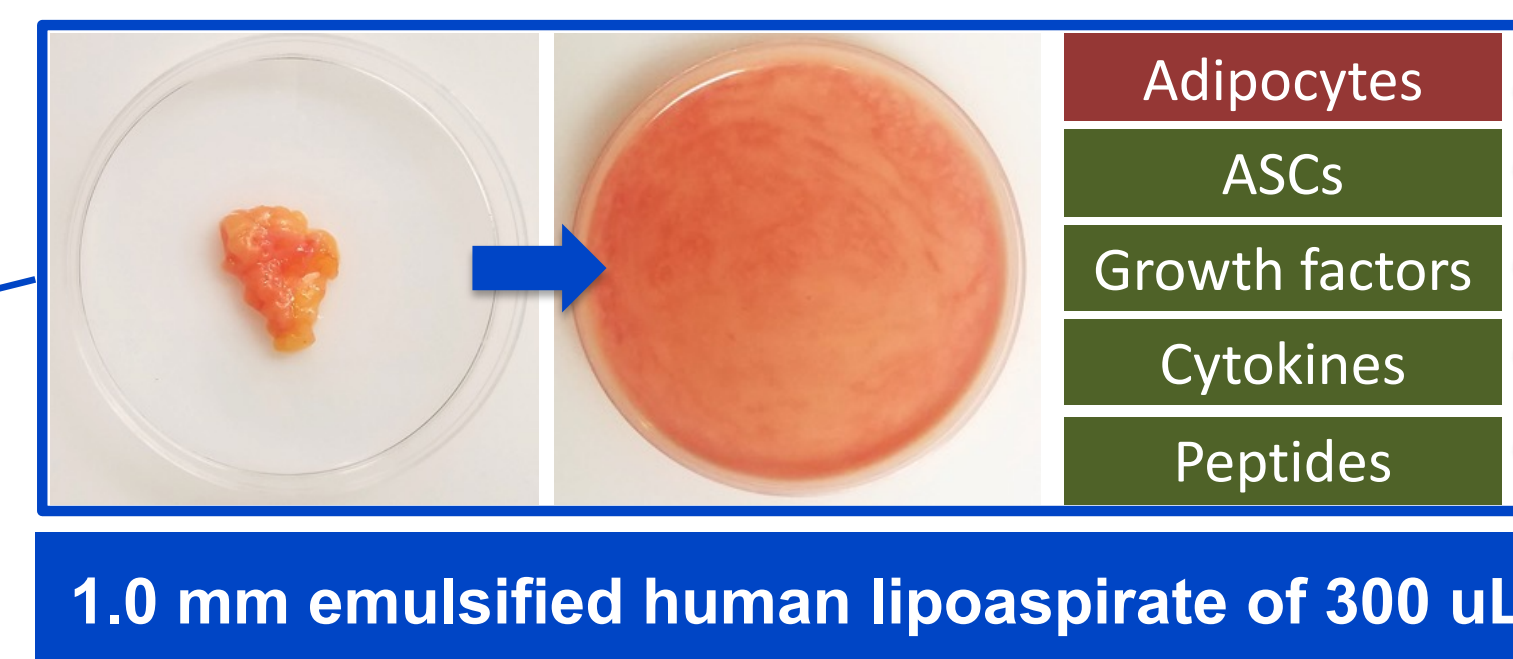
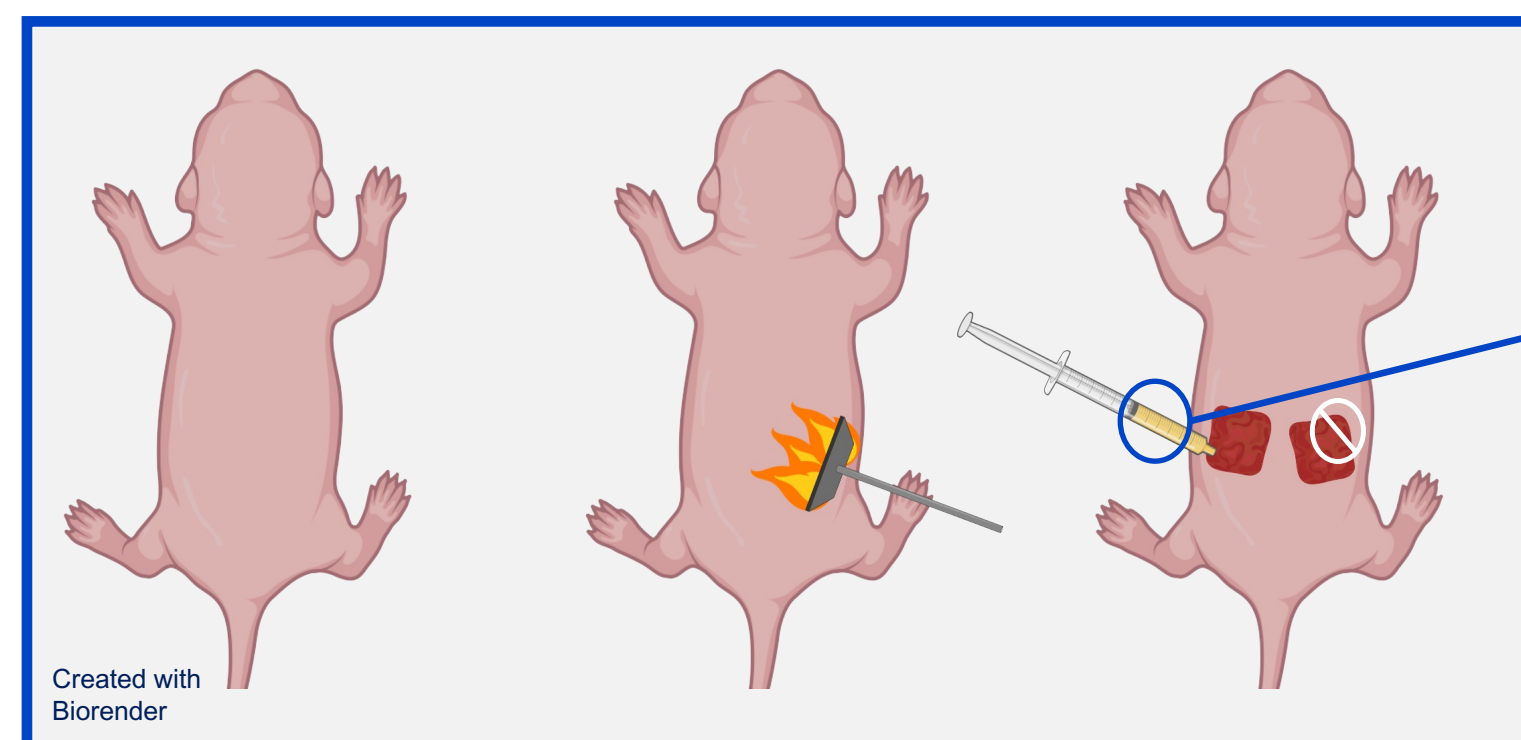
Regulate granulation tissue

Prior reports vary highly as to whether a healthy autologous vascular fraction is necessary or whether xenologous, decellularized, or fractionated adipose extracts may be used.

Aim: To evaluate the role of xenologous adipose extracts and their extracellular matrix in the treatment of the post-burn scar.

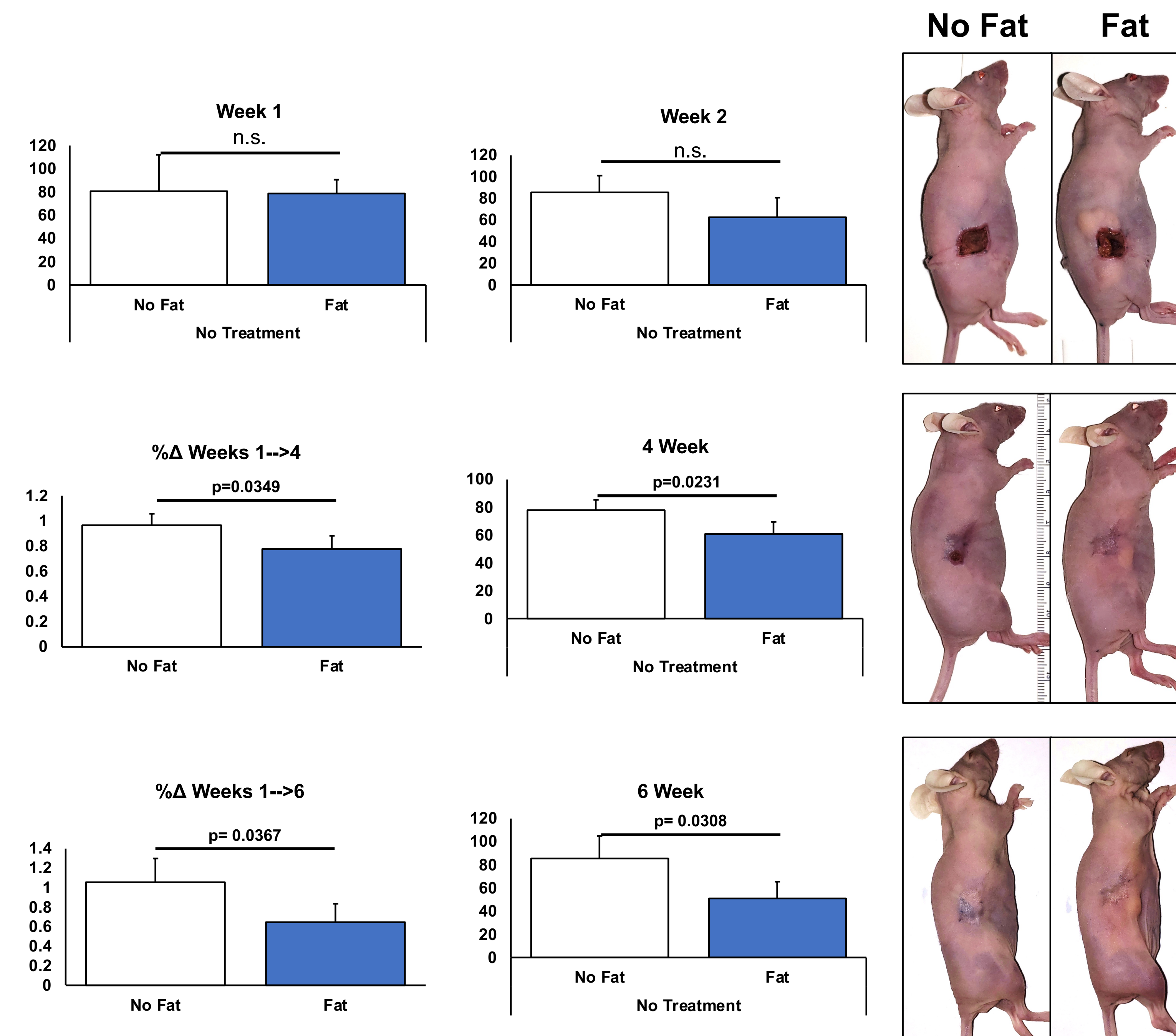
METHODS

Bilateral 1 cm full-thickness thermal injuries.



Followed 6-weeks with photography and endpoint histology.

RESULTS - 1

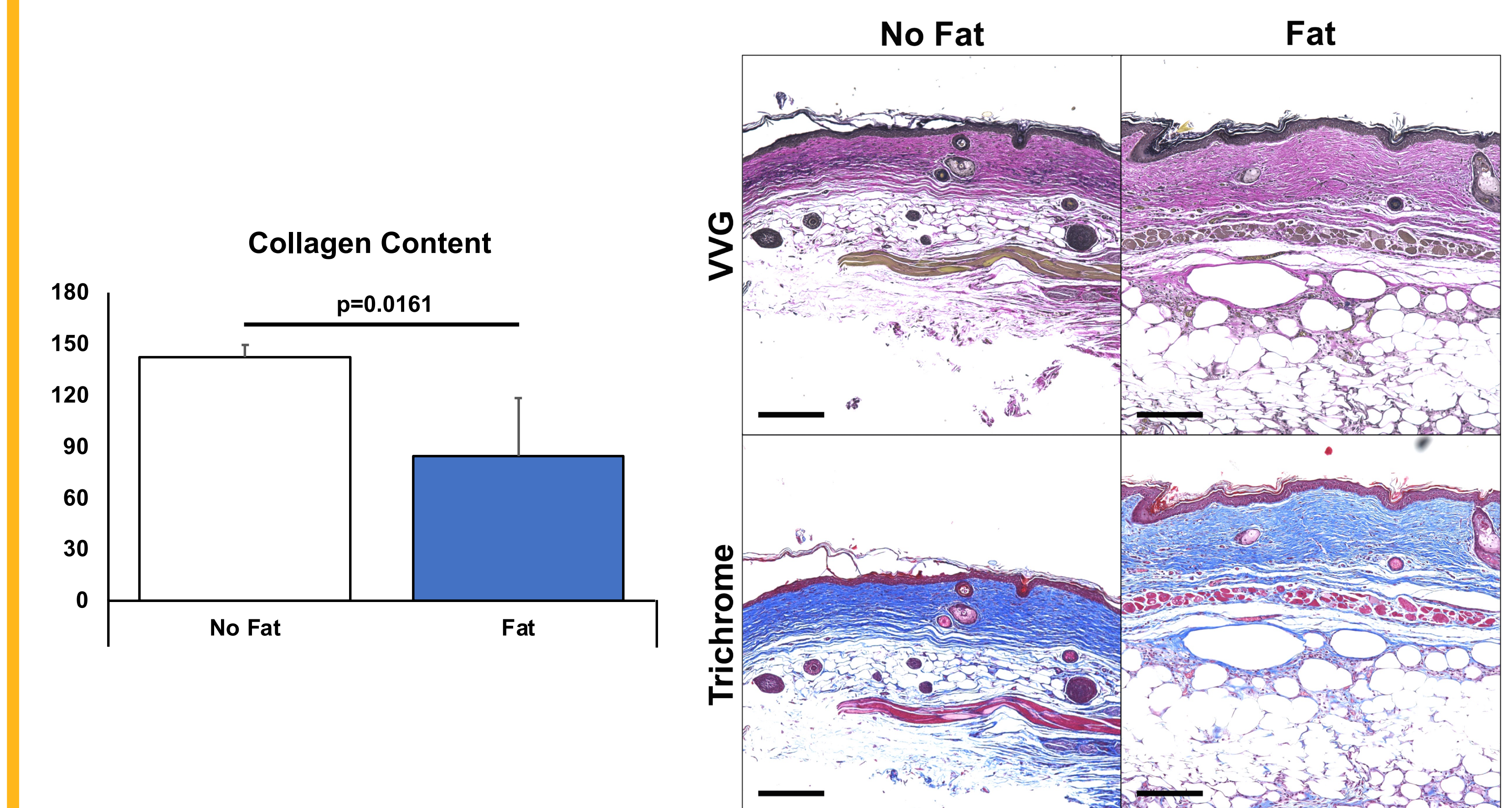


In burns treated with adipose xenograft at time of burn, no difference was noted in surface area or burn morphology at 1-week post-injury.

By 2-weeks rapid resolution of inflammation and wound surface area was noted, which was significant by 4 weeks.

At the endpoint of 6 –weeks the total wound surface area of the fat treated group was almost half of the untreated group.

RESULTS - 2



Adipose engraftment resulted is histologic evidence of scar resolution with consistent revascularization and survival of the subcutaneous adipose xenograft at 6-weeks.

Collagen density was significantly lower in the fat group with visible adipose tissue and greater overall tissue thickness.

CONCLUSION

In contrast to prior data suggesting an autologous-only approach, our findings support a hypothesis that the active functional agent in adipose xenograft for burns in not directly dependent on species match.

This provides evidence to support more broadly applicable approach to off-the-shelf adipose-derived therapeutics in acute burns.