

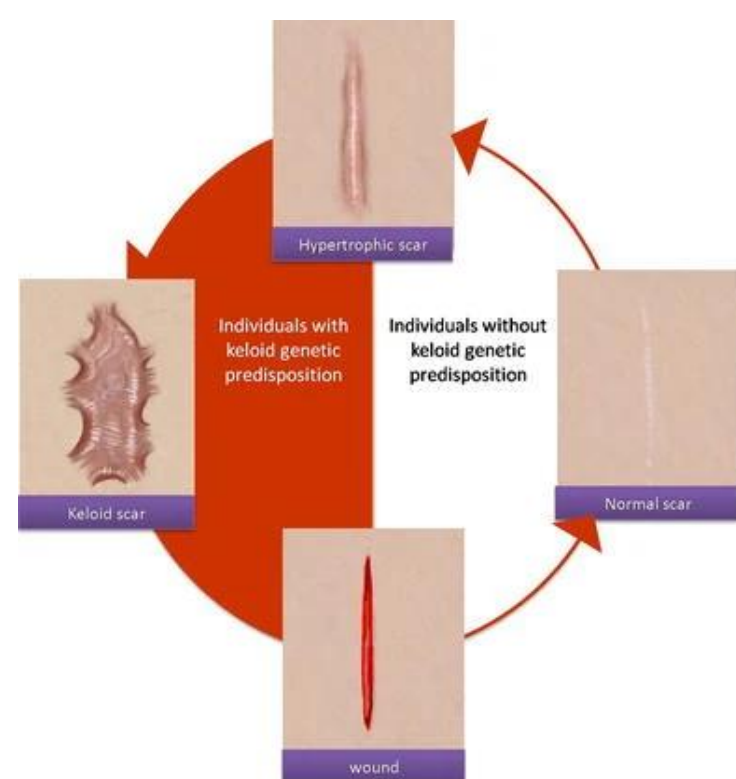
Introduction

Clinical Presentation



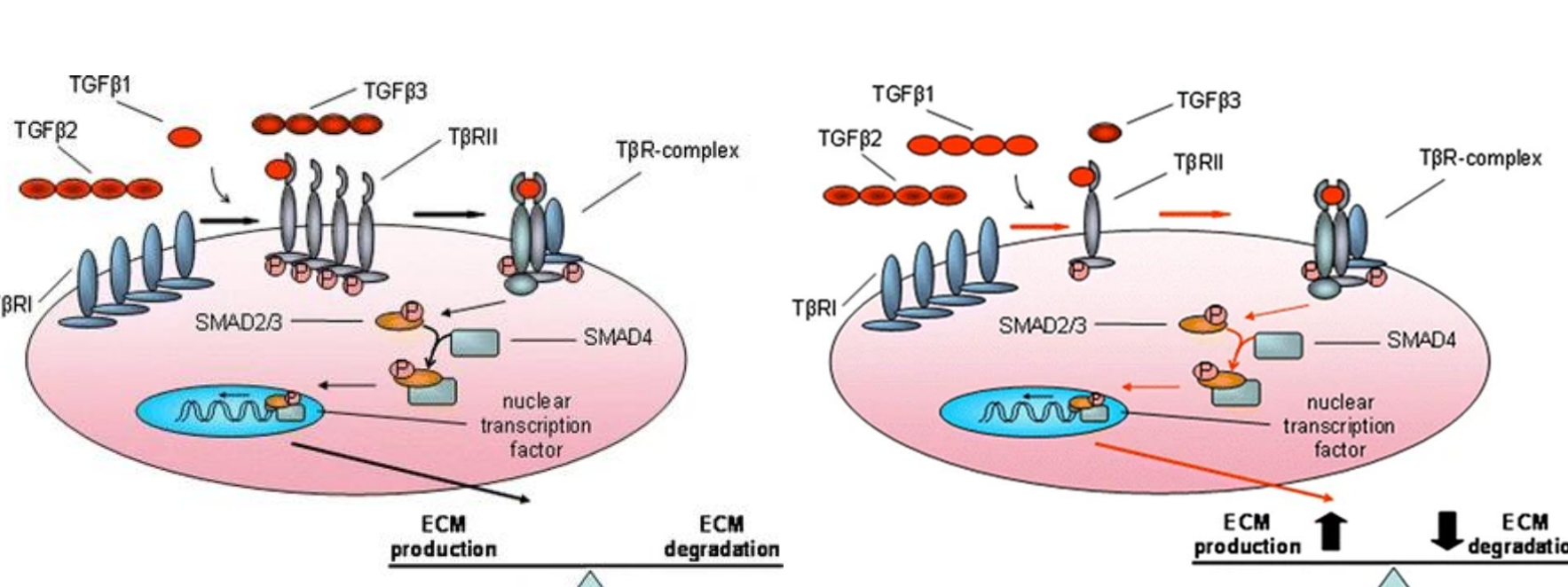
Typical presternal keloid formation

Impact of Mechanical Tension



Progression of raised dermal scarring under tension

Molecular Signaling Pathways

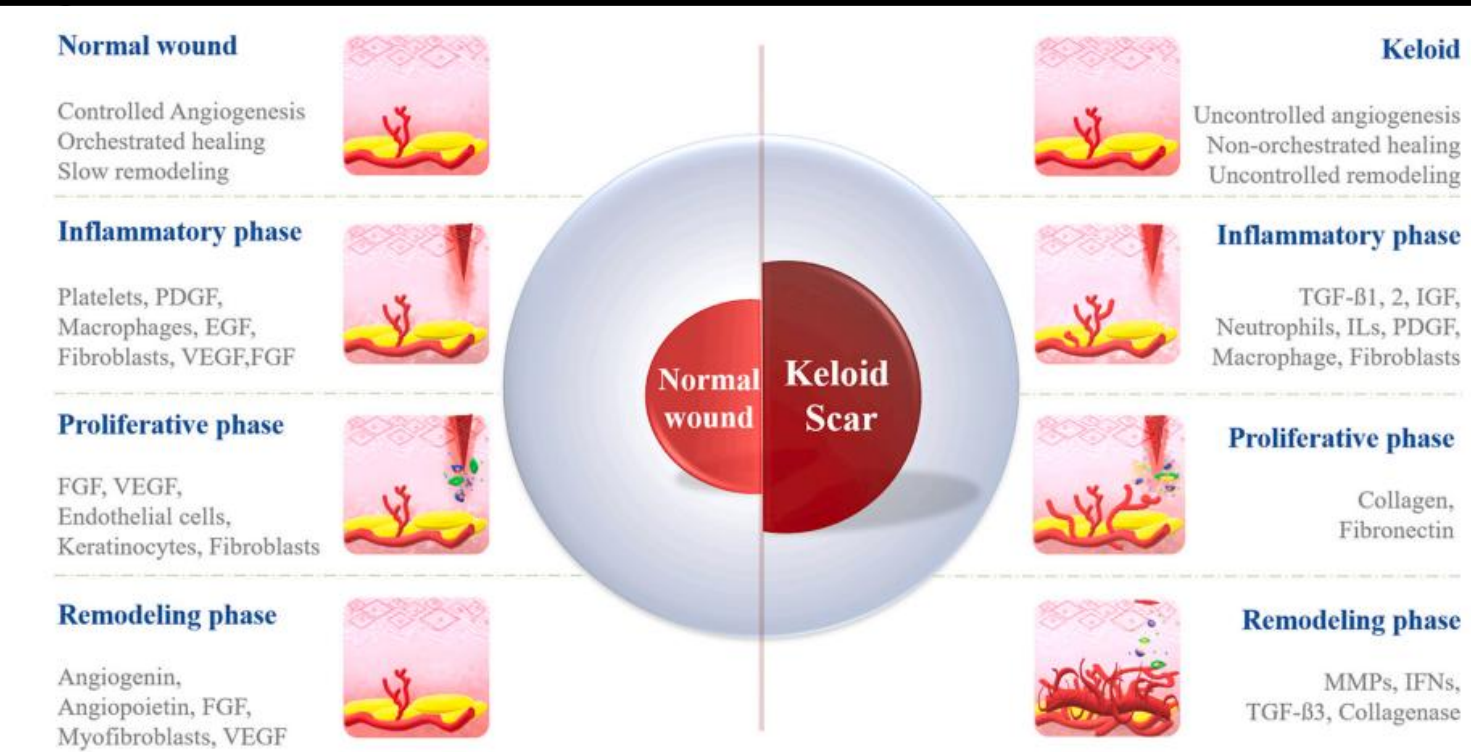


Keloid is driven by a complex interplay of environmental factors and polygenic susceptibility.

Kumar, A.S., et al. *Journal of Controlled Release*, 329:1066-1076, 2021.

Motivation

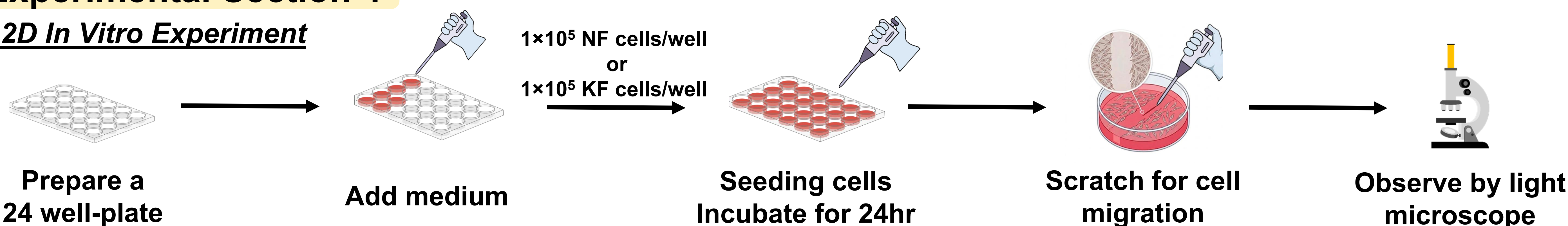
Angiogenesis & Growth Factor Dynamics Normal Wound vs. Keloid



Comparative analysis of endogenous factors up-regulated across different healing stages

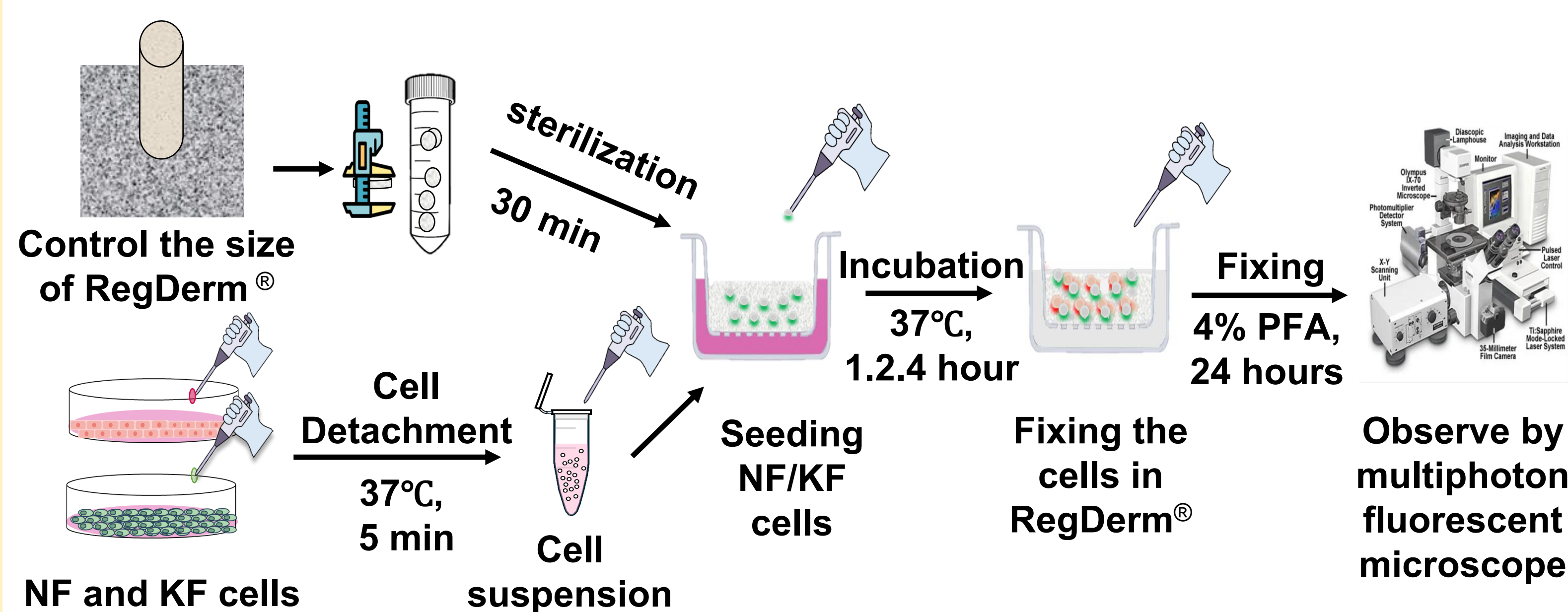
Experimental Section-1

2D In Vitro Experiment



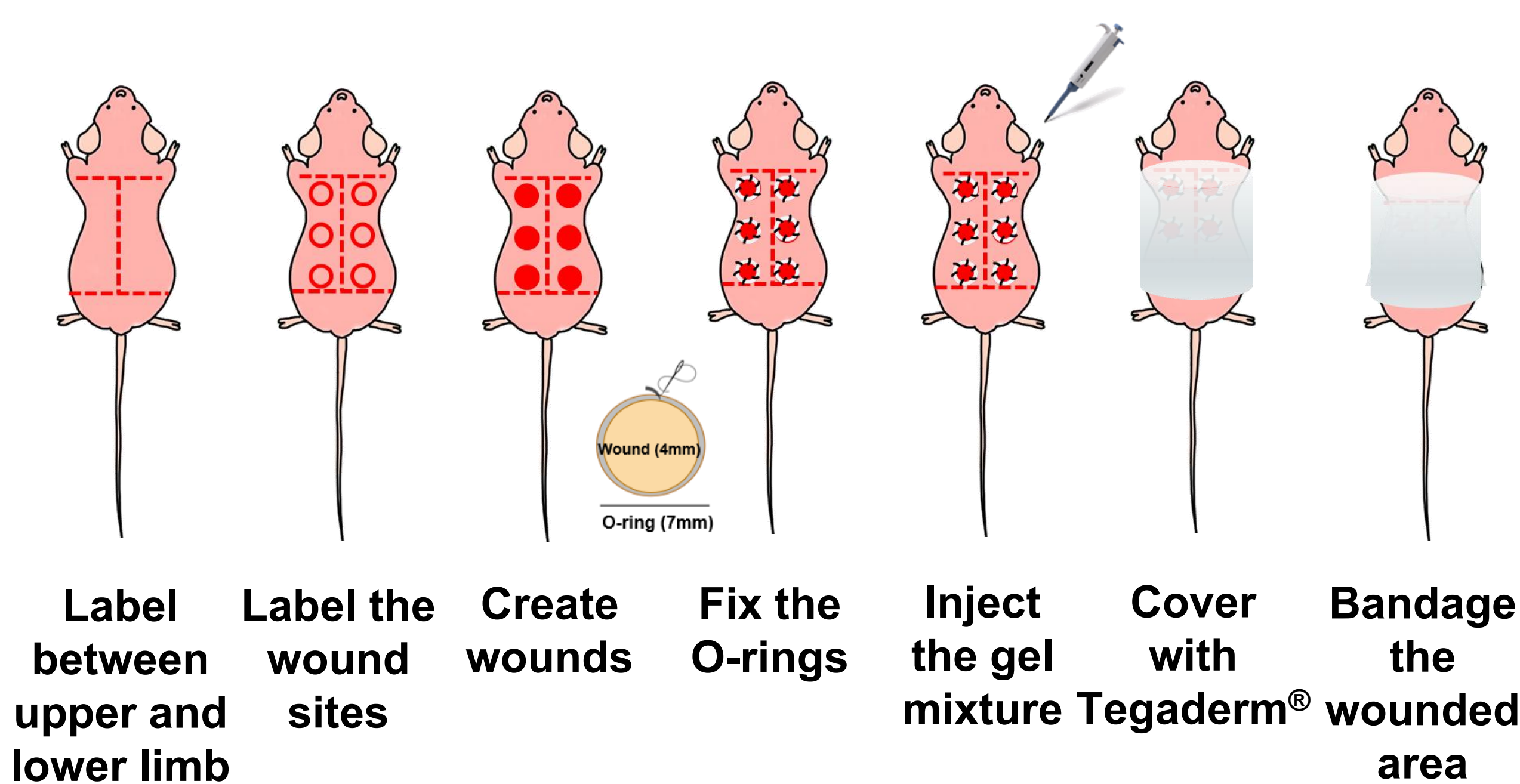
Experimental Section-2

3D In Vitro Experiment



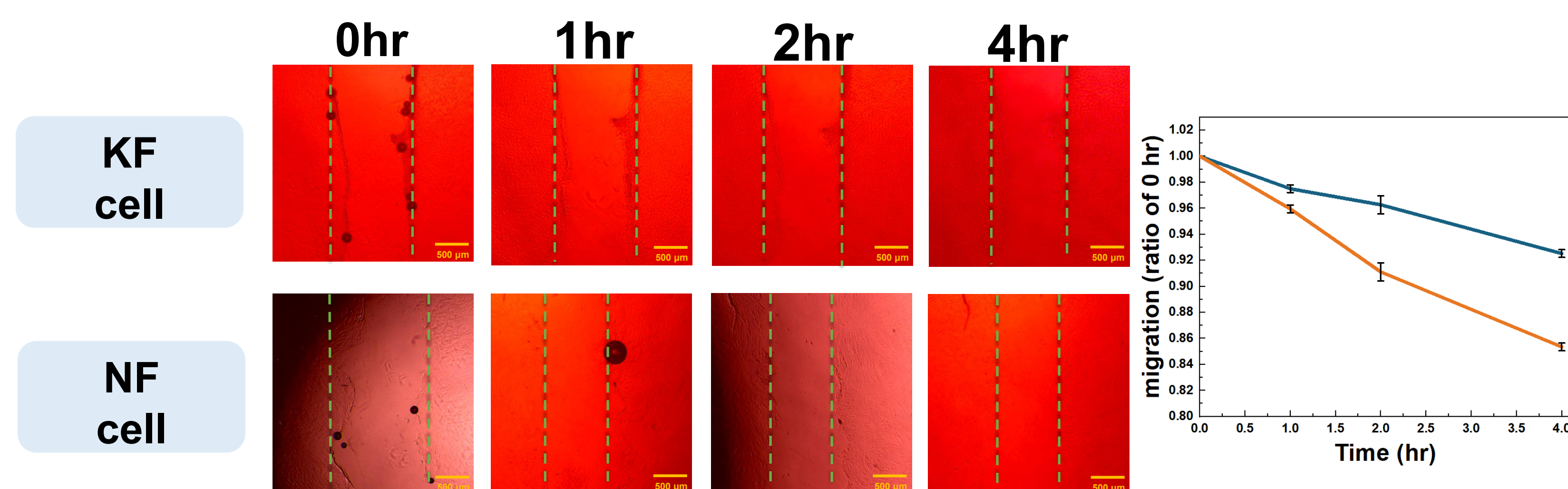
Experimental Section-3

In Vivo Experiment



Result and Discussion-1

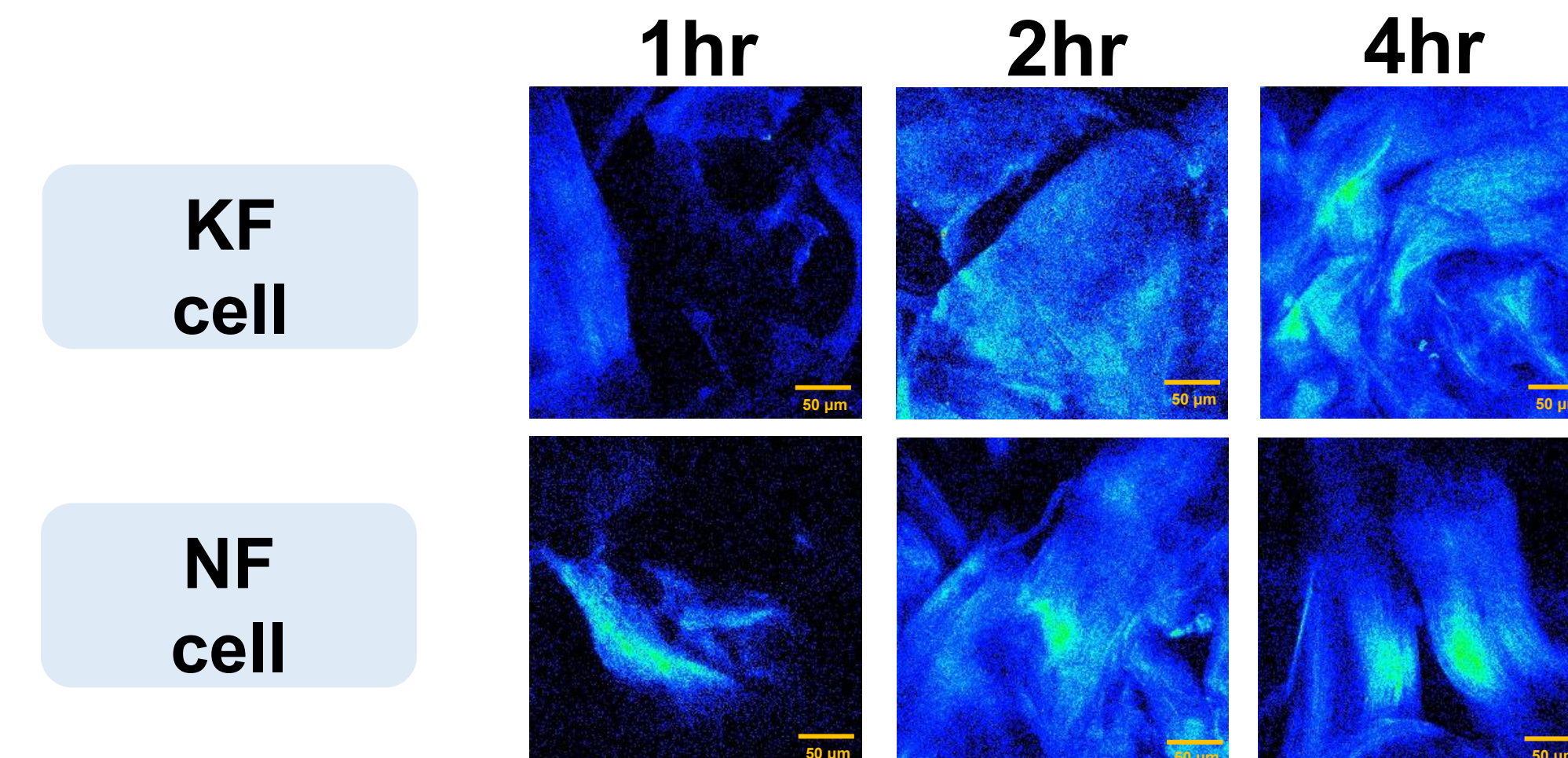
2D cell migration



KF possessed a **higher** intrinsic migration capacity than NF.

Result and Discussion-2

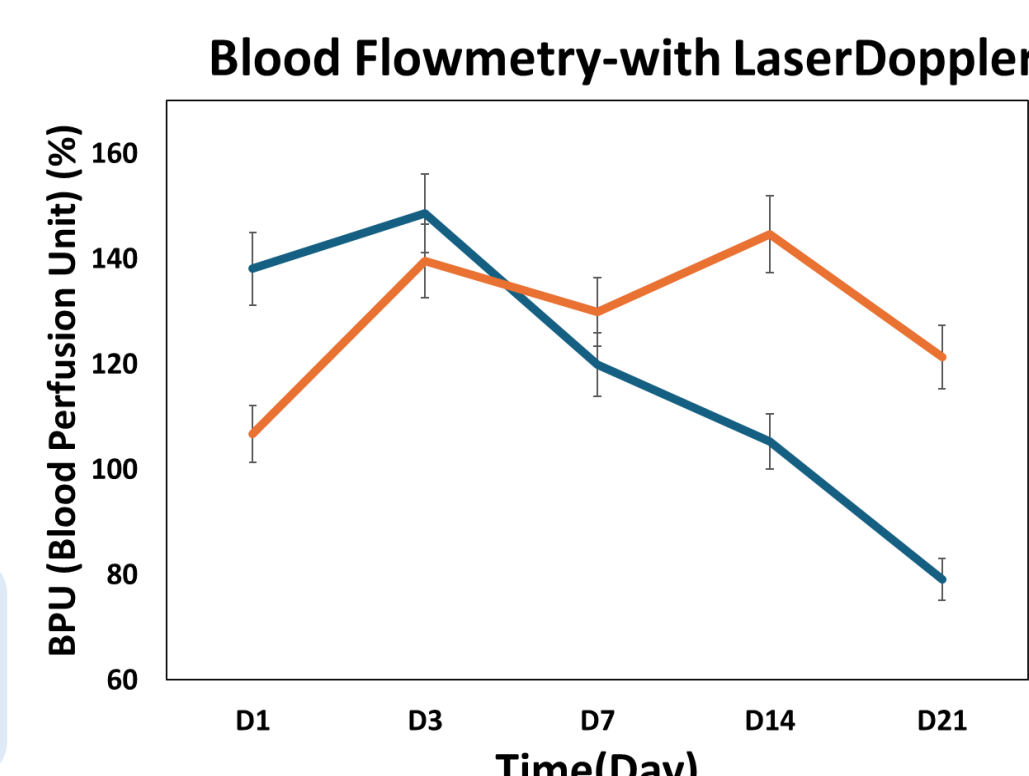
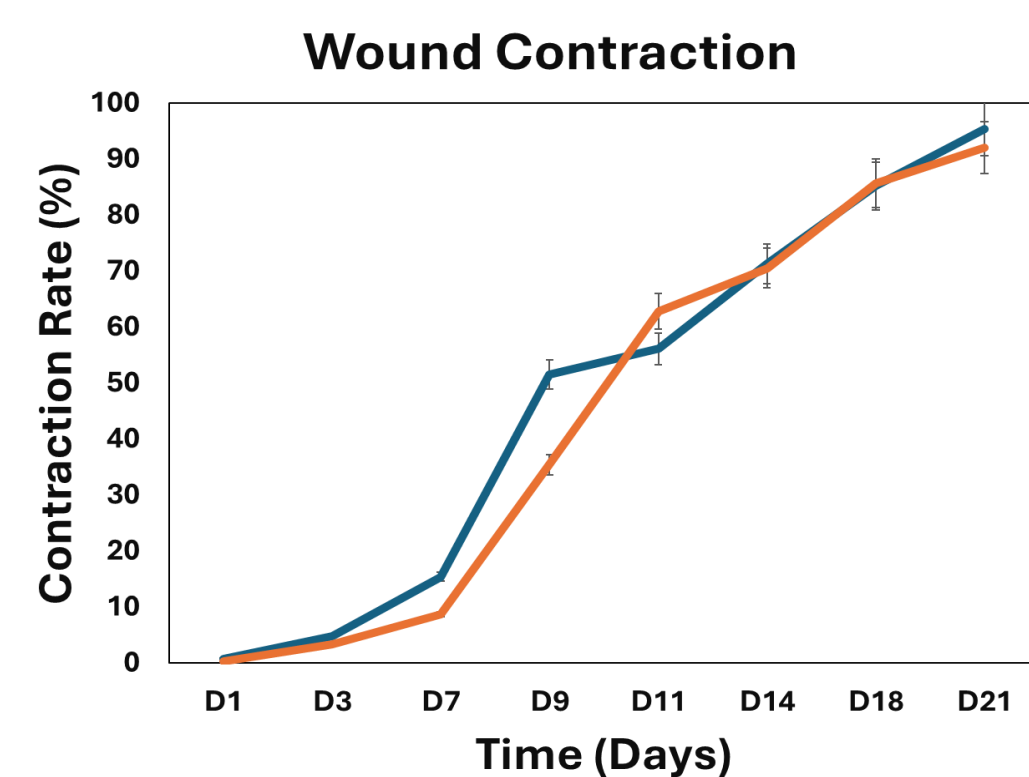
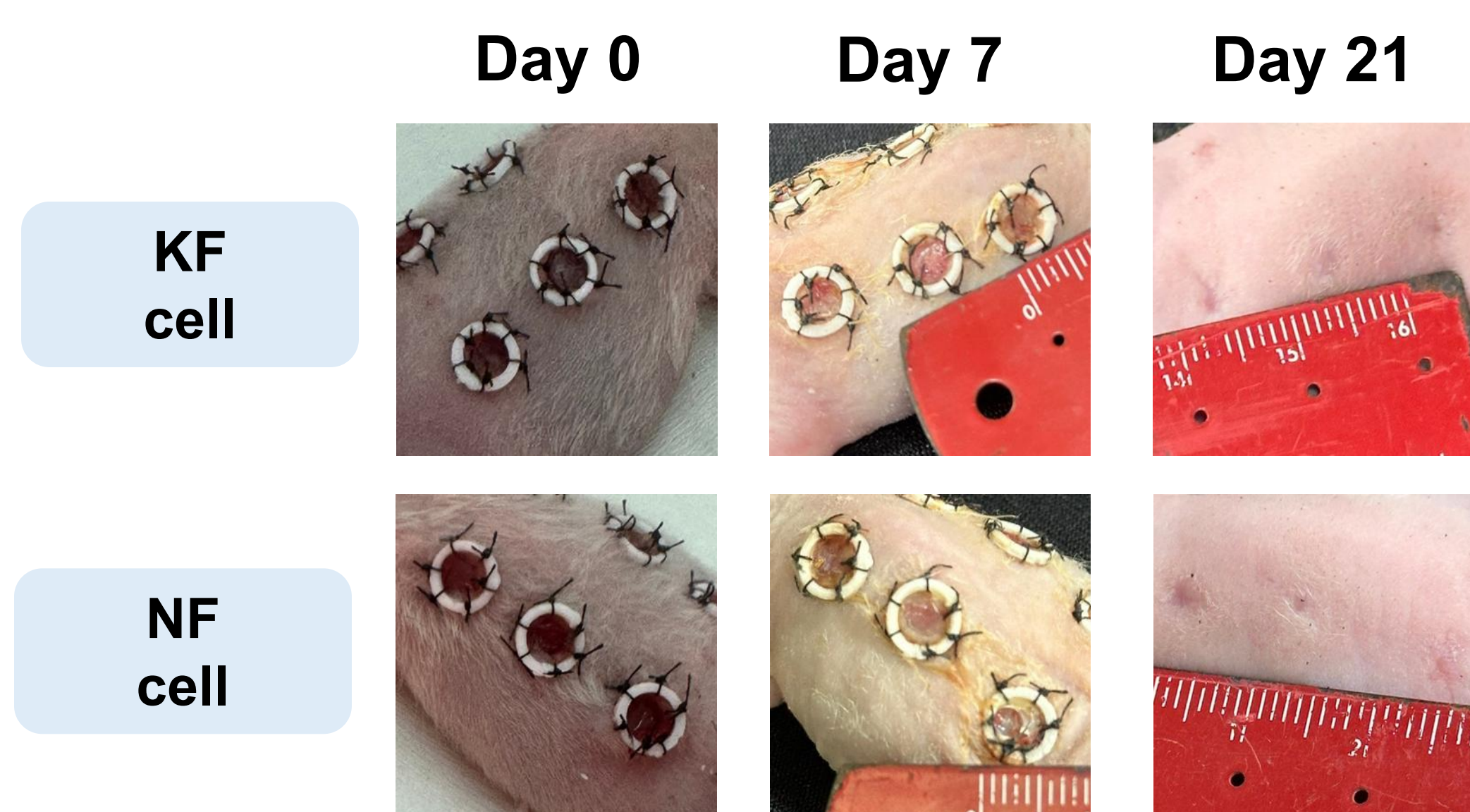
3D Cell Migration in RegDerm®



By 4 hours of incubation, the signals indicated that the Keloid fibroblasts have established **adhesion and initiated organization within the RegDerm®**.

Result and Discussion-3

In Vivo Wound Model



The *in vivo* wound model successfully mimics **human healing** and early angiogenic responses via Laser Doppler flowmetry.

Conclusions

- 2D scratch assay confirms KFs possess significantly greater intrinsic migration than NFs.
- RegDerm® provides a stable 3D matrix where KFs achieve rapid adhesion and early spatial organization within 4 hours.
- The *in vivo* mouse model successfully minimizes skin contraction, effectively mimicking human wound healing and angiogenic kinetics.

Future Works

- Utilize qPCR to quantify the mRNA expression of key fibrotic genes.
- Implant cell-seeded RegDerm® scaffolds into an *in vivo* animal model to evaluate tissue biocompatibility and remodeling.
- Perform H&E staining on harvested explants to examine cellular infiltration, extracellular matrix deposition, and tissue architecture.