

# Single-Cell RNA Sequencing of Repair Tissue Formed After Growth Plate Injury Reveals a Potential Role for Macrophages and Mesenchymal Progenitor Cells in Bony Bar Formation

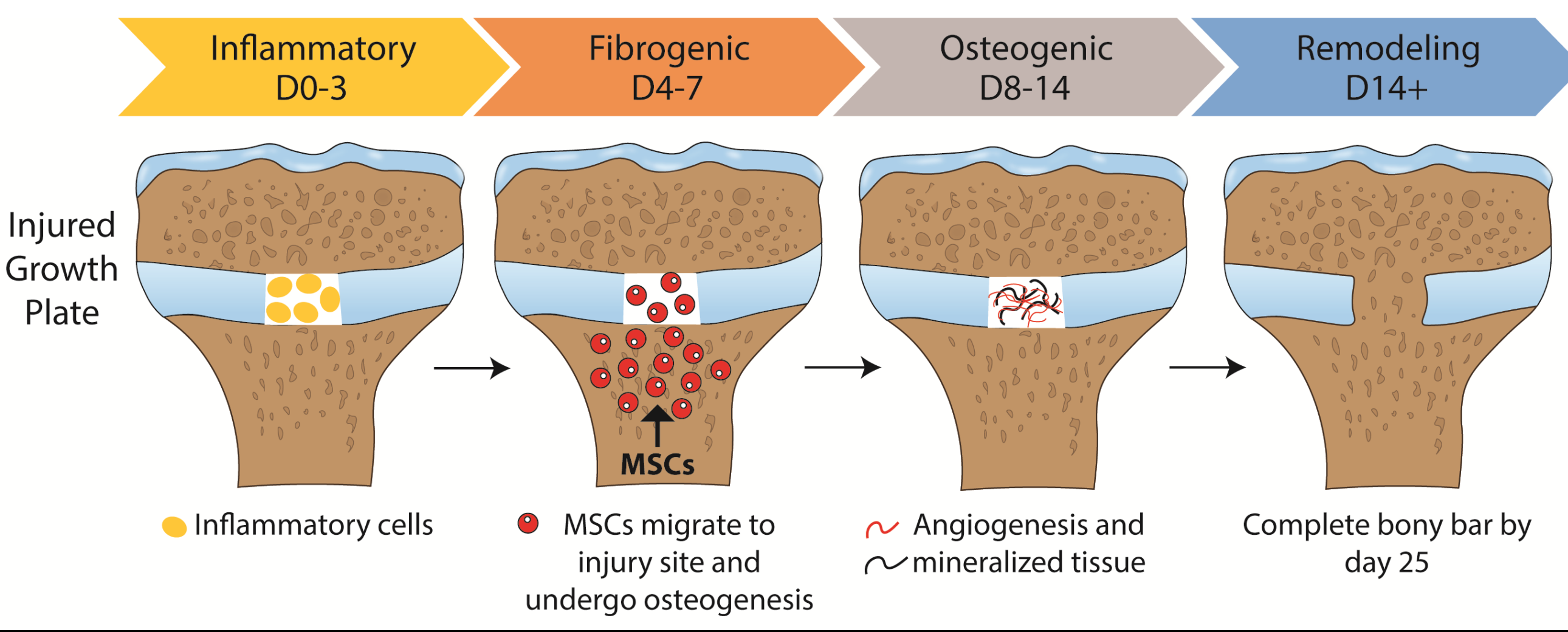
Aditya Mantha, Stacey M. Thomas, MS; Ethan J. Beltrand; Karin A. Payne, PhD

Department of Orthopedics, Colorado Program for Musculoskeletal Research, University of Colorado Anschutz Medical Campus

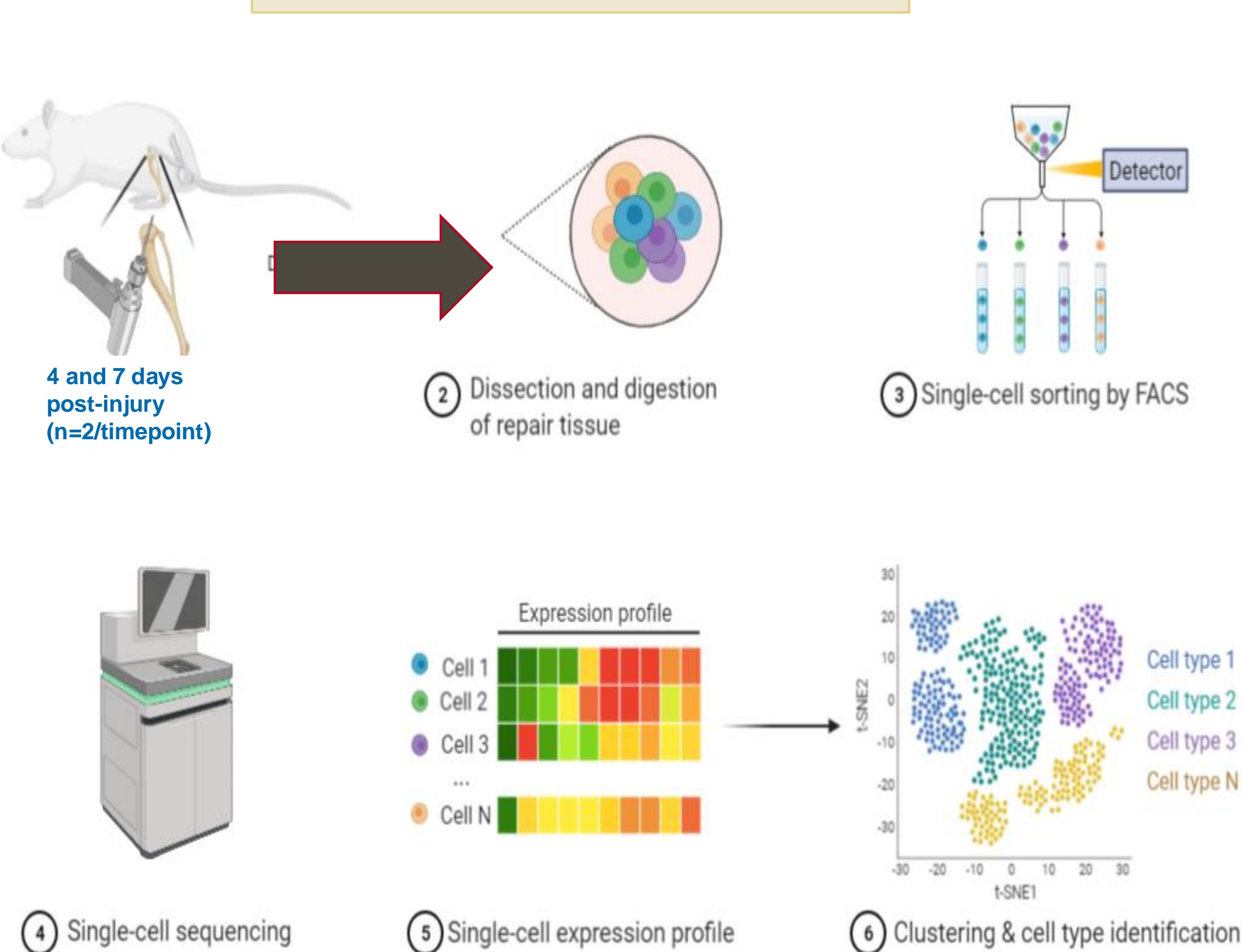


## BACKGROUND

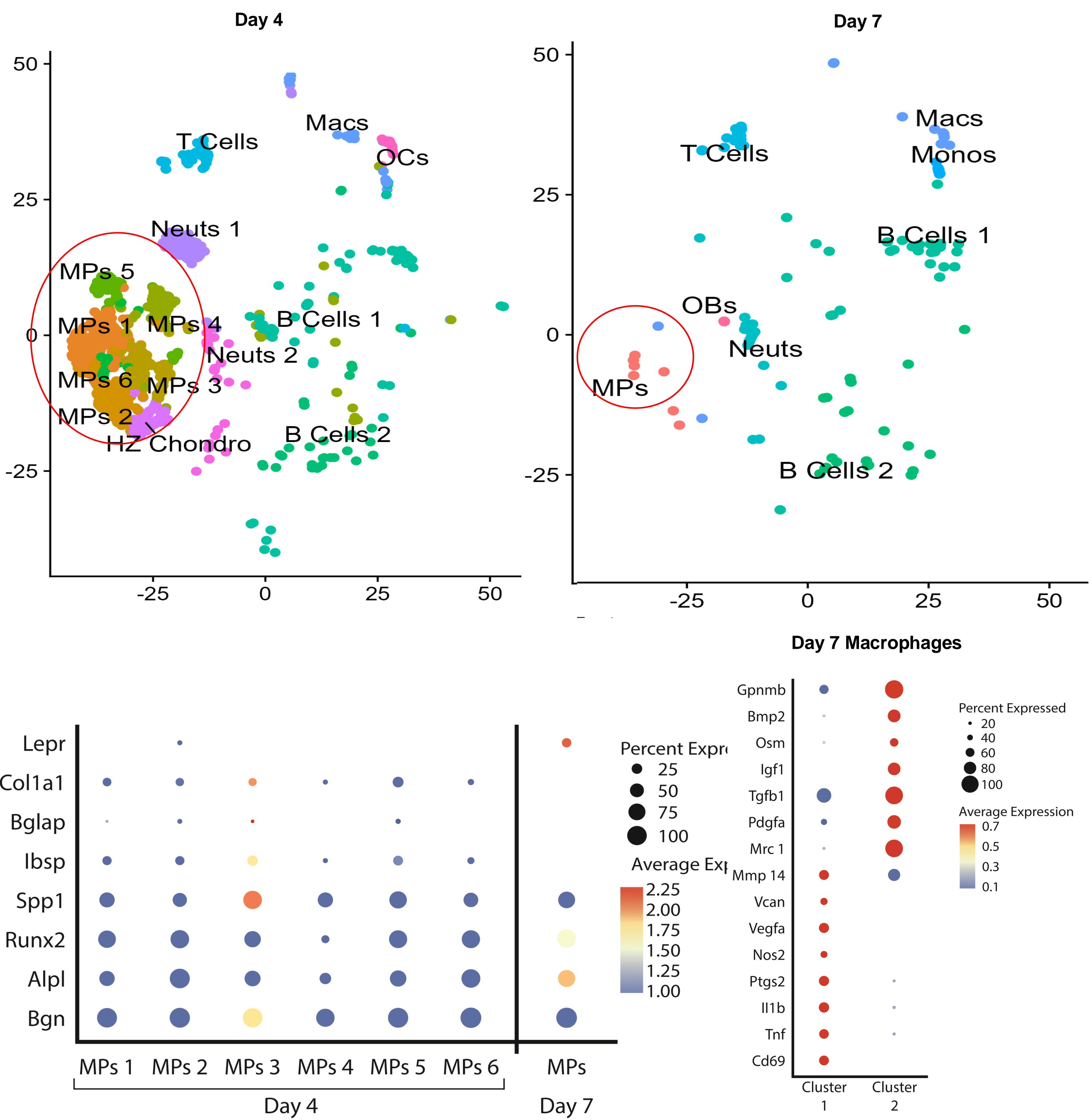
- Growth plate is a region of cartilaginous tissue; when injured, it can be replaced with bone tissue (bony bar)
- Driven by various inflammatory and osteogenic processes
- Purpose: Identify MSC populations in the injured site at different time points following a growth plate injury and detect genes that were upregulated at these times



## METHODS



## RESULTS & DISCUSSION



- Mesenchymal progenitor cells (MPs) were identified at days 4 and 7 after growth plate injury
- Ogn*, *Bgn*, *Alpl*, *Runx2*, and *Lmna* are genes that promote osteogenesis
- Foxa2* (not pictured) was expressed in MP on Day 4 and the which has been implicated in chondrogenesis
- Sub-clustering of the day 7 macrophages uncovered two distinct clusters: Pro-Inflammatory and Pro-Reparative
- Pro-reparative macrophages expressed *Gpnmb*, which promotes MSC migration, proliferation, and survival
- Pro-Inflammatory macrophages expressed *COX2*, *iNOS*, and *Vegfa*