

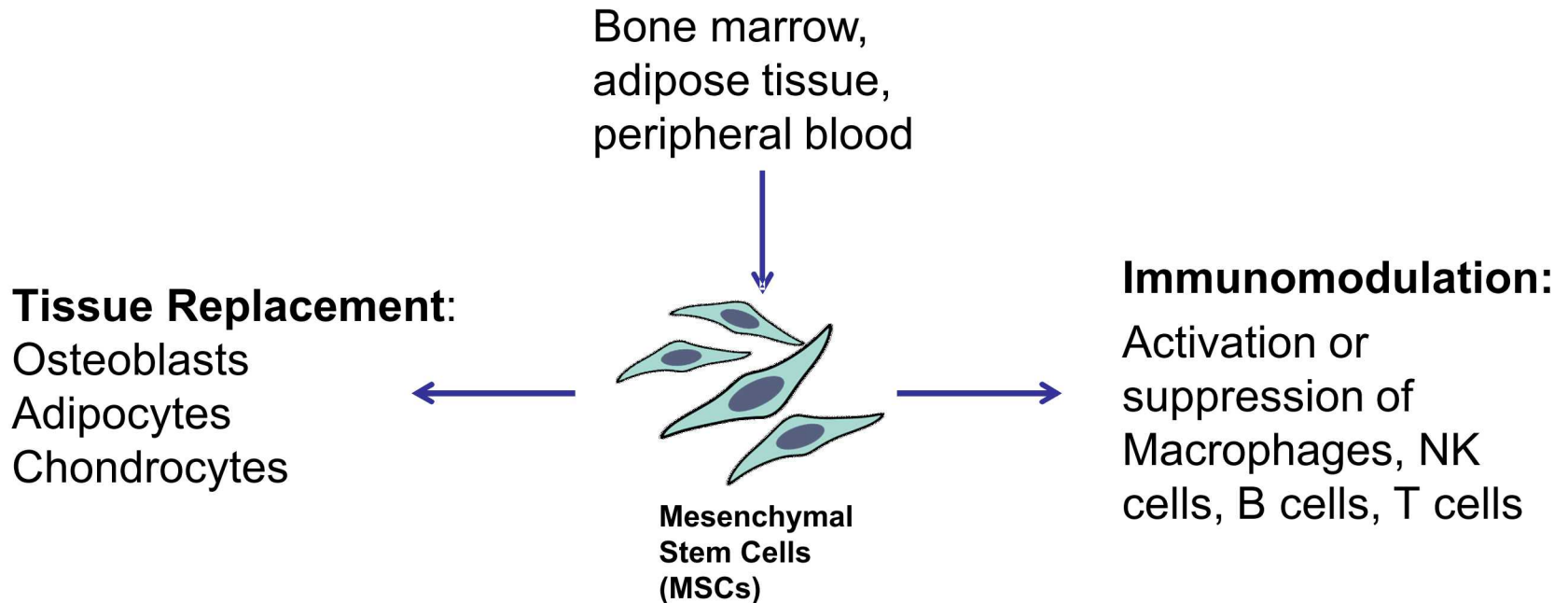
Nikki Tjahjono

Engineering stem cells for antimicrobial therapy

Lightning Talk
February 28, 2019

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

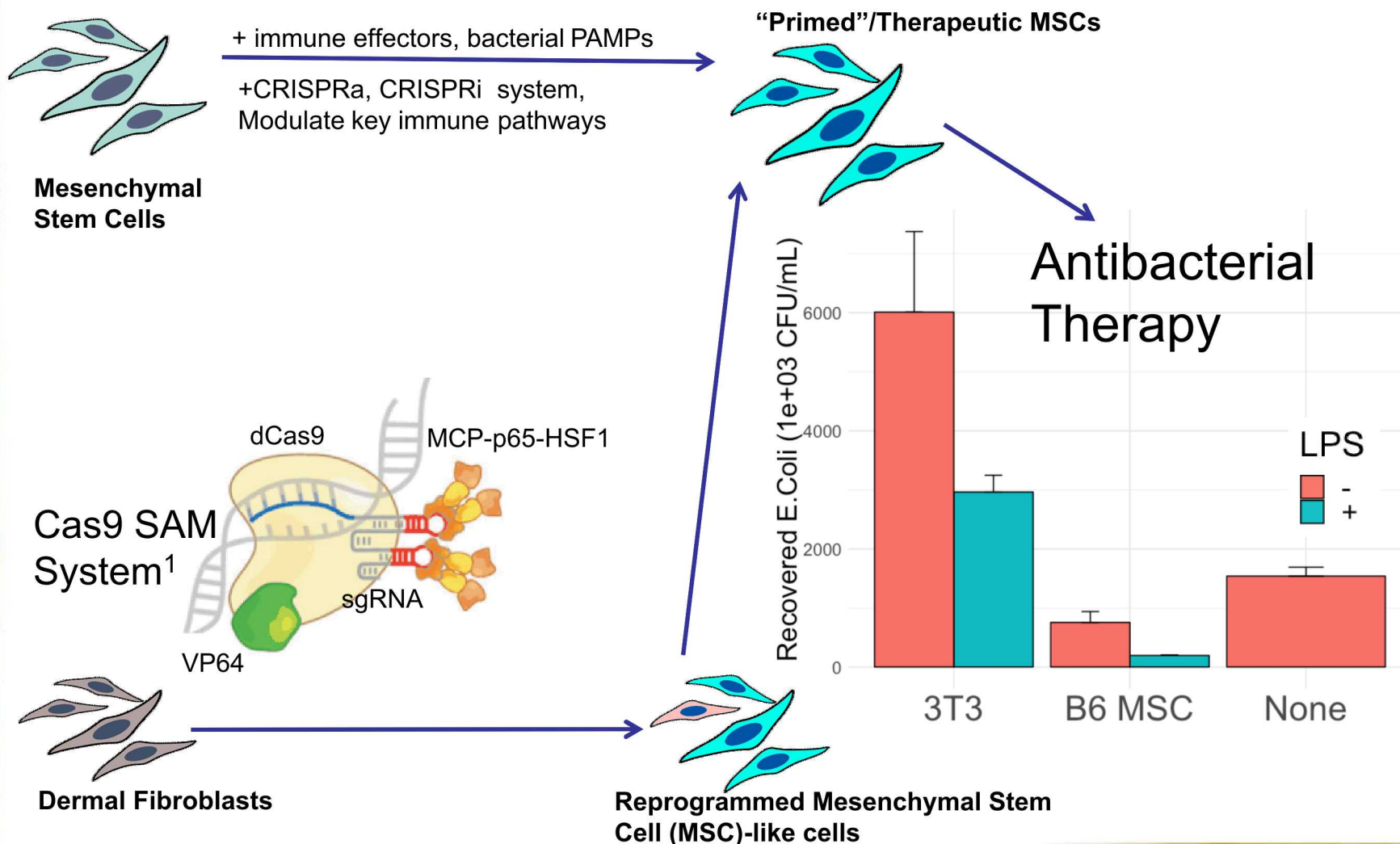
Mesenchymal Stem Cells for Cell Therapy



- Currently 86 registered MSC therapy clinical trials in the US (clinicaltrials.gov)

Goal: Engineer a MSC based therapy as an alternative to antibiotics to fight bacterial infection

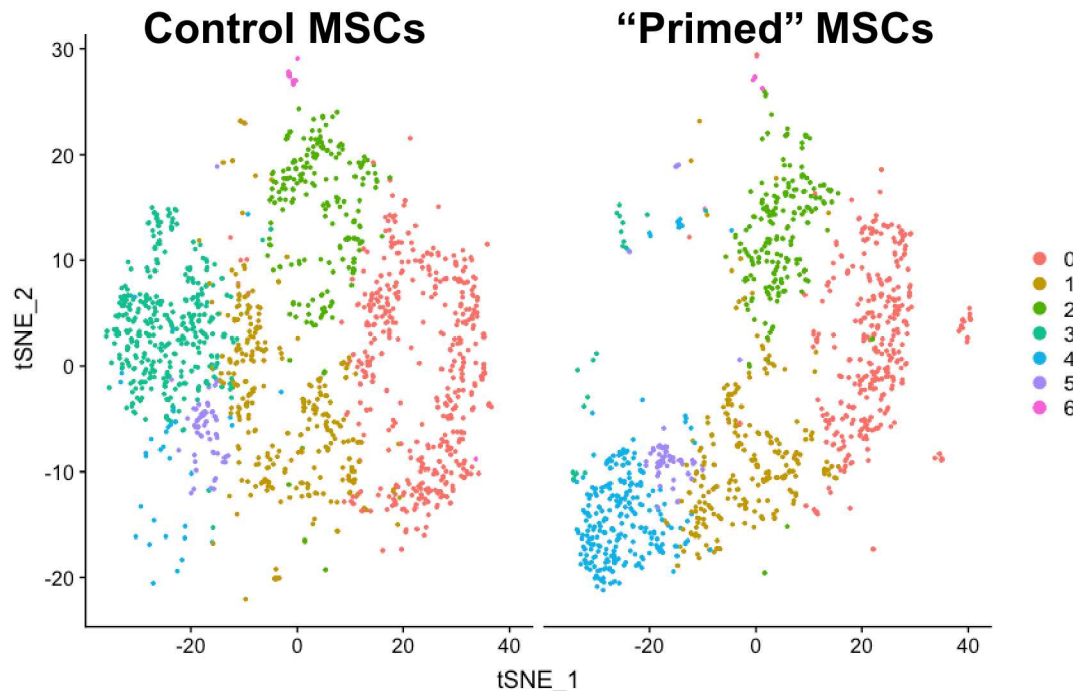
Understanding and Engineering MSC therapy



1: Konermann S, Brigham MD, Trevino AE, et al. Genome-scale transcriptional activation by an engineered CRISPR-Cas9 complex. *Nature*. 2014;517(7536):583-8.

Future Research Interests

- Omics/ big data approach to studying and designing cell systems
- Stem cell heterogeneity, single cell technology
- Engineered cell microenvironments
- Cell and gene therapy development



Acknowledgements

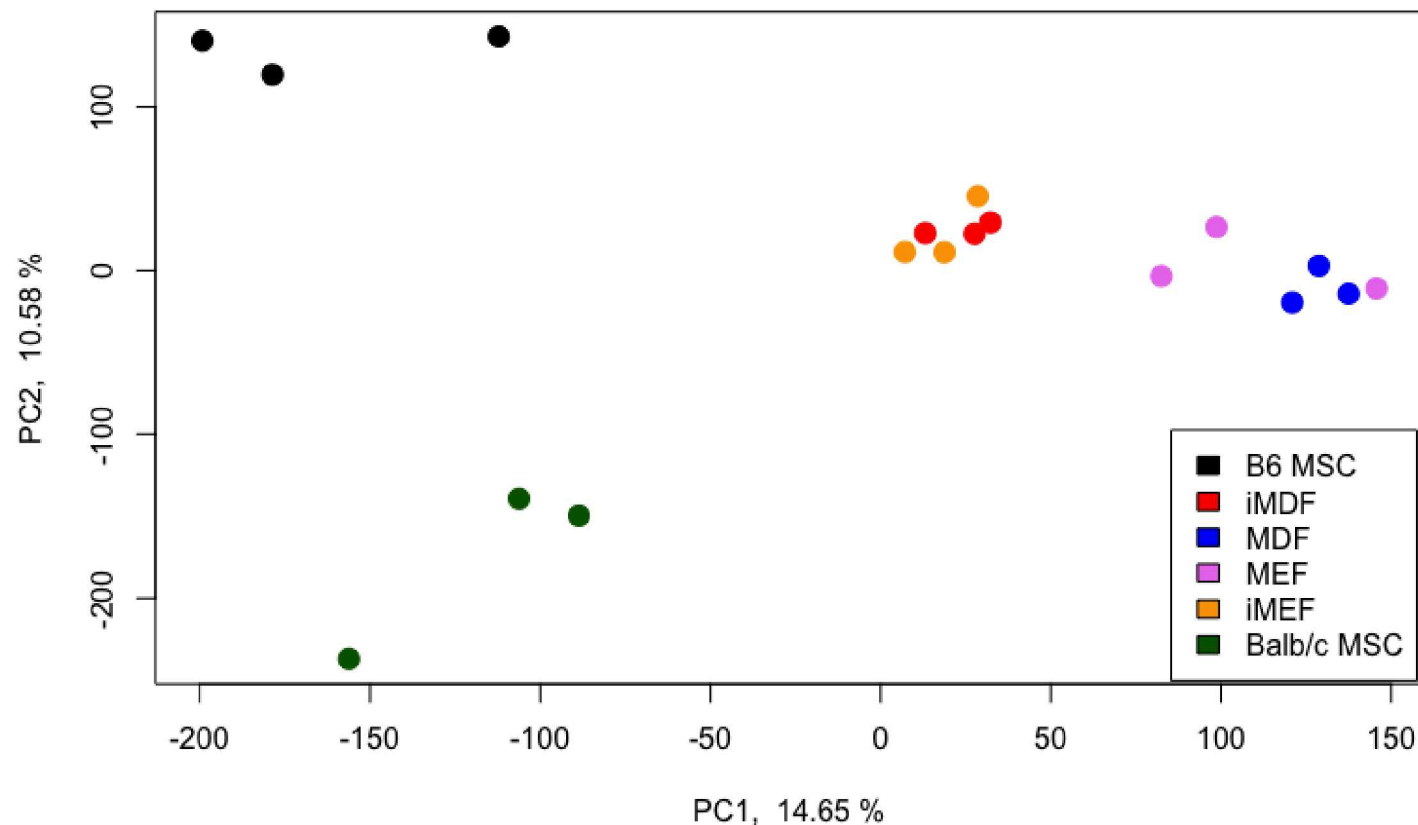
Sandia National Laboratories, Livermore CA

- PI: Raga Krishnakumar
- Matthew Hirakawa
- Yooli Light
- Steven Branda
- Kimberly Butler

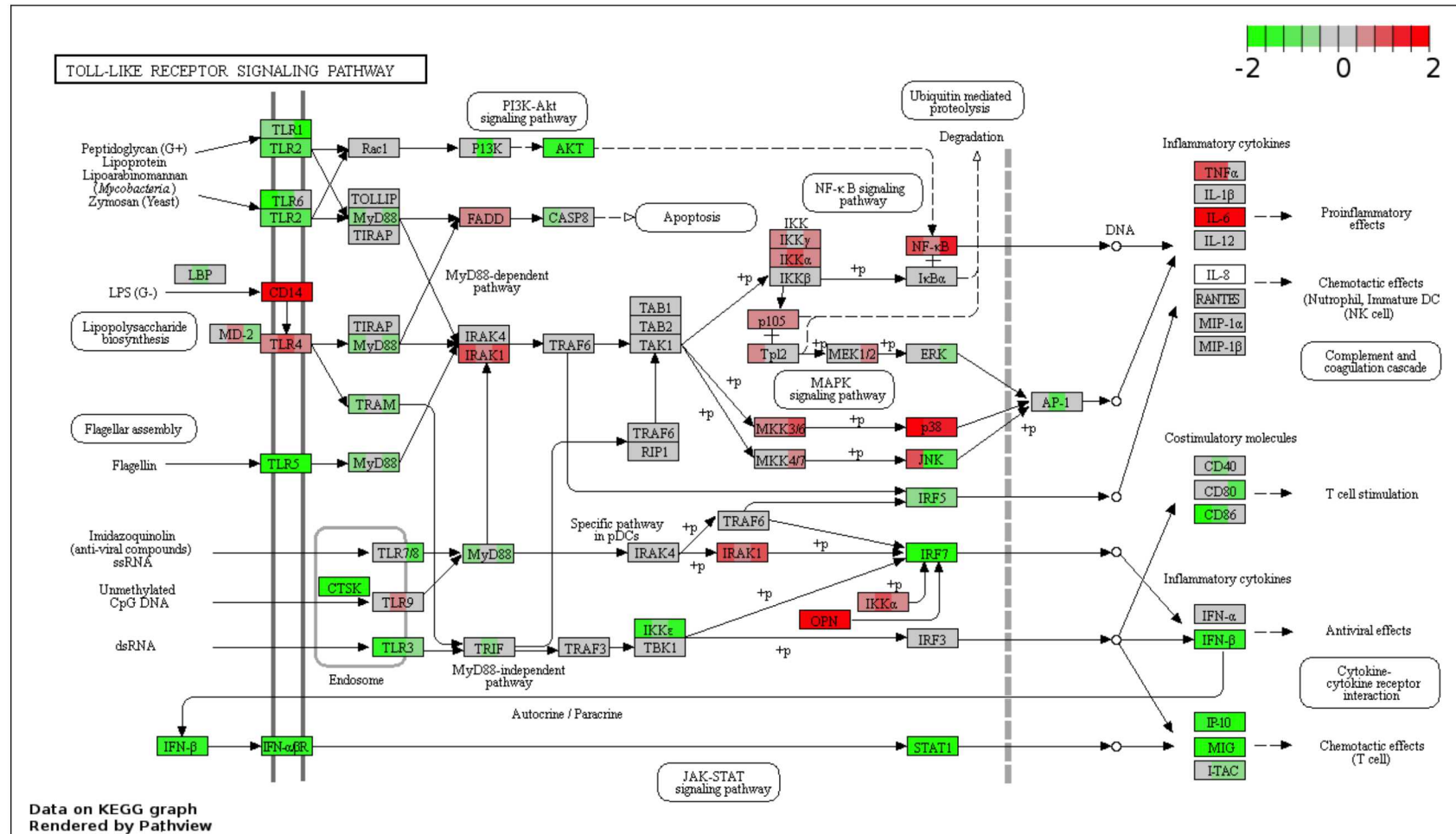
Funding: Sandia Laboratory-Directed Research and Development (Bioscience)

RNA-seq of MSCs and Fibroblasts

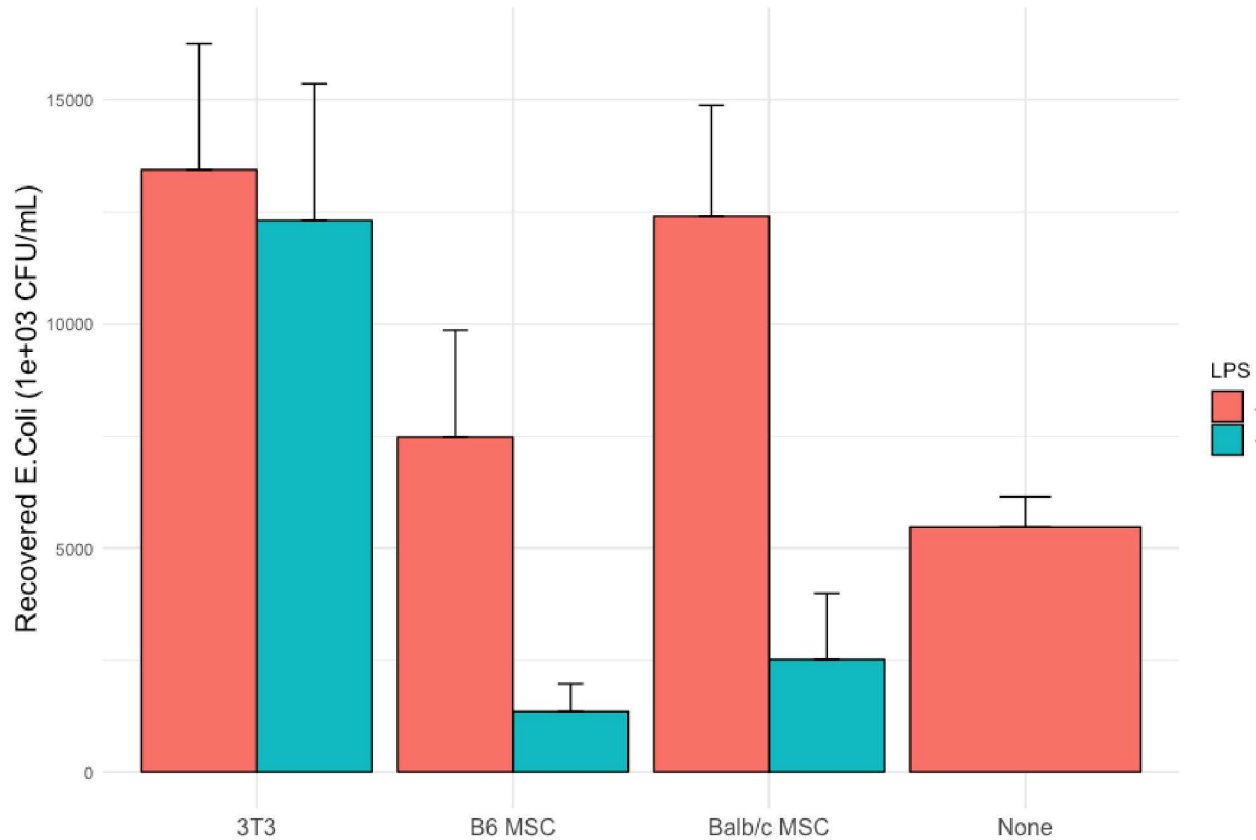
Principal components analysis bi-plot



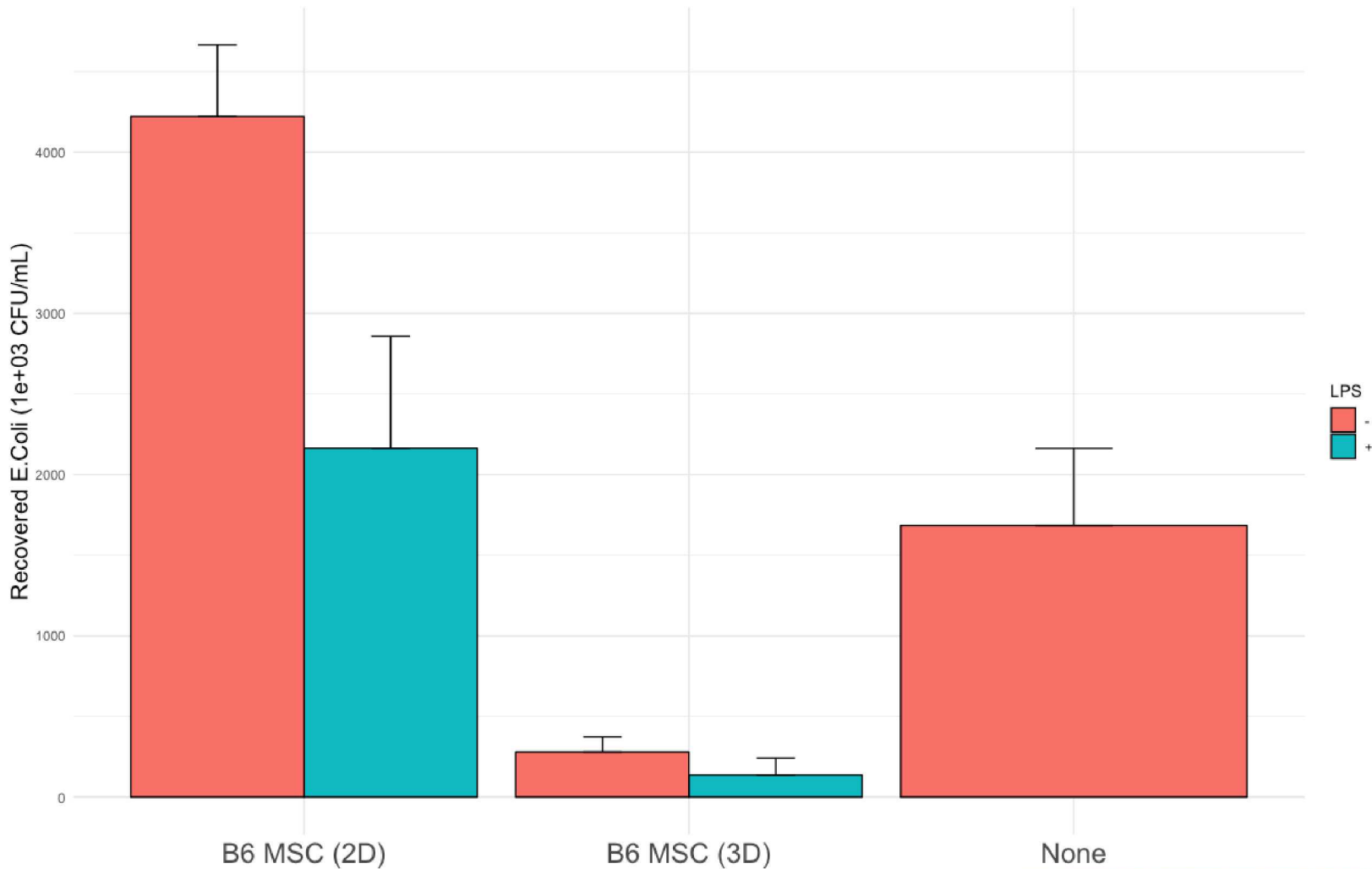
RNA-seq TLR pathway analysis reveals fundamental differences between MSCs from different sources



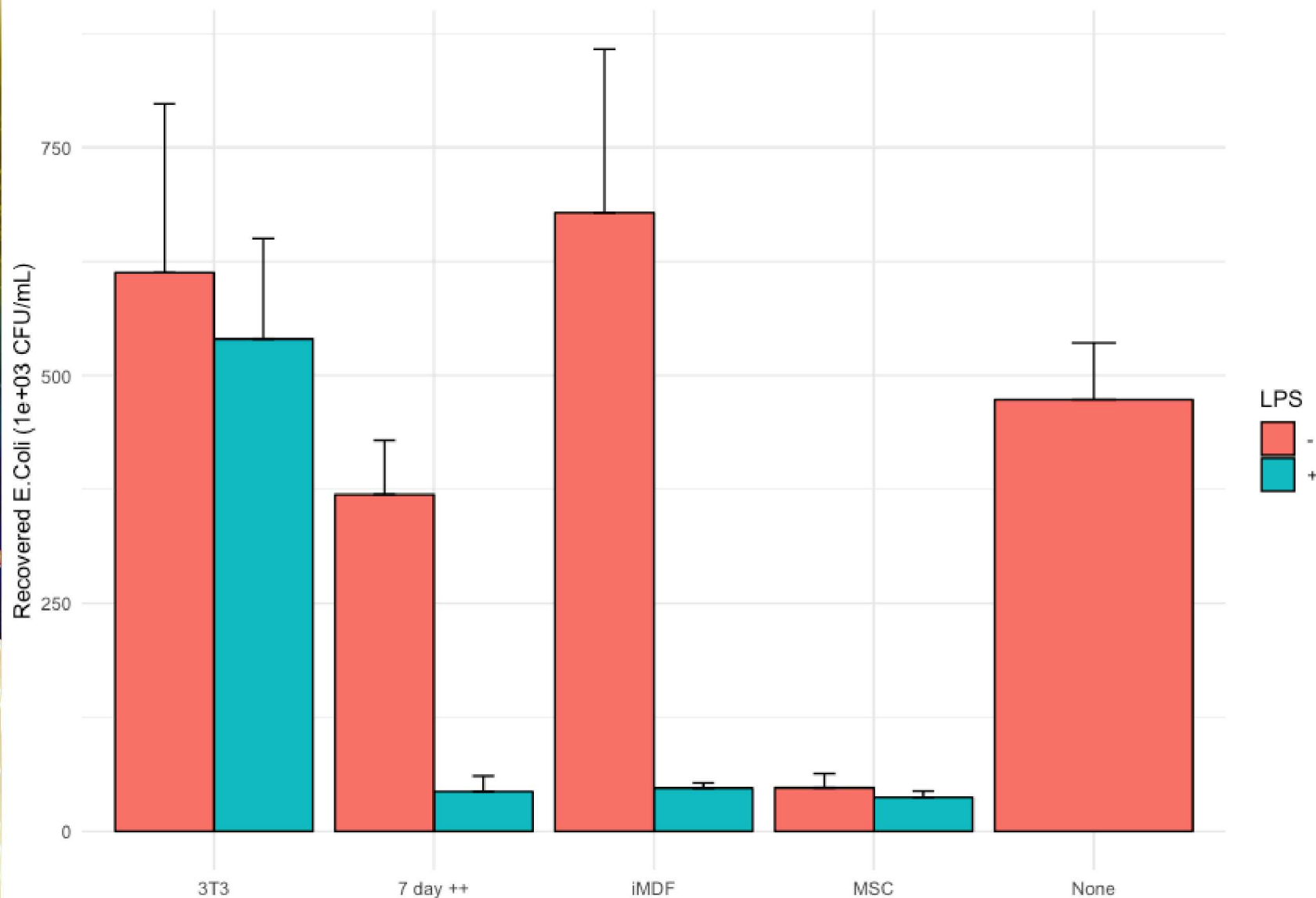
Effect of LPS Priming on MSC Antimicrobial Activity



Effect of 3D Culture on Antimicrobial Activity of MSCs



Efficacy of Fibroblast Reprogramming on Bacterial Killing



TLR agonist screen for MSC priming

