



Microfragmentation for processing stem cells from adipose tissue is promising when compared to enzymatic digestion for the treatment of osteoarthritis

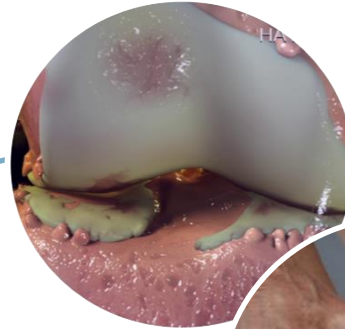


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The authors declare that they have no conflict of interest

Osteoarthritis

Affects ~303 million people globally¹



Degenerative joint disease



Painful



All ages

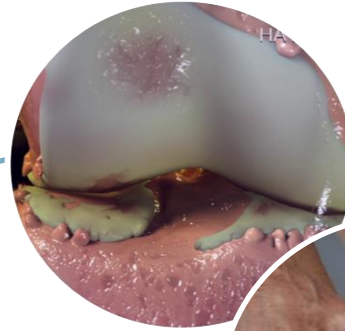


Incurable



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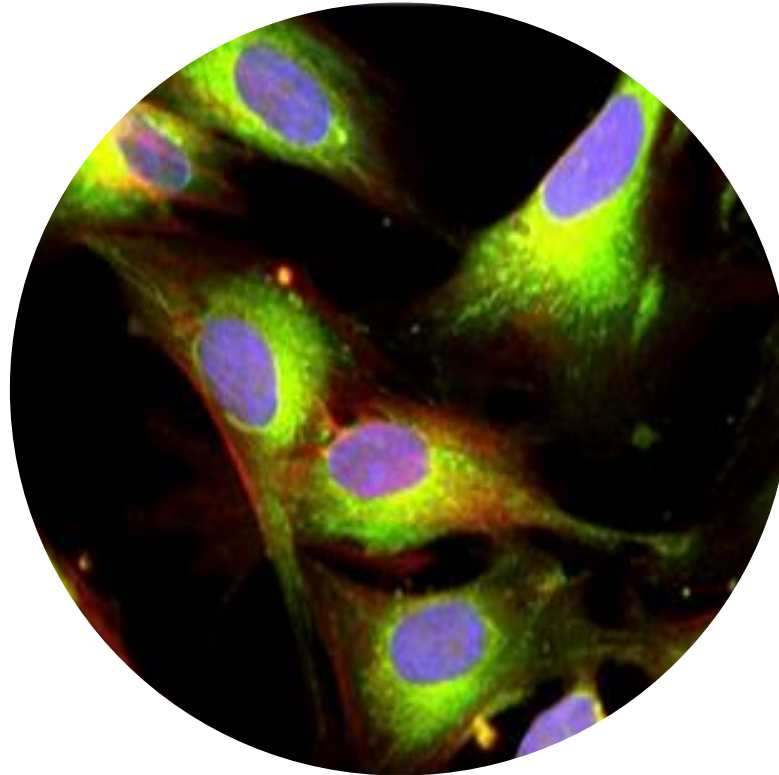
**STEM CELLS
HAVE SHOWN
PROMISING
RESULTS²⁻⁵**



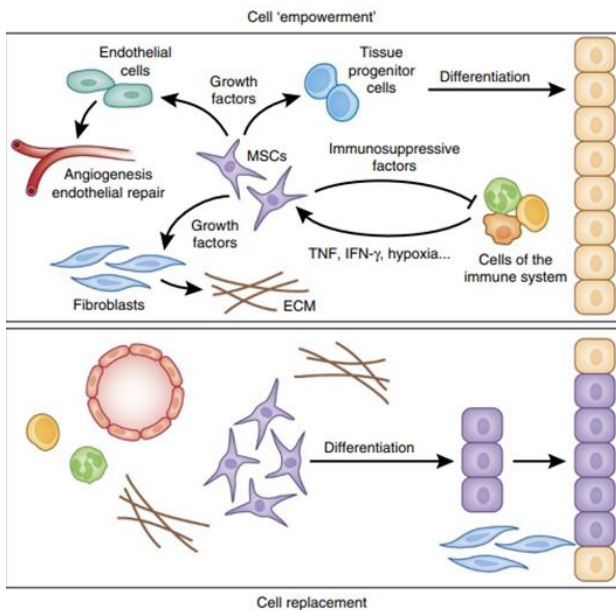
Stem cells are part of the body's normal **repair mechanism**.

Function via⁶:

- Differentiation
- Activation of progenitor cells
- Immunomodulation



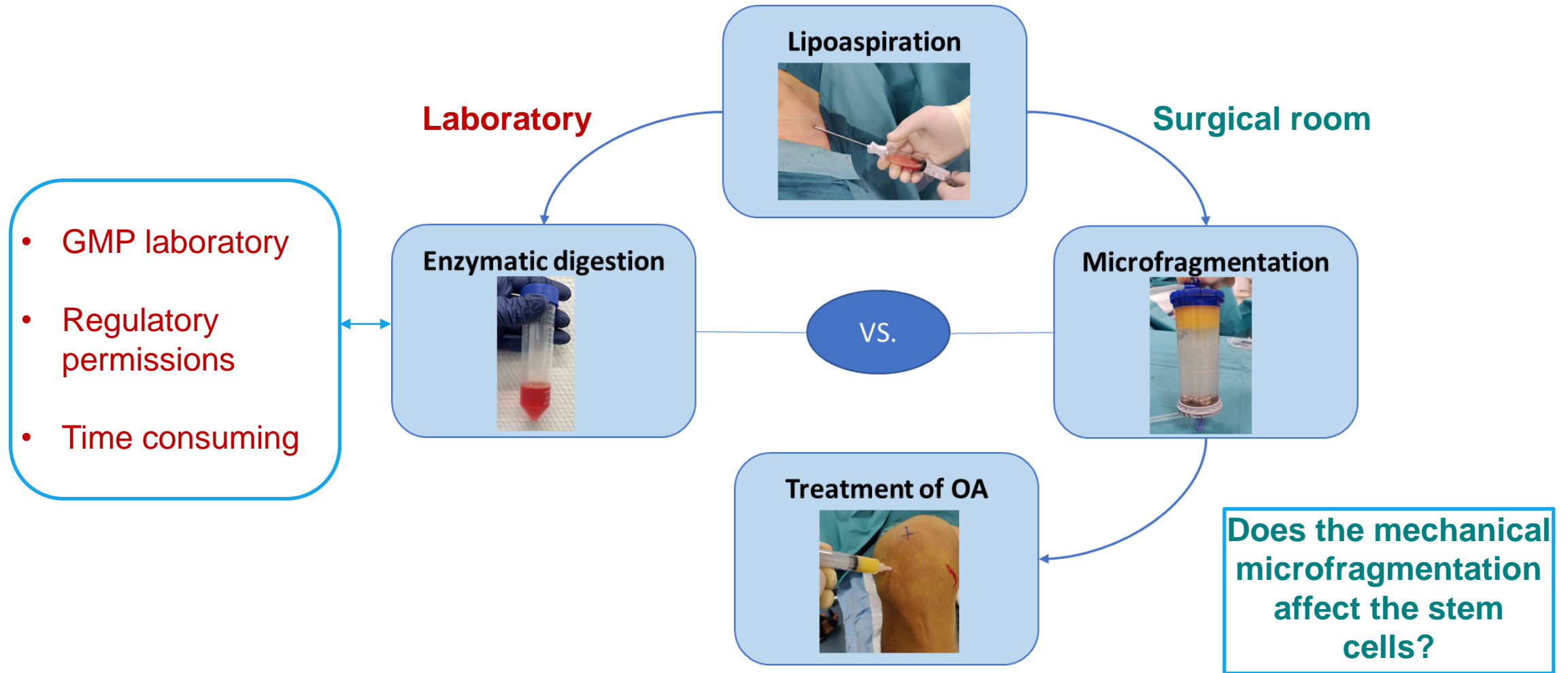
Can be Isolated from various tissues



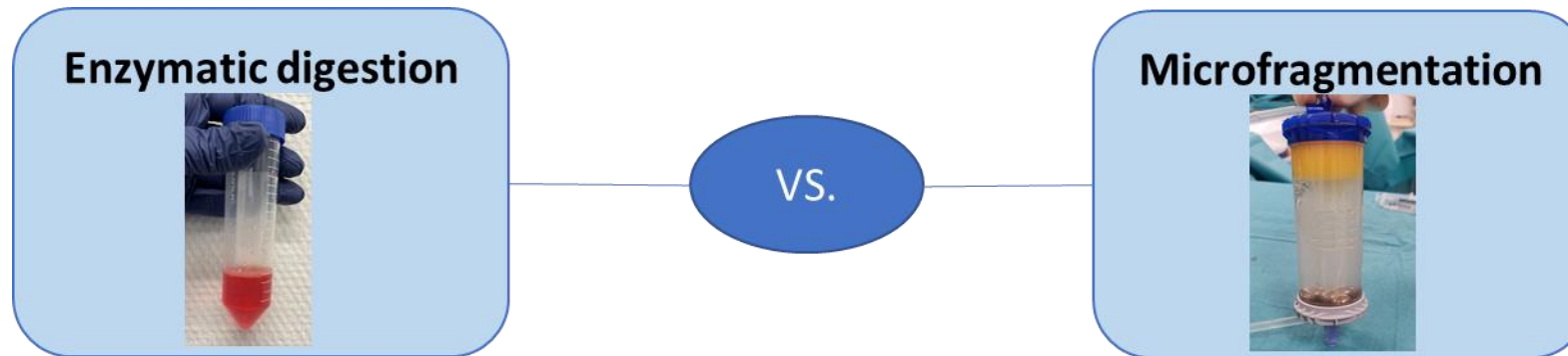
Adipose tissue

- Easy accessible
- Local analgetics
- High quantity of stem cells





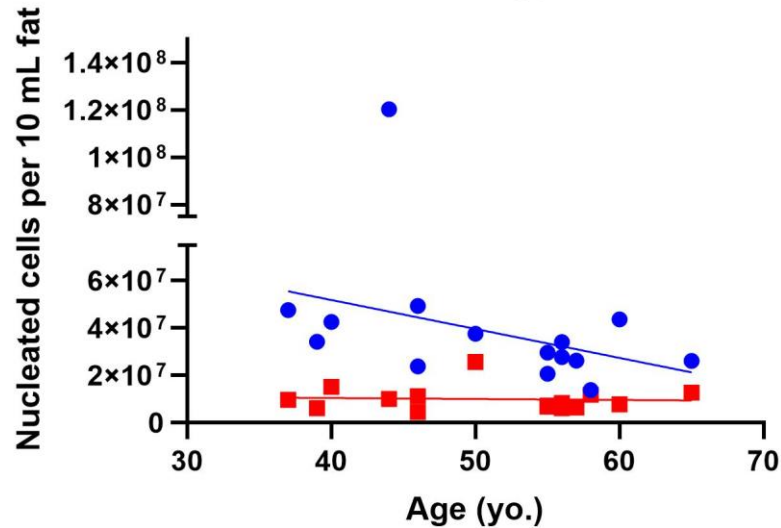
To assess **quantity** and **viability** of **stem cells** from adipose tissue when processed with **microfragmentation** compared to standard **enzymatic digestion**.



Materials: Adipose tissue from 15 knee osteoarthritis patients, age (mean (SD) 50.9 (8.5))



Cell Count - Trypan Blue



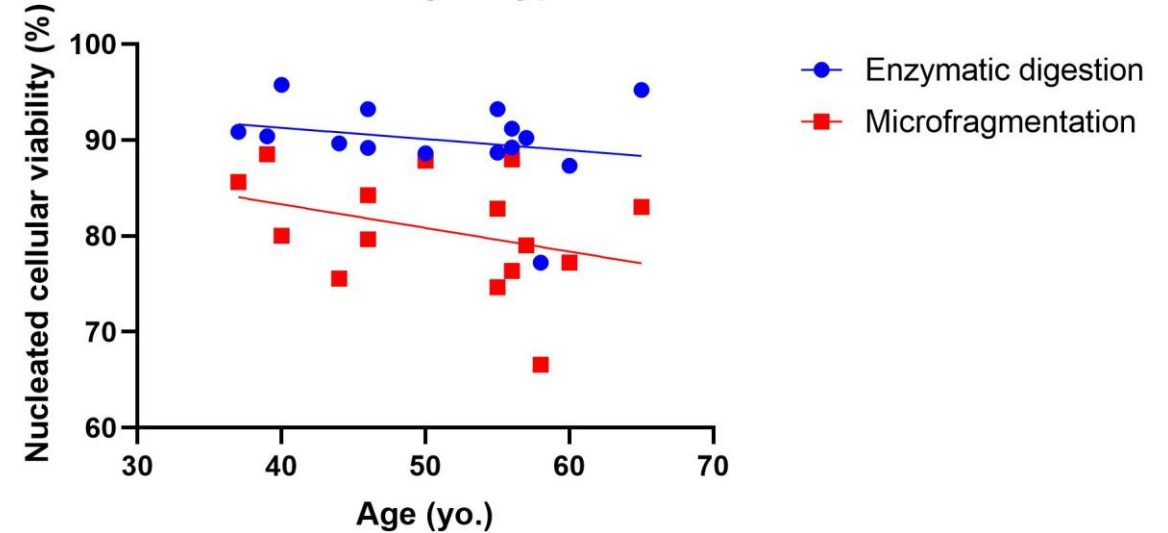
Nucleated cells:

Enzymatic digestion 3.9 × 10⁶/mL (2.5 × 10⁶/mL)

Microfragmentation 1.0 × 10⁶/mL (0.5 × 10⁶/mL)

p < 0.01

Cellular Viability - Trypan Blue



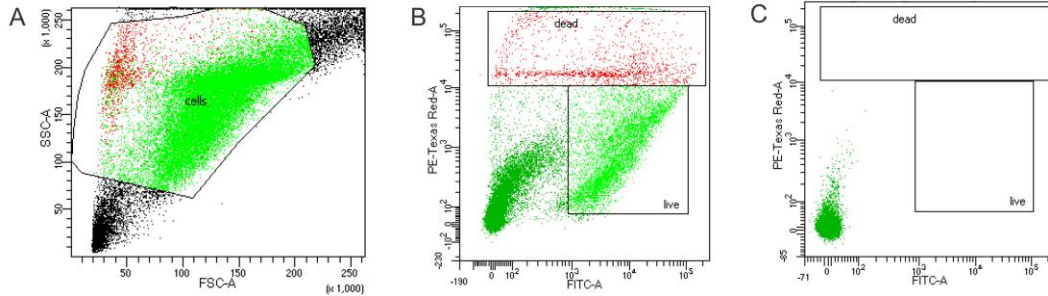
Total nucleated cell viability:

Enzymatic digestion 90% (SD 4%)

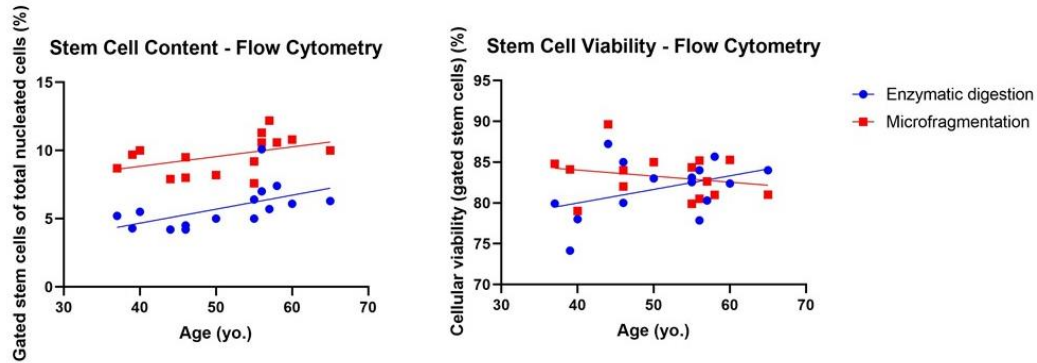
Microfragmentation 80% (SD 6%)

p < 0.01

Flow cytometry → gating on stem cells



Gating strategy

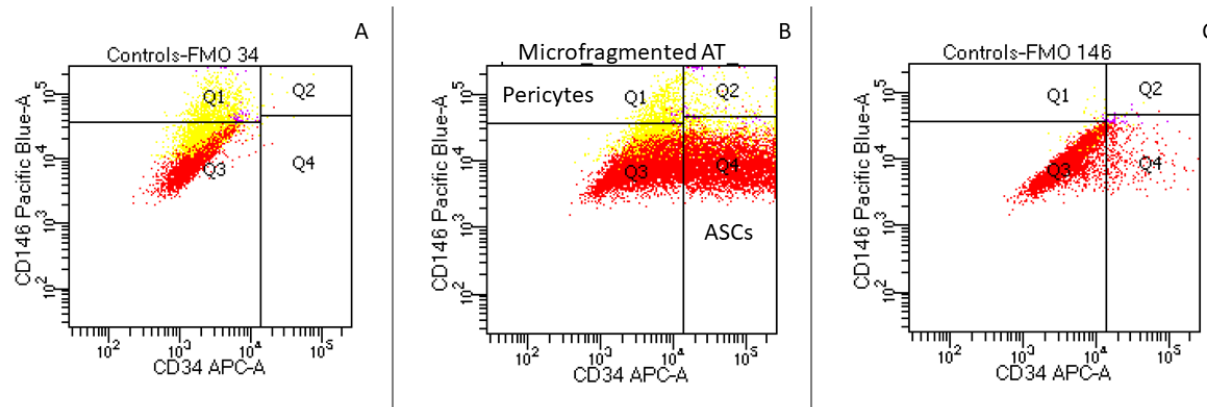
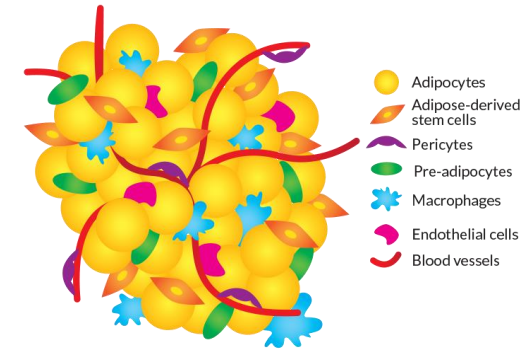


Higher stem cell content per total nucleated cell count for **Microfragmentation** 10% (SD 2%)
 Enzymatic digestion 6% (SD 2%) $p < 0.01$

No significant difference in viability for **Microfragmentation** 84% (SD 3%)
 Enzymatic digestion 82% (SD 4%) $p = 0.17$

Stem cell types identified in microfragmented adipose tissue:

- **Adventitial stem cells (ASCs)** (CD31-/CD45-/CD34+/CD146⁻)
- **Pericytes** (CD31-/CD45-/CD34-/CD146⁺)
- **Mesenchymal stem cells** (CD34-/CD45-/CD146⁻/CD90⁺/CD105⁺)
- **CD271⁺ stem cells** (CD31-/CD45-/CD90⁺/CD271⁺)



Microfragmentation is a promising method to process clinically relevant stem cells for the treatment of osteoarthritis



Thank you for your attention



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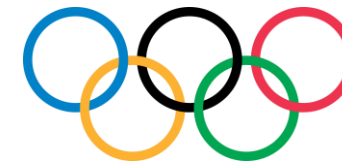
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