

iPSC Manufacturing with a Human-Mimetic 3D Platform

Ronawk's *In Similare* Technology for Regenerative Therapies

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Conflict of Interest

Dr. Amy Manning-Bog is a shareholder in Ronawk.

Challenges in iPSC Therapies

Loss of “Stemness”: Pluripotency markers can diminish

Cell Senescence: Prolonged culture leads to aging and reduced proliferation

Batch Variability: Inconsistent yields and quality between batches in manual systems

High Costs & Labor: Expensive media and intensive labor needs

Scaling Bottlenecks: Difficult to expand to high quantity of cells while maintaining quality



[Increasing Production of Induced Pluripotent Stem Cells - BioProcess International](#)

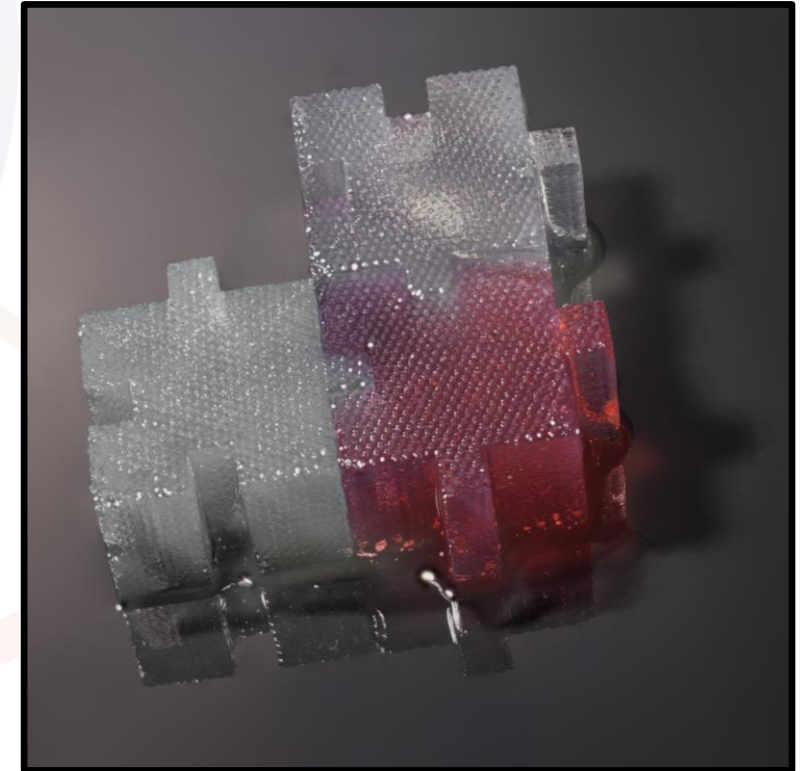
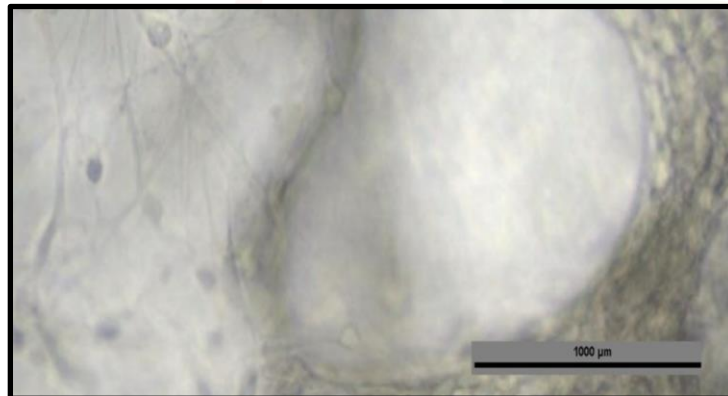
Ronawk's *In Similare* Platform – A 3D Solution

Human-Mimetic 3D Hydrogel: Modular scaffold recreates native tissue-like environment

“*In Similare*” = *In Similar*: Bridges the gap between in vitro and in vivo conditions

End-to-End Use: Same platform from discovery to GMP manufacturing

Customizable & Flexible: Adaptable to different cell types, media, and culture configs



How Ronawk's *In Similare* May Address Key Pain Points

Enhanced Cell Robustness: Supports long-term cell viability and growth

Retention of Stemness: Maintains pluripotency markers and differentiation potential

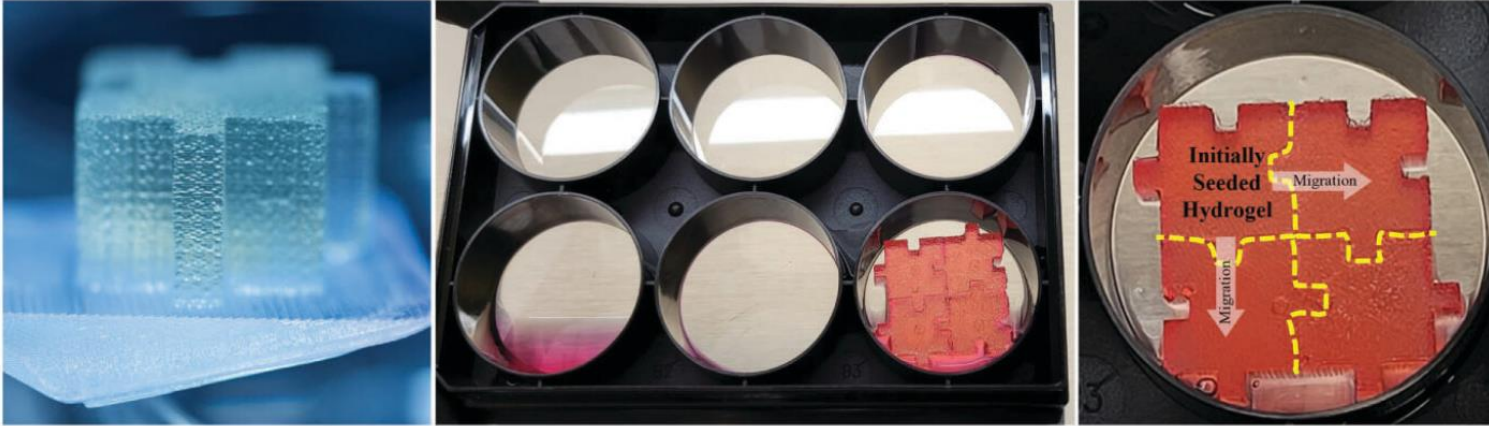
Reduced Senescence: Lowers stress-induced aging; cells keep dividing longer

Seamless Scalability: Modular blocks allow expansion without passaging

Viability: No Passage-Related Stress

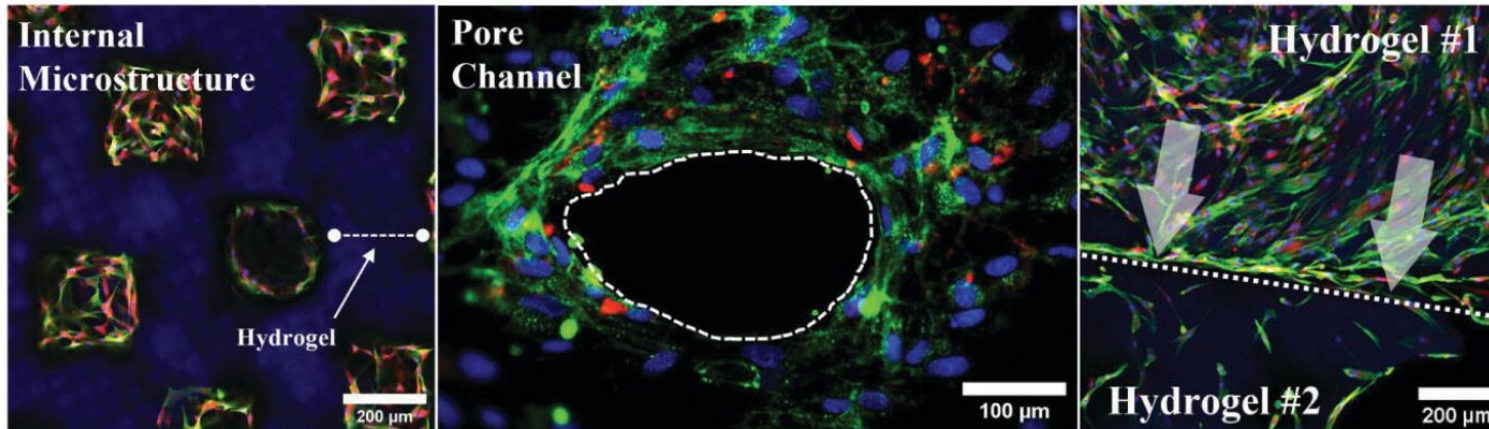
(A)

Macrostructure



(B)

Microstructure



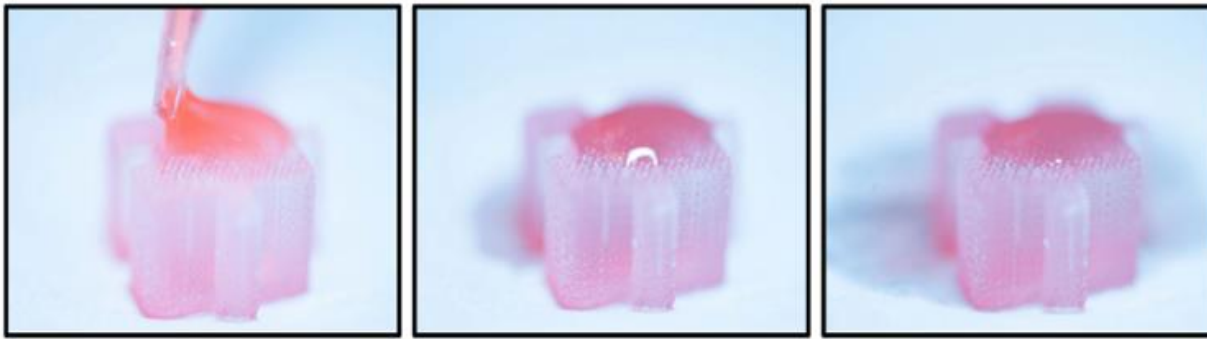
Green = Actin
Blue = Nuclei
Red = Mitotracker

Viability: Oxygen & Media Diffusion

Hydrogel System Enables Efficient Media & Oxygen Diffusion to Optimize Growth

Assessment of Media Diffusion

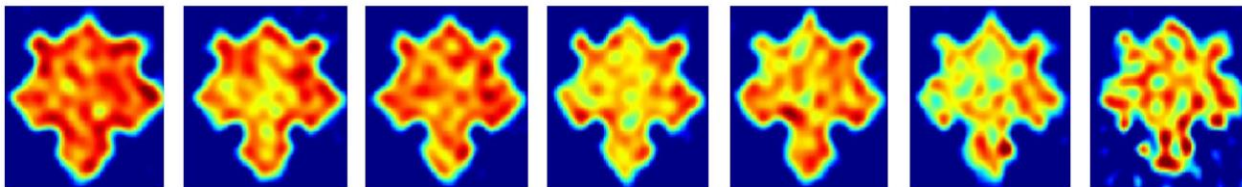
Time (1 - 2 seconds)



Efficient Fluid Transport: liquid media rapidly permeates through the hydrogel's porous microstructure within 1–2 seconds.

Assessment of Oxygen Diffusion

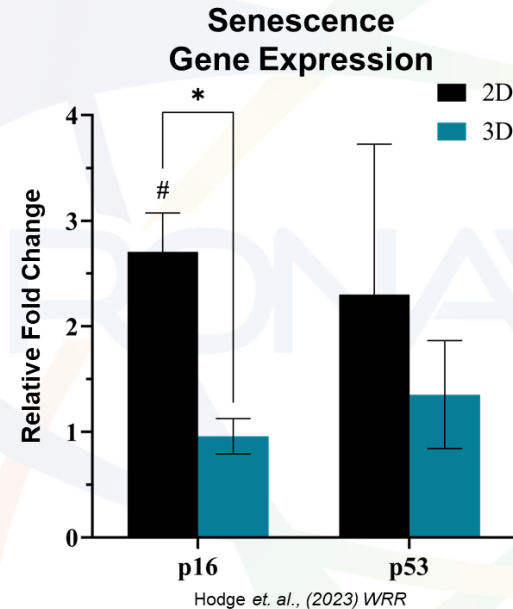
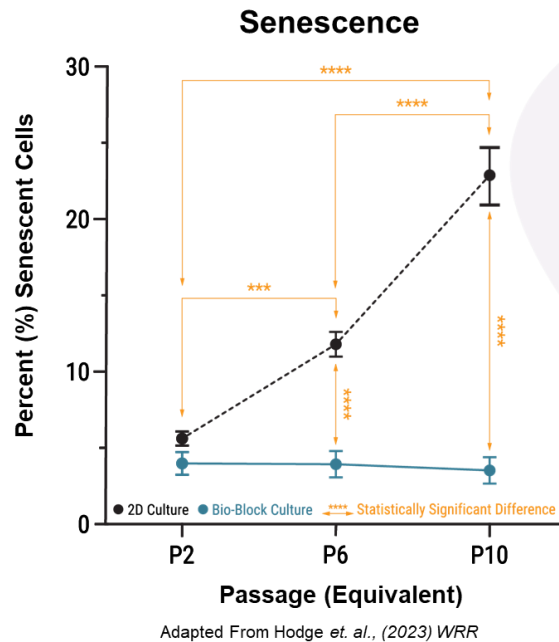
Amplitude maps



Homogenous distribution of Oxygen: Oxygen distribution and partial pressure (~160 Torr) achieved in less than an hour.

Email sleigh@ronawk.com for whitepaper: [The Bio-Block™: A Game-Changer in Tissue Culture.](#)

How *In Similare* Addresses Key Pain Points: Reducing Cellular Senescence



Extended Proliferation: 3D-cultured iPSCs continue dividing vigorously over longer periods

Lower Senescence Markers: Expression of aging markers significantly reduced in 3D vs 2D

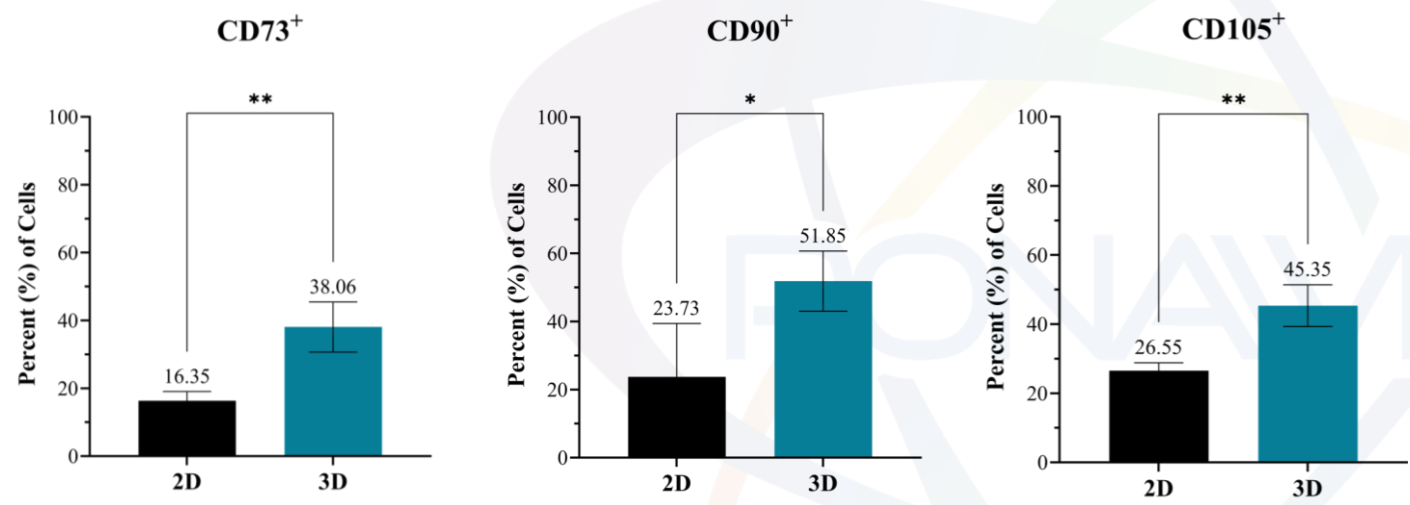
Fewer Senescent Cells: Percentage of cells entering senescence is diminished in the 3D environment (per gene expression and β -gal assays)

Putative Mechanism: 3D matrix provides stress protection – more natural niche signals result in healthier, “younger” cell phenotype

How *In Similare* Addresses Key Pain Points: Retention of Stem Phenotype

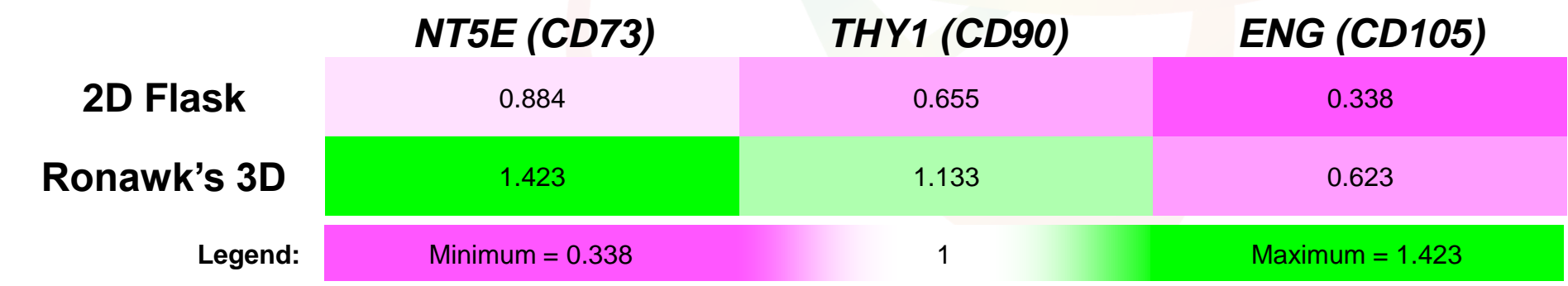
Retention of Adipose Stem Cell Phenotype and Genotype

Protein staining of stemness markers



- Stem-like marker evaluation:
- Immunolabeling and quantification at P5.
 - Higher retention is seen in 3D than in 2D.

Gene expression of stemness markers



Operational Value: Streamlined Scale-Up & Automation

Simplifies workflow with an agnostic, easy-to-use, modular system that is adaptable for diverse media, cells, and applications.

Seamlessly scales and automates to meet evolving demands from pilot to production. *One platform from bench to clinic.*

Reduces costs by up to 90% from media consumption and minimizes waste, contamination, and labor.



24 Flasks —————> **One 6-well Plate** —————> **Hands-free**
90% Media Reduction Labor Hours become Labor Minutes **Maintenance**

Product & Platform: Dual Utility

Internal Validation: Ronawk uses *In Similare* in its own therapeutic R&D programs

Proven in Pipeline: Platform's performance vetted through in-house preclinical success

Continuity in Biomanufacturing: Available as a therapeutic-enabling platform to enable other iPSC and stem cell manufacturing and importantly utilize the same platform to produce iPSCs for R&D and to scale to CMC



In Similare Platform – Summary

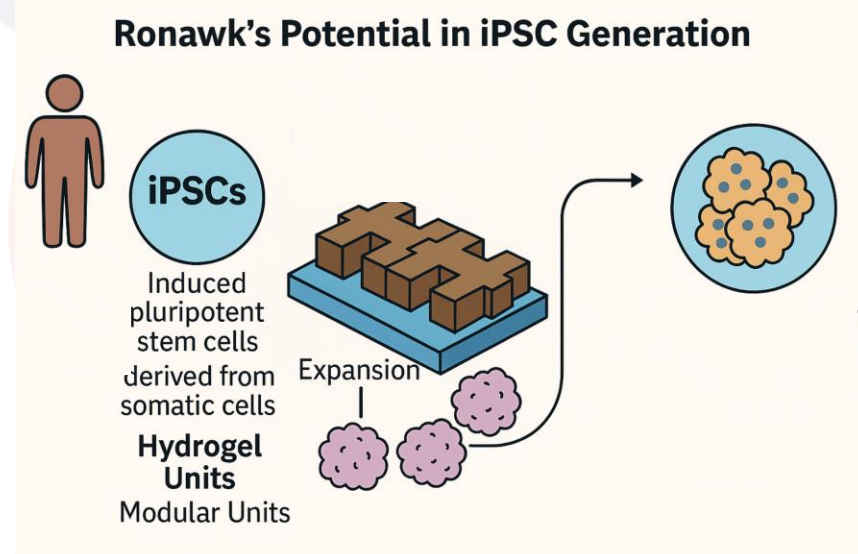
In Similare is potentially a **game-changing 3D platform** for iPSC expansion, addressing key manufacturing hurdles

Maintains cell quality: Preserves stemness/pluripotency and function while minimizing senescence and variability

Enables scale and efficiency: Modular growth, reduced passaging, and higher yields lower cost and labor

Proven & versatile: Validated in Ronawk's own programs and available to advance others' regenerative medicine projects

Future: Paving the way for scalable, cost-effective, and clinically reliable iPSC therapies



Acknowledgments

Thank you to the organizers and our colleagues in the Regenerative Medicine community.

