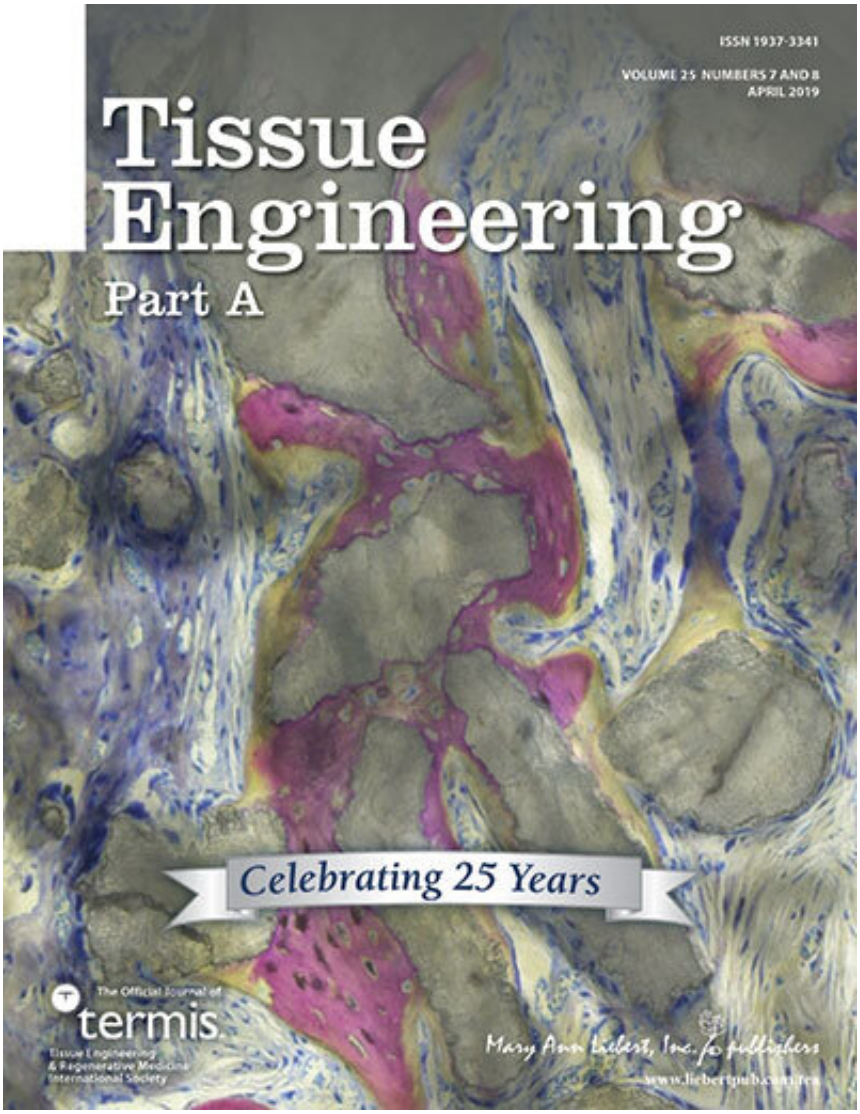
Will MSC micropellets outperform single cells for cartilage regeneration?

May 9 2019



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Repair of cartilage injuries or defects is aided by the introduction of mesenchymal stem cells (MSCs), which can be incorporated into hydrogels to amplify their effects. In a new report, researchers directly compared chondrogenic induction by hydrogels that were prepared using MSCs either as single cell suspensions or as 100-500-cell micropellets. The study is published in *Tissue Engineering*.

Fan Yang, Ph.D., and colleagues from Stanford University, CA present their work in an article titled "Comparing Single Cell vs. Pellet Encapsulation of MSCs in 3-D Hydrogels for Cartilage Regeneration". The authors first identified the optimal size of MSC micropellets that allowed homogeneous incorporation into hydrogels while retaining viability. Four different hydrogel preparations were then tested, and in each case, single cell suspensions were pitted against micropellets to assess chondrogenesis. Additional biochemical assays and histological staining were performed to validate and qualitatively assess cartilage formation, ultimately providing guidance for future cartilage regeneration efforts.

"Dr. Yang and her colleagues at Stanford have shown that traditional pellet culture of cartilage cells may be translated into cartilage engineering approach for mesenchymal stem cell-based cartilage formation," says *Tissue Engineering* Co-Editor-in-Chief John P. Fisher, Ph.D., Fischell Family Distinguished Professor & Department Chair, and Director of the NIH Center for Engineering Complex Tissues at the University of Maryland. "This exciting work has broad implications for not only cartilage, but also other stem cell populations and even models of cancerous tumors."

More information: Heather Rogan et al, Comparing Single Cell Versus Pellet Encapsulation of Mesenchymal Stem Cells in Three-Dimensional Hydrogels for Cartilage Regeneration, *Tissue Engineering Part A* (2019). DOI: 10.1089/ten.tea.2018.0289