Cell-Responsive Biomaterials

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Control hydrogel mechanical properties

Peptide nano-spacings for selective protein binding

Hybrid peptide-polymer hydrogels

Pashuck, E.T., JACS 2010
Pashuck, E.T., ACS Nano 2016
Recapitulating complex tissue microenvironments

What is the system being studied?
- Tissue mimics for regenerative medicine

Why is this topic significant?
- All tissues contain multiple cell types working together towards physiological functions

How is this topic studied?
- In vitro cultures using three-dimensional biomaterials

What are the future directions of this research?
- Cell-responsive biomaterials to signal encapsulated cells
- Create independent niches for each cell type within a hydrogel
How can we better understand biological systems?
• Utilize novel activity-based assays to identify enzyme substrates
• Quantify cell-specific spatio-temporal enzyme expression

How can we use this to design biomaterials?
• Convert enzymatic activity into changes in the local biomaterial
• Design hydrogels which can independently signal multiple cell types through regeneration