

# **Polymer-Mediated, Single-Cell Encapsulation Using Glycoengineering and Click-Chemistry**

Encapsulation of therapeutic cells can increase its efficacy, but current methods are non-uniform and inefficient. This inconsistency leads to varying interactions between each encapsulated cell and the extracellular matrix (ECM). Uniform single-cell encapsulation can be reliably performed by polymer coating with glycoengineering and copper-free click-chemistry. The technique can precisely adjust the stiffness of polymer coating, thereby tuning release of proteins by the encapsulated cells. For example, neural stem cells can be efficiently encapsulated and release neurotrophic factors like VEGF or CNTF. Stem cell therapies can be augmented using uniform, single-cell encapsulation. This could also be useful for reconstructing cellular networks and developing organoids.

## **Applications**

- Improving the efficacy of stem cell therapy
  - Prolong cell survival in harsh environments
  - Increase therapeutic effect
- Culturing cellular networks or organoids

## **Advantages**

- Better uniformity and efficiency of cellular encapsulation
  - Robust and consistent interaction
  - Reduced number of cells necessary for transplantation

- Polymer coating stiffness and protein release can be modulated
- Non-viral cell modulation

## **Publications**

- B. Oh, V. Swaminathan, A. Malkovskiy, S. Santhanam, K. McConnell, P.M. George [Single-Cell Encapsulation via Click-Chemistry Alters Production of Paracrine Factors from Neural Progenitor Cells](#) *Advanced Science* March 5, 2020.

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