

“Cellular Glue” Paves the Way for Custom-Built Tissues

Synthetic molecules called synCAMs may one day be used to regrow injured tissue and organs and to penetrate cancer tumors.

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Cell adhesion molecules (CAMs) are proteins found on the cell surface that facilitate interactions between cells. They are responsible for organizing and binding cells within tissue structures, creating circuits between neurons, and chaperoning immune cells to their destinations. Known as “cellular glue” and essential for organ function, CAMs are found throughout the body. And now, a synthetic version of these molecules (synCAMs) can be found in the Cell Design Institute of the University of California, San Francisco, where Damon Runyon Fellow Adam J. Stevens, PhD, and his colleagues have had a breakthrough.

In a [paper](#) published in *Nature*, the team unveiled their customized cell adhesion molecules, engineered to facilitate specific interactions between cells. SynCAMs, the researchers explain, are made of two parts: a programmable receptor on the cell surface that dictates which other cells the cell can bind, and a piece of a natural CAM inside the cell that determines the strength of the bond. By mixing and matching these parts, it is possible to engineer cells to organize themselves in novel ways (i.e., form cell bonds that would not normally occur) or to model existing tissue structures. SynCAMs may someday be used, for example, to regrow nerves after tissue injury.

“We’re devising ways to control organization of cells, which is central to being able to synthesize tissues with the properties we want them to have,” Dr. Stevens explained in an interview with USCF.

The versatility of synCAMs allows for a wide range of applications—from regenerative medicine, which aims to regrow injured tissue or organs, to cancer research, which benefits enormously from tissue models of the disease. SynCAMs may also find a role in cancer treatment: one of Dr. Stevens’ broader goals is to design synthetic molecules that direct immune cells to tumor-associated antigens and facilitate penetration into the tumor.

“It’s very exciting,” Dr. Stevens added. “These tools could be really transformative.”

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