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Creating a Safe Home for Stem Cells

An interview with Professor Molly Shoichet
Stem Cell Bioengineer, University of Toronto

What are the challenges in stem cell technology?

There's a great promise with stem cells and promoting tissue regeneration, but most of them die. So we think: "how can we create an environment where those stem cells will survive?" And these are in applications of stroke or spinal cord injury or even blindness. And what all of these diseases share in common is that there's no way to promote regeneration in the brain right now. But we know the brain can regenerate, but we don't know how to take advantage of the regenerative capacity of the brain. So what we do is think about what type of environment can we create for the stem cells so that they do survive after we've transplanted in the brain? One of the big challenges in stem cell biology is also having enough stem cells; so having a sufficient supply. So really thinking about that as manufacturing, cell manufacturing.

How can we apply innovations in engineering for medicine?

Some of these materials that we've developed, they're hydrogels, just water swollen materials, have some really interesting therapeutic benefit by themselves. So those are actually really exciting and from a commercial perspective, something that we can accomplish in the shorter term. I think of our lab as applied chemistry and applied biology. So we really have the applications in mind, and those applications are all medical applications. The opportunities are fantastic.