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The Drug of the Future: Cells

An interview with Professor Peter Zandstra
Stem Cell Bioengineer, University of Toronto

How are stem cells being used?

In the very exciting discovery by Shinya Yamanaka in 2006, he taught us that you could take any cell in our body and turn it into the cell that is equivalent to an embryonic stem cell or, also we call them, a pluripotent stem cell. And that's really exciting because now we can make any cell type from patient-specific cells. But the problem is how do we generate enough of them so that we can actually do these therapies? And that's where bioengineers such as the work we're doing, start to help. So we're very interested in trying to understand what the conditions are by which we can generate billions and billions of cells in the hopes that the cells will be useful for cell therapies.

How are stem cells being used to treat disease?

So technologies that have emerged out of the Canadian community are now being put into companies and these companies are undergoing clinical trials, for example, to try to grow blood stem cells to treat patients with leukemia. In other cases, we're going to have to replace tissue that is simply not there anymore; it's damaged tissue. And we think that for some diseases, such as perhaps heart disease, perhaps diabetes, completely replacing the tissue that's no longer there is a potential approach. So we're talking about therapies that are being tested right now today, and therapies that will take 10-20 years to develop.

What are the drugs of the future?

We take drugs such as Aspirin which are small molecules and chemicals. More recently we've been taking biologics which are proteins which are manufactured to treat diseases like cancer. And we're thinking that perhaps cells are the drug of the future. And if we could figure out how to generate these cells in a really robust manner, manufacture them so that we can put them in vials and distribute them to hospitals so that they could be used for cellular therapy, I think that's something that Canada could really lead in.