Searching for the 'Sweet Spot' of Tissue Repair

An interview with **Kelly McNagny**, Biomedical Engineer, Professor, UBC School of Biomedical Engineering

We work on immune cells. People always know about immune cells. Particularly now you know about COVID-19 and infection and immunity.

We work in kind of non-traditional way. Immune cells help you repair tissues, and you get a damaged kidney or you get a damaged gut, can they help you repair that tissue rather than making scar tissue? Scar tissue is what happens when things don't repair well. Normal tissue function is what happens when you do repair damaged tissue. We think immune cells actually play a big role in that, too.

Science is getting really interesting. It looks like very early in life you get exposed to microbiome and other environmental factors, and that tends to educate your immune system. And if your immune system doesn't get educated well, it tends to rebel and act a little badly and you don't get great tissue repair. And so we're trying to figure out in which scenarios that happens.

With engineering now we're getting these really elegant tools for kind of dissecting how cells at the single-cell level talk to each other. And once you know how they communicate with each other you can find ways to, you know, get one cell to stimulate one in a better way for repair, or get one to dampen down when it's doing too much damage and over-repairing. That's what

happens when you get too much scar tissue. So we're really getting down to where we know how cells communicate at the single-cell level, and then we're trying to find ways to boost or dampen that.

Our big idea is there is a newly discovered group of immune cells, they're called innate lymphoid cells — and to me it's amazing that we can find a new cell type within the past 10 years that nobody even knew about — and those cells live in your tissues throughout your life and they help you repair.

If they go awry, if you make too many of them, they can stimulate over-repair and cause you to make scar tissue, get an organ to fail. You see that type of scar tissue forming in things like multiple sclerosis, in Crohn's disease, in liver failure. We want to keep that from happening and get you to regenerate healthy tissue. That'll allow everybody to live longer.