Centuries of Questions; Finally, Some Answers

An interview with **Amy Caudy**, Biochemist
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My big idea is to figure out what we've missed in biochemistry. This space is so exciting because we are at a moment of new technology coming to bear on an old problem. Now, with the advent of high-resolution mass spectrometry, we can bring a whole new method to bear on these questions and measure things that were absolutely impossible to measure before.

Mass spectrometry allows us to weigh ions. We can figure out the mass of a single ion in a mass spectrometer. Mass spectrometers have been around for a couple hundred years, but what has changed is the ability to tell molecules apart. We can tell molecules apart very easily if they differ by a proton or a neutron, and so that allows us to tell the difference between many really related molecules, and also to trace when we feed cells, where exactly that food is going to.

What contributions have you made to your field?

As a PhD student, I was part of a team that developed RNA interference, and particularly to make short hairpin RNAs that you can easily put into cells and knock down genes of interest. And it's enabled the work of hundreds of thousands of labs around the world to knock down genes that they're interested in and understand biology.

We have recently figured out how worms breathe underwater. It turns out that parasitic worms, and other kinds of worms out in the environment, they

don't need oxygen to breathe. How they made the special molecule to do that wasn't known, and we've pretty much figured it out. So I'm really jazzed about that.

What's the future promise of your research?

We're moving toward a place in biochemistry where we'll be able to look at the contents of a single cell and no longer just ask what does this bag of cells look like, but what is one cell doing, and what makes it special and unique? Knowing what happens in one cell is so important because many diseases, like tumours, start from just one or a few cells that have gone wrong. And if you could target those particular cells then you could stop the growth of the entire tumour.