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The Next Generation of mRNA Vaccines is Coming

An interview with **Anna Blakney**, Assistant Professor, University of British Columbia
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As many people have known from the past two years now with the COVID-19 pandemic, mRNA vaccines have had a great year with two vaccines being approved. So what my laboratory does is think about, where is this going? How do we make RNA vaccines even better? Apply it to different disease indications and think about different applications that RNA can fulfill a niche for.

As well, the point of a vaccine is to train your immune system to recognize a foreign pathogen — a virus or bacteria — without ever having seen that pathogen. The way we normally train your immune system is so that it recognizes a protein on the surface of that virus. So for COVID it's the spike protein on the surface of the virus. We can give it the protein itself, we could give it the inactivated virus, or we could use mRNA technology.

The way that mRNA technology works is that instead of producing the protein in large-scale bioreactors, which requires a lot of time and resources, we're able to give your cells the code to make the protein themselves. And so what this means is that it's a lot easier to manufacture these vaccines and we can scale them up for, you know, the billions of people around the world that need vaccines right now in a much more timely fashion.



My laboratory works on a specific type of messenger RNA called self-amplifying RNA, which sounds really complicated but it's just a fancy way of saying this RNA is able to replicate itself once it gets into a patient cell.

What this means for us is it requires a much lower dose than a normal messenger RNA vaccine or medicine. Our RNA is on average 100 times more potent than normal messenger RNA like you would find in the approved vaccines. And so as you can imagine, scaling this up is really meaningful and advantageous because if you're able to get 100 times as many vaccines from the same batch size.

It means we're just going to have access for more people, more available, and they should cost less. So it should be more equitable as well. That's one of the things that really motivates me to do this research is that you can really fundamentally change the way that medicines are made and available to people.