

Diabetes. Where is the Cure and why haven't we found it yet?

For so many people who live with diabetes the promise of a cure is something they almost dare not think about any more.

Why?

Well, as many of you reading this will understand, it's because for decades we have been told a cure is 'not far off' and, of course, medicine has not yet delivered on that promise.

Why?

It's a difficult question but there are many good reasons.

As UWA Senior Lecturer in Medicine Dr Gerard Chew pointed out during our World Diabetes Day event on this topic, diabetes is a condition that involves treating something that isn't working in the body – replacing something that is missing (in the case of type 1 diabetes, functioning pancreatic islet cells that would normally produce insulin). For many other serious medical conditions, a cure might involve removing something that has appeared or developed in the body that is causing disease (think infection or cancer). In medical terms, replacing something or a function that is missing or not working is often more complex and challenging (eg. can we regrow what is missing from the body's own cells, can we replace it with functioning tissue, or can we replace its function using technology?) than taking something away.

The head of WA's Centre for Diabetes Research, Professor Grant Morahan also highlighted that finding a cure is like building a house in a scenario where you also have to invent and then make virtually everything needed to construct it – the bricks, the mortar, the foundation etc. In other words, finding a cure for diabetes takes time, persistence, ongoing funding, and creativity to name a few. But he also reminds us that along the way very important discoveries are made and that without these interim advances the ultimate goal can't be achieved. He also believes we're making great strides towards a cure: "We've made more progress in the last 10 years than in the previous 100 – we are getting there but we have to be patient."

Other issues affecting the search for a cure include the length of time it takes to check the safety of research advances – we must first trial breakthroughs in the lab and then in small numbers of people before we can roll them out to the masses. This can take years or decades. Professor Liz Davis, a Paediatric Endocrinologist and Head of the Diabetes Clinical Service at Princess Margaret Hospital in Perth, says a good rule of thumb for research is a 20 year timeline ie. that it will generally take about 20 years to go from taking a promising finding in the lab to the stage where it is directly helping patients in a clinical setting.

But the 'along the way' discoveries, as underscored by Perth endocrinologist Dr Ricky Arenson, have delivered on many advances in diabetes – including improving the lifespan of those with the condition by about 20 to 40 years so far. That's pretty good going! And it will only get better.

And as Professor Davis reminded us, taking part in research trials is a great way for people living with diabetes to get their hands on new technologies and advances faster.

So, what are some of the most promising areas for a cure?

- The artificial pancreas.

Professor Davis believes we will get to the stage where these systems are fully autonomous and patients will be able to maintain blood glucose levels even if they don't bolus. She believes it will reach a point where these autonomous systems can maintain blood glucose levels that are good enough to prevent the health complications that can arise from diabetes.

- Smart insulins.

Smart insulins – in the form of patches, tablets etc – hold the promise of a cure by looking at how to put insulin back in the body (and are a great alternative to attaching technology to the body) but there is a way to go in terms of overcoming the challenges associated with insulin being released when it's not required, according to Professor Davis.

- Stem cells.

Professor Morahan reminds us that while using stem cells to create insulin-producing cells is a very exciting possibility, the recipient of a stem cell graft would also need a treatment to turn off their immune response, making it a complex option, but an option nonetheless. A group at WA's Centre for Diabetes Research has identified compounds that can act on progenitor cells to turn them into insulin-producing beta cells and they have shown this can work in mice and human cells. More funding is needed for this work to continue.

- Pancreas transplant.

Pancreas transplants are being done in Australia already with doctors attempting to select just the right recipients to ensure the best chances of success. Dr Chew says most people currently receiving a pancreas transplant also receive a kidney transplant, and are aged under 50 as they have to be very fit to get through the procedures. Anti-rejection medications are of course also necessary, and these can be associated with their own complications and risks. The balance of risks and benefits, and the limited availability of donor organs, means that this is a treatment option for some, but not most, patients.

- Islet cell transplant.

Transplanting donor islet cells into a patient's liver in the hope they will 'take' and begin producing insulin is also a possible cure. Dr Chew points out though that they are rather fragile cells and so they often don't survive, and sometimes patients need more than one procedure. He also cautions this option may not make a patient completely free of diabetes, just to help manage it better.

- Prevention as cure.

Dr Joey Kaye, Director of Diabetes Services at Sir Charles Gairdner Hospital, said much work was also being done into ways to prevent diabetes rather than cure it after it develops. This involves being able to identify those people most at risk of developing diabetes as well as looking for triggers (such as food proteins, viruses or other environmental exposures) that may be able to be blocked, removed or modified to avoid activation of the immune system. Researchers also need to understand how diabetes-related immune dysregulation occurs. There are also studies looking at if the immune system can be diverted away from the pancreas, (such as by giving small amounts of insulin); or suppressed with other medications when the first signs of inflammation show up in the pancreas. He says several trials of immune therapies are or have been conducted but so far have only been partially successful ie. leading to a delay in some people developing it but not stopping it altogether.

Our expert panel members agree each new advance or understanding adds another piece to the puzzle that can lead us to a cure. What we need to ensure we get there as soon as possible is

clever researchers, funding, families and people living with, or at risk of diabetes to be involved with trials and a collective belief that we will find a way to cure diabetes.

And it's very much needed. In WA, rates of type 1 diabetes are going up 2-3 percent a year. The incidence of type 2 is on the rise dramatically in Australia and gestational diabetes is becoming more common in pregnancy too.

As we push forward to keep searching for the cure (or cures) and funding important local research, we are determined, committed and hopeful, we'd love you to join us on this journey - or stay with us if you're already part of our team!

Please share this with your family, friends and community so that we can all understand a little more about finding a cure for diabetes.

I welcome your comments and thoughts on email sherl@diabetesresearchwa.com.au



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