Kidney, Transplant & Diabetes RESEARCH AUSTRALIA

NEWS

We are proud to support groundbreaking translational medical research that is helping to improve the lives of our family and friends suffering with these diseases.

3D Printing Revolutionising Type 1 Diabetes Treatment

Your dedicated researchers are leading the way in groundbreaking new treatments for type 1 diabetes through the development of a 3D printer that can print insulin-producing islet cells to treat this debilitating condition.

Leading this life-changing research is Professor Toby Coates and his team of experts at the Royal Adelaide Hospital, in collaboration with the Bioengineering team at the ARC Centre of Excellence for Electromaterials Science Intelligent Polymer Research Institute at the University of Wollongong.

As you may know, islet transplantation has recently revolutionised treatment for type 1 diabetes, and in many cases has cured people of the chronic condition they've been living with for decades.

"We currently use islet transplantation to treat patients with severe or unstable diabetes. This is done by transplanting donor islet cells which can restore the diabetes sufferer's capacity to produce insulin and regulate blood sugar levels," Prof Coates said.

Whilst successful in many cases, the islet transplantation treatment is only an option for those with severe diabetes due to a number of complexities and barriers. Prof Coates is confident this can be fixed with an innovative and life-changing 3D printer.

"The current islet transplant procedure relies on donor islet cells being available for the transplant, and it also involves the patient having to take immunosuppression medication to stop their immune system from rejecting the cells. This medication has a number of negative effects including organ toxicity and an increased risk of cancer," Prof Coates explained.

"At this stage we transplant these islets into the patient's liver, and whilst it has been successful, in the process we lose about 75 percent of these islets in the first few hours."

This could all change thanks to this world-first research! Using the 3D printer, Prof Coates and the team are creating an artificial pancreas that is custom designed to fix the problems currently associated with the islet transplant procedure.

"Our goal is to use the patient's own cells to grow the islet cells they need to produce insulin, solving the problem of donor rejection and the need for additional medication," Prof Coates said.

"Within this artificial pancreas we are putting an ink comprised of islet cells along with two or three different cell types that will protect the islets once they've been transplanted.

"It's like we're creating a defensive castle wall around the outside of these islet cells. This wall will include cells that fight the immune system's rejection and also cells to promote the function of these islet cells.

"What this means is that we'll avoid having to transplant the islet cells into the liver, patients will not have to take immunosuppression medication orally and we'll be able to make more islet cells available."

With your support, this breakthrough research can revolutionise type 1 diabetes treatment, making islet transplantation more widely available to all those living with diabetes and save more lives.

"I believe this printer will enable us to treat more people with diabetes and eventually get to the point of having a large number of cells available and curing diabetes completely!"

Our aim is simple – to reduce and ultimately eliminate the high incidence of these chronic diseases in Australia and around the world.

Improving Outcomes for Transplant Patients

One in three Australians are at risk of being diagnosed with chronic kidney disease in their lifetime. For this reason, researchers you support are working tirelessly to ensure people living with this condition have the best treatment available to them, informed by the latest research.

Sadly in many cases chronic kidney disease can lead to kidney failure or end stage kidney disease, where the function of the kidney completely stops and regular dialysis is inevitable. For these patients, if they are lucky they can undergo a kidney transplant to prolong life, though unfortunately this comes with complications of its own.

Dr Rob Carroll, Transplant Nephrologist at the Royal Adelaide Hospital, is busy behind the scenes investigating ways of improving outcomes and quality of life for patients with kidney disease who undergo a kidney transplant.

“We’re involved in new research looking at inflammatory markers in people’s urine, and whether it could be used to predict if someone’s body will reject a new kidney,” Dr Carroll said.

“There is good data to suggest that if you look at someone’s urine and they have these particular inflammatory markers, their new kidney won’t last as long as people who have no inflammation in their urine.”

Currently clinicians wait for blood test results to change to determine if a patient’s new kidney will inevitably be rejected, but this groundbreaking research could allow specialists to be more pre-emptive and predict the likelihood of rejection.

“This research is a game changer. We should be able to say to a patient - your kidney is inflamed so we’re going to treat you with a specific protocol because we know on average your kidney will do better than if we just wait for your creatinine to rise or your kidney function to get worse.”

The second aspect of Dr Carroll’s research is trialling an immunotherapy treatment for incurable cancer after a patient has had a kidney transplant.

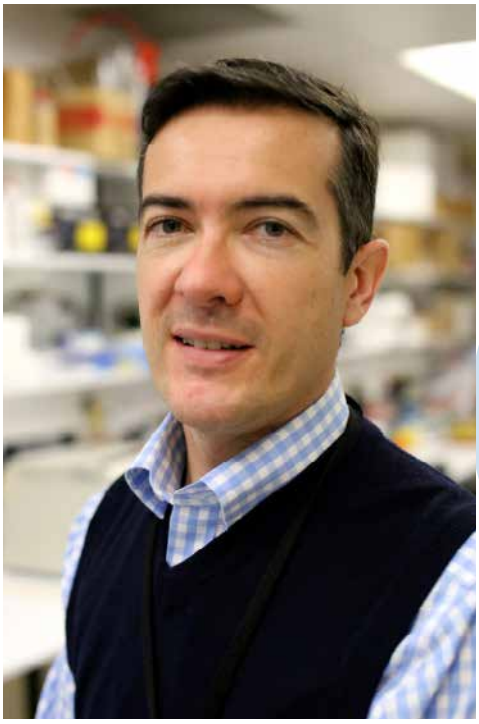
“Having kidney failure increases a patient’s risk of developing malignancy, but having immunosuppressant on top of that makes you at five times more risk of getting cancer compared to the general population. In general these malignancies are a lot more aggressive," Dr Carroll said.

“This immunotherapy has revolutionised treatment for melanoma in the general population and we want to see if it is effective in patients with a kidney transplant and cancer.

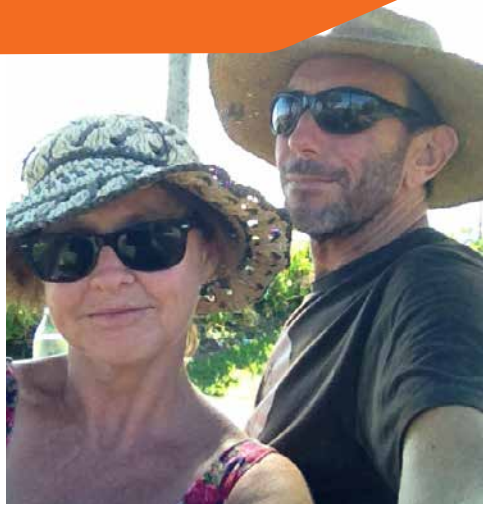
“Now any transplant patient who develops an incurable malignancy, who can’t have surgery or tolerate chemotherapy, they have the choice to be exposed to this new treatment.”

THIS RESEARCH IS MADE POSSIBLE THANKS TO YOU, AND WITH YOUR CONTINUED SUPPORT DR CARROLL IS CONFIDENT THE FUTURE FOR TRANSPLANT PATIENTS COULD BE A LOT BRIGHTER.

“Ideally we want to get to the point where we can utilise new technologies to personalise a transplant patient’s treatment, to make sure we’re keeping their kidney happy but also reducing complications like infection or malignancy."



Living with Chronic Kidney Disease



Darwin local Rob Smith is battling chronic kidney disease and has been on dialysis for the last 10 years of his life. Taking the disease in his stride, Rob is hopeful research will find a cure and change his life.

With your support, our researchers are determined to find better treatments and an ultimate cure for Rob and so many others living with this chronic condition.

Rob began noticing something wasn't right around six months before his eventual diagnosis with IGA nephropathy, a common type of chronic kidney disease.

"I had been perpetually exhausted, but I had a stressful job at the time and I was doing very long hours, so being a bloke I just ignored it and thought I was getting old," Rob said.

"I then noticed my urine was quite foamy and a dark colour. No matter how much water I drank it wasn't getting any lighter. Whilst this was happening my palate began to change, the taste of meat and beer made me feel sick – I knew something was really wrong!

"All I wanted to do was eat fruit, it was quite odd. So eventually I went to the doctor and I blew the mercury out of the blood pressure gauge. That's how it all started."

Do you have a story to share? Email us at contactus@kidneydiabetesresearch.com.au or phone (08) 7002 0840.

Rob's kidney disease had moved fast, and by the time he saw his doctor, his kidneys were at 25 per cent function, meaning dialysis would not be far off.

"A couple of months later I was on dialysis, I went downhill quite quickly. I was on haemodialysis for about a year at the clinic in Darwin, and then I changed to peritoneal dialysis for six months before I had a kidney transplant."

IN WHAT APPEARED A STROKE OF LUCK, ROB'S WIFE JO WAS A PERFECT BLOOD MATCH, AND IN 2007, A KIDNEY TRANSPLANT WAS PERFORMED AT THE QUEEN ELIZABETH HOSPITAL IN ADELAIDE.

"The transplant itself went extraordinarily well, but sadly the original disease came back at lightning speed," Rob said.

"I was back on dialysis within a few months. It was a bit of a rollercoaster."

At this point Rob explained he opted for Nocturnal Home Haemodialysis after researching that dialysing three nights a week or alternate nights was sufficient, but dialysing six nights a week provided the best clinical results.

Soon after Rob was dialysing eight to 10 hours, seven nights a week.

"When I was having dialysis at the clinic I felt like half a human being, I had no energy and I constantly felt mildly nauseous," Rob said.

"With nocturnal dialysis I set myself up, watch a bit of television and then I go to sleep. Don't get me wrong it's a pain having to do it every night, but the benefits far outweigh the drawbacks. I can eat fruit and have a glass of water pretty much whenever I want, which I could never do before.

"My blood results are now almost like I'm a normal human being."

Not letting his kidney disease define his lifestyle, Rob and his wife have travelled overseas and have even toured around Europe in a caravan with a dialysis machine. Currently working part time, Rob is one half of the ABC radio show 'Tales from the Tinny' in Darwin, where he has taken outback fishing trips with his dialysis machine in tow.

"My wife and I decided once the transplant was over, if I was going to be on dialysis, then we were going to be the world champions at it."

ROB IS CONFIDENT RESEARCH WILL CONTINUE IMPROVING TREATMENT OPTIONS FOR OTHERS LIKE HIM LIVING WITH CHRONIC CONDITIONS.

"For the moment I'll maintain dialysis, but down the track, who knows. I'm hopeful research finds new ways to help me live my life."

Your support ensures our research team can continue fighting these chronic conditions for people like Rob. Thank you.

Pictured top left: Rob with his loving wife Jo.
Pictured left: Not letting the disease define his lifestyle, Rob lives his life to the fullest.

A Mum's Life-Changing Gift: Why Jane Gives Back to Research

Jane and her mum Catherine.

As a result of her type 1 diabetes, Jane Banning was diagnosed with chronic renal failure and looking at a life of daily dialysis. That was until her loving mother changed her life by offering her the greatest gift of all, a kidney transplant.

Considering her experience is living proof that research saves lives, Jane felt it only fitting to give back to help others living with the same chronic conditions. Last year Jane became one of our champions and now makes a regular monthly donation to research that will lead to a cure for both the diseases that have affected her life.

Jane was diagnosed with type 1 diabetes when she was only 12-years-old. Her mum Catherine vividly remembers the moments leading up to the eventual diagnosis.

"It became a very hot summer, we went to Sydney for holidays and Jane was drinking lots and lots of water. Then she began losing weight, so I started thinking what if she's got diabetes," Catherine recounts.

"I was a registered nurse so one day I brought home a test aid and sure enough it showed up – Jane had diabetes."

On the brink of teenage hood, Jane's life changed forever after that moment. Spending a week in the children's ward to adjust to her new life, Jane learnt how to inject herself with insulin, a daily routine she has now been following for almost 40 years.

"At first I struggled with having diabetes. I didn't want to be any different from my friends," Jane said.

Around 15 years after her diagnosis, Jane began picking up on signs that her kidneys weren't functioning properly, a common side effect of diabetes.

"I started noticing dermatitis on my hands and around my limbs, nose and face. I also realised I was retaining a lot of fluid, one morning I woke up to go to work and I couldn't get my nursing shoes on. I thought something was not right here," Jane said.

Sure enough Jane had chronic kidney failure. For almost nine years she was able to manage her condition, until it became clear she would need to be on dialysis.

"I ended up on dialysis for 13 months at the end there, before my wonderful mother kindly offered to donate her kidney to me."

Jane and Catherine's surgery was performed at The Queen Elizabeth Hospital, and despite a few setbacks, the operation was a huge success. So much so that twelve years later, Jane's donated kidney is still functioning well.

"My kidney is still going strong, I feel very lucky," Jane said.

Whilst still living with her diabetes, Jane knows she's one of the lucky ones to have had a successful kidney transplant. It's for this reason she supports research, not only because advancements have saved her life, but so it can continue to save the lives of others.

"I'm living proof that medical research saves lives, and I wanted to give back to it. It's something I can put money towards and I know that all of what I'm giving is going to a great cause," Jane said.

"I think a cure for diabetes will come one day thanks to research," Catherine added.

Wanting to use her own experience to help others, Jane is also studying a Diploma of Counselling with the aim of helping people living with diabetes and kidney disease.

You can become a champion like Jane and regularly support research that is changing the lives of people living with these chronic diseases. Contact your Donor Relations Specialist Bonnie Stewart on **(08) 7002 0840** to find out more!

Register Your Interest For a Lab Tour!

Would you like to go behind the scenes and see where the lifesaving research you support takes place? We're looking to hold a donor tour of our world-class research facility at the RAH later this year, hosted by one of your specialist researchers. Register your interest today by emailing **contactus@kidneydiabetesresearch.com.au** or call **(08) 7002 0840.**

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