

Australian Foundation For Diabetes Research

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NEWSLETTER
JUNE 2022

Support from the National Stem Cell Foundation of Australia



A key source of funding needed by the Australian Foundation for Diabetes Research (AFDR) to pay for contract research at UTS has been The National Stem Cell Foundation of Australia (NSCFA). In the 3 years since the AFDR and the NSCFA signed a Donor Supported Research Funding Agreement, the AFDR has received more than \$550,000. Half of this was provided by donors which would normally have given directly to the AFDR.

“We are most grateful to the Board of the NSCFA”, said Professor Tuch, “not only for their support, but also for their understanding during the physical restrictions during the COVID-19 pandemic. When Milestones could not be reached within the anticipated time frame, the NSCFA kindly agreed to continue its support regardless, thereby giving the AFDR a further opportunity to achieve them.”



In late May, Mr Graeme Mehegan, General Manager of the NSCFA, came to Sydney to see first-hand the progress that was being made. He is pictured here with Research Assistant Iris Cheng.

Patent granted

The Australian Patent Office advised us in February this year the granting of the patent we were seeking to protect our bioengineered device that delivers insulin-producing cells to diabetic recipients. It has taken 4½ years to achieve this outcome, with protection provided for a further 15 years.



16 February 2022

Notice of acceptance for your
patent application

“This is a boon for the Foundation,” said its Director Professor Bernie Tuch, “since it has commercial implications if the device performs as anticipated in clinical trials with type 1 diabetes (T1D) recipients. Discussions continue with examiners attached to the patent offices in the United States of America and Europe to try and have the patent granted in those jurisdictions.

Preparations for clinical trial

Contract research continues at the University of Technology (UTS) to gather the necessary data that will allow an application to be made to the regulatory bodies for a phase 1b/2a clinical trial for treatment of T1D. This will require the stem cell derived insulin-producing cells supplied by our Israeli partner, Kadimastem Ltd, and the bioengineered device produced in Australia to deliver the cells to recipients.

Experiments have shown that blood sugar levels of diabetic mice are normalized when the cells are encapsulated and implanted into the animals. Early data shows that the same can be achieved when the encapsulated cells placed in a specially made scaffold are implanted. Experiments are continuing to reproduce these results. An advantage of using this bioengineered device is that it is possible to be removed from the recipient in the unlikely event the implanted cells malfunction. Indeed, it is this feature that the regulatory body which has been approached has indicated must be a feature of any clinical trial the approval for which is sought.

Training the next generation

Dr Felix Dang is a 28-year-old from Vietnam who became part of the AFDR's Bioengineered Diabetes Therapy Project 2 years ago. He was responsible for carrying out the contract laboratory experiments at UTS. He combined with Professor Hui Chen of the School of Life Sciences at UTS to transplant the diabetic mice with the bioengineered device containing insulin-producing cells. During his time with the AFDR, he became a permanent resident of Australia.



Dr Felix Dang (l) and Professor Hui Chen in the Animal House sewing up the incision made to insert a bioengineered device into a diabetic mouse.

Taking over from Dr Dang, who is moving to Queensland in late May, is Iris Cheng, currently writing up her PhD. Ms Cheng is of a similar age to her predecessor and comes from Belize in Central America. She has considerable laboratory skills gained during the 4 years of her higher degree studies at UTS. For both of these Research Assistants, working with the AFDR has been their first professional job, as they start their career progression.



(l to r) Dr Felix Dang and Iris Cheng sitting together at UTS during the changeover of personnel in May

Aiding Living Cell Technologies

Living Cell Technologies Ltd (LCT) is an ASX listed medical biotechnology company that is carrying out a third clinical trial with encapsulated pig brain cells for the treatment of Parkinson's disease. The first two trials were in Auckland, New Zealand, but recently the company has moved its site of operation to Sydney, with UTS being the site where manufacturing of its product will commence.



There are a number of similarities between the activities of LCT and those of the AFDR, namely the culturing and encapsulation of cells intended for human use.

A commercial agreement was struck involving these two companies and UTS whereby the encapsulation machine that the AFDR was using also would be used by LCT. Moreover, the Research Assistant that the AFDR was using to culture and encapsulate the insulin-producing cells would be shared with LCT.

Smart nanocarriers enhances bioengineered device

With research funds obtained from the Juvenile Diabetes Research Foundation based in New York, the AFDR was successful in enhancing the capacity of its bioengineered device to function. The project entailed being able to use nanotechnology to prevent rejection of the insulin-producing cells inside the device if this occurred.

To achieve this goal, our collaborators Dr Helen Xu, Dr Lana McClements and their team with expertise in Chemistry, Engineering and Biology at UTS attached anti-rejection molecules to smart nanocarriers inside microcapsules. These molecules were released when a special light, which cannot be seen by the human naked eye, was shone on the nanocarriers.

The application of this breakthrough technology might be achieved by implanting the device containing microencapsulated insulin-producing cells beneath the skin of a person with T1D, with the special light being applied to the skin when required.



(l to r) Dr Yanan Huang, Prakriti Siwakoti, Dr Lana McClements & Dr Helen Xu in meeting room at UTS



MAKING A DONATION

There are three ways you can make a donation to support the *Bioengineered Diabetes Therapy Project*, being conducted by the AFDR:

1: Via Credit Card

2: Via cheque/money order payable to the Australian Foundation for Diabetes Research PO Box 821, Maroubra NSW 2031 OR

*National Stem Cell Foundation of Australia (NSCFA) PO Box 140, McCrae VIC 3938

3. Via Bank Transfer to the Australian Foundation for Diabetes Research: BSB 062 230, Account Number 1027 3887 OR

*National Stem Cell Foundation of Australia BSB 083 266, Account Number 12305 0040

* The NSCFA has an arrangement with the AFDR to match \$ for \$ for donations ≥ \$500. Thus, if you donate \$1000 to the NSCFA for the Diabetes Project, the NSCFA will give the AFDR \$2000. Both the AFDR and NSCFA are endorsed as *Deductible Gift Recipients*.

Via Credit card:

Amount:

- \$50 \$100 \$200 - 1 wk supply of mice
- \$400 = 1 wk supply of chemicals
- \$500 \$1000
- \$2300 = 1 wk salary Research personnel
- Other \$.....

- Visa Mastercard

Name on card

.....

Card number ____/____/____/____

Expiry/..... Validation number _ _ _

MAKING A BEQUEST

I give to the Australian Foundation for Diabetes Research:

- the sum of _____,
- the following assets in my estate: _____, or
- ___ percent of my estate, free from all duties thereon.

* When drafting your will, please select only the relevant alternative.

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