

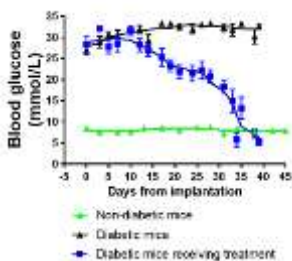


Human Insulin Cells

During a recent overseas visit, AFDR Director, Professor Bernie Tuch, met with members of the Executive of a biomedical company that has made human insulin cells.

"It had a desire to use these cells for the treatment of type 1 diabetes", said Prof Tuch, "and was looking for a means of implanting these in humans without the need for anti-rejection drugs."

The AFDR leads an Australian consortium that has bioengineered a device that fulfils this purpose. When it is seeded with mouse insulin cells and implanted in mice, diabetes is reversed, with no anti-rejection therapy needed. Initial experiments were carried out in diabetic mice that had no immune system. Experiments were successfully repeated in diabetic mice with an immune system that would be expected to reject the grafted insulin cells, but did not.



Blood sugar levels of mice with an immune system transplanted with a device containing insulin cells.

"The next step is to test the device seeded with human insulin cells," said Prof

Tuch. "We are delighted the overseas company has agreed to work with the AFDR for this purpose."

The Feasibility Study requires the cells to be sent to Sydney where they will be seeded into the bioengineered device and implanted into diabetic mice.

Successful completion of this experiment will be followed by it being repeated overseas, by Australian personnel.

The human insulin cells are made from pluripotent stem cells over a period of several weeks in the laboratory. The technique used has been patented by the overseas company in a number of countries including the USA. An advantage of using such cells is their never-ending supply.

Successful completion of the above experiments will be followed by application for a clinical trial in people with type 1 diabetes.

"We are quite excited about the possibility of using the device seeded with human insulin cells to treat type 1 diabetes", said Professor Tuch."

The AFDR and the overseas company have made a joint application to Government, both in New South Wales and overseas, for funding to kick-start the project. A decision is expected by the middle of the year.

Patent Extended

The AFDR took out a Provisional Patent entitled *Delivery Scaffolds* in 2016, to protect the delivery device it and partners had bioengineered. Last year, international protection was extended through the Patent Corporation Treaty. Inventors named in the patent include relevant personnel of the AFDR, as well as those of colleagues at Queensland University of Technology and The University of Sydney.

Book Chapter



Luke Carroll at his desk writing part of a book chapter on encapsulation of insulin producing cells.

PhD student Luke Carroll and colleagues were requested to write a book chapter entitled *Encapsulation and Transplantation of Insulin Producing Cells*, and have done so. This is to appear in a book entitled *Progenitor Cells: Methods and Protocols*, which is being printed by the company Springer.

Luke has just completed the 4th year of a PhD at The University of Sydney, and is hoping to submit his thesis by the end of the 1st quarter of this year.

He has been supported during his studies with scholarships from the AFDR and the Juvenile Diabetes Research Foundation Australia, with support for laboratory consumables from CSIRO.

Stem Cells Shared with Thailand

One of many projects which the AFDR seeded funds into was the creation of two human embryonic stem cell lines, Endeavour-1 and Endeavour-2. These were produced a decade ago in the Diabetes Transplant Unit at the Prince of Wales Hospital, in conjunction with IVF Australia, under licence from the National Health and Medical Research Council.

Previously the AFDR has shared the cells with a number of Australian researchers. Last year, it passed cells on to Dr May Wattanapanitch, a colleague at Siriraj Hospital in Bangkok, Thailand, for disease modelling and drug screening. May completed her PhD in Sydney in 2010.



Dr May Wattanapanitch (centre, front row) and colleagues in a laboratory of the Department of Research & Development, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok.



Making a Donation or Bequest for Diabetes Research

Funds collected will be used to support the Bioengineered Diabetes Therapy Project, being conducted at The University of Sydney.

PAYMENT DETAILS for [your name]

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Donation

Amount

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

Please select payment type

1. Credit card

- Payment type options: Visa, Mastercard

Name on card

Card number ____/____/____/____ Expiry/..... Validation number ____

2. Cheque / money order payable to the Australian Foundation for Diabetes Research PO Box 821, Maroubra NSW 2031

3. Bank transfer to Australian Foundation for Diabetes Research BSB 062 230, Account 1027 3887

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Bequest

I give to the Australian Foundation for Diabetes Research:

- Bequest options: 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.