

## A Million Have It !

- ◆ More than one million Australians have some form of diabetes
- ◆ The incidence of diabetes in Australia has increased by 37% in the last ten years and diabetes is now the seventh leading cause of death in Australia
- ◆ The direct annual health care cost for diabetes in Australia is estimated at \$1 billion and may reach \$2.3 billion by 2010
- ◆ Help the DTU to make a difference

**Further funding for the creation of a Cell Therapy Facility for the treatment of diabetes is still urgently needed.**

**If you would like to contribute to this vital research please fill in the Australian Foundation for Diabetes Research coupon provided, all donations over \$2.00 are fully tax deductible.**

**For more information about the Unit please consult the website**

[www.diabetes.unsw.edu.au](http://www.diabetes.unsw.edu.au)

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# Newsletter

## Growing cord blood stem cells on smart surfaces

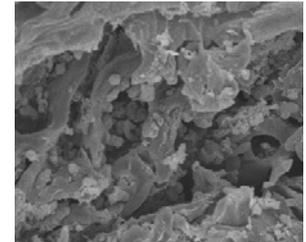
The Diabetes Transplant Unit (DTU) has recently received recognition of its skills with stem cells, by being awarded an Australian Research Council grant.

“This Linkage Grant will allow the Unit to continue working with our commercial partner, BioE Inc, in converting its cord blood stem cells into insulin-producing cells,” said Professor Tuch, Director of the DTU. “The Grant is to assist in differentiating stem cells

attached to smart surfaces on 3D scaffolds.”

Dr Dan Collins, Chief Scientific Officer of the Minneapolis based company, BioE, said, “Recent studies have suggested that cells organised into three-dimensional constructs are better insulin producers. BioE is very excited about the prospects of combining our cord blood stem cells with these

smart surfaces to create insulin-producing tissues.”



**Stem cells grown on 3D scaffolds**

## Phase 1A results of Seaweed Diabetes Trial

In February last year, the DTU commenced Phase 1 of a pilot clinical trial transplanting islets isolated from donor human pancreases into people with type 1 diabetes.

The novelty of the trial was that the transplanted cells were placed inside microcapsules made from a product of seaweed, called alginate, to protect them from the immune system of the host, thereby overcoming the need for anti-rejection drugs.

The outcome of the first part of the Phase 1 trial was announced at the annual scientific meeting of the Endocrine Society of Australia

held in Christchurch in early September.

An average of 173,000 islets, prepared from six pancreases, were injected into the abdomens of three recipients; with one person receiving 4



**Seaweed Diabetes Trial Phase 1A**

lots of islets. There were no adverse effects of the transplants, thereby demonstrating the safety of the procedure.

Small amounts of insulin were produced from the encapsulated islets, especially in the immediate post-transplant period; and in the recipient of the multiple transplants for several months.

Optimisation of insulin secretion from the engrafted islets is now required; and with this goal, Phase 1B of the Seaweed Diabetes Trial has commenced.

## The Chicago project

It is not just the DTU that is interested in the transplantation of encapsulated human insulin-producing cells as a therapy for type 1 diabetes. In the United States, a group in Chicago headed by Professor Jose Oberholzer is planning on a similar goal.

Professor Oberholzer's group has already successfully transplanted islets into the livers of people with type 1 diabetes. The transplant recipients were all given anti-rejection drugs to block the body's immune response.

The transplantation of encapsulated islets into recipients in Chicago has been termed the *Chicago Project*. Professor Oberholzer has had the vision to involve a number of others around the world with different areas of expertise to assist in this project. The latest recruitment to the Project has been the DTU.

“We have found the interaction with colleagues in both the USA and Europe who share our vision for cell therapies without

the need for anti-rejection drugs highly beneficial”, enthused Professor Tuch. “This is a collaboration in all senses of the word”.



**Professors Oberholzer, Tuch and Jansen in Chicago**

**NSW Stem Cell Network**

A three year renewal of support to run the NSW Stem Cell Network has been granted by the NSW Government’s Office of Science and Medical Research.

The three year grant will allow the NSW Stem Cell Network to continue with its mission to foster communication amongst those with an interest in stem cell research. The NSW Stem Cell Network organises

workshops, seminars, training courses, public education campaigns and utilises the internet to facilitate the flow of information about stem cells.

Centred at the DTU, the NSW Stem Cell Network has been in operation since 2002, and now has more than 550 professional members from all walks of life.

In concert with the renewal of the NSW Government contract is

the arrival of the NSW Stem Cell Network’s new manager, Nola Camden, who brings with her a passion for the area.

Nola has already been hard at work organising the Network’s 10<sup>th</sup> Workshop, on *Novel Clinical Trials with Stem Cells*. Held at the Prince of Wales Hospital on Friday 26th October, this timely Workshop was well received.



**Nola (right) with one of the sponsors of the Workshop, Shelston IP’s Jacinta Flattery**

**Endeavour 1**

Endeavour 1 is the name the DTU gave to its first human embryonic stem cell line, created in association with IVF Australia.

The line was produced using human feeder cells and is the subject of a patent that is being taken out in both Australia and the USA.

For his involvement in this project, Associate Professor Kuldeep Sidhu was short-listed for a prize in the recent Eureka Science Awards.

Permission to include Endeavour 1 in the United Kingdom Stem Cell Bank has recently been granted.

**The Associate Director of the DTU, A/Professor Kuldeep Sidhu was short-listed for a prize in the recent Eureka Science Awards.**

The DTU hopes to create further Endeavour lines, at least one of which it is anticipated will be used in future human trials.

Regulatory authorities in Australia advise that such cells will need to be produced under Good Manufacturing Practice (GMP) conditions. To achieve this, specially constructed facilities are required. The DTU with the support of the Prince Henry Centenary Research Fund has plans for the creation of such a facility. Review of these plans

is currently underway by the Prince of Wales Hospital.

The DTU is fortunate to have Sarah Walke as its key person involved in planning of the GMP facility. Sarah has proven she has the attention to detail necessary to investigate what is required to develop and manage such a facility; as well as knowing how to achieve it within both budgetary and physical constraints.

It is hoped that a speedy review process will see the plans go to tender before the end of the year.

**Awards**

The DTU has been blessed in having many post-graduate and undergraduate students who bring with them a passion for research.

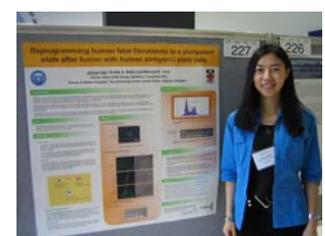
Support for them comes from many different sources, including the Australian Foundation for Diabetes Research (Vijay Vaithilingam), Australian Government (Henry

Chung and Anna Zinger), International Postgraduate Award (Jinnuo Han), University of New South Wales Postgraduate Award (Catalina Palma), and the Prince of Wales Clinical School (Methichit Chayosumrit and Daniel Lie).

The DTU is grateful to these organisations for their continued support.

This year has seen quite a number of our postgraduate students submit their PhD theses. These include Sophia Dean, Jayne Foster, Mark Lutherborrow, Mathiyalagan Appavoo and Justin Lees.

We trust that shortly they will all be walking on stage to receive the well deserved award of their doctorates.



**Jinnuo Han presents a poster at the International Stem Cell Society Convention in Cairns**

**Visiting researcher**

Over the years the DTU has been fortunate to have visiting researchers form part of the research effort. Most recently, we have had Dr Jinlian Hua from the People’s Republic of China, spend a year with the Unit. This experienced researcher from Yangling commenced the challenging project of converting human

embryonic stem cells into eggs. If successful, the eggs might then be used for the technique of nuclear transfer, also called therapeutic cloning, which was recently legalised both in the Federal and State Parliaments.

Whilst Dr Hua did show that embryonic stem cells could differentiate into egg-like structures, ability to produce



**Dr Wu with Dr Hua at the DTU**

mature eggs by this method remains elusive.

Dr Hua presented these findings to the International Society for Stem Cell Research, held in June earlier this year. We are grateful that he, as well as a number of his colleagues in the Unit, received travel grants to attend the Meeting from the Australian Stem Cell Centre.