



# Newsletter

## 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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## Human Cord Blood Stem Cells collaboration

The Diabetes Transplant Unit (DTU) entered into a joint research partnership in May 2006 with BioE Inc, a US based biotechnology company. The purpose of the agreement was to evaluate the potential of BioE's cord blood-derived stem cells to form insulin producing  $\beta$  (beta) cells.

BioE has developed the Multi Lineage Progenitor Cell™

(MLPC™), their proprietary human cord-blood-derived stem cell.

The DTU is currently conducting research using growth factors and pancreatic tissue as a culture medium to try and encourage these MLPC cells to become insulin producing  $\beta$  cells. Professor Bernie Tuch, Director of the DTU stated

"our partnership with BioE is a prime example of two organizations capitalizing on the research strengths of the other, regardless of the countries of origin. Our collaboration ultimately should translate into positive outcomes in the clinical arena much faster than if we were to undertake these efforts individually."

## Grant for Encapsulated Pig Beta Cells as a Therapy for Diabetes

The DTU has just been awarded a project grant from the National Health and Medical Research Council to continue its work on encapsulated pig  $\beta$  cells as a therapy for diabetes. This is a 3

year grant with "significant money". This grant will allow the DTU to realistically examine the possibility of being able to transplant

encapsulated insulin-producing pig cells as a therapy for diabetes, at least in the preclinical model being used.

## Prizes and Awards

Recently the Faculty of Medicine at the University of NSW held its annual Research Day. Here the Faculty's research is showcased via a poster exhibition by postgraduate research students. This poster exhibition is also a competition which was sponsored by Merck Sharpe and Dohme. The winners in each category received \$1000.

Jayne Foster, a postgraduate research student at the DTU won a prize for her poster presentation based on her research on

encapsulated fetal pig islet-like cell clusters.



**Jayne Foster, post graduate research student at the DTU receiving her Poster Prize at UNSW Research Day**

On Friday the 27th October the annual Tow Research Prize Awards were held at Randwick Hospital campus. The competition is designed to foster high quality medical and scientific research amongst more junior researchers. This year another of the DTU staff, Daniel Lie, won a cash award for his poster presentation outlining his research work on directed differentiation of human embryonic stem cells.

## Encapsulated Human Islet Transplant Trial Update

The Encapsulated Human Islet Transplant clinical trial began in February this year. Participants receive injections of islets encapsulated in a product derived from seaweed, with the aim of normalizing blood sugar levels.

Encapsulation is a platform technology paving the way for future therapies. It prevents the need for anti-rejection therapy while maintaining passage through the pores of the capsule of

nutrients, waste products and insulin.

Of a maximum of 6 potential recipients in this pilot trial, two have received multiple injections of encapsulated islets. Both the recipients are well and the transplants have been well tolerated.

It is expected that the trial will take a further 18 months. Limiting the rate of progress has been the supply of donor

pancreases, from which the islets are isolated.



**Example of encapsulated islet cells**

**Visitors**

The DTU has had the pleasure of a visit from Associate Professor Rennian Wang from the Department of Physiology and Pharmacology at the University of Western Ontario, Canada. Although her visit was only been brief she provided valuable insight into her work to the research staff of the DTU.



**Professor Rennian Wang from the University of Western Ontario, Canada**

The focus of the research being carried out by Professor Wang and her team is the investigation of islet cell growth and the regulation of islet differentiation. Their aim is to develop optimal culture environments to promote islet cell survival and proliferation in the laboratory.

Professor Wang's visit was kindly sponsored by Sanofi

Aventis Pty Ltd, one of the world's leading pharmaceutical companies. The DTU would also like to thank Sanofi Aventis for their ongoing support.

Another international visitor to the DTU this year is Professor Nurit Kaiser from the Department of Endocrinology and Internal Medicine at the Hadassah Hospital, Jerusalem.



**Professor Nurit Kaiser from the Hebrew University of Jerusalem and the Hadassah Hospital Jerusalem, Israel**

Professor Kaiser is on sabbatical with the DTU until December this year .

Dr Kaiser has been lecturing in this field since 1978 and was a visiting Professor at Harvard University from 1989 to1990. Her current research interest is in the area of type 2 diabetes, studying the regulation of normal  $\beta$  cell function and

growth in comparison with the functionality of  $\beta$  cells in type 2 diabetes in animal models.

The strategies being investigated by our visitors may provide models to study the control of islet differentiation and possibly provide new sources of  $\beta$  cells for transplantation.

**"This is a major victory for those in the Diabetes Transplant Unit who have publicly declared their desire to go down this pathway...."**

**Stem Cell Research Issues— Historic victory in the Senate**

The Senate voted 34 to 32 in early November to overturn the ban on therapeutic cloning in Australia. This is a major victory for those in the Diabetes Transplant Unit who have publicly declared their desire to go down this pathway to create both patient-specific and disease-specific embryonic stem cell (ESC) lines. Patient-specific lines allow transplantation of cells derived from ESC without being rejected by the recipient. Disease-specific lines allow a better understanding of the

development of genetic diseases.

Both the Director of the DTU, Professor Tuch, and ESC Manager, Dr Sidhu, have appeared in the press, and before a Senate subcommittee to argue passionately for the change. The DTU also joined the Coalition for the Advancement of Medical Research Australia (CAMRA) for this purpose. A vote in the House of Representatives is required at the end of November for the bill to be legalized.

Following the 2002 legislation changes in Australia, the DTU has developed the Endeavour 1 line, this is the first human embryonic stem cell line created in Australia without the use of major animal products.

Currently the DTU has a provisional patent and is now in the process of extending this to an international patent for the development of their Endeavour 1 ESC line. The DTU already holds an international patent to develop clonal lines from the Endeavour 1 line.

Stem cells in general are derived from embryonic, fetal and adult tissues. Stem cells are different from other cell types and what makes them different is their ability to differentiate into specialized cells and also their capability of replicating themselves continuously over long periods of time. It is these features which makes them extremely suitable for research and cell therapies.

**"Independent Learning Projects, a new learning experience which gives students the opportunity to put scientific theory into practice."**

**Rebecca L. Cooper Medical Research Foundation Grant**

The DTU would like to thank the Rebecca L. Cooper Medical Research Foundation for its ongoing support and recent grant for funding of equipment for the Unit over the next 5 years.

This latest grant compliments multiple previous awards from the Foundation since 1986.

The Rebecca L. Cooper Medical Research Foundation was founded in 1984 with the purpose of funding medical

research in Australia. The value of each grant competitively awarded, is \$18,000.

This year the DTU purchased an operating microscope with the funds made available.

**Independent Learning Projects**

The Independent Learning Project (ILP) is a new initiative introduced this year into the Medical degree at the University of NSW.

The ILP is a new learning experience for these students which gives them the opportunity to put scientific theory into practice. It also allows the students to gain

background knowledge into the principles of research, literature appraisal, data collection, analysis and presentation.

The DTU currently has two participants in the ILP, Lyvia Khong and John Doan.

Lyvia has undertaken a project to genetically manipulate human embryonic stem cells to

become insulin producing cells.

John's project involves working with primitive pancreatic cells and using growth factors to encourage these cells to become insulin producing cells.

Both John and Lyvia are a very welcome addition to the DTU research team.



**Lyvia and John, the DTU's first ILP students**