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NHMRC Program Grant gives Garvan the potential to find a cure for Type 1 Diabetes

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The National Health and Medical Research Council (NHMRC) today announced that The Garvan Institute of Medical Research would receive over $15.7 million in various Research Fellowships, Project Grants, Equipment Grants, Infrastructure Grants and a large Program Grant, alone worth over $3 million.

The Program Grant, a joint initiative between the NHMRC and the Juvenile Diabetes Research Foundation (JDRF) in Australia, has been awarded to Dr Shane Grey, head of Garvan's Gene Therapy and Autoimmunity Group, to undertake a vital aspect of Type 1 diabetes research. He will examine the action and function of insulin-producing pancreatic 'beta cells' in clinical procedure known as 'islet transplantation'. Dr Grey aims to improve the success rate of this procedure, a potential cure for Type I diabetes.

'Islets of Langerhans' are clusters of different types of cells in the pancreas, including the beta cells that make insulin. Each pancreas has around 1 million islets, which maintain the body's blood sugar levels in exquisite balance. A transplant involves removing the islets from a deceased donor pancreas - and transplanting them into a recipient.

"Around the world, over 100 transplants have been done, the most successful by a team in Canada," said Dr Grey. "The latest figures show that after one year, there's about a 70% success rate, the measure of success being complete insulin independence. Sadly, after 5 years that figure drops to around 10%."

"Some people see that decline of beta cell function as failure. Personally, I see a reason for optimism. We shot for the moon and we got half way there. Now we have to figure out how to achieve the rest of the journey, how to change the 10% into 100%."

In Australia, approximately 100,000 people have Type 1 diabetes, an autoimmune disease that usually starts in childhood. Over 40% of people with Type 1 diabetes suffer from complications in later life that can lead to renal failure, blindness or amputation. The most damaging aspect of the disease is hyperglycemia, or very high blood sugar levels, owing to an inability to produce insulin, the hormone that helps convert glucose in our blood to energy in our muscles.

While the advent of easily injected insulin saved, and continues to save, many lives, the effect is imprecise. The United Kingdom Prospective Diabetes Study (released in 1999) and The Diabetes Complications and Control Trial, undertaken by The U.S. National Institute of Diabetes and Digestive and Kidney Diseases (between 1983 and 1993) demonstrated conclusively that hyperglycemia causes the long-term blood vessel and tissue damage that occurs in diabetes. When people were put on very strictly controlled dietary and insulin regimens over a long period, the damage was markedly, but not totally, reduced. The kind of precise (second-by-second) monitoring required to completely prevent damage is impossible to achieve by insulin or

dietary control. Islet transplants offer a means of regaining the body's own perfect control over insulin production.

In Grey's opinion, the secret to transplant success lies in the beta cell, with one option being gene therapy. "We need to find a way to modify the beta cell genetically so that it will survive the transplantation process and allow recipients to produce their own insulin. If we succeed, it will save a lot of suffering globally and save billions of dollars in health budgets."

"The NHMRC Program Grant gives us the opportunity to pool the thinking of all the current Australian experts in this field, clinicians and researchers, to try and figure out how to make islet tissue transplants work in patients with Type 1 diabetes. The major hurdle to be overcome is the fact that beta cells don't like being extracted out of the pancreas. When you transplant into a recipient, it's estimated that up to 70% will die within the first 24-36 hours. They are very fragile – not like a heart, which you can put in a freezer box and ship across the country."

To achieve the aims of the program, Dr Grey has assembled an outstanding team of senior researchers from around the country, including Garvan experts, Associate Professor Trevor Biden, Dr Jenny Gunton and Dr Ross Laybutt. In addition to Garvan researchers, the program team includes senior members Associate Professor Chris Nolan from the Australian National University (ANU) and Dr Sof Andrikopoulos from Melbourne University.

"The JDRF in Australia, together with the NHMRC, have established a smart system," said Grey. "They've set up clinical islet transplant centres around the country – a sort of clinical flagship program. Now they're feeding information to those centres through research programs such as ours. It's very collaborative and very exciting. In my opinion, it's the only way to make progress in a complex area such as this."

NOTES TO EDITORS

Find out more about The United Kingdom Prospective Diabetes Study at and The Diabetes Complications and Control Trial at the following links:

http://en.wikipedia.org/wiki/Diabetes_control_and_complications_trial

http://content.nejm.org/cgi/content/full/329/14/1035

http://www.diabetesmonitor.com/d01.htm

http://www.mrcophth.com/importanttrialsinophthalmology/ukpds.html

http://www.diabetesmonitor.com/d03.htm

ABOUT GARVAN

The Garvan Institute of Medical Research was founded in 1963. Initially a research department of St Vincent's Hospital in Sydney, it is now one of Australia's largest medical research institutions with approximately 400 scientists, students and support staff. Garvan's main research programs are: Cancer, Diabetes & Obesity, Arthritis & Immunology, Osteoporosis, and Neuroscience. The Garvan's mission is to make significant contributions to medical science that will change the directions of science and medicine and

have major impacts on human health. The outcome of Garvan's discoveries is the development of better methods of diagnosis, treatment, and ultimately, prevention of disease.

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