

The Centre for Diabetes Research Update
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The Centre has, over the past 12 months, rapidly grown in research achievements with many exciting developments reported/printed in prestigious journals. The Centre now has 20 researchers collaborating world-wide on vital and important research relating to diabetes.

Bid to uncover intricacies of type 1 diabetes

The Centre for Diabetes Research (CDR) has published the largest ever genetic linkage study undertaken in the top-ranked journal – Diabetes – in the field of diabetes research. This was the outcome of the Type 1 Diabetes Genetics Consortium's (T1DGC) ten-year study that the CDR reported on in the 2010 DRF Research Report. The study analyzed data gathered from over 4,000 pairs of brothers and sisters (with type 1 diabetes) to identify genes that affect the risk of developing type 1 diabetes (T1D).

The outcome of the study was that over 40 genes were identified that affect the risk of developing T1D and surprisingly that these genes interact in an apparently random fashion. It is this astounding revelation that will be extensively researched in Perth at the Centre.

Newly appointed Research Assistant Professor Cao Nguyen (funded by the DRFWA) and Dr Ramesh Ram (funded by the National Institute of Health) will conduct a large-scale complex data analysis of these findings using high performance computing in a bid to uncover the genetic intricacies of T1D. These cannot be found by conventional genetic testing.

Professor Morahan is confident that the Centre will produce some very exciting results from this research in the coming year.

Environmental Factors may affect Australians families at risk of developing T1D

(Australian Childhood Diabetes DNA Repository)

The Australian Childhood Diabetes DNA Repository (ACDDR) invited families of children affected by either T1D or child-onset T2D to provide DNA samples to assist in discovering the genetic causes behind diabetes. At the end of 2010 the ACDDR had collected 1812 complete trio families (children with T1D and both biological parents). These families have now been tested for the 40 T1D genes identified by the T1DGC and the results were very surprising. While many of the genes showed a significant effect in Australian families, there were many that appeared to have no effect at all.

This suggests that there are environmental interactions with these genes and that these environmental factors differ between Australia and the United Kingdom where the genes were first identified.

The effect of diet on diabetes and obesity

(Obesity is characterized by people having a Body Mass Index of over 35 and Diabetes is the combination of diabetes and obesity)

Previous research on the effect of diet on diabetes and obesity at the Centre has shown that **a semi-purified diet supplemented with lupin kernel meal reduced body weight** gain in mice. To examine this effect further, 12 different strains of mice were fed this semi-purified diet. 2 had similar responses to the diet and this suggests that the response may be influenced by complex genetic interactions.

Michael Durell and Professor Morahan will continue this important research at the Centre as the possibilities from this research, along with that of the CFGM (see report also in this issue), are far-reaching and the Centre looks forward to reporting outcomes in the next edition of the DRF Research Report.

Diabetic Retinopathy

The Inaugural ACDS was awarded to Lakshini Weerasekera at the Centre for Diabetes Research for the establishment and characterization of a mouse model of diabetic retinopathy.

Lakshini's PhD project involves investigating the 'Gene Mine' resource to identify a suitable mouse model (strain) to study the eye complication, Diabetic Retinopathy, which occurs due to diabetes. To date there are preliminary results on eight strains of mice that have been identified. One strain has shown early signs of Diabetic Retinopathy where bulging structures occur deep in the capillary bed. Lakshini is currently using several methods to confirm this initial structural change and will also study the progression of retinopathy to identify the gene that causes this change.

A detailed report is available from the DRFWA office.