

## **Genotype and phenotype analysis in diabetes complications**

**Host School/Institute: Department of Molecular Genetics and Institute of Endocrinology and Diabetes, the Children's Hospital at Westmead**

**URL: <http://www.chw.edu.au>**

**Project Code: CHW9**

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### Description of Project:

Our group is studying adolescents with type 1 diabetes for the development of early microvascular complications (retinopathy, neuropathy and nephropathy). An individual's susceptibility to diabetic complications may be modulated by genetic determinants in addition to their glucose control.

Recent studies have focused on aldose reductase, an enzyme which metabolises glucose to sorbitol (polyol pathway). Polymorphisms within the aldose reductase gene promoter region have been associated with high, medium or low production of the aldose reductase enzyme and also other downstream anti-oxidant enzymes (including catalase and superoxide dismutase). These differences in phenotypic expression may increase a person's risk for microvascular complications.

The summer vacation project will include genotyping individual patient DNA for polymorphisms within the promoter sequence and other regulatory regions of the aldose reductase gene using PCR, microsatellite and restriction fragment length polymorphism analysis. In addition the mRNA expression levels of aldose reductase and associated genes will be measured from an *in vitro* culture system using patients' white blood cells and analysed using quantitative real-time PCR.

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