



Research Activities

Mechanisms of Diabetic Complications

Professor Leon Bach

Patients with diabetes develop complications including damage to the blood vessels, eyes, nerves and kidneys. Although high glucose levels are necessary for the development of these complications, the precise mechanisms remain incompletely understood. Professor Leon Bach's laboratory is studying the role of proteins that are modified by glucose (advanced glycation end products – AGEs). In particular, his laboratory has identified a novel interaction between AGEs and ERM proteins that are important for maintaining cell shape and function. Current studies are aimed at identifying the role of this interaction in mediating diabetes-induced tissue damage. In 2010, the group studied the relationship between proteases and AGE binding to ERM proteins with a focus on kidney tubule cells. The group also started studying the role of ERM proteins in podocytes, which are cells within the filtering apparatus of the kidney.

Professor Bach has continued a clinical study with Associate Professor Dmitri Sviridov and Associate Professor Merlin Thomas from the Baker IDI Heart and Diabetes Institute to investigate the effects of glucose modification on the anti-atherogenic properties of high density lipoprotein in diabetic patients.

Regulation of Growth Factor Activity

Professor Leon Bach

Insulin-like growth factors (IGFs) are important for normal growth and development, and the IGF system is perturbed in many disease states, including growth disorders, diabetic complications, cancer, and atherosclerosis. A family of six IGF binding proteins (IGFBPs) regulates their actions. For many years, Professor Leon Bach's laboratory has focused on the biological role of IGFBP-6, particularly its role as an IGF-II inhibitor in cancer. These studies may lead to a new class of therapies aimed at modulating the IGF system, which may be relevant for IGF-dependent diseases.

The group has previously shown that IGFBP-6 promotes migration of cancer cells in an IGF-independent manner. Further work in 2010 has studied a number of intracellular signalling molecules involved in this effect and identified a possible cell surface protein that may also be involved.

Clinical Trials in Diabetes and Thyroid Care

Professor Duncan Topliss

ADVANCE-ON is a long term follow-up of participants in the now-concluded ADVANCE trial in Type 2 diabetes. It seeks to provide evidence of a late benefit (legacy effect) of tight glycaemic control versus standard control in macrovascular disease prevention.

The ORIGIN study is testing the effect of early insulin therapy using the new long-acting analogue glargine insulin to prevent macrovascular disease in Type 2 diabetes. It concludes in 2011 and its results are expected to be presented in mid-2012.

The HOPE study (Phase 2), which concludes in 2011, has examined the effects of a novel VEGF/multikinase inhibitor (E7080) on advanced thyroid cancers and suggests benefit. The Alfred will be a trial site for a Phase 3 randomised placebo-controlled trial of this agent commencing later in 2011.

Diabetes in Lung Transplant Recipients

Dr Kathryn Hackman and Professor Leon Bach

A collaboration has been established with Professor Greg Snell, Head of the Lung Transplant Unit, to document the incidence of diabetes in lung transplant recipients and to study the effects of diabetes on transplant outcomes.

Research Achievements

Professor Leon Bach gave an invited Meet the Professor lecture on 'IGFs, diabetes and metabolism' at the 14th International Congress of Endocrinology in Kyoto.

Professor Duncan Topliss gave an invited lecture at the World Congress of Internal Medicine in a seminar entitled Update in Topical Areas of Endocrinology, on 'Challenges for the general physician in thyroid disease' and an invited lecture at the Endocrine Society of Australia Seminar Meeting on 'Thyroid cancer; the challenge of implementing modern guidelines'.

Dr Kathryn Hackman commenced an MD studying the causes and effects of diabetes in lung transplant recipients.



Postgraduate Students

1 PhD Student
1 MD Student

Publications

7 Journal Articles
1 Book Chapter