

University News

Study identifies genes that control thyroid levels

Friday, 29 October 2010

Sequence variations in DNA have been identified that affect personal levels of thyroid hormones, according to an international research team.

Research team member, Adjunct Associate Professor Scott Wilson, from The University of Western Australia's School of Medicine and Pharmacology, said since genetic variations were present in more than one in four people examined, there may be a potential role for screening as part of a wider program of personalised genomic medicine.

"This would allow us to identify individuals who are most at risk of thyroid-related disease," he said.

Thyroid hormones act on almost every tissue in the body, affecting basal metabolic rate, protein synthesis, fat and carbohydrate metabolism. Thyroid disease is an important public health problem as it affects up to 10 per cent of the population.

The research team includes Clinical Associate Professor John Walsh, Adjunct Associate Professor Scott Wilson, Adjunct Professor John Beilby, Assistant Professor Alexandra Bremner and researchers at King's College London. They carried out a genome-wide association study of 2,031 female twins and identified the most common DNA variants in their genes.

This was from a total of 2,120,505 possible variations that could be responsible for conferring different levels of thyroid hormone. To confirm their findings, they then tested 1,154 people from the Busselton Health Study in Western Australia. The results were published last month in *The American Journal of Human Genetics*.

The [Busselton Health Study](#) is one of the longest running epidemiological research programs in the world. The residents of Busselton, a town in Western Australia's South West, have been involved in a series of health surveys since 1966.

Associate Professor Walsh said evaluation of thyroid function was generally performed by measuring circulating concentrations of thyroid-related hormones.

"Thyrotropin (also known as TSH) is the most sensitive marker of thyroid dysfunction," Professor Walsh said. "Even in healthy subjects, there can be considerable differences in hormone levels between different people in the population, but the levels are generally tightly regulated within an individual person over time.

"This suggests that individuals have different setpoints for thyroid hormones. Twin and family studies have shown that these setpoints are under strong genetic control.

"Understanding the control of these setpoints may be important for health because even in people with apparently normal thyroid hormone concentrations, small changes in thyroid function are associated with changes in body mass index, blood pressure, lipids, presence of atrial fibrillation and cardiovascular mortality."

Media references

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