Gene associated with diabetes risk suggests link with body clock

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New research shows a link between the body clock and diabetes.

A connection between the body clock and abnormalities in metabolism and diabetes has been suggested in new research by an international team involving the University of Oxford, the Wellcome Trust Sanger Institute and the MRC Epidemiology Unit in Cambridge.

The researchers have identified a gene involved in the way the body responds to the 24 hour day-night cycle that is strongly linked to high blood sugar levels and an increased risk of type 2 diabetes. The results of the genome-wide association scan are published in *Nature Genetics*.

‘We have extremely strong, incontrovertible evidence that the gene encoding melatonin receptor 1B is associated with high fasting glucose levels and increased risk of type 2 diabetes,’ says Professor Mark McCarthy of the Oxford Centre for Diabetes, Endocrinology and Metabolism at the University of Oxford.

Melatonin is a hormone that is strongly tied to control of our sleep-wake cycles, with concentrations in the blood peaking at nighttime and dipping during the day. As a result, melatonin is implicated in conditions like jetlag and sleep disorders.

Disrupted sleep patterns are known to be associated with a range of health problems including metabolic disorders like diabetes, but it is not understood how they are connected. In identifying a link between a melatonin receptor and blood sugar levels, this study provides genetic evidence that mechanisms controlled by our body clock are connected to the machinery that keeps us metabolically healthy. It seems likely that the action of melatonin on the pancreas is being disturbed in this case, the researchers suggest.

The international research collaboration combined ten genome-wide association scans involving a total of over 36,000 individuals of European descent. A variant in the gene encoding melatonin receptor 1B (MTNR1B) showed a rise of 0.07 mmol/l in fasting glucose level on average and a 9% increase in risk of type 2 diabetes for each copy of the gene variant inherited from a parent.

‘High fasting glucose levels are early markers of diabetes and this observation provides important clues about the possible mechanisms linking genes to diabetes risk,’ says Professor Nick Wareham, Director of the MRC Epidemiology Unit in Cambridge.

Other genes have previously been shown to be associated with high

blood sugar levels, but have not shown an increase in diabetes risk. The melatonin receptor found in this genome-wide study is the first gene to be linked to both high blood sugar and increased risk of diabetes.

'Although levels of glucose in the blood are used to diagnose diabetes, most of the genes previously associated with high glucose levels do not increase risk of diabetes,' says Dr Inês Barroso from the Wellcome Trust Sanger Institute. 'We have found a variant – a G in the genome in place of a C – in MTNR1B. This single-letter change influences both sugar levels and diabetes. This remarkable result should allow us to gain new insight into this problem.'

Source: University of Oxford