MedicalXpress

Blood-clotting agent can diagnose fatal genetic diseases, finds study

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(PhysOrg.com) -- University of Manchester scientists have shown that a protein involved in blood clotting can be used to diagnose and subsequently monitor the treatment of a group of childhood genetic diseases.

In the study, published in the Journal of Inherited Metabolic Disease, the researchers were able to show that the clotting agent, heparan cofactor II/Thrombin (HCII/T) complex, could be used as a 'biomarker', or biological tell, in individuals with mucopolysaccharide (MPS) diseases.

MPS diseases are severe metabolic conditions caused by a genetic defect that affects the body's ability to break down complex sugars in cells and the bloodstream. The conditions result in a range of symptoms from abnormal skeletal development to mental decline and even premature death depending on the type of sugars built up in the body.

Treatment options have been limited but recent advances whereby the missing or faulty enzyme that breaks down the sugars is replaced artificially in affected individuals has made the need for an accurate diagnostic tool for these diseases more pressing.

Lead researcher Dr Brian Bigger, from Manchester's MPS Stem Cell Research Laboratory, said: "HCII/T complex was originally developed in Canada as a test for patients with MPSI, II and VI. We were able to show that HCII/T complex can clearly distinguish between untreated patients with MPSI, MPSII, MPSIIIA, MPSIIIB, MPSIIIC, MPSVI and

unaffected individuals.

“We also went on to monitor long-term clinical outcomes in patients with MPSI, MPSII and MPSVI after treatment to show that elevations of both this biomarker, and the dermatan sulphate:chondroitin sulphate biomarker currently used in the diagnostic laboratory in Manchester, correlated with clinical treatment outcomes in patients.

“Two of the sugars that are commonly accumulated in MPS diseases are heparan sulphate (HS) and dermatan sulphate (DS). Other sugars such as chondroitin sulphate (CS) are usually not accumulated in the disease. By measuring the ratio of DS:CS in urine we can accurately diagnose the disease, but detection of sugars is expensive and technically challenging. Instead, the HCIIT method relies on detection of proteins binding to sugars and is much cheaper to perform.”

Simon Jones, a consultant paediatrician at St Mary’s Hospital in Manchester and co-author on the paper, added: “These are difficult diseases to treat and monitor so advances such as this will help us to diagnose and treat patients more effectively in the future.”

More information: The open-access paper, entitled “Heparin cofactor II-thrombin complex and dermatan sulphate:chondroitin sulphate ratio are biomarkers of short and long-term treatment effects in mucopolysaccharide diseases”, is available to view here: springerlink.metapress.com/con … 86tp62/fulltext.html

Provided by University of Manchester