Metabolomics-based testing shown to improve the diagnosis and treatment of non-alcoholic fatty liver disease (NAFLD)

CIC bioGUNE and OWL Metabolomics identify two subtypes of NAFLD

The cited study, performed with 535 biopsied proved NAFLD patients and analyzing more than 400 lipids, has been published in the journal Gastroenterology.

The metabolomics analysis, performed using a serum sample, allows the diagnosis of the presence of NASH and, in the future, will potentially expand the use of personalized drug treatments in such patients.

(Bilbao, February 27, 2017). Non-alcoholic steatohepatitis (NASH), a clinically-relevant and progressed form of non-alcoholic fatty liver disease (NAFLD), is histologically defined as the presence of fat (steatosis) together with inflammation and hepatic damage.

NASH is a progressive lesion that can evolve to a major hepatic damage, advanced fibrosis, cirrhosis and hepatocellular carcinoma (HCC). In the previous decades, the incidence of NAFLD has expanded rapidly and is currently the leading cause of chronic liver disease with a prevalence ranging between 10 and 40% in the adult population of Western countries, in whom approximately 10-30% progress to NASH.

In the USA, NASH is currently the second leading cause of liver transplant, and it has been estimated that it will be the first cause of liver transplant in the foreseeable future. Currently, weight loss and exercise can be helpful, there is currently no approved drug for NASH treatment.

Current treatments aim to control the associated comorbidities such as obesity, diabetes and hyperlipidemia. Today, the definitive diagnosis of NASH depends on performing an invasive liver biopsy, a medical procedure with some controversies due to the variability in sampling variation, inter-observer variability, high cost and patient safety risks. This is one reason many current NASH patients are not appropriately diagnosed.

NAFLD begins when the synthesis and entry of lipids from the blood into the liver are higher than the liver's ability to remove those lipids via oxidation. Significant research in NAFLD has focused on the identification of the changes in lipid metabolism, particularly those lipids responsible for the formation of fatty liver and its ultimate progression to NASH.

The results of the newly-published study in Gastroenterology may lead to changes in the way NASH is diagnosed and treated. The study results demonstrate for the first time that there are two main subtypes of NASH evolution (named "M" and "no-M") which differ by the type of alteration they exert on hepatic lipid metabolism.

Through metabolomic analysis, the research group lead by Professor José Mato, General Director of Center for Cooperative Research in Biosciences CIC bioGUNE (Derio, Bizkaia, Spain), in close collaboration with research team from OWL Metabolomics (Derio, Bizkaia, Spain), have now demonstrated that each one of the 2 subtypes has a different metabolomic fingerprint. This recently-published study considered 535 biopsy-proven NAFLD patients and analyzed more than 400 lipid subfractions.

The researchers have also demonstrated that NASH "M" subtype has the same metabolomic profile as the MAT1A-KO mice, a genetically-modified mouse species which develops NASH spontaneously.

This study demonstrates that the administration of S- adenosylmethionine (SAMe) is effective for NASH treatment in MAT1A-KO mice. After two months of SAMe administration, the histology and analytics of MAT1A-KO mice significantly improved. SAMe is an agent with an excellent safety profile in humans and is used for intrahepatic cholestasis treatment. The authors of this new study conclude that SAMe could also be useful for NASH treatment in those patients who present with metabolic "M" subtype, representing approximately to 50% of all NAFLD patients in this study.

This multidisciplinary team of researchers conclude that "the metabolomics-based analysis can be an improved method to diagnose, monitor and treat the disease progression by providing metabolic subtype analysis, not just the subjective results of an invasive liver biopsy". Pablo Ortiz, MD, PhD, and OWL Metabolomics CEO added: "It is the first study published in a high impact factor journal in which metabolomics is postulated as a novel technology that can efficiently identify the most adequate patient type for each of the drugs currently in clinical research for NASH". The animal model can therefore serve as a useful adjunct to the drug research program by employing the metabolomics-based profile of the patient candidates for treatment".

About OWL Metabolomics

OWL Metabolomics is a biotechnology company committed to the identification, validation and global commercialization of novel diagnostic assays for the liver and other prevalent human diseases, including the identification of potential therapeutic targets involved in the development of such diseases. Since its inception in 2002, OWL has pioneered unique diagnostic research within the fatty liver space, a field of considerable focus in new drug development.

The 'OWLiver' and 'OWLiver Care' assays are the world's first metabolomics-based in-vitro tests for diagnosing non-alcoholic steatohepatitis (NASH) and non-alcoholic fatty liver disease (NAFLD), respectively, using micro-blood samples (<0.3 ml) versus today's diagnostic gold-standard which mandates an invasive liver biopsy.

OWL Metabolomics is a privately-held company based in Derio, Spain. Its main partner is the venture capital management firm Cross Road Biotech Inversiones Biotecnológicas. OWL Metabolomics collaborates globally with hospitals, liver research centers, biotechnology groups and the pharmaceutical industry.

http://www.owlmetabolomics.com/liver-disease-diagnosis.aspx