METHODS AND BIOMARKERS TO DETECT CHRONIC LIVER DISEASE DEVELOPMENT

One research group from FRC-IDIBAPS and CIBER has developed a new treatment system of liver injury using therapeutics mRNAs.

The Need

Liver cirrhosis is among the top ten causes of death worldwide. The identification of reliable biomarkers of the disease would facilitate early diagnosis, risk stratification, and prediction of patients' responses to specific treatments.

Non-invasive plasma biomarkers offer advantages over liver biopsy, primarily due to their safety, cost-effectiveness, and ease of assessment. However, when used alone, these biomarkers often lack accuracy and fail to capture the complexity of liver disease at the tissue level, as most of the measured signals are derived from hepatocytes.

The integration of these approaches with biomarkers from hepatic cell types directly involved in disease progression, such as sinusoidal cells, may be essential for the development of more accurate strategies to predict disease progression.

The Solution

The present invention discloses a method for detecting the development of chronic liver disease in a subject, comprising determining the expression levels of biomarkers in sinusoidal cells, including liver sinusoidal endothelial cells (LSECs), hepatic stellate cells (HSCs), and macrophages (MPs), which play key roles in the progression of chronic liver disease (CLD).

More specifically, the invention consists of a gene signature based on the analysis of the expression levels of 17 genes derived from hepatic sinusoidal cells.

This biological characterization of the patient's sinusoidal cell state predicts clinical decompensation and disease regression with greater accuracy and specificity than traditional clinical parameters and biomarkers. In addition, it is less invasive than other assays routinely used in clinical practice, such as hepatic venous pressure gradient (HVPG) measurement.

Innovative Aspects

Novel approach: The present invention discloses a novel diagnostic strategy based on determining, in a personalized manner, the degree of activation/dedifferentiation of each sinusoidal cell subtype.

Lower invasiveness than conventional diagnostic tests: The novel method is less invasive than hepatic venous pressure gradient (HVPG) measurement, currently the gold-standard diagnostic method with predictive capacity. HVPG requires hospitalization and a multidisciplinary medical team, limiting its use to specialized centers and making it costly.

Higher specificity than current diagnostic methods: The scores derived from the invention yield fewer false positives compared to HVPG-based assessments.

Patient stratification: The scores also enable classification of patients according to HVPG thresholds (e.g., above or below 10 mmHg or 12 mmHg), which are commonly used to assess patient risk. This represents an advantage, as the scores could serve as a first-line screening tool in general hospitals, prior to referral to specialized centers for HVPG measurement.

Predictive marker of disease progression: The scores correlate with changes in HVPG measurements, thereby predicting whether the patient's condition will improve or worsen. This biological characterization of the sinusoidal cell state enables more accurate prediction of clinical decompensation and disease regression.

Intellectual Property:

- Priority European patent application filed (July 2025)

Aims

Looking for a partner interested in a license and/or a collaboration agreement to develop and exploit this asset.

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