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New proteomic approaches for biomarker discovery: The search for novel liver fibrosis markers in hepatitis C patients

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Two-dimensional gel electrophoresis (2-DE) is often used to separate plasma or serum proteins in an attempt to identify novel disease biomarkers. A major problem with this approach is the presence of high abundant plasma/serum proteins which limit the detection of low abundance features. We used two proteomic approaches to identify new fibrosis biomarkers in patients with different stages of liver fibrosis. Plasma samples from healthy individuals and patients with hepatitis C virus (HCV) induced cirrhosis were analysed using 2-DE over a narrow pH 3-5.6 range, arranged outside the pH of highly abundant albumin, transferrin and immunoglobulins. Several novel markers were identified by this approach and were validated across all fibrosis stages by Western blotting. This is the first time the pH 3-5.6 range has been used to separate plasma by 2-DE and was found to be beneficial for biomarker discovery. In addition, we used in-solution isoelectric focusing followed by SDS-PAGE to find biomarkers in HCV-induced liver cirrhosis. This approach was found to be beneficial for identifying basic, high molecular weight protein biomarkers. These approaches have successfully helped to identify novel biomarkers for hepatic fibrosis and these approaches are also useful for discovering novel biomarkers in other diseases.

Biography

Bevin Gangadharan obtained his D.Phil under the supervision of Prof. Nicole Zitzmann at the University of Oxford where he carried out the first ever gel-based proteomics study to discover novel biomarkers for liver fibrosis. He has more than a decade of experience in proteomics and biomarker discovery and first started in this field in 2000 at Smithkline Beecham looking at depletion of albumin in plasma, an important approach in biomarker discovery. He has published in several peer-reviewed journals and has two patents on novel biomarkers for liver fibrosis. He is on the editorial board for Biomarker Research and gives proteomics lectures to students in the Department of Biochemistry at the University of Oxford.

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