S K Jain et al., J Mol Biomark Diagn 2015, 6:4
http://dx.doi.org/10.4172/2155-9929.C1.025

OMICS International
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6th International Conference on
Biomarkers & Clinical Research
August 31-September 02, 2015 Toronto, Canada

Implication of cancer proteomics in development of biomarkers for early detection of HCC

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Post-HGP era opened new vistas for understanding gene expression and initiated several specialized 'omics'. Proteomics is analysis of total cellular proteins under different physiological and pathological conditions and is useful for discovery of novel biomarker(s) for diagnosis, and monitoring of progression of cancers by direct analysis of serum proteins. Hepatocellular carcinomas highly prevalent and leads to high morbidity and mortality. Presently serum α-fetoprotein levels form standard diagnosis of HCC, which is relatively low in sensitivity and specificity. In our efforts to develop biomarkers for early detection of HCC, a novel animal model to study-chemically induced liver cancer was developed. The serum protein profiles at various stages of disease progression have been analyzed by 2D electrophoresis. Number of differentially expressed proteins have been detected, some of which bear correlation with disease progression. Histopathology and marker enzyme analyses confirmed and monitored tumor formation and disease progression. The proteins of interest have been characterized by MALDI-TOF and LC-MS/MS. We report the analysis of one of these proteins whose levels are elevated during very early stage of cancer initiation and remain elevated thereafter. The cloning and high level expression of this protein has been achieved. The sequencing of its gene revealed that specific point mutations take place in this protein during tumorogenesis and mutated protein shows immunogenicity. The diseased animals have circulating antibodies against. These findings are important in understanding the molecular mechanism of HCC development. Sera of clinically confirmed HCC patients have elevated levels of this protein that supports its potential as probable biomarker for diagnosis of HCC. The implications of these studies will be discussed.

Biography

S K Jain, PhD from AIIMS, New Delhi is Professor of Medical Biochemistry & Biotechnology, Hamdard University. He was a Research Associate at Washington University Medical Centre, Tufts Medical School and Harvard Medical School (USA), senior scientist at National Institute of Immunology, New Delhi (1985-2000), visiting Professor, Catholic University, Rome; visiting scientist, Institute of Virology, Oxford; served as consultant to WHO and US-AID; has been Dean, Faculties of Science & Allied Health Sciences and officiating Vice-Chancellor of Hamdard University. He has published 175 papers in peer reviewed journals, number of book chapters and guided more than 50 PhD students. His current research interests are molecular biology/ immunology of typhoid and proteomics of lung and liver cancers.

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