

Blood-based test for multiple sclerosis – biomarkers for disease detection and monitoring of treatment

Victor V. Levenson

Rush University Medical Center, USA

Detection of multiple sclerosis (MS) is a challenging process, which usually requires repeated imaging over time. The absence of unequivocal detection tests delays initiation of treatment thus increasing potential for significant brain damage. Similarly, the absence of biomarkers that reflect disease activity complicates treatment of clinically-defined MS and trials of disease-modifying medications. In this presentation novel biomarkers based on methylation of cell-free circulating DNA in blood will be described. These biomarkers reflect the presence of relapsing-remitting MS (RRMS) even when the patient is in remission. Moreover, they can differentiate patients in relapse and in remission thus opening the possibility to detect asymptomatic relapses, which constitute over 90% of relapses in RRMS. Treatment-related changes in DNA methylation-based biomarkers suggest that methylation of cell-free circulating DNA can be used to monitor treatment thus providing an objective measure of success for clinical trials. To illustrate the potential of methylation patterns I will use data produced by our MetDet-56 technique, which is designed to evaluate methylation patterns of 56 promoters in each clinical sample. Current version of the assay evaluates methylation on a genome-wide scale but still requires only 1 ng of DNA or 0.5 ml of blood plasma. This presentation will concentrate on technical aspects of methylation pattern development and assessment as applied to solving well-defined clinical problems of multiple sclerosis.

Biography

Victor V. Levenson has received his MD from the 2nd Moscow Medical Institute and his Ph.D from the Institute of Molecular Biology (Moscow, USSR). His laboratory developed a unique and currently unmatched process for methylation detection in extremely small clinical samples (biopsies, cytological samples and cell-free-circulating DNA from blood). He has published more than 35 peer-reviewed papers in reputed journals.