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A novel biomarker-based tool to monitor multiple sclerosis evolution at clinical and sub-clinical stages: Antibody-proteases as a new generation of translational tools to monitor, to predict and to prevent demyelination

Subclinical multiple sclerosis (S-MS) can be usually defined as the discovery of characteristic lesions at magnetic resonance (MR) or at autopsy, in the absence of clinical evidence con-sistent with MS. The methodological bricks of subclinical diagnostic and predictive protocols should include basic algorithms to differ essentially from those employed in canonical clinical practice, i.e., (i) to confirm a diagnosis of subclinical stage of the disease course and (ii) to select a mode for preventive treatment to quench the autoimmune inflammation. In this sense, among the best-validated proteome-related translational biomarkers, antibody-proteases were proven to be the best known ones. Abs against myelin basic protein/MBP endowing with proteolytic activity (Ab-proteases with functionality) is of great value to monitor demyelination to illustrate the evolution of MS. The activity of the MBP-targeted Ab-proteases discovered in MS patients markedly differs between: (i) MS patients and healthy controls; (ii) different clinical MS courses; (iii) EDSS scales of demyelination to correlate with the disability of MS patients to predict the transformation prior to changes of the clinical course. The activity of Ab-proteases was first registered at the subclinical stages 1-2 years prior to the clinical illness. About 24% of the direct MS-related relatives (probands) were se-ropositive for low-active Ab-proteases from which 38% of the seropositive relatives estab-lished were being monitored for 2 years whilst demonstrating a stable growth of the Ab-associated proteolytic activity. Three patients were initially evaluated because of accidental MRI findings suggestive of MS that fulfilled the Barkhof criteria. At the moment of MR ex-amination, patients were asymptomatic. The objective examinations as well as the clinical history were negative. After having those patients tested for Ab-proteases, all three have demonstrated elevated levels of the specific activity to target MBP. We have been monitoring along with the patients mentioned all direct members (13 healthy persons) of their families for two years and found that three relatives tested had elevated levels of the specific activity which was having a trend to grow whilst correlating with clinical symptoms of MS including the chronic fatigue, muscle weakness, dizziness, etc. All family members were studied with MRI, evoked potentials, and human leukocyte antigen (HLA) typing. The activity of Ab-proteases and its dynamics tested would confirm a high subclinical and predictive (transla-tional) value of the tools as applicable for personalized monitoring protocols. Further studies on targeted Ab-mediated proteolysis may provide a translational tool for predicting demye-lination and thus the disability of the MS patients in a variety of clinical and subclinical cases.

Biography

Sergey Suchkov is a Researcher-Immunologist, a Clinician graduated from Astrakhan State Medical University, Russia in 1980. He has been trained at the Institute for Medical Enzy-mology, The USSR Academy of Medical Sciences, National Center for Immunology (Rus-sia), NIH, Bethesda, USA and British Society for Immunology to cover 4 British university facilities. Since 2005, he has been working as Faculty Professor of I.M. Sechenov First Mos-cow State Medical University and of A.I. Evdokimov Moscow State Medical & Dental Uni-versity. He is the First Vice-President and Dean of the School of PPPM Politics and Man-agement of the University of World Politics and Law. He was a Scientifi c Secretary-in-Chief of the Editorial Board of the International Journal "Biomedical Science" (Russian Academy of Sciences and Royal Society of Chemistry, UK) and The International Publishing Bureau at the Presidium of the Russian Academy of Sciences. He was a Director of the Russian-American Program in Immunology of the Eye Diseases. He is a Member of EPMA, NY Academy of Sciences and an Editorial Board Member for Open Journal of Immunology and others.

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