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Antibody-proteases as a novel biomarker and a unique target to suit translational tools to be applied for biodesign, bioengineering and regenerative medicine therapeutic for a treatment of EGFR-dependent breast cancer tumorsSergey Suchkov^{1,2,3}, Noel Rose⁴, Aleks Gabibov⁵, Stefani Bolevich¹ and Harry Schroeder⁶¹I M Sechenov First Moscow State Medical University, Russia²A I Evdokimov Moscow State University of Medicine and Dentistry, Russia³European Association for Prediction, Belgium⁴Johns Hopkins Center for Autoimmune Disease Research and PAHO/WHO Collaborating Center for Autoimmune Disorders, Johns Hopkins Medical Institutions, USA⁵Institute for Bioorganic Chemistry – RAS, Russia⁶University of Alabama at Birmingham, USA

Catalytic Abs (catAbs) are multivalent immunoglobulins (Igs) with a capacity to hydrolyze the antigenic (Ag) substrate. In this sense, proteolytic Abs (Ab-proteases) represent Abs to provide proteolytic effects. Abs against myelin basic protein/MBP with proteolytic activity exhibiting sequence-specific cleavage of MBP are of great value to monitor demyelination whilst in MS. The activity of Ab-proteases was first registered at the subclinical stages 1-2 years prior to the clinical illness. And the activity of the Ab-proteases revealed significant correlation with scales of demyelination and the disability of the patients as well. So, the activity of Ab-proteases and its dynamics tested would confirm a high subclinical and predictive (translational) value of the tools as applicable for personalized monitoring protocols. Of tremendous value are Ab-proteases directly affecting remodeling of tissues with multilevel architectonics (for instance, myelin). By changing sequence specificity one may reach reduction of a density of the negative proteolytic effects within the myelin sheath and thus minimizing scales of demyelination. Ab-proteases can be programmed and re-programmed to suit the needs of the body metabolism or could be designed for the development of new catalysts with no natural counterparts. Further studies are needed to secure artificial or edited Ab-proteases as translational tools of the newest generation to diagnose, to monitor, to control and to treat and rehabilitate MS patients at clinical stages and to prevent the disorder at subclinical stages in persons-at-risks to secure the efficacy of regenerative manipulations.

Recent Publications

1. Ponomarenko N A et al. (2002) Catalytic antibodies in clinical and experimental pathology: human and mouse models. *Journal of Immunological Methods*. 269(1-2):197-211.
2. Ponomarenko N A et al. (2005) Catalytic activity of autoantibodies toward myelin basic protein correlates with the scores on the multiple sclerosis expanded disability status scale. *Immunol. Lett.* 103(1)45-50.
3. Gabibov A G et al. (2006) Catalytic autoantibodies in clinical autoimmunity and modern medicine. *Autoimmunity Reviews*. 5(5):324-330.
4. Gabibov A A, Paltsev M A and Suchkov S V (2011) Antibody-associated proteolysis in surveillance of autoimmune demyelination: clinical and preclinical issues. *Future Neurology*. 6(3):303-305.
5. D Kostyushev et al. (2011) Myelin-associated serological targets as applicable to diagnostic tools to be used at the preclinical and transient stages of multiple sclerosis progression. *Open J. Immunology*. 1(3):80-86.

Biography

Sergey Suchkov graduated from Astrakhan State Medical University and was awarded with MD; in 1985 maintained his PhD at the I M Sechenov Moscow Medical Academy and in 2001, maintained his Doctor Degree at National Institute of Immunology, Russia. From 1987 through 1989 was a Senior Researcher at Koltzov Institute of Developmental Biology. From 1989 through 1995, he was the Head of the Lab of Clinical Immunology, Helmholtz Eye Research Institute in Moscow. From 1995 through 2004, a Chair of the Department for Clinical Immunology, Moscow Clinical Research Institute (MONIKI). He has been trained at: National Institute of Health; Wills Eye Hospital, Pennsylvania, USA; University of Florida in Gainesville; University of California San Francisco; Johns Hopkins University, Baltimore, MD, USA respectively. He was an Exe Secretary-in-Chief of the Editorial Board, *Biomedical Science*, an international journal published jointly by the USSR Academy of Sciences and the Royal Society of Chemistry, UK. At present, he is a Chair, Department for Personalized and Translational Medicine, I M Sechenov First Moscow State Medical University. He is a Member of the: New York Academy of Sciences, USA; American Chemical Society (ACS), USA; American Heart Association (AHA), USA; European Association for Predictive, Preventive and Personalized Medicine (EPMA), Belgium; American Association for Research in Vision and Ophthalmology (ARVO); ISER (International Society for Eye Research); Personalized Medicine Coalition (PMC), Washington, USA.

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