CSF antibody profiling of patients with HTLV-1 associated myelopathy/ tropical spastic paraparesis using VirScan

Yoshimi Enose-Akahata,[1] Limin Wang,[2] Fahad Almsned,[3] Kory R. Johnson,[3] Yair Mina,[1] Joan Ohayon,[4] Xin Wei Wang,[2] and Steven Jacobson [1*]

[1]Viral Immunology Section, [3]Bioinformatics Section, and [4]Neuroimmunology Clinic, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD 20892 USA
[2]Laboratory of Human Carcinogenesis, Center for Cancer Research, National Cancer Institute, National Institutes of Health, Bethesda, MD 20892 USA

*Corresponding author
E-mail: jacobsons@ninds.nih.gov

Background:
Intrathecal antibody synthesis is well-documented in chronic virus associated neurologic disease with demyelination, neuroinflammation and persistent immune dysregulation in the CNS. It is important to determine if patterns or "signatures" of antigen-specific antibody responses associated with various viral exposures can be defined in patients with neurologic diseases including human T cell lymphotropic virus 1 (HTLV-1)-associated myelopathy/tropical spastic paraparesis (HAM/TSP).

Methods:
We used a phage-immunoprecipitation-sequencing technology, i.e., VirScan, a robust platform capable of very high complexity serological screening for virus exposure across the entire human virome to determine potential viral pathogens in patients with neurologic diseases. Using VirScan , antibody profilings in CSF and serum of patients with HAM/TSP was compared to those in healthy volunteers (HV) and patients with multiple sclerosis (MS).

Results:
Antibody binding scores against primate T cell lymphotropic viruses were highly detected in both CSF and serum of HAM/TSP patient but not in CSF of HV and MS patients. Compared to HV, the antibody profiling in CSF and serum of HAM/TSP patients showed significant differences from those in HV. HAM/TSP patients also demonstrated increased antibody responses associated to peptides against multiple viruses including Epstein-Barr virus (EBV) and cytomegalovirus (CMV) in both serum and CSF, while an increased antibody reponses against EBV were detected in MS patients. Analysis of covariance testing under leave-one-out cross-validation condition also demonstrated an differential pattern of serum and CSF antibody profilings in HAM/TSP patients and also in MS patients compared to HV.

Conclusion:
VirScan is a powerful platform to uncover local virus-specific antibody signitures and the associated inflammatory milieu in subjects with chronic virus infection and neuroinflammatory diseases where virus-specific antibody

production may be required to control viral persistence and/or may be associated with disease development.

Disclosure of Interest Statement:
Nothing to disclose.