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

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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 responses 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 signatures 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.