CASE STUDY

Characterizing brain-specific neuropathology in off-target tissues in an animal model of multiple sclerosis

Who: Jacqueline Quandt, PhD
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Dr. Jacqueline Quandt is the Associate Director of the UBC MS Research Group at UBC and leads the Neuroinflammation Lab at the Djavad Mowafaghian Centre for Brain Health and the Department of Pathology in the Faculty of Medicine. Her research is focused on understanding the role of the immune system in both damage and repair of the brain and spinal cord as a result of neurodegenerative diseases, such as Multiple Sclerosis. Using cell-based and more complex disease models, researchers in the Quandt Lab study the relationships between inflammation and neuronal death.

nCounter® Assay selection:

nCounter Mouse Neuropathology Panel

Project Summary:

Most of what we consider in MS therapeutic design is derived from patient imaging studies, histological analyses, and studies in experimental autoimmune encephalomyelitis (EAE), the animal model of MS. Acute lesions are thought to result from a cascade of inflammatory events triggered by activated T cells trafficking to the central nervous system (CNS) and encountering their cognate antigen to begin a cascade of lymphocyte, macrophage, and microglial responses that cause damage. Damage to oligodendrocytes, myelin, neurons, and axons have been observed in MS and EAE. Different mechanisms are suggested to drive both demyelination and axonal injury and the widespread axonal degeneration and atrophy that become prominent through disease progression and increasing disability. Similar to MS, axonal loss is significant through all investigated disease stages, across all brain matter, and correlates with clinical impairment. Our team has shown that within the brain and spinal cord there are specific responses and changes prior to the onset of clinical symptoms. Our goal is to characterize and compare the specific early neuropathological changes that occur in the brain to those in the spinal cord using the Neuropathology Panel. We expect the NanoString technology is both sensitive and robust enough to identify novel genes and pathways associated with early changes in the CNS that contribute to both grey and white matter disease at different sites. Those findings are novel and have specific relevance to the onset and progression of disease, where neuroprotection is the highest priority arm of current MS-related therapeutic development.

"We have been looking a lot at inflammation and immune associated genes over the years and more recently I've been interested in factors that were turning on and off in neuronal and glial populations. If we're interested in looking outside of the target tissue, the spinal cord primarily in this model, at different times during the disease it would be most appropriate to use the targeted NanoString Gene Expression panel rather than come in with an RNA sequencing approach that's going to identify the thousands of immune genes that are up or down because of the target tissue being invaded by immune cells."

Jacqueline Quandt, PhD

To learn more about Neuropathology Panels, visit nanostring.com/neuroscience

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