

CLINICAL SPECIFICATIONS

CEREBELLAR

Function:

Cerebellum is the part of the brain controlling movement and balance. Inside the cerebellar cortex there are large neurons called Purkinje's cells. The Cerebellar antibodies test measures antibodies against the cerebellum Purkinje's Cell Antigens.

Antibodies Appear:

Autism⁵
 Celiac Disease⁵
 Gluten Ataxia^{5,7}
 Paraneoplastic Cerebellar Degeneration Syndrome^{1,4,7}
 Opsoclonus-Myoclonus Syndrome³

Known Cross-Reactions: gliadin,⁶⁻⁸ tumor cells,³ Milk butyrophilin^{6,7}

Clinical Significance:

Elevated Cerebellar antibodies are an indication of neuroautoimmunity. Infection, or exposure to toxic chemicals, can induce production of antibodies against Purkinje's cells.⁵ Due to cross-reactivity between Gliadin and Cerebellar antigens or peptides, an autoimmune reaction occurs.⁷ Medical conditions related to Purkinje cells range from toxic exposure (mercury, alcohol) to autoimmune disorders (Celiac disease), and from genetic mutations (spinocerebellar ataxias) to neurodegenerative diseases of no known genetic basis (cerebellar multiple system atrophy, sporadic ataxias). Although the etiology of paraneoplastic cerebellar degeneration (PCD), which generally occurs in patients with neoplasms of the lung, breast, ovary, or with Hodgkin's disease, is unknown, scientists speculate it is autoimmune in nature.⁴ The known cross-reactivity between cerebellar peptides and gliadin and milk butyrophilin, as seen in patients with gluten sensitivity, which includes many individuals with autism spectrum disorder (ASD), may be responsible for molecular level gluten ataxia,^{6,7} tremors and alterations of coordination, balance and sensations.^{2,6,7} Exacerbating cerebellar degeneration, and bringing about the subsequent clinical conditions in ASD patients is mercury -induced disruption in cerebellar synaptic transmission between parallel fibers or climbing fibers of Purkinje cells.² According to Bernard and colleagues, due to the anti-cerebellar antibodies present in the sera of ASD patients, ongoing damage may arise as these antibodies find and react with neuronal antigens.²

References:

1. Balegno, et al. Antibodies to cerebellar nerve fibres in two patients with paraneoplastic cerebellar ataxia. *Anticancer Research*, 2005; 25:3211-3214.
2. Bernard, et al. Autism: a unique type of mercury poisoning. *ARC Research*, Cranford, NJ; 2000.
3. Blaes, et al. Surface-binding autoantibodies to cerebellar neurons in opsoclonus syndrome. *Ann Neurol*, 2005; 58:313-317.
4. Dropcho, et al. Cloning of a brain protein identified by autoantibodies from a patient with paraneoplastic cerebellar degeneration. *Poc Natl Acad Sci*, 1987; 84:4552-4556.
5. Hadjivassiliou, et al. The humoral response in the pathogenesis of gluten ataxia. *Neurology*, 2002; 58:1221-1226.
6. Vojdani et al. The immunology of gluten sensitivity beyond the intestinal tract. *Eur J Inflammation*, 2008; 6(2):1-6.
7. Vojdani, et al. Immune response to dietary proteins, gliadin and cerebellar peptides in children with autism. *Nutr Neurosci*, 2004; 7(3):151-161.
8. Vojdani and Tarash. Cross-reaction between gliadin and different food and tissue antigens, *Food Nutri Sci*, 2013; 4:20-32.