CASE STUDY #2

Gradual onset of tics and severe cognitive regression in 20-year-old male

Initially diagnosed with bipolar disorder, testing reveals immune-mediated condition

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Autoimmune Brain Panel™ test results

(formerly known as the Cunningham Panel™)

Presentation: 20-year-old male with gradual onset of tics, inability to concentrate, sensory abnormalities, emotional lability, severe cognitive regression, separation anxiety, developmental regression, sleep disturbances, handwriting disturbance and aggressiveness.

Previous Diagnoses: Unspecified bipolar disorders

Previous Lab Results: Positive for Lyme disease, Babesia, and Rickettsia

Medical History: Rocky Mountain Spotted Fever, multiple ear and strep infections throughout childhood, known immunodeficiency.

Family History: Positive for rheumatoid arthritis, asthma and eczema.

Pre-Treatment Autoimmune Brain Panel™ Results: Elevated anti-Dopamine Receptor D1 autoantibodies - 4,000 (normal range 500-2,000), borderline anti-Dopamine Receptor D2L - 8,000 (normal range 2,000-8,000), elevated anti-Tubulin autoantibodies - 2,000 (normal range 250-1,000), elevated Calcium/calmodulin-dependent protein kinase II (CaMKII) - 140 (normal range 53-130)

Treatment: Plasmapheresis followed by multiple IVIg treatments.

Post-Treatment Autoimmune Brain Panel™ Results: Anti-Dopamine Receptor D1 autoantibodies decreased to borderline (2,000), anti-Dopamine Receptor D2L autoantibodies remained at borderline (8,000), anti-Tubulin autoantibodies decreased to borderline (1,000), Calcium/calmodulin-dependent protein kinase II (CaMKII) decreased to borderline (124)

Status: Overall cognitive abilities improved, with mother reporting patient's math skills returned after many years.

PRE-TREATMENT TEST RESULTS

Anti-Dopamine D1 Receptor Autoantibodies	Elevated 4000
Anti-Dopamine D2L Receptor Autoantibodies	Borderline 8000
Anti-Lysoganglioside GM1 Autoantibodies	Normal 160
Anti-Tubulin Autoantibodies	Elevated 2000
CaM Kinase II	Elevated 140

POST-TREATMENT TEST RESULTS

Anti-Dopamine D1 Receptor Autoantibodies	Borderline 2000
Anti-Dopamine D2L Receptor Autoantibodies	Borderline 8000
Anti-Lysoganglioside GM1 Autoantibodies	Normal 160
Anti-Tubulin Autoantibodies	Borderline 1000
CaM Kinase II	Borderline 124

SUMMARY

A 20-year-old male with gradual onset of tics, severe cognitive regression and multiple neuropsychiatric symptoms, who tested positive for multiple tick-borne illnesses, had elevated anti-Dopamine Receptor D1 and anti-Tubulin autoantibodies, along with an elevated cell stimulation assay (CaMKII) suggesting an infection-triggered autoimmune-based etiology.

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Autoimmune Brain Panel™ test results

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PRE-TREATMENT:
Patient Symptomatic

Elevated Dopamine Receptor D1 autoantibodies (4,000) consistent with emotional lability, anxiety, regression, sleep problems and aggressiveness; Tubulin autoantibodies (2,000) consistent with poor concentration and cognitive regression. Calcium/calmodulin-dependent protein kinase II (CaMKII) at 140 correlates with tics, sensory abnormalities, and dysgraphia.

LABORATORY TEST RESULTS COMPARED TO NORMAL RANGES

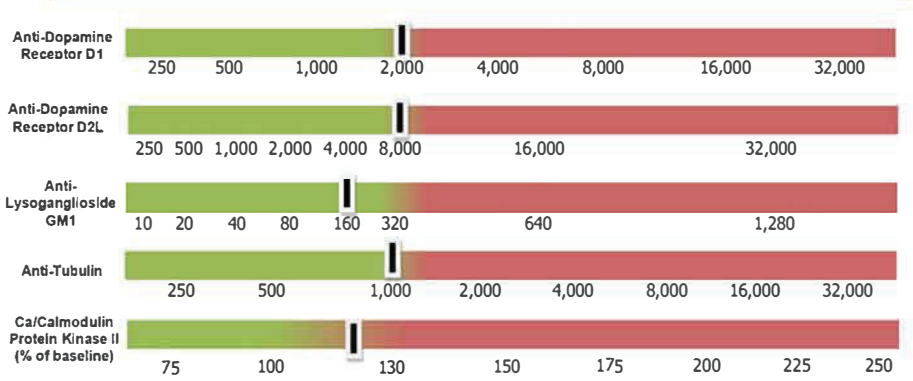
	Anti-Dopamine Receptor D1 (titer)	Anti-Dopamine Receptor D2L (titer)	Anti-Lysoganglioside GM1 (titer)	Anti-Tubulin (titer)	CaM Kinase II (% of baseline)
Patient Result	**1:4,000**	**1:8,000**	**1:160**	**1:2,000**	**140**
Normal Ranges	500 to 2,000	2,000 to 8,000	80 to 320	250 to 1,000	53-130
Normal Mean	1,056	6,000	147	609	95
INTERPRETATION*	**ELEVATED**	**BORDERLINE**	**NORMAL**	**ELEVATED**	**ELEVATED**

LABORATORY TEST RESULTS

LABORATORY TEST RESULTS COMPARED TO NORMAL RANGES

	Anti-Dopamine Receptor D1 (titer)	Anti-Dopamine Receptor D2L (titer)	Anti-Lysoganglioside GM1 (titer)	Anti-Tubulin (titer)	CaM Kinase II (% of baseline)
Patient Result	**1:2,000**	**1:8,000**	**1:160**	**1:1,000**	**124**
Normal Ranges	500 to 2,000	2,000 to 8,000	80 to 320	250 to 1,000	53-130
Normal Mean	1,056	6,000	147	609	95
INTERPRETATION*	**BORDERLINE**	**BORDERLINE**	**NORMAL**	**BORDERLINE**	**BORDERLINE**

LABORATORY TEST RESULTS



POST-TREATMENT:
Symptom Resolution

Borderline Dopamine Receptor D1 autoantibodies (2,000), Dopamine Receptor D2L autoantibodies (8,000), Tubulin autoantibodies (1,000) and CaMKII (124) consistent with resolution of symptoms.