moleculera biosciences
a precision medicine company

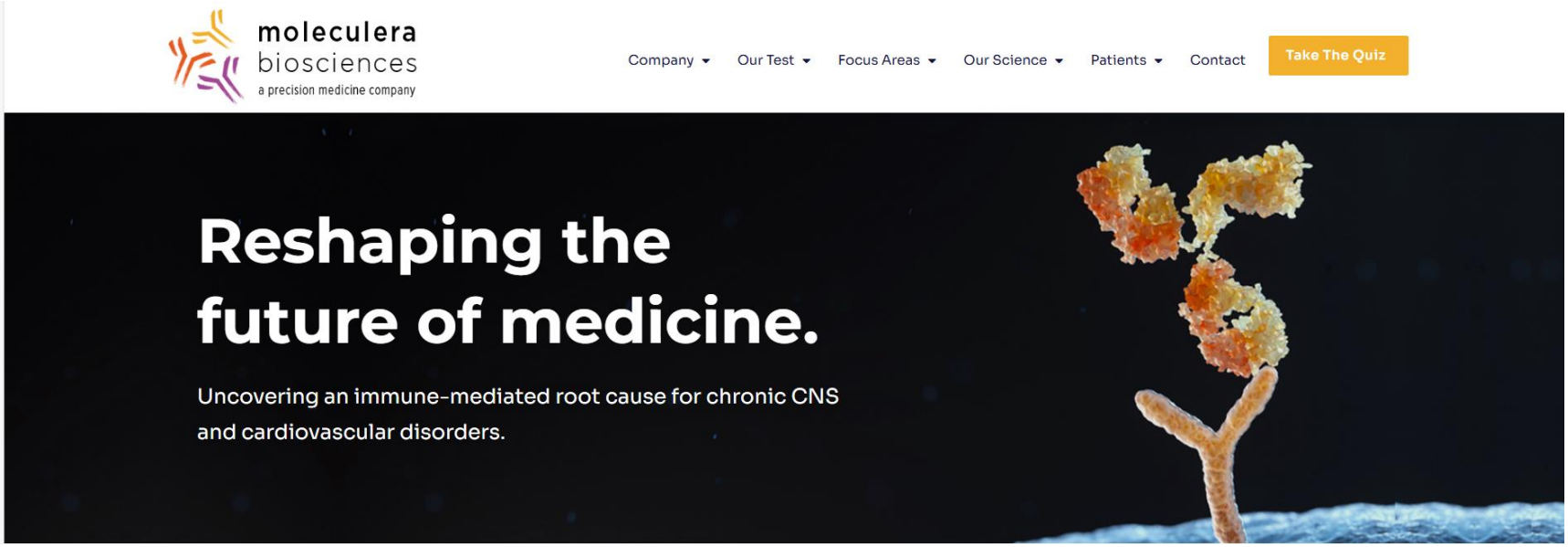
Moleculera Biosciences

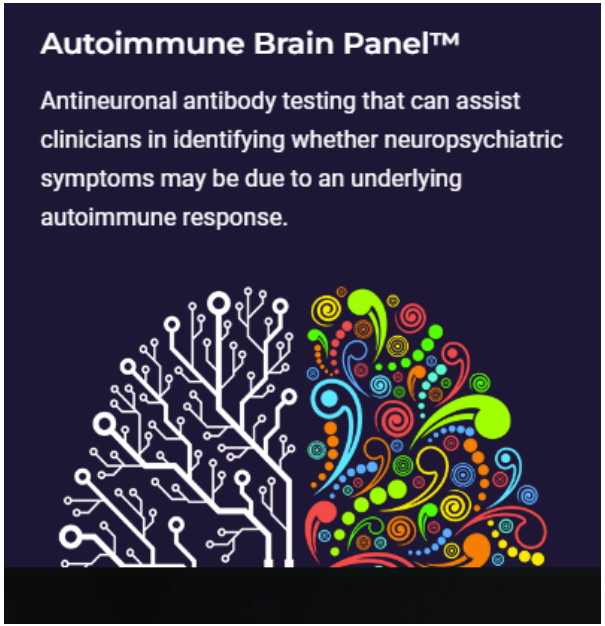
LABORATORY TESTING & RESULTS GUIDANCE

Gilian Crowther AONM Director of Research
Ashley McCamant, Moleculera Medical Relations Consultant

AONM
ACADEMY OF NUTRITIONAL MEDICINE

Unparalleled antineuronal antibody testing





https://www.moleculera.com/

Topics

1. **What is autoimmune encephalitis? PANS/PANDAS nomenclature**
2. Diagnostic criteria/symptoms
3. Investigations
4. Testing options
5. Therapeutic approaches – brief overview
6. Further resources

Focus: Autoimmune encephalitis in the basal ganglia

Moleculera Biosciences is best known for its outstanding work in the field of brain autoimmune conditions that can underlie neuropsychiatric symptoms

Autoimmune Brain Panel™

Improving patient care through precision testing.

The Autoimmune Brain Panel™ includes a series of five high-complexity blood tests that assists clinicians in determining whether a patient's neuropsychiatric symptoms may be due to a treatable autoimmune dysfunction, rather than a primary neurologic or psychiatric illness. Once diagnosed and treated properly, patients often experience a complete resolution or dramatic reduction in symptoms.

Learn More

Only test of its kind

Providing hope for patients with treatment-resistant neuropsychiatric conditions.

https://www.moleculera.com/

Strep antibodies found to be able to migrate across the blood-brain barrier

JCI The Journal of Clinical Investigation
Published by The American Society for Clinical Investigation | Founded 1908

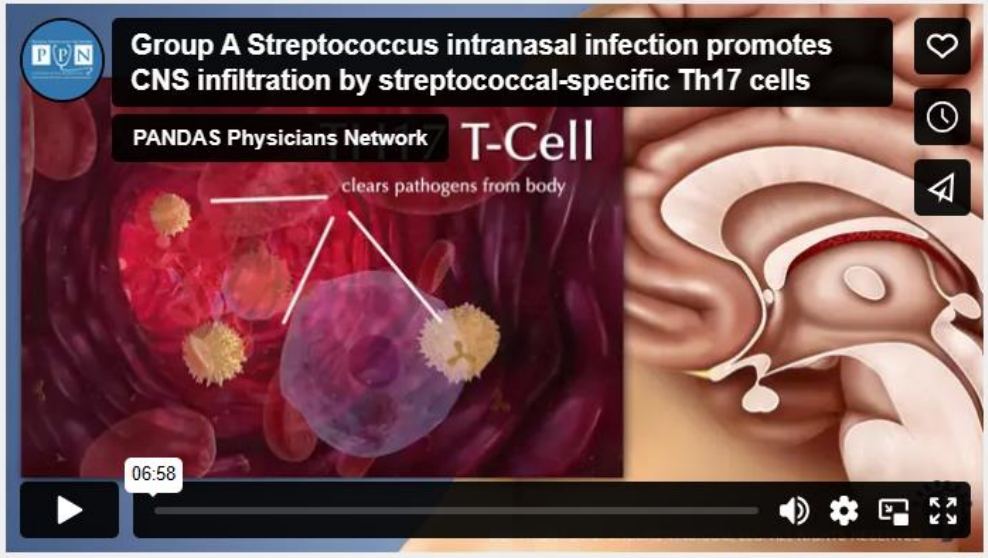
J Clin Invest. 2016 Jan 4; 126(1): 303–317. PMCID: PMC4701547
Published online 2015 Dec 14. doi: 10.1172/JCI80792 PMID: 26657857

Group A *Streptococcus* intranasal infection promotes CNS infiltration by streptococcal-specific Th17 cells

Thamotharampillai Dileepan,[1] Erica D. Smith,[2] Daniel Knowland,[2] Martin Hsu,[2] Maryann Platt,[3] Peter Bittner-Eddy,[1] Brenda Cohen,[1] Peter Southern,[1] Elizabeth Latimer,[4] Earl Harley,[5] Dritan Agalliu,[2,3] and P. Patrick Cleary[1]

Antibodies migrate into the brain via the 1st cranial nerve: the olfactory nerve

Video: "Group A Streptococcus intranasal infection promotes CNS infiltration by streptococcal-specific Th17 cells".
Drs. Pat Cleary and Dritan Agalliu
Related Research: pandasppn.org/agalliu



Source: Drs Agalliu and Cleary, https://www.youtube.com/watch?v=8aPJV6hokro; https://www.pandasppn.org/presentations/; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4701547/

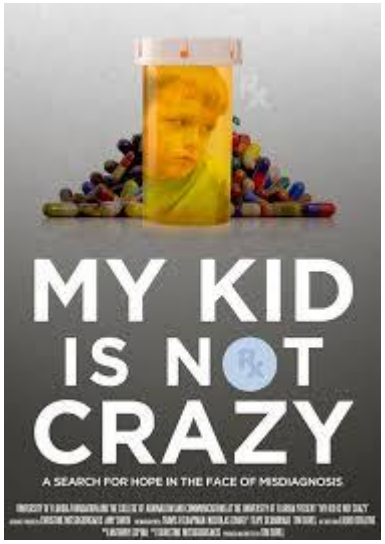
Excellent video material available on PANS/PANDAS

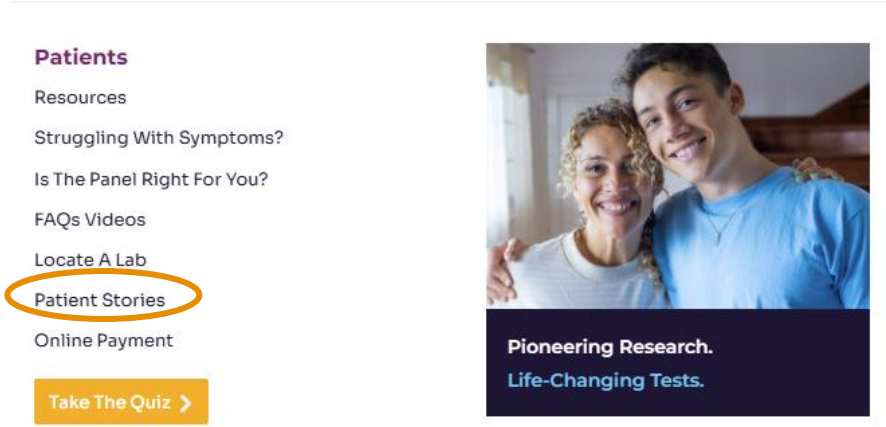
Link to the video: Group A Streptococcus intranasal infection promotes CNS infiltration by streptococcal-specific Th17 cells

https://vimeo.com/228821260

Film: **My Kid is Not Crazy: a search for hope in the face of misdiagnosis**

https://www.youtube.com/watch?v=WJQT9-cQwIw&t=194s



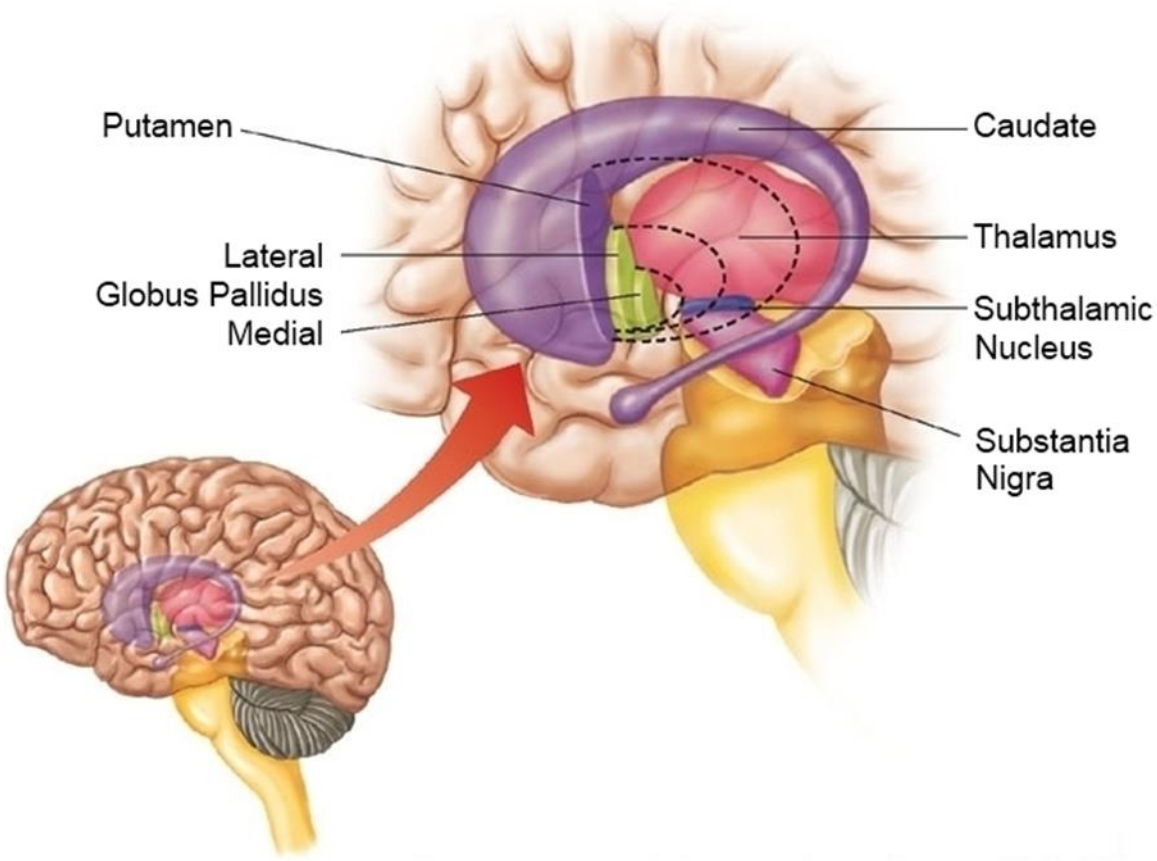


The Basal Ganglia is where these antineuronal antibodies largely occur

Basal Ganglia responsible for:

- Voluntary motor control
- Procedural learning
- Cognitive functions
- Emotional functions
- Eye movement

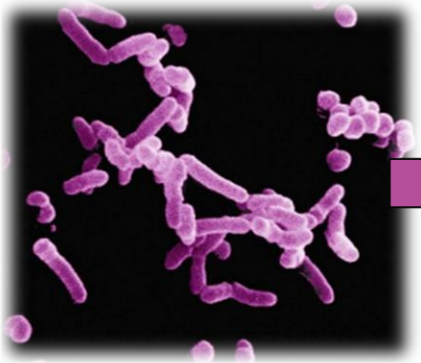
Two other disorders of the Basal Ganglia are Parkinson's' Disease and Huntington's Disease



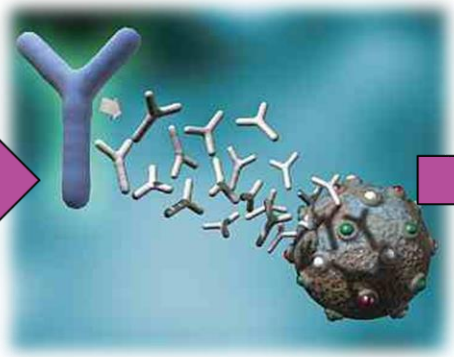
Source: Courtesy of Moleculera Biosciences, Professor Craig Shimasaki, https://www.moleculera.com/

Autoimmune mechanism for multiple neuropsychiatric behavioral disorders

Microbial, Viral, Fungal Infection Occurs



Body Produces Antibodies That Recognize Infectious Agent



Antibodies Cross-React With Neurologic Receptors (molecular mimicry)

Reaction Disrupts Brain Function (friendly fire)

Neuropsychiatric symptoms Including Anxiety, Aggression, Rage, OCD, Tics, Depression, Hyperactivity, Insomnia, Phobias

Source: Courtesy of Moleculera Biosciences, Professor Craig Shimasaki, https://www.moleculera.com/

Many Infectious Triggers are Associated with PANDAS or PANS (examples)

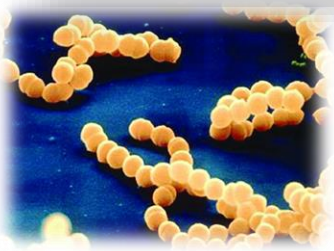
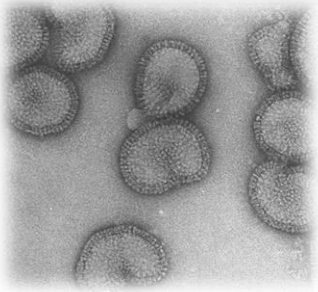
- **Group A streptococci**
- **Influenza A**
- **Varicella (chickenpox)**
- **Mycoplasma**
- **Lyme disease**
- **Babesia**
- **Bartonella**
- **Coxsackie virus**
- **Epstein Barr Virus**

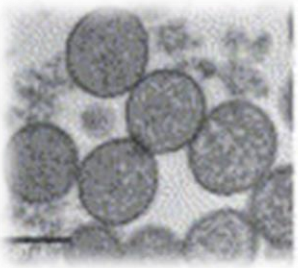
BIOLOGY | HEALTH

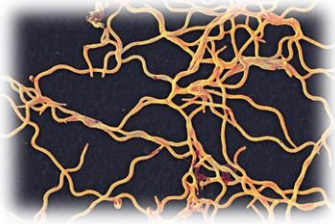
Yes, You Can Catch Insanity

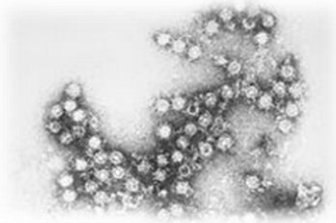
A controversial disease revives the debate about the immune system and mental illness.

BY ANDREW CURRY
ILLUSTRATION BY HADLEY HOOPER
APRIL 16, 2015





Patients often have more than one infection, and can be subclinical

Source: Courtesy of Moleculera Biosciences, Professor Craig Shimasaki, https://www.moleculera.com/

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Official diagnostic criteria exist for both – here for PANDAS

PANDAS PHYSICIANS NETWORK

A DIVISION OF THE FOUNDATION FOR BRAIN SCIENCE AND IMMUNOLOGY

www.pandasppn.org

"While the initial infection might be mild, in some cases it triggers a misdirected immune response and/or a brain inflammation that causes the rapid onset of severe symptoms, which can include obsessive compulsive disorder, tics, severely restricted food intake, anxiety, aggression, depression, memory deficiency, poor cognitive function and behavioural and developmental regression."

www.panspandasuk.org

PANDAS: Diagnostic Criteria

There are 5 diagnostic criteria for PANDAS, as developed by the PANDAS Physicians Network consortium [1]:

1. Presence of OCD and/or tics (particularly multiple, complex, or unusual tics)
2. Symptoms of the disorder first become evident between 3 years of age and puberty

   "Post-pubertal onset of PANDAS is possible and seen by NIMH and clinicians in the field." [1]
3. Acute onset and episodic (relapsing-remitting) course

   To meet the diagnostic criteria, symptoms must appear suddenly, seemingly overnight. However, there have been cases reported where symptom onset is more gradual.
4. Association with Group A Streptococcal (GAS) infection

   In PANDAS syndrome, "GAS infections often are found without apparent pharyngitis (i.e., the child did not complain of a sore throat)." [1]

   "40% of children with documented GAS infections do not show a titer rise, creating a potential false negative." [1]
5. Association with Neurological Abnormalities

   "The diagnostic criteria for PANDAS require only the presence of OCD or tics, but co-morbid neuropsychiatric symptoms are universally present." [1]

   "... it is not uncommon for the type of co-morbid symptoms to change multiple times during the course of the illness." [1]

Source: https://www.youtube.com/watch?v=8aPJV6hokro; https://www.pandasppn.org/presentations/; https://pandasnetwork.org/what-is-pandas/; https://www.panspandasuk.org/faqs#:~:text=What%20is%20PANDAS%3F&text=PANS%20is%20an%20acronym%20for%20Pediatric%20Acute%2Donset%20Neuropsychiatric%20Syndrome.&text=PANS%20is%20a%20neuropsychiatric%20condition,both%20physical%20and%20psychiatric%20symptoms.

Diagnostic criteria: PANS (www.pandasppn.org)

PANDAS PHYSICIANS NETWORK
A DIVISION OF THE FOUNDATION FOR BRAIN SCIENCE AND IMMUNOLOGY

PANS: Diagnostic Criteria

To be diagnosed with PANS, a patient must meet the following criteria, as developed by the PANDAS Physicians Network consortium [3]:

1. An abrupt, acute, dramatic onset of obsessive-compulsive disorder or severely restricted food intake

   "Approximately 1 in 5 children with PANS will have restricted intake of specific foods or all food groups, often with observable weight loss..." [3]

   "The acuity of symptom onset and age at onset can distinguish PANS-related eating restrictions from more typical anorexia nervosa." [3]

2. Concurrent presence of additional neuropsychiatric symptoms with similarly severe and acute onset from at least 2 of the following categories:
   - Anxiety
   - Emotional Lability and/or Depression
   - Irritability, Aggression, and/or Severe Oppositional Behaviors
   - Behavioral (Developmental) Regression
   - Sudden Deterioration in School Performance
   - Motor or Sensory Abnormalities
   - Somatic Signs and Symptoms, including Sleep Disturbances, Enuresis, or Urinary Frequency

   "The presenting symptoms often change over the first weeks of illness." [3]

3. Symptoms are not better explained by a known neurologic or medical disorder

4. No age requirement

   "PANS has no age limitation, but symptoms typically begin during the grade-school years."

Source: https://www.youtube.com/watch?v=8aPJV6hokro; https://www.pandasppn.org/presentations/

Symptoms according to the National Institute of Mental Health Samples (NIMH) USA

Symptoms During Exacerbations

- Choreiform movements 95%
- Emotional lability 66%
- School changes 60%
- Personality changes 54%
- Bedtime fears 50%
- Fidgetiness 50%
- Separation fears 40%
- Sensory defensiveness 40%
- Irritability 40%
- Impulsivity and distraction 38%

Comorbid Diagnoses

- ADHD 40%
- ADD 40%
- Depression 36%
- Separation anxiety 20%
- Overanxious 28%
- Enuresis 20%
- Anorexia 17%
- Etc.

Source: Courtesy of Moleculera Biosciences, Professor Craig Shimasaki, https://www.moleculera.com/

Two-page questionnaire provided by Moleculera Labs

2. Does the patient have a personal history of any of the following infections? (Check all that apply)

- ☐ Anaplasma / Anaplasmosis
- ☐ Babesia / Babesiosis
- ☐ Bartonella / Bartonellosis
- ☐ Brucella / Brucellosis
- ☐ Campylobacter / food poisoning
- ☐ Candida albicans / yeast infection
- ☐ Cat Scratch Fever
- ☐ Chlamydia pneumonia
- ☐ Clostridium / Clostridium difficile
- ☐ CMV / Cytomegalovirus
- ☐ Coxsackie/Hand, foot, and mouth
- ☐ Covid-19
- ☐ Ehrlichia / Ehrlichiosis
- ☐ Epstein Barr virus
- ☐ H. Pylori / stomach ulcers
- ☐ Hepatitis (any type)
- ☐ HHV 6 / Roseola
- ☐ HHV 7
- ☐ HPV / Human Papilloma virus
- ☐ HSV 1 / Herpes Simplex type 1
- ☐ HSV 2 / Herpes Simplex type 2
- ☐ Impetigo
- ☐ Influenza / Flu (any type)
- ☐ Lyme / Lyme borreliosis
- ☐ MARCONS
- ☐ Measles / Rubeola
- ☐ Mononucleosis
- ☐ Mumps
- ☐ Mycoplasma pneumonia
- ☐ Parasites / worms
- ☐ Parvovirus / Fifths disease
- ☐ Pertussis / Whooping cough
- ☐ Rocky Mountain spotted fever
- ☐ Staph / Staphylococcus
- ☐ Strep / Streptococcus
- ☐ Toxoplasmosis
- ☐ Urinary tract infection
- ☐ Varicella / Chickenpox / Shingles
- ☐ Other (please specify): _____

3. Has anyone in the patient's family been diagnosed with any of the following conditions? (Check all that apply)

- ☐ Allergic disorders (environmental, food, seasonal)
- ☐ Alopecia (hair loss in round patches)
- ☐ Anxiety disorder, phobias, or panic attacks
- ☐ Autoimmune disorders (i.e. Asthma, Lupus, Diabetes)
- ☐ Bipolar depression, manic depression
- ☐ Celiac disease (gluten intolerance)
- ☐ Crohn's disease, ulcerative colitis
- ☐ Depression, major depressive disorder
- ☐ Epilepsy, seizures, or convulsions
- ☐ Immune deficiency (any type, i.e. low IgG, CVID/chronic variable immunodeficiency syndrome)
- ☐ Irritable bowel or inflammatory bowel disorder
- ☐ Obsessive Compulsive disorder / OCD
- ☐ Psoriasis or eczema
- ☐ Recurrent rashes or hives
- ☐ Recurrent/relapsing fever, Mediterranean fever
- ☐ Rheumatic Fever, Rheumatic heart disease
- ☐ Rheumatoid arthritis
- ☐ Tics, Tourette disorder
- ☐ Vitiligo (patchy loss of skin color)

4. What age (in years) was the patient when symptoms were first noticed or experienced?
(Please enter a close estimate if the actual age is unknown) Age in Years _____

Do the patient's symptoms have an episodic relapsing and remitting course? Do the symptoms seem to stop or go away for a while then return? ☐ Yes ☐ No

Presenting Symptoms and Behaviors – What symptoms or behaviors occurred causing the patient, parent, or other person to observe that something was wrong, abnormal, or unusual? (Check all that apply)

- ☐ Obsessions, intrusive thoughts, phobias, fear of harm coming to self, family or others
- ☐ Fear of vomiting or choking when eating or drinking; fear of swallowing own saliva
- ☐ Motor tics (repetitive movements that are consistently the same (shoulder shrugs, neck twists, blinking, twitching)
- ☐ Vocal tics (repetitive sounds that are consistently the same (sniffing, coughing, throat clearing, lip smacking)
- ☐ Generalized anxiety, nervousness, agitation
- ☐ Fear stricken appearance, panic episodes or attacks
- ☐ Very large or dilated pupils (dark circle in the middle of the eyeball) ← **Mydriasis**
- ☐ Depression (i.e. downcast mood, shifting or unstable mood, isolation, feeling sad, negative outlook)
- ☐ Hurting or injuring him/herself, threatening to harm him/herself or others
- ☐ New or worsening of oppositional and/or defiant behavior
- ☐ Deterioration in school performance (falling grades, loss of math or other academic skills, poor attendance or refusal)
- ☐ Sensory abnormalities (increased sensitivity to light, sound, touch, tastes, odors, clothing tags)
- ☐ Deterioration in handwriting / dysgraphia
- ☐ Joint pain, tenderness, swelling, redness, stiffness or connective tissue problems, or extremely flexible joints
- ☐ Catatonia (a state of immobility and stupor)
- ☐ Sleep disturbances (insomnia, night terrors, excessive sleeping, frequent awakening, unable or refusal to sleep alone)
- ☐ Compulsions (counting, checking, repetitive behaviors, anxiety with incomplete rituals or when things aren't "just right")
- ☐ Motor abnormalities (excluding tics) chorea, choreiform movements, inconsistent movements, "piano playing fingers"
- ☐ New or markedly increased hyperactivity
- ☐ Restricted food intake or food refusal (not usually related to body image concerns)
- ☐ Irritability and/or aggressive behavior
- ☐ Emotional lability (such as mood swings, emotional meltdowns, rages, tantrums, often without any recall of incident)
- ☐ Behavioral (developmental) regression (baby talk, playing with baby toys, or preference to play with younger children)
- ☐ Inability or decreased ability to concentrate, focus, pay attention, memory problems, word finding difficulties
- ☐ Separation anxiety (fear of being alone, sleeping with parent, requires someone present at all times)
- ☐ Abdominal pain, diarrhea, constipation, excess time spent in the bathroom, fixated with bowel function
- ☐ Seizures / convulsions
- ☐ Psychosis, loss of touch with reality, seeing, hearing or feeling things that others cannot see, hear or feel
- ☐ Urinary Symptoms (frequency, urgency, daytime accidents, bedwetting)

Source: Moleculera questionnaire (available from AONM, www.aonm.org)

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Initial tests recommended by the PANS/PANDAS Physicians Network

Initial Investigations

- FBC
- U+E
- LFT
- CRP
- ASOT
- Anti-Dnase B
- Mycoplasma titres
- Total IgE
- Vitamin D
- Anti-nuclear antigen(ANA)
- TFT
- Immunoglobulins and Immunoglobulin sub-sets.
- Culture / swab

Source: www.pandasppn.org

Tests of streptococcal antibodies are useful but not exclusionary if -ve

Analysis		Result	Units	Reference Range
		FINAL REPORT		
Anti-StreptoDNase B				
Anti-StreptoDNase B		130	E/ml	< 200
Anti-Streptolysine O				
Anti-Streptolysine O	+	963	IE/ml	< 200
Immunology				
IgA		1.28	g/l	0.70 - 5.00
IgG		10.70	g/l	7.00 - 16.00
IgM		1.46	g/l	0.40 - 2.80

Other tests done by providers in the workup depending onneed (selection)

S100B (breach of the Blood Brain Barrier)
Cardiac echo
MRI of the head
EEG
Brain SPECT (type of nuclear imaging test - single-photon emission computerized tomography)
Brain PET scan (positron emission tomography)
Neurocognitive testing
Brain biopsy (lymphocytes/glial cells)
Spinal tap

Organic Acids
Mycotoxins
Food Intolerance

Etc.

The Autoimmune Brain Panel™ | *Sample Report*

moleculera biosciences
a precision medicine company

Autoimmune Brain Panel™ Testing Results
Formerly known as the Cunningham Panel™

Patient Name: Last Name, First Name
Patient DOB: MM/DD/YYYY
Patient ID Number: C000-001-XX
Date of Test Report: 03/17/2024

PATIENT REPORT

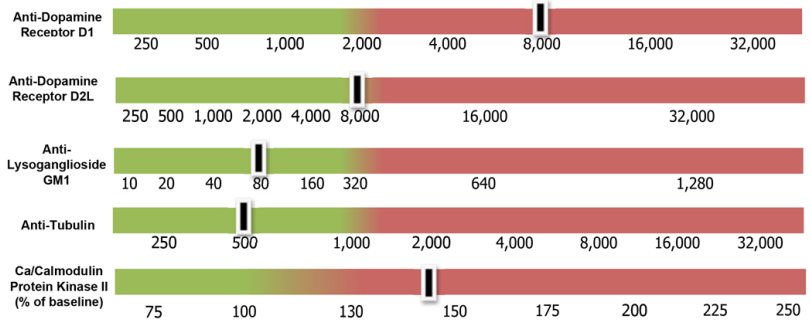
Submitting Prescriber: Doctor Name, MD
Date of Collection: MM/DD/YYYY
Date of Receipt: MM/DD/YYYY

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 II² (% of baseline)
Patient Result	**1:8,000**	**1:8,000**	**1:80**	**1:500**	**145**
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**	**NORMAL**	**ELEVATED**

***Report Guidance:** If any one (1) or more of these five (5) assay values is elevated, it may indicate a clinically significant autoimmune neurological condition. This is a condition in which the patient's autoantibodies cross-react and are directed against selected neuronal targets which are involved in normal neuropsychiatric and/or motor functions. It is important to note that the degree of elevation in assay values may not necessarily correlate with degree of symptom severity, as any value above normal ranges may correlate with symptomatology.

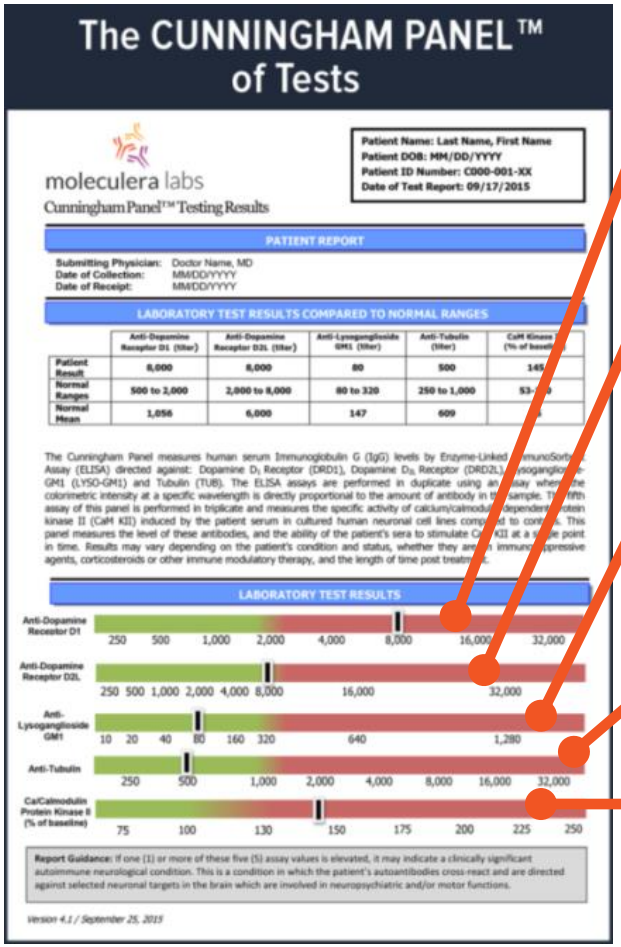
LABORATORY TEST RESULTS



The Autoimmune Brain Panel™ (formerly known as the Cunningham Panel™) measures human serum Immunoglobulin G (IgG) levels by Enzyme-Linked ImmunoSorbent Assay (ELISA) directed against: Dopamine D1 Receptor (DRD1), Dopamine D2L Receptor (DRD2L), Lysoganglioside-GM1 (LYSO-GM1) and Tubulin (TUB). ELISA results are determined by measuring the colorimetric intensity at a specific wavelength which is directly proportional to the amount of antibody in the sample. The fifth assay of this panel measures the specific activity of calcium/calmodulin-dependent protein kinase II (CaM KII) induced by the patient serum in cultured human neuronal cell lines compared to controls. This panel measures the level of these antibodies, and the ability of the patient's sera to stimulate CaM KII at a single point in time. Results may vary depending on the patient's condition and status, whether they are on immunosuppressive agents, corticosteroids or other immune modulatory therapy, and the length of time post treatment.

Version 6.0.2 / March 4, 2024

The Autoimmune Brain Panel™ | *Biomarker Components*


The CUNNINGHAM PANEL™ of Tests

moleculera labs

Cunningham Panel™ Testing Results

Patient Name: Last Name, First Name
Patient DOB: MM/DD/YYYY
Patient ID Number: C000-001-XX
Date of Test Report: 09/17/2015

PATIENT REPORT

Submitting Physician: Doctor Name, MD
Date of Collection: MM/DD/YYYY
Date of Receipt: MM/DD/YYYY

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 (% of baseline)
Patient Result	8,000	8,000	80	500	140
Normal Ranges	500 to 2,000	2,000 to 8,000	80 to 320	250 to 1,000	53-[illegible]
Normal Mean	1,056	6,000	147	609	[illegible]

The Cunningham Panel measures human serum Immunoglobulin G (IgG) levels by Enzyme-Linked ImmunoSorbent Assay (ELISA) directed against: Dopamine D_1 Receptor (DRD1), Dopamine D_{2L} Receptor (DRD2L), Lysoganglioside GM1 (LYSO-GM1) and Tubulin (TUB). The ELISA assays are performed in duplicate using an assay where the colorimetric intensity at a specific wavelength is directly proportional to the amount of antibody in the sample. The fifth assay of this panel is performed in triplicate and measures the specific activity of calcium/calmodulin dependent protein kinase II (CaM KII) induced by the patient serum in cultured human neuronal cell lines compared to controls. This panel measures the level of these antibodies, and the ability of the patient's sera to stimulate CaM KII at a single point in time. Results may vary depending on the patient's condition and status, whether they are on immunosuppressive agents, corticosteroids or other immune modulatory therapy, and the length of time post treatment.

LABORATORY TEST RESULTS

Report Guidance: If one (1) or more of these five (5) assay values is elevated, it may indicate a clinically significant autoimmune neurological condition. This is a condition in which the patient's autoantibodies cross-react and are directed against selected neuronal targets in the brain which are involved in neuropsychiatric and/or motor functions.

Version 4.1 / September 25, 2015

1) Anti-Dopamine D1

Often positive with psychiatric symptoms including psychosis(1)

2) Anti-Dopamine D2L

Often positive with movement disorders and impulsivity(1)

3) Anti-Lysoganglioside GM1

Often positive with neuropathic symptoms including tics(1)

4) Anti-Tubulin

Often positive with cognitive complaints, OCD and brain fog(1)

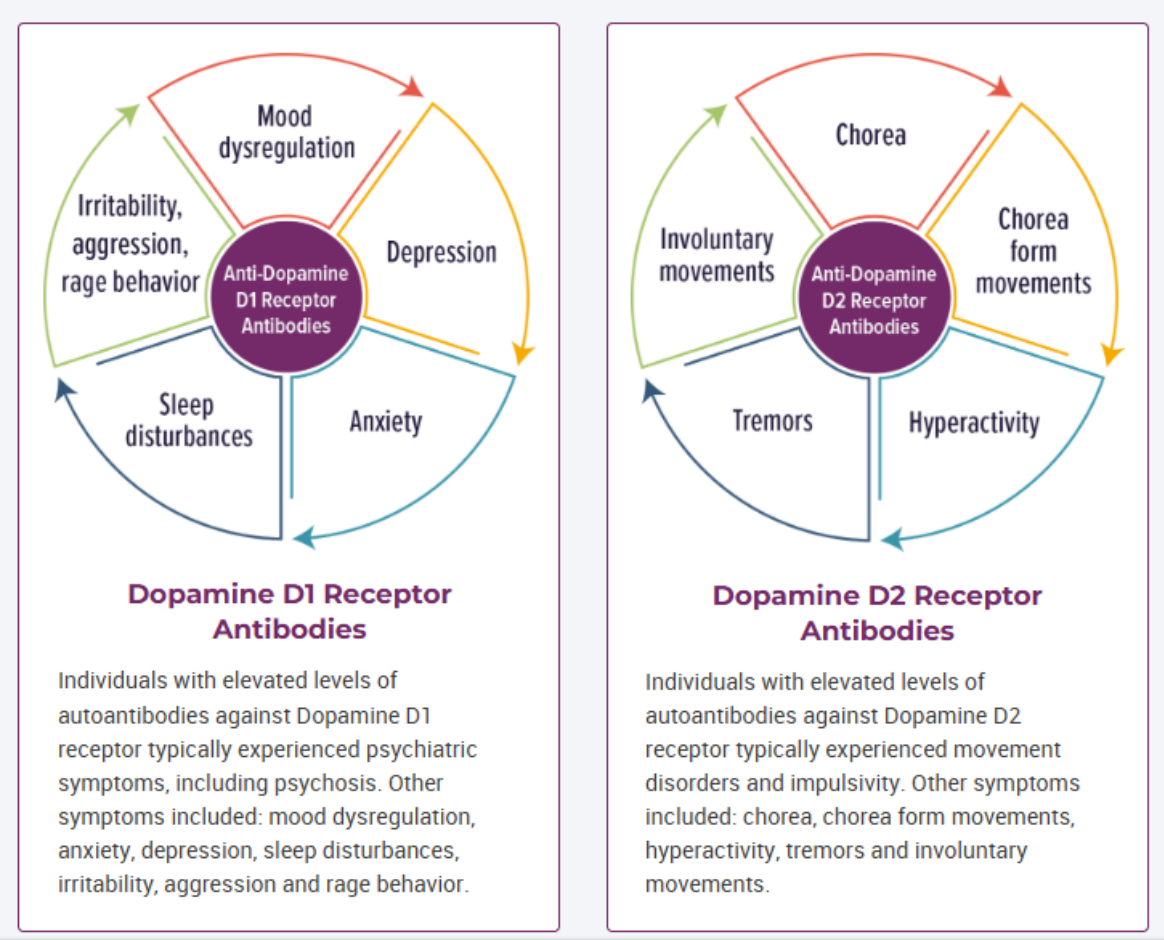
5) CaM KII Activity

Sympathetic nervous system activation symptoms, any symptom of adrenergic activation (1)

Ref: (1) Reported by Dr. Amirm Katz based upon his 112 patients studied and our patient responses

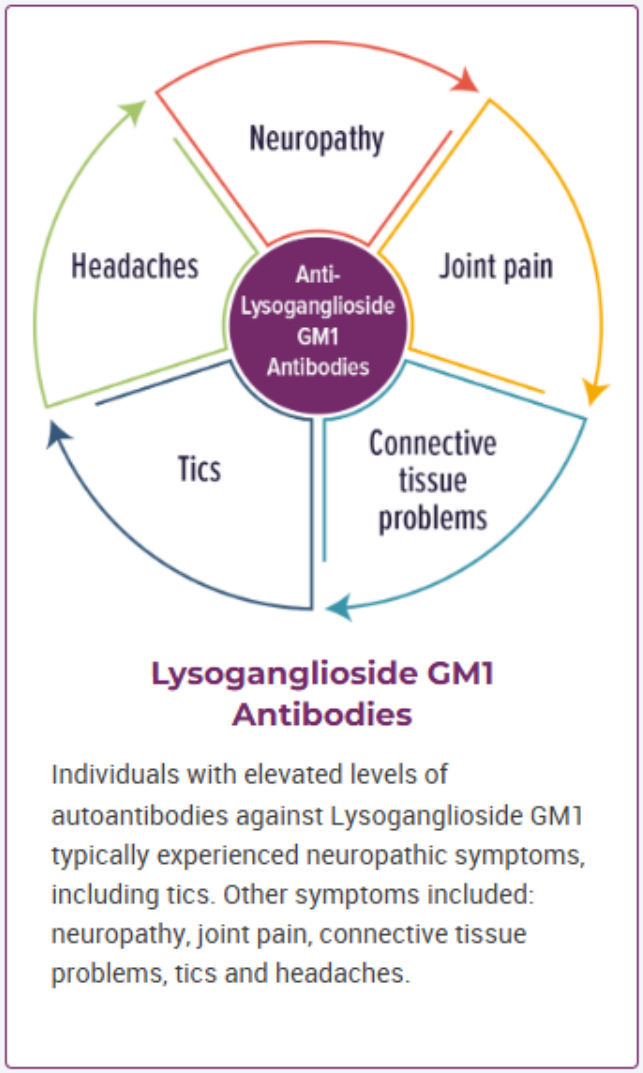
Symptoms associated with targets comprising the panel: *Dopamine receptor antibodies*

The patient population analysis found the following symptoms tend to correlate with specific assays*



https://www.moleculera.com/autoimmune-brain-panel/; Shimasaki C et al. Evaluation of the Cunningham Panel™ in pediatric autoimmune neuropsychiatric disorder associated with streptococcal infection (PANDAS) and pediatric acute-onset neuropsychiatric syndrome (PANS): Changes in antineuronal antibody titers parallel changes in patient symptoms. J Neuroimmunol. 2020 Feb 15;339:577138. doi: 10.1016/j.jneuroim.2019.577138. Epub 2019 Dec 15. PMID: 31884258. https://www.jni-journal.com/article/S0165-5728(19)30352-2/fulltext

Symptoms associated with targets comprising the panel: *Lysoganglioside GM1 antibodies*



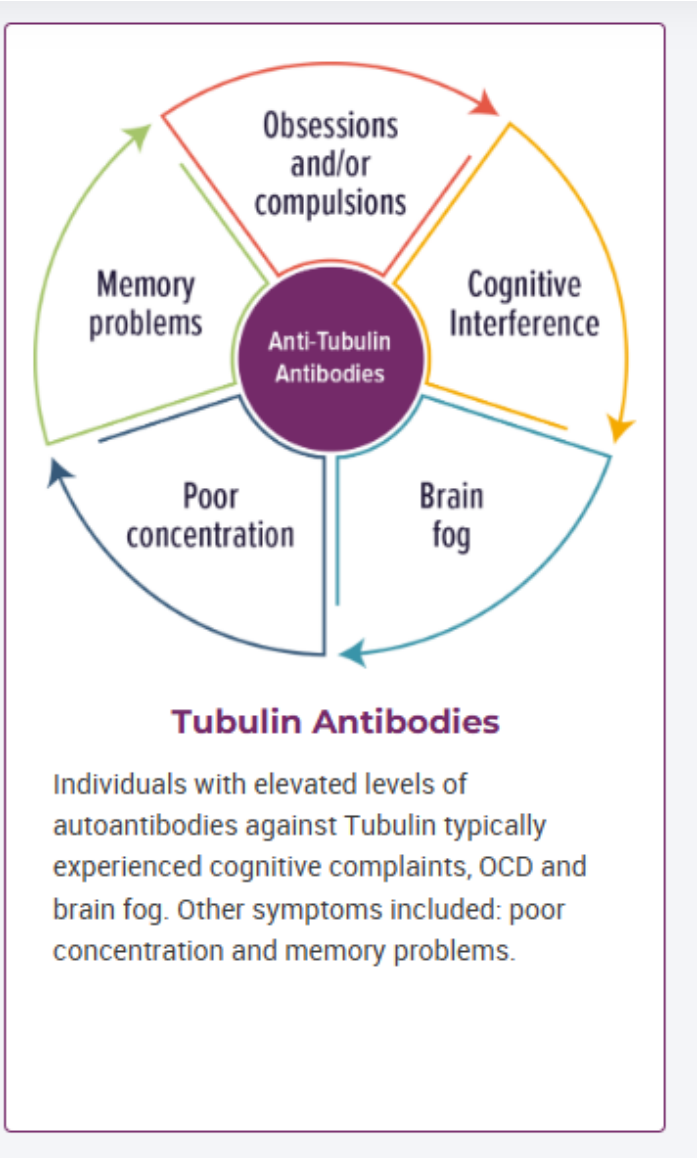
Gangliosides are components of all cell membranes and abundant in neurons, including motor neurons at the neuromuscular junction.

The GM1 ganglioside has been shown to preferentially localise in pre- and post-synaptic membranes at the synaptic terminals in the cerebral cortex.

Lysogangliosides modulate cellular signaling.

https://www.moleculera.com/

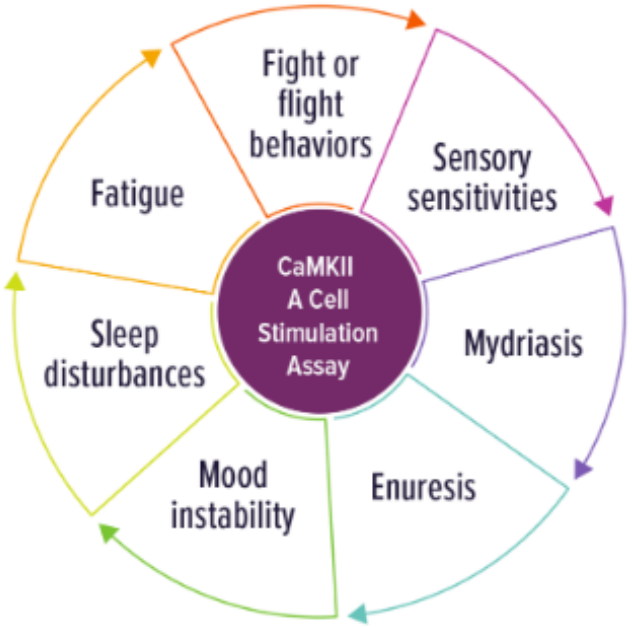
Symptoms associated with targets comprising the panel: *Tubulin antibodies*



Tubulin is an intracellular protein comprised of microtubules that provide a skeleton for maintaining cell shape and is thought to be involved in cell motility and intracellular transport. While tubulin is in every cell, it is highly abundant and concentrated in brain tissue.

https://www.moleculera.com/

Symptoms associated with targets comprising the panel: *CaMKII (Ca^{2+}/Calmodulin Protein Kinase II)*



CaMKII – A Cell Stimulation Assay

Individuals with elevated CaMKII levels were often positive with involuntary movements and any symptom of adrenergic activation. Other symptoms included: fight or flight behaviors, sensory abnormalities, fatigue, sleep disturbance, mood instability, enuresis and mydriasis.

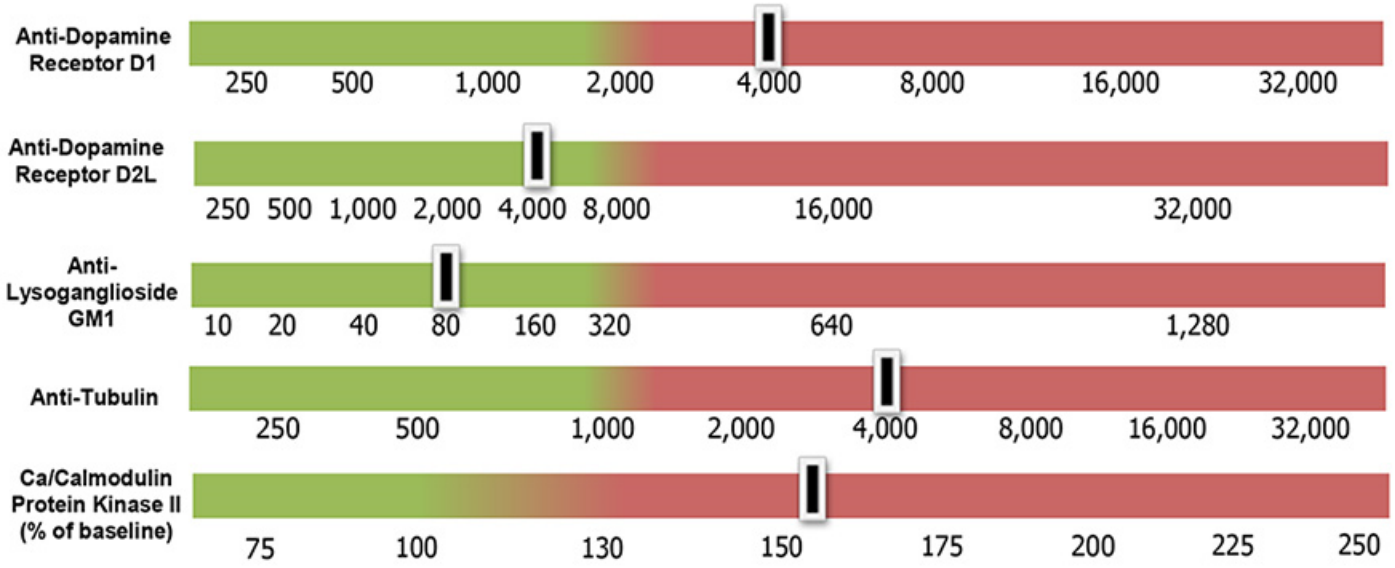
https://www.moleculera.com/

The Autoimmune Brain Panel™ | *Results Report Example 1*

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[1] (% of baseline)
Patient Result	1:4,000	1:4,000	1:80	1:4,000	155
Normal Ranges	500 to 2,000	2,000 to 8,000	80 to 320	250 to 1,000	53 to 130
Normal Mean	1,056	6,000	147	609	95
INTERPRETATION*	ELEVATED	NORMAL	NORMAL	ELEVATED	ELEVATED

LABORATORY TEST RESULTS

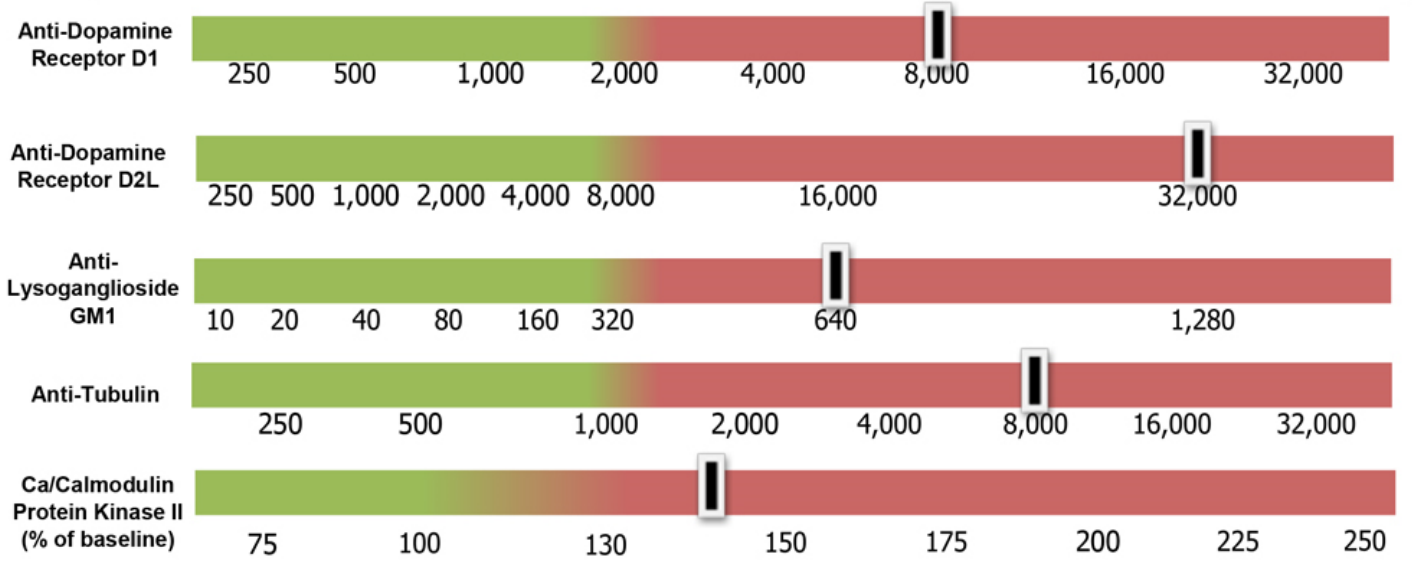


The Autoimmune Brain Panel™ | *Results Report Example 2*

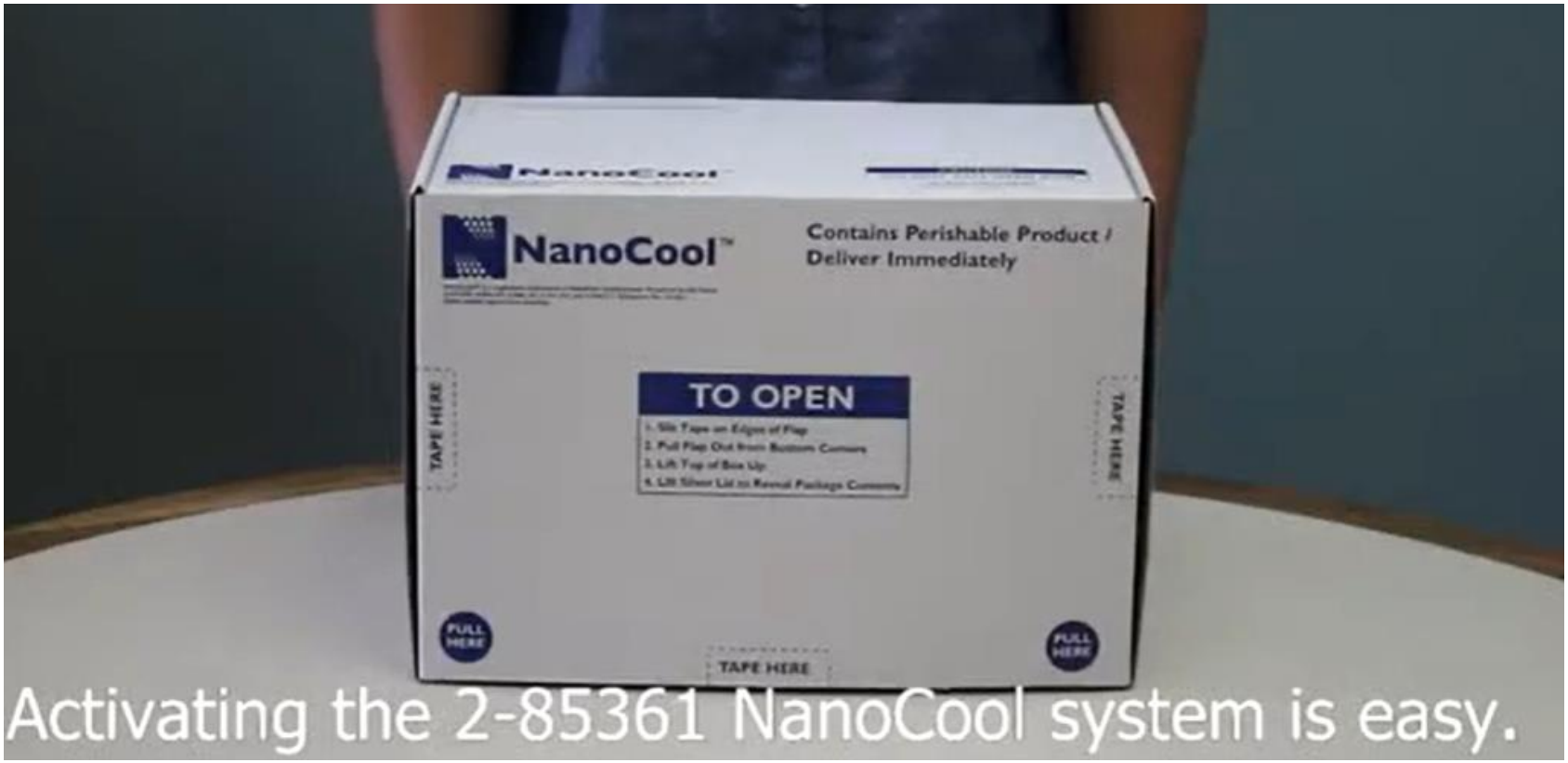
LABORATORY TEST RESULTS COMPARED TO NORMAL RANGES

	Anti-Dopamine Receptor D1 (titer)	Anti-Dopamine Receptor D2L (titer)	Anti-Lysoganglioside GM1 (titer)	Anti-Tubulin (titer)	CaM Kinase II (% of baseline)
Patient Result	1:8,000	1:32,000	1:640	1:8,000	142
Normal Ranges	500 to 2,000	2,000 to 8,000	80 to 320	250 to 1,000	53 to 130
Normal Mean	1,056	6,000	147	609	95
INTERPRETATION *	ELEVATED	ELEVATED	ELEVATED	ELEVATED	ELEVATED

LABORATORY TEST RESULTS

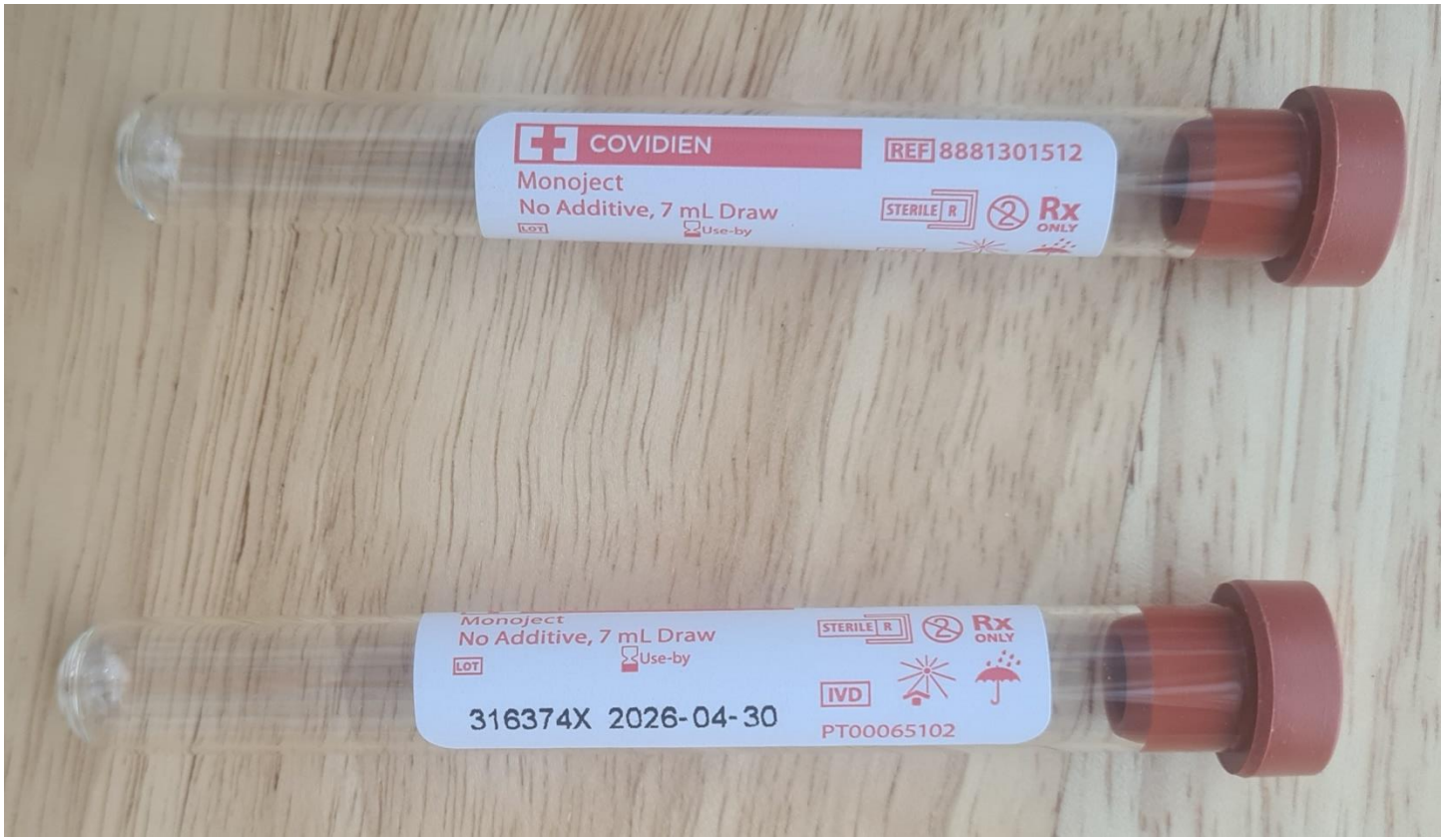


Sample needs to be returned in a Nanocool box with cooling engine



https://www.youtube.com/watch?v=A6lihMx1h0s

Vital to use the tubes provided and no others



25 years of history in the US – no NICE* guidelines for it here

National Institute for Health and Care Excellence

APPG (All-Party Parliamentary Group) successfully launched; parliamentary debate held on Sept. 12th 2023

Westminster Hall

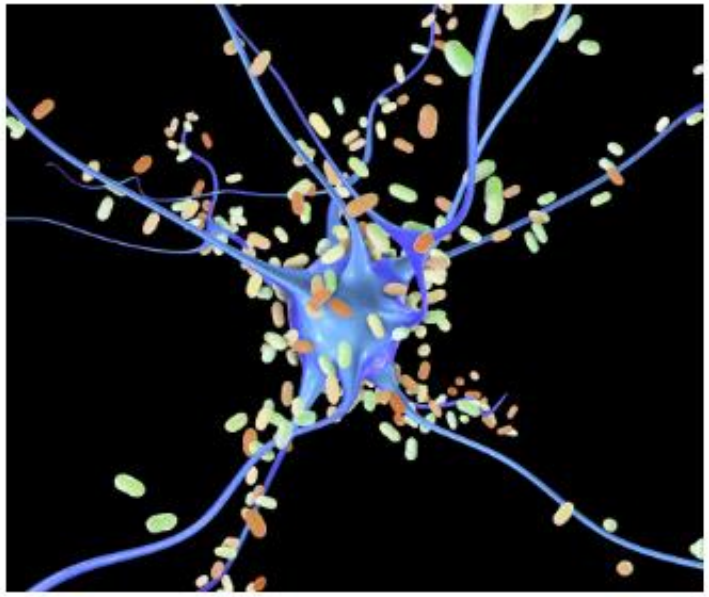
Tuesday 12 September 2023 Meeting started at 9.29am, ended 11.34am

AGENDA	INDEX
09:30:08	Westminster Hall debate: General Debate: Pediatric acute-onset neuropsychiatric syndrome and Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections
11:00:36	Westminster Hall debate: Level of public ownership in the offshore wind sector

Hansard:
"All political parties from across the spectrum came together in unity to call for the minister to take action to ensure that the thousands of affected families in UK have equitable and effective access to treatment."

Source: https://bit.ly/3P75Deh

Huge explosion of PANDAS cases since Covid – sometimes entire families



ACADEMY OF NUTRITIONAL MEDICINE

PANDAS on the Rise Due to the Increase in Group A Strep Infections

– BY GILIAN CROWTHER MA (OXON) ND/NT

Published on 7 July, 2023

Since last September, at least five European countries (the UK, France, Ireland, the Netherlands, and Sweden) have reported a rise in invasive group A streptococcal infections (iGAS).

One key factor is likely to be due to increased exposure to strep A infections during the COVID-19 pandemic, leading to a drop in immunity.

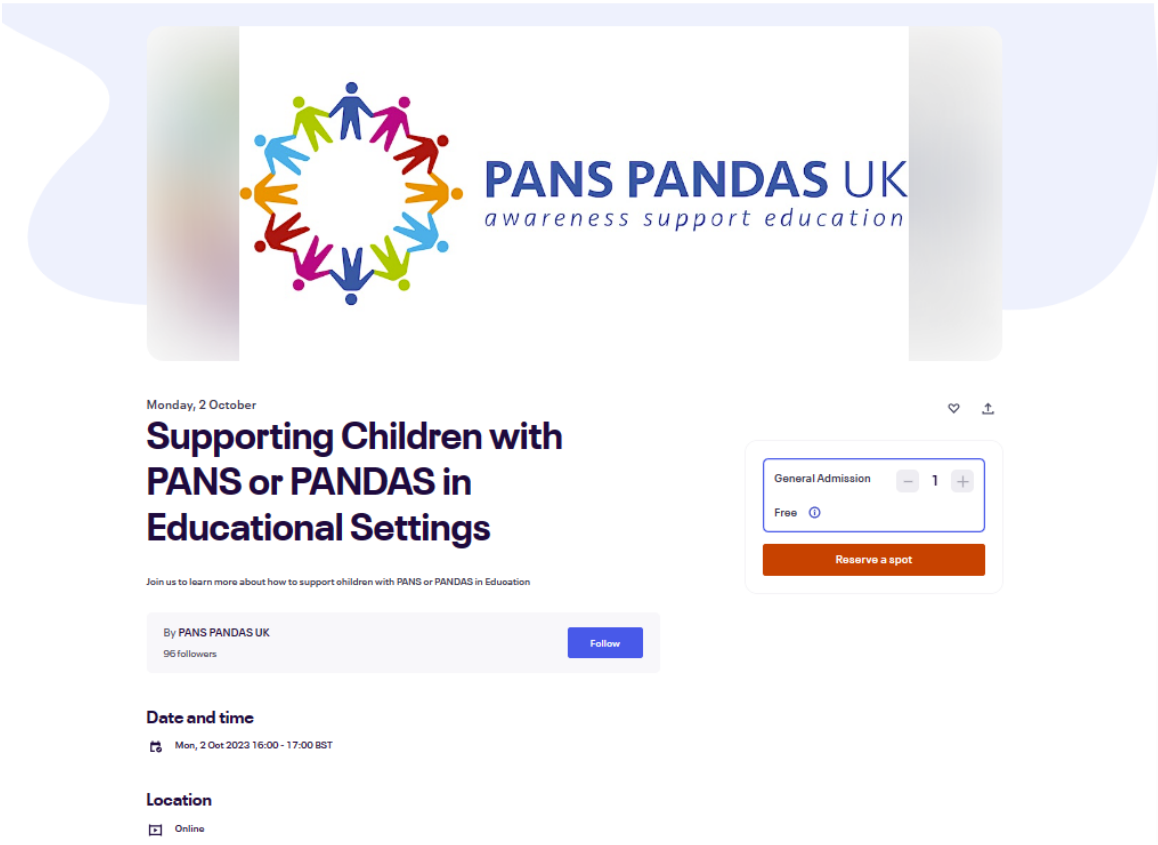
Streptococcus A, otherwise known as Strep A, is a common bacterium found in the throat and on the skin. It can cause several different infections, including tonsilitis, pharyngitis, scarlet fever, impetigo, and pneumonia.

Amy Joy Smith RN:

- My understanding (based on anecdotal discussions with a colleague aware of work being done at Columbia neurobiology lab) is that the Covid cytokine pathways involved in BBB disruption and microglial activation are essentially identical to PANDAS
- I treat post-covid syndromes in a very similar manner to PANS/PANDAS

Source: https://aonmhealthhub.org/pandas-on-the-rise-due-to-the-increase-in-group-a-strep-infections/academy-of-nutritional-medicine/; https://www.youtube.com/watch?v=DKQ5_N3RWdA

PANS/PANDAS UK provides educational training



Offer free CPD accredited training for any relevant education professionals. The aims of the session cover in brief:

- Raising the awareness of the conditions amongst Educational Professionals
- Considering the impact of PANS or PANDAS on children in education
- Summarising points of good practice in schools

Source: https://www.eventbrite.co.uk/e/supporting-children-with-pans-or-pandas-in-educational-settings-tickets-656572575247?aff=erelexpmlt

AONM Conference on PANDAS/PANS & Associated Disorders: all slides available – recordings on request

DR. CRAIG SHIMASAKI

President & CEO Moleculera Labs, Inc.

PANDAS/PANS & Related Neuropsychiatric Disorders: Science Basics for Parents and Patients. Could an infection be causing your child's symptoms?

DR ELENA FRID

Unraveling Mysteries of Neuropsychiatric Disorders

Dr Tania Dempsey, Founder of Armonk Integrative Medicine, kindly stood in at the last minute as the scheduled speaker was unable to attend due to family reasons.

Source: https://aonm.org/pans-pandas-conference-may-2018/

https://aonm.org/pans-pandas-webinars/

DR. NANCY OHARA – DEMYSTIFYING PANS/PANDAS PART 2, WITH EXTENDED Q&AS

DR. NANCY OHARA – DEMYSTIFYING PANS/PANDAS: A FUNCTIONAL MEDICINE GUIDE ON BASAL GANGLIA ENCEPHALITIS

PROF. CRAIG SHIMASAKI - THE RISE IN OTHER INFECTIONS POST-COVID AND OUR IMMUNE RESPONSE

DR CRAIG SHIMASAKI: CAN INFECTIONS REALLY TRIGGER AUTOIMMUNE NEUROPSYCHIATRIC DISORDERS?

NEURO-AUTOIMMUNE CONDITIONS AND HOW TO TEST FOR THEM

PANDAS/PANS – INTERPRETATION OF THE CUNNINGHAM PANEL RESULTS

THE LINKS BETWEEN LYME DISEASE AND AUTOIMMUNE ENCEPHALOPATHY AND BASAL GANGLIA ENCEPHALITIS (BGE)

FOR MORE INFORMATION ABOUT DR. DASHORE'S BOOK CLICK HERE

INTERCONNECTIONS BETWEEN COVID-19, PANS/PANDAS AND BIOTOXIN ILLNESS

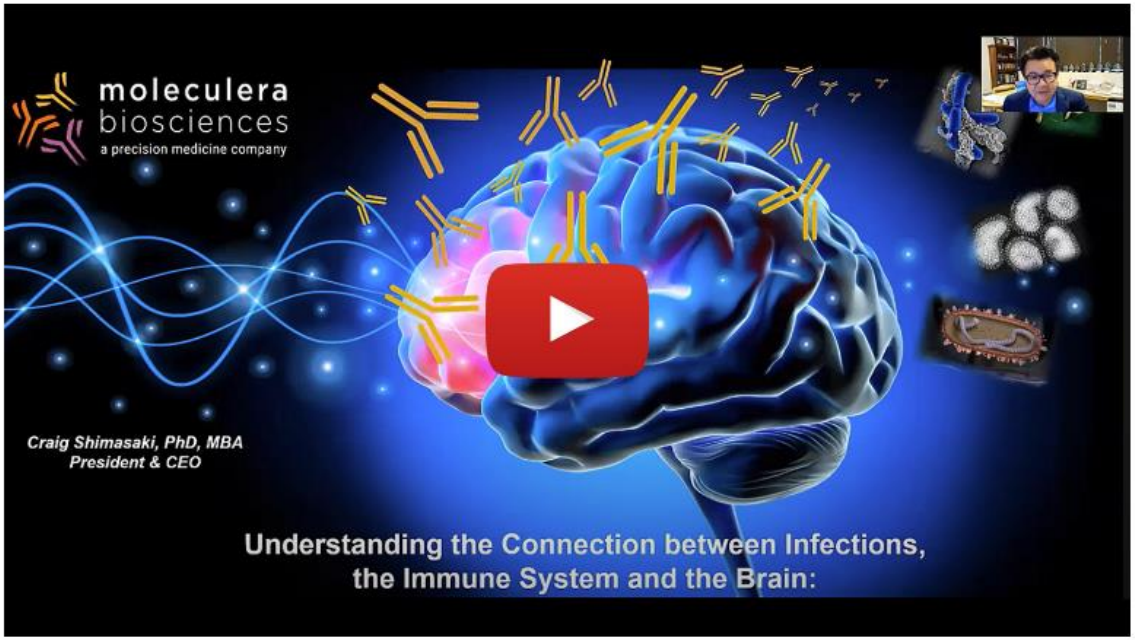
DR. SAM VINNICK TALKS ABOUT THERAPIES FOR AUTOIMMUNE ENCEPHALOPATHIES

Educational resources on the Moleculera page, too

moleculera biosciences
a precision medicine company

Company ▾ Our Test ▾ Focus Areas ▾ Our Science ▾

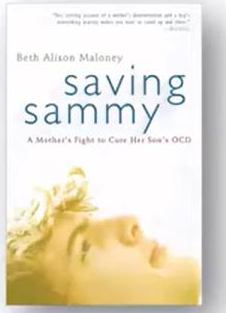
Understanding the Connection between Infections, our Immune System and the Brain - *Case studies: Autoimmune Brain Panel*



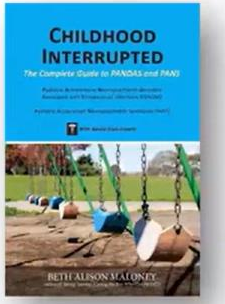
Webinar Info

https://www.moleculera.com/medical/webinar-connection-infections-immune-system-brain/

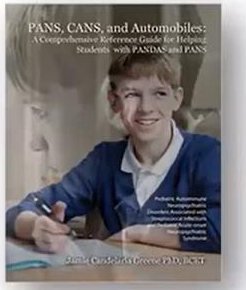
Extensive literature available on PANS/PANDAS and the related field



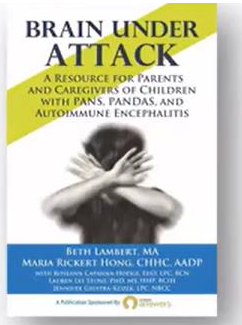
Saving Sammy: A Mother's Fight to Cure Her Son's OCD
By: Beth Alison Maloney



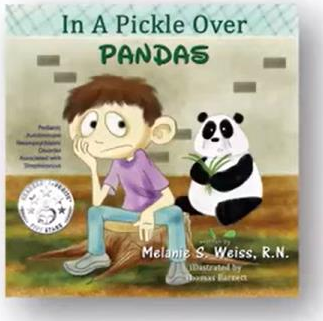
Childhood Interrupted: The Complete Guide to PANDAS and PANS
By: Beth Alison Maloney



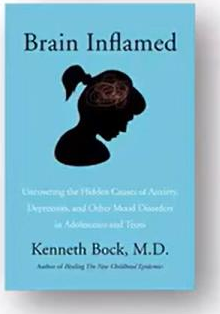
PANS, CANS, and Automobiles: A Comprehensive Reference Guide for Helping Students with PANDAS and PANS
By: Jamie Candelaria Greene



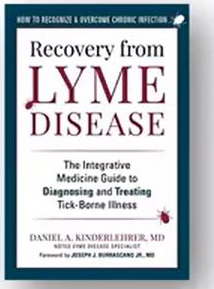
Brain Under Attack: A Resource for Parents and Caregivers of Children with PANS, PANDAS, and Autoimmune Encephalitis
By: Beth Lambert & Maria Rickert Hong



In A Pickle Over PANDAS
By: Melanie S. Weiss

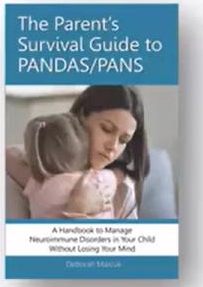


Brain Inflamed: Uncovering the Hidden Causes of Anxiety, Depression, and Other Mood Disorders in Adolescents and Teens
By: Kenneth Bock, M.D.

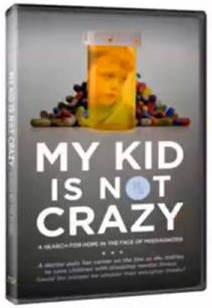


Recovery from Lyme Disease : The Integrative Medicine Guide to Diagnosing and Treating Tick-borne Illness
By: Daniel A. Kinderlehrer, M.D.

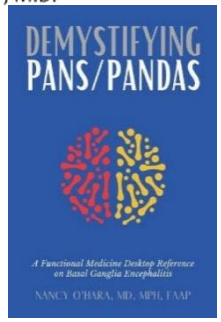
By:



The Parent's Survival Guide to PANDAS/PANS: A Handbook to Manage Neuroimmune Disorders in Your Child Without Losing Your Mind
By: Deborah Marcus



DVD/Video/YouTube
My Kid is Not Crazy: A Search for Hope in the Face of Misdiagnosis
By: Tim Sorel



Additional Information Sources

PANDAS NETWORK
Pediatric Autoimmune Neuropsychiatric Disorders

www.pandasnetwork.org

PANDAS PHYSICIANS NETWORK
PPN
A DIVISION OF THE FOUNDATION FOR BRAIN SCIENCE AND IMMUNOLOGY

www.pandasppn.org

PANDAS PANS UK

www.panspandasuk.org

EXPAND

https://expand.care/

Contact details

www.aonm.org

https://aonm.org/cunningham-panel-panspandas/

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0044 333 121 0305

gilian@aonm.org
0044 786 772 6387

www.moleculera.com

medicalrelations@moleculera.com

moleculera biosciences
a precision medicine company

Thank you very much!
Q&A

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Appendix:
Huge number of references available, please just ask

https://aonm.org/information-pans-pandas/

Shimasaki, Craig, Richard E. Frye, Rosario Trifiletti, Michael Cooperstock, Gary Kaplan, Isaac Melamed, Rosalie Greenberg, et al. "Evaluation of the Cunningham Panel™ in Pediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcal Infection (PANDAS) and Pediatric Acute-Onset Neuropsychiatric Syndrome (PANS): Changes in Antineuronal Antibody Titers Parallel Changes in Patient Symptoms." Journal of Neuroimmunology 339 (2020): 577138. https://doi.org/10.1016/j.jneuroim.2019.577138