

PANDAS & PANS

An Integrative Approach

Dr. Jill Crista



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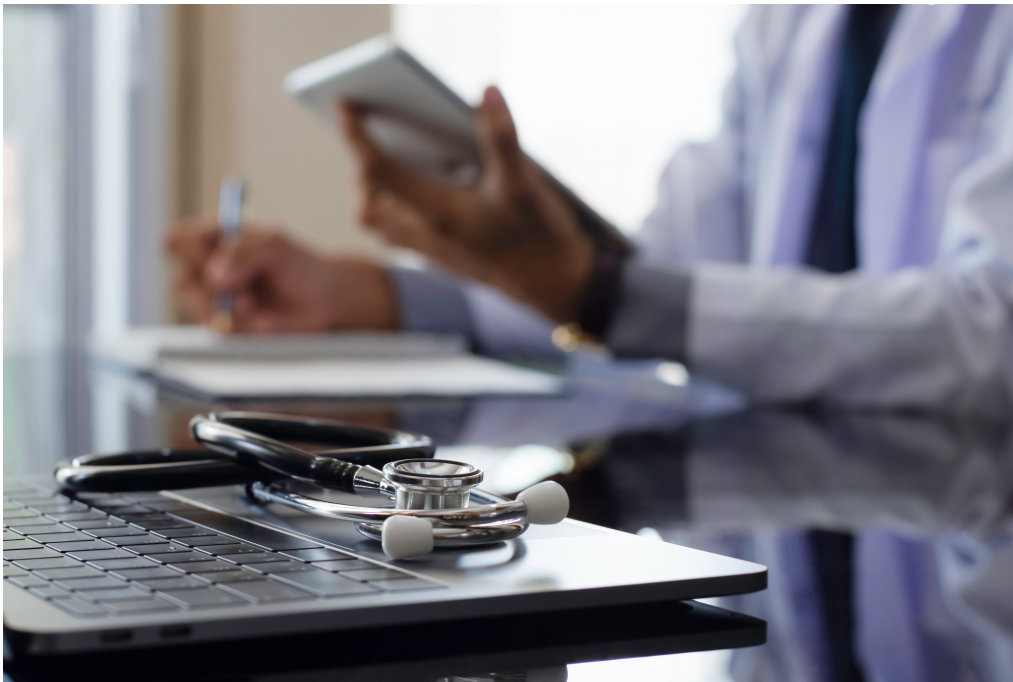
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Recovery Essentials



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Course Outline

1. Symptoms
2. Mechanisms
3. Diagnostics
4. Conventional treatment approach
5. Integrative treatment approach
- 6. Recovery essentials**
7. Cases



Recovery Essentials

Structure

Brain food

Peace of Mind

Dream Team

Structure

Routine Calm

Structural Alignment

Structured Breath

Structure of Movement

Structured Water

Necessity of Nature

Routine calm

Chronobiology: circadian rhythm rebalance - moving with the tide of biology rather than against it.

Routine is a gift to the adrenals, which govern immunity, inflammation, and blood sugar fuel to the brain.

Wake, eat, move, and sleep around the same times each day.

Morning -

Get outside immediately after waking, before 8am ideal

Use full-spectrum daylight lightbulbs before 3pm, not after

Timing of meals

Evening -

Turn lights down

Turn temp down

Sleep rule “2 before 12”.

PMID: 32130879 When Rhythms Meet the Blues: Circadian Interactions with the Microbiota-Gut-Brain Axis



Structural alignment

Physical structure is something that needs to be constantly realigned in a kid with P/P.

The constant pressure of BGE changes the alignment of the cranial bones, and restricts blood flow in and waste products out.

When the cranial bones are out of alignment, the brain's lymphatics can't drain. The brain's function is also impaired, especially the cranial nerves which govern our senses.

Cervical congestion is also observed.

Also address oral palate narrowing/jaw development/tongue placement - holistic dentist

CST after every dentist visit. Sustained jaw opening amplifies the improper alignment.

Glymphatics drain the brain ~

Dr. Bredesen's latest findings - sleep on side for maximal glymphatic drainage.



Breath

In its protective wisdom, the body adjusted its systems to under-breathe. The brain tells the respiratory system to breathe only enough to survive, not thrive. Why?

Germs and toxins carried in the air may have a free “elevator ride to the brain” via the olfactory nerve.

Many kids need to be taught breathing techniques to resuscitate natural breathing instincts.

Additionally, terror of their thoughts commonly over-rules natural autonomic respiratory rates (sympathetic state.)

Adequate belly breathing engages the vagus nerve. Most kids with P/P hold their bellies too tight to engage their vagus nerve.

Better if exhale is longer than the inhale. Children can hum to help lengthen the exhale.

Breathing techniques can be learned in calm times to prep for crisis moments, and as a quick part of the pre-meal routine to prep the body for eating.

Make breath part of the scheduled structure.



We're made to move

Improved cognitive effects from short bouts of movement (ie: walk to school, recess).

Physical activity has a positive effect on attention.

Additional improvement in academic performance and executive functions (inhibition, working memory, cognitive flexibility and planning.)

Physical exercise inhibits inflammation and microglial activation via neuroprotective myokines.

Exercise facilitates the M1-to-M2 polarization of microglia by enhancing autophagy via the BDNF/AKT/mTOR pathway (in neuropathic pain model.)

Association of calf muscle pump stimulation with sleep quality.

PMID: 19356688, 29054748, 36288601, 31324021, 27686225



doctortro

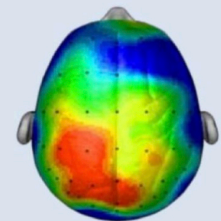
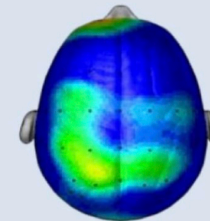


Cognitive Effects of Exercise On Preadolescent Children

Average composite of 20 students' brains taking the same test after 20 minutes of:

Sitting Quietly

Walking



Scan compliments of Dr. Charles Hillman University of Illinois

Structured water

Water is water is water, right!? Wrong.

A special phase of water (aka the fourth phase or exclusion zone/EZ water) is ordered and acquires features that are different from bulk or liquid water.

The transition of ordered EZ water to bulk water serves as an important trigger of many cellular physiological functions, and in turn cellular health.

Maintains a unique electrical charge (our battery) and helps conduct the electrical impulses of the brain and nervous system, as well as drive a “current” within our blood vessels, taking the workload off the heart as a pump.

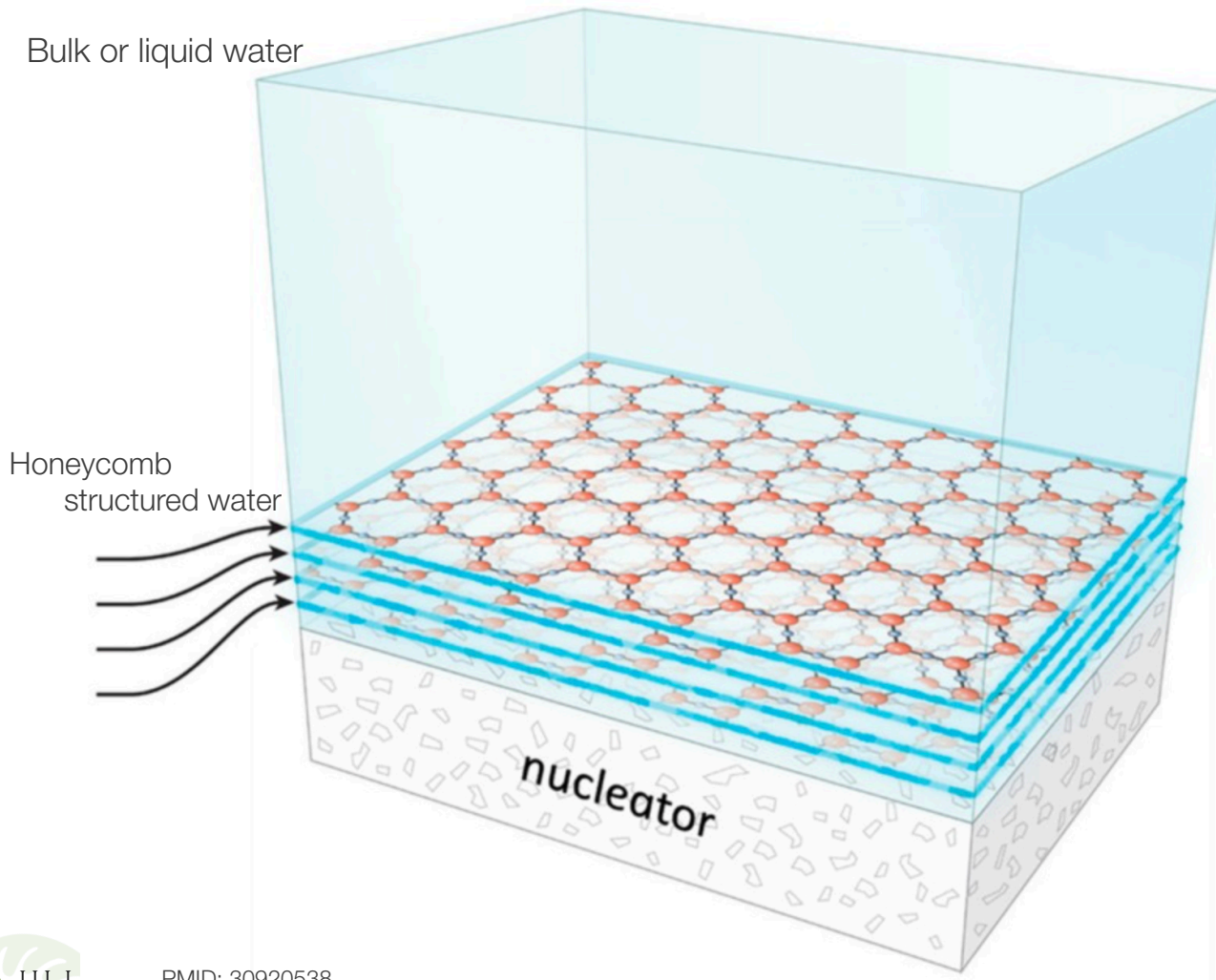
Referred to as exclusion zone water because the structure of the water creates a hydrogel of pure water in the form of H₃O₂, which not only creates a selectively polarized internal and surface charge, it also excludes colloidal and molecular solutes from extensive regions next to the hydrophilic surface.

Hydrogel water-to-solid ratios sometimes reach tens of thousands to one. *Yet can hold a frequency.*

In nature water becomes structured as it bounces, falls, and squeezes through limestone.
We make it intrinsically the same way, by simply moving (ie: rebounder.)

PMID: 30920538, 32708867, 30202249





Agents known to enhance biological function (ie: coconut water, holy basil, turmeric) result in EZ expansion.

Whereas glyphosate considerably diminishes EZ size.

However, while the expansion effect of the health-promoting agents was observed over a wide range of concentrations, excessive doses ultimately reduced EZ size.

PMID: 30202249

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Nature is a necessity

Shinrin-yoku or forest bathing/forest medicine = appreciation with all 5 senses.

Increases NK activity, the number of NK cells, and the intracellular levels of anti-cancer proteins.

Reduces BP and HR.

Reduces stress hormones, such as urinary adrenaline and noradrenaline and salivary/serum cortisol.

Increases the activity of parasympathetic nerves and reduces the activity of sympathetic nerves to stabilize the balance of autonomic nervous system.

Improves sleep.

Increases the levels of serum adiponectin and dehydroepiandrosterone sulfate.

Reduces the scores for anxiety, depression, anger, fatigue, and confusion, and increases the score for vigor, showing preventive effects on depression.

May have preventive effect on COVID-19 by boosting immune function and by reducing mental stress.





Commune with nature every every every every every every day



Recovery Essentials

Structure

Brain food

Peace of Mind

Dream Team

Brain Food

Organic matters most

Additional dietary considerations

Disordered eating

Joy seeking



Organic!

Additional dietary considerations

Are there additional dietary considerations? Certainly!

*****BUT be cautious of creating issues around food/eating!*****

Diet high in antioxidants are not only beneficial for mental health, they're also protective against pesticides, insecticides, mycotoxins.

Good fats reduce inflammation and nourish nervous system.

Sufficient B-vitamins as psychobiotics.

Sufficient protein prevents blood sugar sweeps. Aim for 1g/kg body weight.

Be mindful of histamine.

Dr. Kharrazian: possibility of food cross-reactivity to cerebellar, myelin basic protein, streptococcus
- dairy, eggs.

Timing may be more important than content (intermittent fasting data from earlier
- benefits to microbiome-gut-brain axis)

PMID: 32358751, 32340112, 30904906



Extra-virgin olive oil (EVOO)

RCT: 30 pts with impaired fasting glucose (common in food-restrictive kids), receive a lunch with or without **10 g (2¹/₄ tsp) EVOO**.

Markers measured before, 60 and 120 min after lunch:

Serum LPS, Apo-B48, markers of oxidative stress [oxidized LDL (oxLDL) and soluble Nox2-derived peptide (sNox2-dp), a marker of nicotinamide-adenine-dinucleotide-phosphate oxidase isoform Nox2 activation], and plasma polyphenols.

Gut-derived LPSs increase post-prandial oxidative stress via Nox2 activation in patients with impaired fasting glucose tolerance.

At 120 min, LPS (β - 15.73, $p < 0.001$), Apo-B48 (β - 0.14, $p = 0.004$), sNox2-dp (β - 5.47, $p = 0.030$), and oxLDL (β - 42.80, $p < 0.001$) significantly differed between the two treatment groups.

EVOO administration significantly mitigated post-prandial oxidative stress-related inflammation, potentially triggered by LPS.

PMID: 29766292



B-vitamins and the biome

B-vitamins function as psychobiotics.

Are obligate cofactors and co-enzymes for many aspects of the nervous system.

Primary source-diet (we can't synthesize), secondary-microbiome.

Important cofactors mediating multiple metabolic pathways in humans, esp liver detox, neurological health, and I/S surveillance and homeostasis.

Involvement as psychobiotics in brain energetic metabolism (kynurenines/tryptophan pathway) for neurological functions.

Studies exhibit malfunctioning related to deficiency.

Microbiome made up of B-producers and B-consumers.

**B-consumer biome is in competition with our cells for these nutrients.

Can be administered orally or as IM/IV if the child has leaky gut or is restricting food.
(Parenting tip: mentioning this option has helped parents get their child to take their B's.)

PMID: 36583209, 36271691, 31058161



B fulfilled

I start with Vitamin B2, Riboflavin ~

Nourishes the brain and nerves, and it has the lowest possibility of causing any kind of reaction.

Typical therapeutic dose is 50 mg daily.

Next, I add Vitamin B6, Pyridoxine ~

High dopamine can deplete Vitamin B6. When this vitamin is low, the brain chemistry shifts to the more excitatory brain chemical glutamate.

Typical therapeutic dose is 100 mg daily.

If a child is struggling with fatigue or nerve tingling, I optimize Vitamin B12, Cobalamin ~

Especially needed if a child has had heavy exposure to silly gas or weed killer. Silly gas forces this vitamin into its inactive form. Glyphosate, the chemical in weed killer, can impair the area of the intestines where we absorb Vitamin B12.

Typical therapeutic dose is 1,000 mcg daily.

In kids who've been exposed to mold, I optimize Vitamin B1, Thiamine ~

Molds emit alcohols that can chew through this vitamin very quickly. Since mold mycotoxins are stored in the fat and cause the most problems there, I use the fat-soluble form called Benfotiamine.

Typical therapeutic dose is 150 mg daily.

Bs may cause nausea, impedes sleep if taken too late in the day.



Histamine

One area where a child might benefit from temporary dietary restrictions, especially if mold exposed.

Histamine intolerance is a very common reason for disordered eating, small appetites, and reactions after eating.

Histamine reactions can happen soon after eating and include ~

Irritability

Redness or flushing

Pruritus

Allergic reactions

Headache

Reflux, nausea or indigestion

Joint pain

Worsening asthma soon after eating



High histamine foods to avoid

- Leftovers
- Packaged and processed foods
- Fermented foods
- Aged cheeses
- Cured meats
- Fruit and citrus juices (except lemon)
- Strawberries
- Spinach
- Raw tomatoes
- Vinegar
- Soured foods
- Fish (flash frozen salmon is okay)
- Bone broth
- Collagen (also feeds Bartonella)



Disordered eating

By asking why a child isn't eating, we may be able to point to an area of intervention.

Ask why, don't assume.

Fear of Choking ~

Swallowing involves an intricate interplay of nerves and muscles, run right through the area of inflammation in the brain of a P/P kid.

If a child fears choking, it's quite likely a valid fear.

To help kids swallow with more ease, take measures that are used with post-stroke patients, such as puréeing food and adding thickeners to liquids.

This fear gets better as inflammation reduces.

Fear of Contamination ~

Tells you his gates are being breached.

Add measures to Guard the Gates, ie: spices high in Strep-killing essential oils to support the sense of safety in the limbic system to allow a kid to eat.

Add cinnamon to sweet foods, or thyme and oregano to savory foods. Even smelling the essential oils may be enough to give green light to eat.



Disordered eating mechanisms

Histamine Intolerance ~

Feeling sick or fluey soon after eating is classic histamine intolerance.

In these cases, kids will simply avoid feeling bad by not eating. The reactions can be so bad that hunger feels like the least bad option.

Add Mast Cell Stabilizers, such as Perilla and Quercetin/Luteolin, or antihistamine medication 15–20 minutes before eating, while following a low-histamine diet may help.

Mental Health Flare ~

Having mental health flares after eating is a sign that the gut microbiome is disrupted.

Gut-derived exotoxin agitation of the microglia can flare any of the neuropsychiatric symptoms.

The Botanical Avatars Gotu kola and Chinese skullcap reduce gut-derived inflammatory endotoxins such as LPS (lipopolysaccharide), as do Flame Tamers Feverfew and Rosemary. Any or all of these glycerites may be taken 15 minutes before meals to prevent microglial activation.



Disordered eating mechanisms

Belly Pain ~

While you're working on fostering a beneficial microbiome, you may need to soothe an achy belly. Hot or cold teas of mint and ginger not only reduce pain but also inflammation. These are easy additions to mealtimes.

Aloe juice is also soothing, gives the gut immunity a boost, acts as a binder, and comes conveniently as single-serving bottled juices for when you're on-the-go.

Eating-Related Trauma ~

Sometimes the eating issue has been so severe in the past, there's now a lot of "energy" around it. Parents become hyper-aware of intake, and kids can feel it. Kids feel this as pressure and trauma. Trauma can shut down the vagus nerve.

Humming can turn it back on. Humming stimulates the vagus nerve to induce a feeling of calm and relaxation, and turns on digestion. A happy vagus nerve tells the body it's safe to eat.

Hum for 5-10 minutes before the mealtime. It doesn't have to be constant. Maybe he hums along to a favorite song or as part of a breathing technique. Either way, hum.

Fry an Onion!





Joy seeking

“The web of laughter” ~

Laughter interacts with several frontal and limbic regions, including cingulate, orbitofrontal, medial prefrontal and anterior insular regions involved in interoception, emotion, social reward and motor behaviour.

Humor therapy has been shown to be effective in improving depression and anxiety in those with health problems.

PMID: 36126672, 37340873



Joy is basic nourishment

Play, stories, music, art, dance, sports, animals, games, curiosity, friends, food, photography, creating, unplanned time, jumping on the bed, etc.



Recovery Essentials

Structure

Brain food

Peace of Mind

Dream Team

Peace of Mind

Avoid talking it into being

Mindfulness

Limbic & Vagal

Treat yeast

Neural nutritional support

Homeopathy

Nasal ginsenosides

Addiction



Prisoners in their own minds

Even after the worst of it passes, these children find themselves continuously looking over their shoulder, expecting and waiting for the mind torture to happen again.

The physical change to their brains traumatizes their mental-emotional state.

The images and obsessions playing in a child's mind are frightening, grotesque, and unnerving.

It isn't uncommon for a child to believe her parent has been replaced by an imposter or to have a "daymare" of killing her pet, sibling, teacher, or you—or even harming herself.

It's important to understand the level of trauma a P/P child is living with every day, 24-7.



Mindfulness

For long-term recovery into adulthood, kids with P/P need mental health skills and support. Many of my patients who are now young adults are thriving with this skillset.

Virtual mindfulness resources available for kids, teens, and young adults recovering from P/P, especially those unable to leave their bedrooms.

Interactive practices, meditations, and even online retreats.

Compared to higher-force interventions such as IVIG, you might be thinking, “why bother?” While it might seem too “fluffy”, I can report from working with families that Mindfulness saved the day in more instances than I can count.

Teens often report that the Mindfulness recordings helped their parents also chill out, and that was the medicine needed at the moment.

With practice, Mindfulness can become a stabilizing presence in a child’s *and* parent’s life.



Avoid talking it into being

*Trigger warning to psychologists, psychiatrists, counselors, social workers.

Talking about an intrusive thought will take it from thinking to being. From thought to reality.

Neuroscience is showing that our brains can't tell the difference between concentrated thought and reality. In studies on exercise, people who did concentrated visioning of themselves exercising every day for a half hour, grew muscle on par with those who had actually exercised for a half hour.

Be cautious of growing these unwanted thoughts by talking about them. Their compulsions manage their obsessions. Temporarily, consider letting the compulsions fly. They are a healing salve on the scary thoughts.

Let your child determine the timing. I have seen children who were forced into counseling or prodded to talk about their visions become very unstable and a danger to themselves.

Tame your own curiosity.

Later, after the storm of brain inflammation passes, kids probably will need to talk . . . a lot, and to professionals.



P/P brains are different than externally traumatized brains

I'm not recommending to avoid counseling or psychiatry. They're a key part of the Dream Team (next).

I'm suggesting that you ask that member of your Dream Team to avoid talking the visions into reality with your child. They must contain their academic curiosity and do what's best for the child.

Trauma from PANDAS/PANS is different than historical trauma, because the trauma is happening right now.

The child is IN the war.

We wouldn't sit a child down who's in the middle of a war zone and ask her to rehash the horrific events of that day. We'd spend the time praising her for her strength, reassuring her that it will get better, and consoling her suffering.

There are plenty of other things to talk about. And talking about other things keeps her mental highways open to more flexible thought.

Acknowledge that I'm not trained in psychology or psychiatry. I'm speaking from many heart-wrenching experiences. And if you'd like to understand more, check out Dr. Joe Dispenza's work.

So what CAN you do?



What would you rather think about?

Prompt by parents (and you if handling this part of the Dream Team.)

Will have to do so over and over and over and over again. This very powerful question was taught to me by my mentor and seasoned clinical psychologist, Jan Engels-Smith.

“What would you rather think about?”

Of course if they could, they would be thinking about puppies and unicorns. But their inflamed brains pressure the negative thoughts, compulsions, and visions.

Ask, ask, and ask again. Go ahead. Be annoying. Be a broken record on repeat.

Repeating “what would you rather think about?” keeps the wiring fluid.

They will get mad at everyone for continuously asking. Do it anyway.

Eventually, they’ll start to ask it to themselves.



Limbic retraining with Aromatherapy

Utilizes the olfactory route to effect change in the limbic system.

Mechanisms ~

First-order neurons transmit the odor-evoked response to the olfactory bulb.

In the olfactory bulb, the axons of mitral cells (a) and some tufted cells (secondary neurons) form the olfactory tract.

The axons of some mitral cells or lateral branches enter the anterior olfactory nucleus and pass to the contralateral olfactory bulb.

Additional secondary neurons enter the olfactory striatum (medial, lateral, and medial) and then project to central olfactory areas, including the olfactory tubercle, piriform cortex, amygdala, and the entorhinal cortex.

The entorhinal cortex partially transmits to the hippocampus. Eventually, the central olfactory-area signals are transmitted through the thalamus to the orbitofrontal cortex.

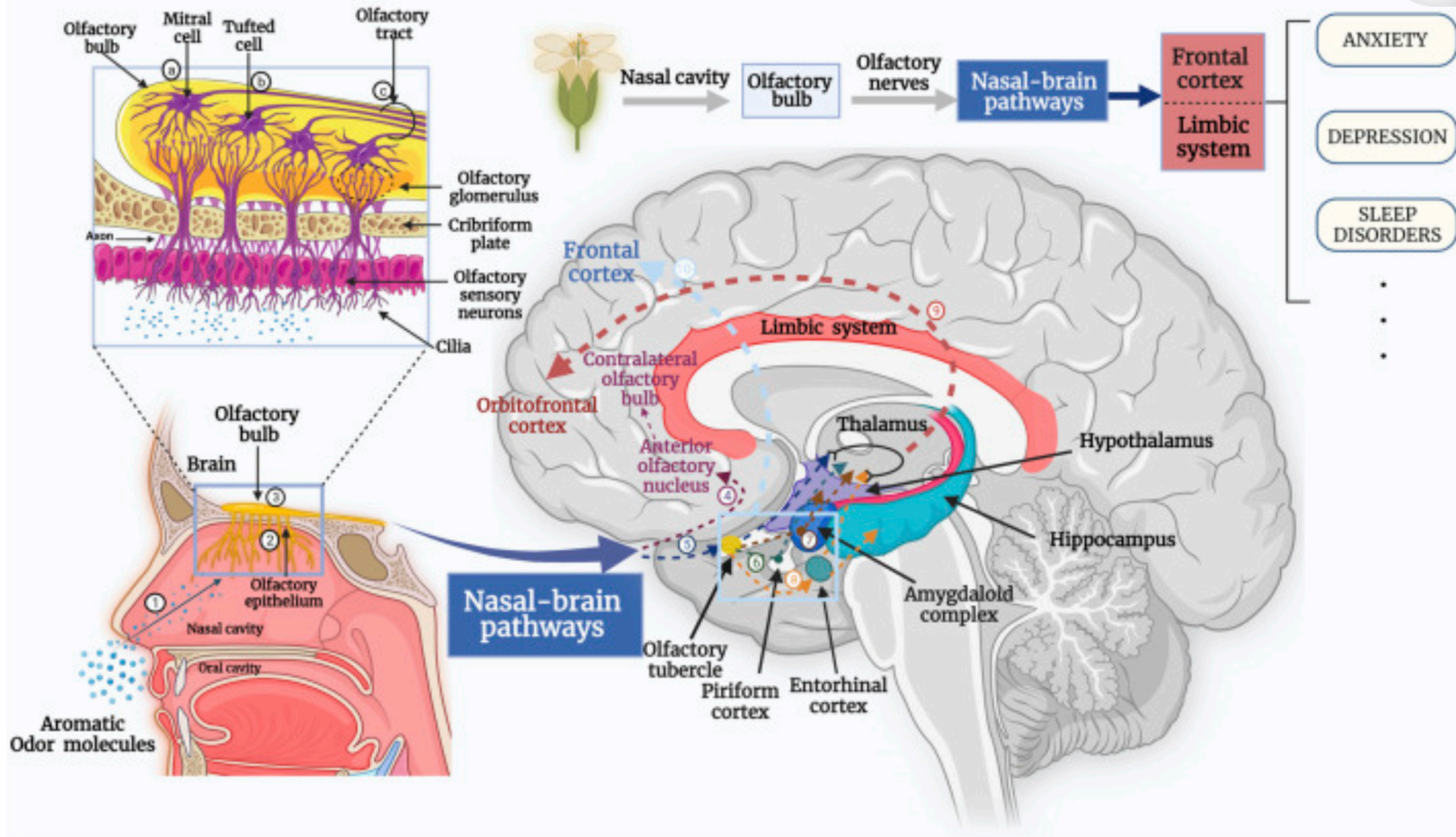
An additional olfactory signaling pathway passes directly from the central olfactory area to the prefrontal cortex.

These impulses induce the release of neurotransmitters such as serotonin or endorphin, which act as a “bridge” between nerves and other bodily systems.

PMID: 35496310, 23531112, 30525233, 33411049, 31604545



Inhalation Aromatherapy via Brain-Targeted Nasal Delivery for Mood Disorders



PMID: 35496310



Limbic retraining

Aromatherapies that have a calming effect and assist in limbic retraining are:



- Lavender
- Blue tansy
- Lemon balm
- Bergamot
- German chamomile
- Black spruce

Use high-quality oils free of pesticides and solvents and store them in glass containers.

Much fewer side-effects than psychotropic drugs.

Additional aids: limbic retraining programs, frequency-specific microcurrent, homeopathy, prayer, and many other modalities available.

PMID: 35496310

Cell danger response

Dr. Naviaux's ground-breaking work using anti-purinergics (suramin - a P2-purinoceptor antagonist) to re-establish cellular safety signals. Suramin Autism Treatment-1 (SAT-1) trial.

Double-blind, placebo-controlled, translational pilot study to examine the safety and activity of low-dose suramin in children with ASD.

Ten male subjects with ASD, ages 5-14 years, were matched by age, IQ, and autism severity into five pairs, then randomized to receive a single, IV infusion of suramin (20 mg/kg) or saline.

75% of the pathways that were altered by suramin in children with ASD were also altered in the mouse models.

Autism Diagnostic Observation Schedule-2 (ADOS-2) comparison scores improved in the suramin group and did not change in the placebo group.

Expressive One-Word Picture Vocabulary Test (EOWPVT) scores did not change.

Secondary outcomes also showed improvements in language, social interaction, and decreased restricted or repetitive behaviors.
























Not an approved use in US. It's been used to treat African sleeping sickness (trypanosomiasis) for over 100 years, and remains on the WHO list of essential medications.

No data on PANDAS/PANS.

PMID: 23516405, 28695149



Targeting P2 receptors in purinergic signaling: a new strategy of active ingredients in traditional Chinese herbals for diseases treatment

Active ingredients	MF	MW	Chemical formula	Dose (mg·kg ⁻¹)	Pharmacological actions	Targets	Ref
Tetramethylpyrazine	C ₈ H ₁₂ N ₂	136.198		100, i.p., 2 w	Anti-inflammation, strengthening heart, lowering blood pressure, inhibiting platelet aggregation and relieving pain	P2X3R	[45-52]
Sodium Ferulate	C ₁₉ H ₁₆ NaO ₄	216.168		100, i.p., 2 w	Alleviating hyperalgesia and neuropathic pain	P2X3R	[53-54, 160]
Lappaconitine	C ₃₂ H ₄₄ N ₂ O ₅	584.71		4, i.p., 2 w	Anti-inflammation, anti-nociception, anti-arrhythm, anti-rheumatism, anti-cancer, inhibiting the activity of hippocampal neurons and immunoregulatory activities	P2X3R	[55, 56]
Hesperidin	C ₂₈ H ₃₆ O ₁₅	610.561		50, i.p., 2 w	Inhibiting the nociceptive transmission	P2X3R	[57]
Sinomenine	C ₁₉ H ₂₃ NO ₄	329.390		40, i.p., 2 w	Anti-inflammation and relieving the hyperalgesia	P2X3R	[60]
1,8-Cineole	C ₁₀ H ₁₈ O	154.249		100, i.p., 2 w	Anti-inflammation, anti-oxidant and alleviating pathological pain	P2X3R	[61, 62]
Emodin	C ₁₅ H ₁₀ O ₅	270.24		50, i.p., 2 w	Anti-inflammation, inhibiting liver and kidney fibrosis, inhibiting cell proliferation, relieving peripheral neuralgia and inhibiting breast and lung cancer	P2X2R, P2X3R, P2X7R, ADA	[68, 104-106, 145]
Curcumin	C ₂₁ H ₂₀ O ₆	368.385		4 mg/mL, sublingual vein, 2 w	Desensitizing the primary afferents of DRG, relieving mechanical and thermal hyperalgesia	P2X3R, P2X7R, P2Y12R	[70, 127, 71]
Gardenoside	C ₁₇ H ₁₄ O ₁₁	404.368		60 μmol/mL, i.g., 2 w	Protecting neural cells and treating neuropathic pain	P2X3R, P2X7R	[72]
Puerarin	C ₂₃ H ₂₀ O ₉	270.24		100, i.p., 2 w	Improving the cardiac function by relieving the inflammation and associated pain	P2X3R, P2X7R	[76-78, 133, 79]
Resveratrol	C ₁₄ H ₁₂ O ₂	228.24		100 and 200, i.p., 4 w	Anti-oxidant, anti-free radical, anti-tumor, anti-microbial and anti-platelet aggregation	P2X3R, P2X7R	[8, 83, 84]
Astragalin	C ₂₁ H ₃₀ O ₁₁	448.38		50, i.g., 2 w	Suppressing neuropathic pain	P2X4R	[85]
Artemisinin	C ₁₅ H ₂₂ O ₅	282.336		5, i.p., 2 w	Anti-inflammation, anti-tumor and anti-malaria	P2X4R	[86-88]
Osthole	C ₁₃ H ₁₆ O ₂	244.285		20, i.p., 2 w	Suppressing neuropathic pain and nociceptive responses and alleviating hyperglycaemia	P2X4R	[89, 90]
Mangiferin	C ₃₀ H ₄₈ O ₁₁	422.342		100, i.g., 1 w	Anti-inflammation and anti-apoptotic effects	CD73R	[103]
Rhein	C ₁₉ H ₁₀ O ₆	284.220		10 μM/L	Anti-inflammation, anti-tumor and anti-angiogenesis	P2X4R, P2X7R	[110, 111]
Naringin	C ₂₇ H ₃₂ O ₁₄	580.535		80 μM	Anti-inflammatory, anti-oxidative and anti-apoptotic properties	P2X7R	[112-113]
Geniposide	C ₁₇ H ₁₄ O ₁₀	388.366		33.2 μg/mL	Anti-inflammation	P2Y14R	[114-116]
Evodiamine	C ₁₈ H ₁₇ N ₃ O	303.365		0.25 μM	Anti-inflammation, anti-rheumatic and anti-nociceptive effects	P2X4R, P2X7R	[120, 121]
Bullatine A	C ₂₂ H ₃₁ NO ₂	343.503		50 μM	Anti-inflammation	P2X7R	[122]
Oxymatrine	C ₁₃ H ₁₇ O ₂	264.363		5, i.p., 2 w	Anti-inflammation, anti-ulcer, anti-arrhythmic and anti-tumor	P2X3R	[134-135]
Baicatin	C ₂₁ H ₁₆ O ₁₁	446.364		100, i.p., 2 w	Anti-inflammation, anti-oxidative and anti-apoptotic activities	P2Y12R	[136, 137]
Isorhapontigenin	C ₁₆ H ₁₄ O ₄	258.27		60 μM	Anti-inflammation, anti-cancer and anti-oxidant activities	P2Y12R	[152-155]

PMID: 33751327



Botanical anti-purinergics for CDR

Botanicals that target P2 receptors in purinergic signaling “exhibit superior pharmacological activities on diversified P2R channels.”

Botanical Avatars ~

Chinese skullcap (*Scutellaria baicalensis*)

Astragalus

Ginsengs

Botanical Antimicrobials ~

Japanese knotweed

Red sage - *Salvia miltiorrhiza* (Dan shen)

Sweet Annie - *Artemisia annua* (Qinghao)

Rhubarb - *Rheum palmatum* (Dahuang)

Ligusticum walliichi (Chuan xiong) (may be called Sichuan lovage root)

Gardenia jasminoides Ellis (Zhizi)

Ginger - cholinergic activity as well

PMID: 29795391, 33751327, 27002391, 25752193, 32441354



Vagus nerve stimulation

“When the CDR is chronically activated, the coordination between the two limbs of the vagus nerve is disrupted.”

Humming, laughing, gargling, vocalizing, belly breathing.

Safe and Sound Protocol - suitable for children. Listening with headphones. Non-invasive acoustic vagus nerve stimulator and builds sense of safety. Can be delivered in-clinic or remotely.

Transcutaneous vagal nerve stimulation (tVNS) - may alter the functions of the limbic-cortical and peripheral networks underlying the hyperarousal component of PTSD and thus improve patient health and well-being. Suitable for children with refractory epilepsy. P/P kids?

PMID: 28824913



Yeast is a mental beast

Animal models: *C. albican* infection aggravates neuroinflammation via CNS dissemination and local induction of encephalitogenic cytokines.

Clinical pearl ~

If things are going sideways, make sure the child doesn't have yeast overgrowth. Yeast overgrowth is often missed, and it predictably messes with a child's mental game.

If found, treat it aggressively and for longer than you think is needed. Die-off symptoms after initiating antifungal therapies are diagnostic.

Many *Candida* strains are resistant to current medications. Combining herbs, such as garlic, with the medications can reduce resistance.

PMID: 34901093, 28584446, 25969836



Neural support

DHA ~ (Docosahexaenoic acid)

Helpful with mold exposure. Protects the brain, nervous system, and eyes from mycotoxin effects.

Therapeutic dose is up to 3 grams daily until symptoms reduce, then maintenance dose of 500 mg daily.

Vegetarian sources from algae.

PQQ ~ (Pyrroloquinoline quinone)

CoQ's cousin. Improved function of the mitochondria, heart, and brain.

Helps with learning, memory, and reduction of brain fatigue.

Protects the brain from the damage of excess excitatory NTs during flares.

Nourishing the brain with PQQ during a flare can prevent the post-flare exhaustion.

Therapeutic dose is 20 mg daily.

Phosphatidylserine ~

Important for proper brain function. Gets used up in kids with P/P. Phosphatidylserine blocks excessive amounts of excitatory brain chemistry.

Repairs and prunes neuronal circuits, thereby keeping a focus on desired nerve tracts to reduce brain chaos. Results in improved focus and better sleep.

Therapeutic dose is 100 mg in the morning and 200 mg before bed. In rare cases, it can initially cause insomnia while the low tank is filling.

PMID: 23686346, 24755484, 34585770, 32657463



Inositol

Though not technically a B-vitamin, it's often referred to as Vitamin B8.

Particularly helpful for severe OCD and tics, especially where sleep is a struggle.

Typically use the myo-inositol form.

Therapeutic dose is much higher than other B-vitamins at 3,500 mg taken bid.

Powdered form very well tolerated.

PMID: 21352883, 32215361



Low-dose lithium

Lithium is a natural element. Stigmatized due to high dose Rx use for bipolar disorder and mania.

Can be toxic in high doses. Must be monitored with regular blood testing. But the low-dose version can be used safely OTC for mood stabilization in kids with P/P.

Low dose has subtle mood-elevating effect, anti-neuroinflammatory effects, and lesser known mitochondrial activation effects (CDR).

Pool story: Changing nothing else with their child's regimen, a family changed their pool chemicals to a mineral blend based around lithium. Within days, their child became stable and a pleasure to be around. Nearly a month after the pool had to be winterized, she relapsed. We tried low-dose lithium, and the stable child returned.

A systematic review reported that across studies, LDL was reported to be safe.

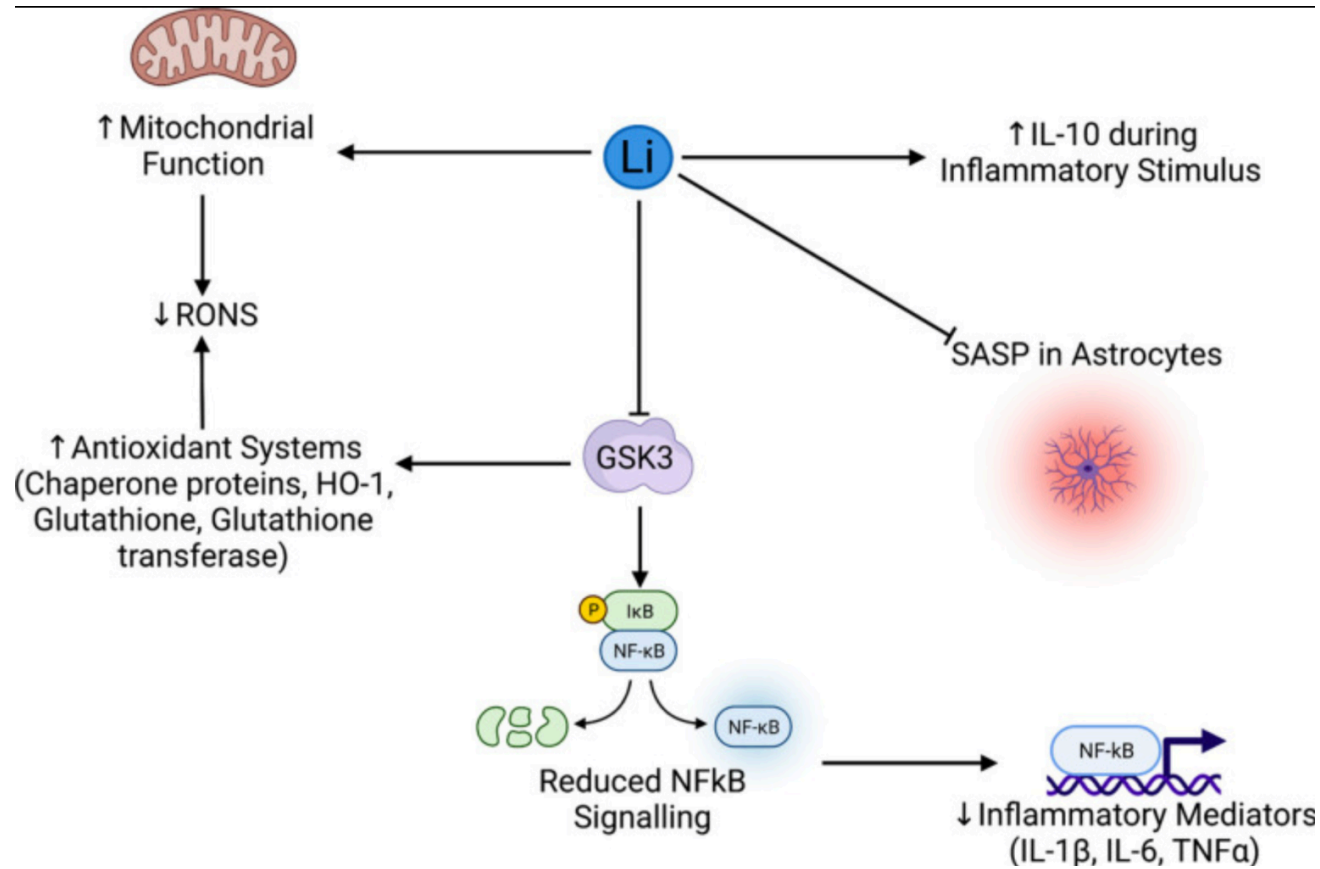
Adult therapeutic low-dose is 10 mg taken twice daily, best taken earlier in the day.

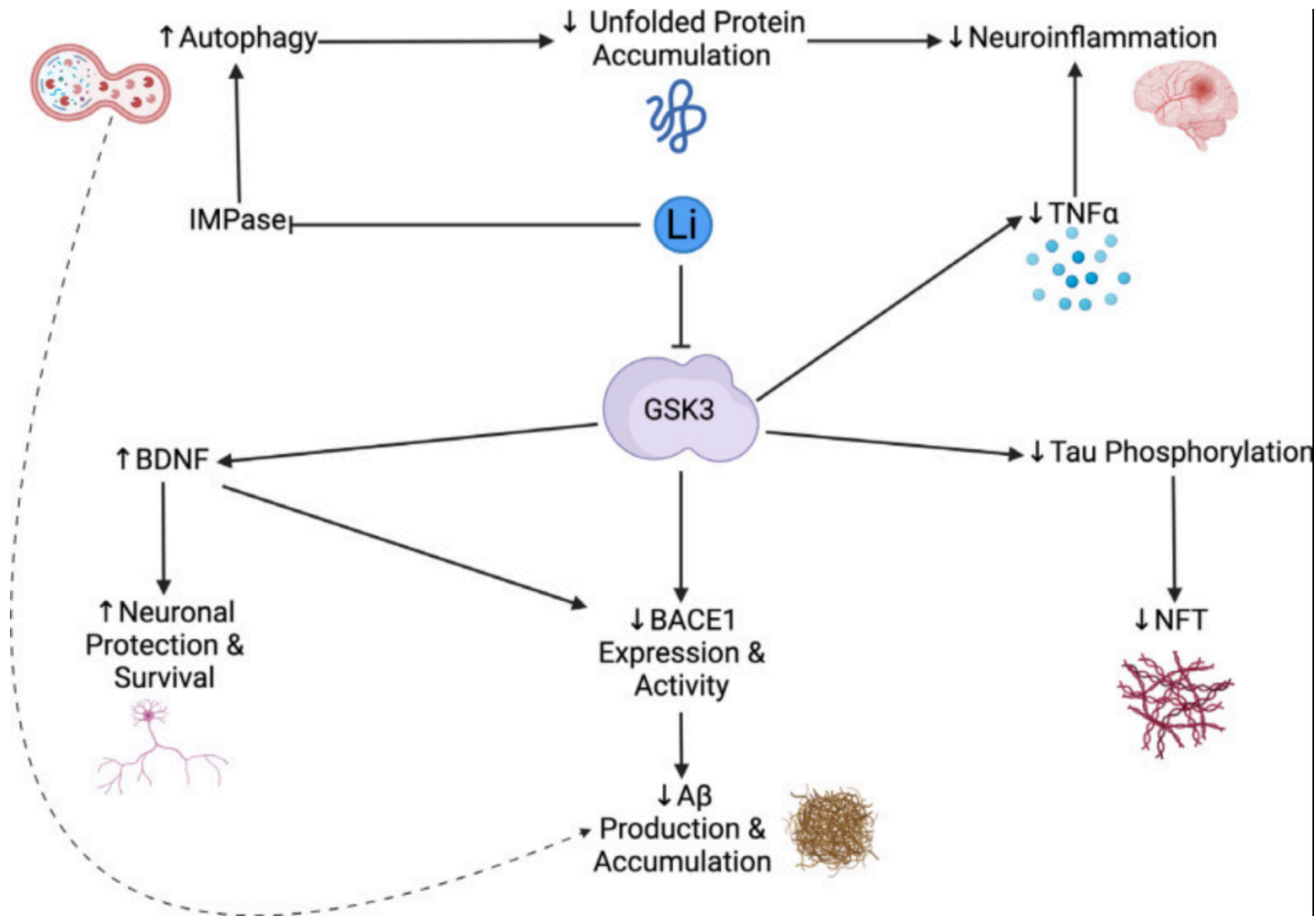
One caution with Lithium is that it has a litany of drug interactions, even in low doses. Check the Medication Compatibility Chart.

PMID: 35236261, 36436738



Lithium increases mitochondrial function, reduces inflammation, and protects the BBB





Lithium reduces neuroinflammation and induces BDNF

PMID: 35236261

Homeopathy

Homeopathy uses the principles of “like cures like” and the “law of minimum dose.”

The principle of “like cures like” states that a substance, which in large doses would cause similar symptoms to the patient, is then administered in minute amounts to treat the same symptoms. Hence like cures like.

The “law of minimum dose” says that the more minute the amount of a substance, the greater will be its therapeutic effect.

“It’s as if we give the body a red herring reason that it’s upset, so it has something to organize a response around. In other words, we tell the body it isn’t mad at brain cells, it’s actually mad at the remedy. And since it’s in such a small dose, the body gets to be successful, and fully resolve the issue. This is very calming to a body, and a brain.”

List in handouts - not an exhaustive list but a place to start.

Extremely easy and safe to use with kids of all age. Can be administered on sugar pellets or in a little sip of water held in the mouth for 30 seconds. I usually use the 30c OTC potency with P/P kids.

To prevent “discharging” the remedy, here are some guidelines:

Storage: Do not expose to cell phone or microwave radiation, or full-strength essential oils

Pellets: Do not touch them before popping them under your child’s tongue

Liquid: Use a glass cup only



Nasal ginsenosides

The “hope hit.” May be used if there’s a mood or energy crash after a flare. Nasal spray is fast acting.

Compounded blend of ginseng extracts and nicotinamide riboside. Ginsenosides from ginseng are the very parts that make a Botanical Avatar work so well, the triterpenoid saponins.

Ginsenosides protect the brain from excess excitatory brain chemicals, reduce microglial activation, and restore normal brain neuron function.

Has an effect on the same ion channels affected by glyphosate. Is a perfect follow-up nasal spray for kids who play outdoor sports on chemically-sprayed fields.

Healing to tissues. The more it’s used, the less it’s needed.

Cautions ~

In some children, this has a very stimulating effect. Start by using it in the morning only, with the lowest dose, and in only one nostril to test it out.

Some compounding pharmacies combine this with methylcobalamin. If a child has methylation issues, skip or substitute with hydroxocobalamin.

PMID: 28412215, 24678300



Addiction

Extremely high risk of addiction based on chemistry and structural changes in the brain.

Chicken or egg?

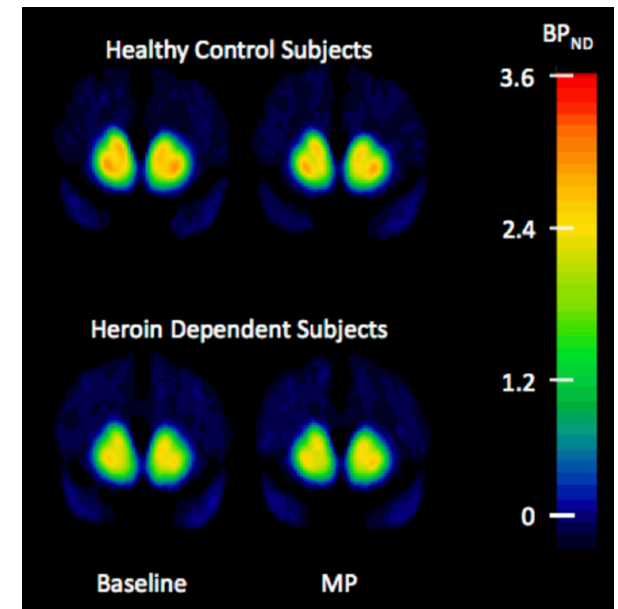
PET imaging studies have shown that addiction to a number of substances of abuse is associated with a decrease in dopamine D(2/3) receptor binding and decreased presynaptic dopamine release in the striatum.

Not just substances - screens/gaming, gambling, high-risk behaviors, etc.

If opiate, encourage appropriate MAT tx, ie: bupropion treatment. If trained properly, can be done in your office (if not addiction or psychiatric clinic, bypasses some FDA reporting/charting requirement.)

PMID: 22015315

Dopamine receptors





Recovery Essentials

Structure

Brain food

Peace of Mind

Dream Team

Dream Team

Beliefs

Parent, caregiver, and sibling support

Medical support village



Yes, their world gets smaller



False belief ~
smaller = less support

Parents need to be given permission to
rewrite that belief.

Their child can have disruptive
behaviors AND they can be
supported.

Parents, caregivers, and siblings

Check on how they're doing. Like, really...how.

Spend time in the appointment on them and developing their support plan.

Set up the Dream Team (the medical support team) for the sick child, but don't forget the other members of the family.

Siblings are often missed collateral damage. Have suffered a "death loss", and chaos, and loss of parents. Discuss with the parents about sibling support.

Excellent book for siblings by Dr. Lindsey Wells ~
"Super Sam! and the battle against PANS/PANDAS"



It takes a medical support village

Naturopathic/Functional Medicine Doctor

Allergist/Immunologist

Neurologist

Psychologist/Psychiatrist

Nutritionist

PANDAS/PANS-Aware Dentist

CranioSacral Therapist

School Nurse

Homeopathic Practitioner

Spiritual/Energetic Practitioner



Intention of collaboration

Setting the intention for collaboration among the healthcare Dream Team members STARTS WITH YOU.

Be mindful of unintentionally putting the parents in the middle of a difference of opinion of practitioners.

Pick up the phone/video and have a real conversation with the other practitioner.

Collaboration doesn't require agreement, but does require mutual respect and humility.

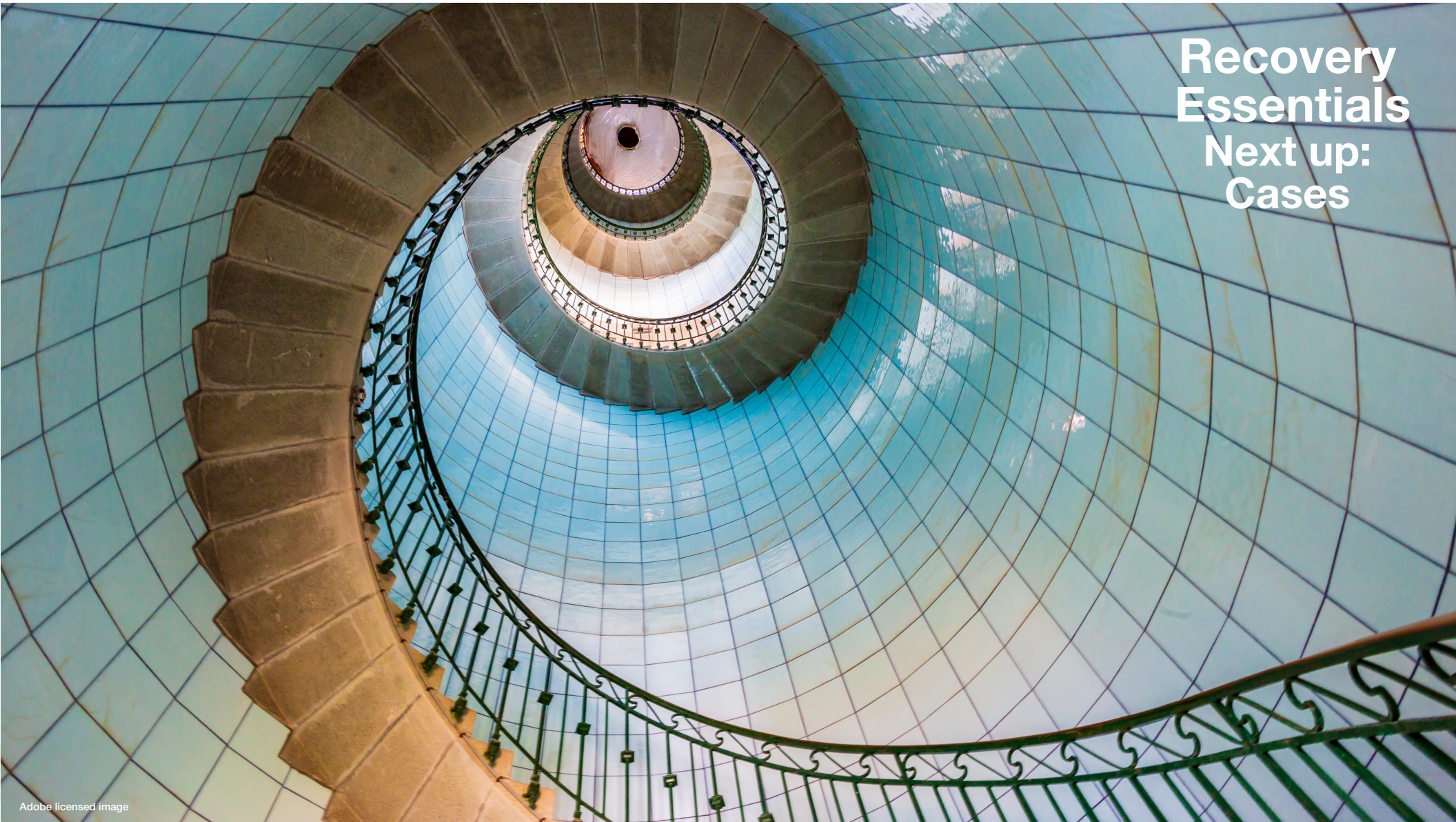
No standard of care due to lack of clinical trials. "Our review highlights the need for a comprehensive algorithm..." - meaning that none of us has "the only way".

Collaboration is essential for the child's recovery and trust.

Trusted practitioners become valuable allies in the child's life as he grows into adulthood.



PMID: 37251418



Recovery
Essentials
Next up:
Cases

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