

ADHD PLUS MINUS TREATMENT PLAN

+ NUTRITIONAL LITHIUM

Dr. James Greenblatt, MD

The plan below is part of a guide for practitioners to add elements (+) or remove them (-) from the patient's environment or lifestyle as treatment for ADHD symptoms. Biochemical individuality will determine the most important elements for each patient.

LITHIUM MECHANISM

Nutritional Lithium

Lithium (Li) is a naturally-occurring mineral, found in vegetables, grains, and drinking water. Average dietary intakes of lithium are approximately 0.5-3 mg daily (Goldstein et. al., 2016). In high daily doses of 600 to 1800mg of lithium carbonate, it is used as a pharmaceutical treatment of bipolar disorder.

In low daily doses of 1-10mg of lithium orotate, however, it is used as an effective nutritional-level treatment in certain subtypes of ADHD.

Nutritional lithium is not recommended for inattention-type ADHD. Rather, lithium is indicated for irritable, aggressive, hyperactive, or impulsive ADHD with tendencies for suicidal behaviour and/or substance abuse.

Lithium in the General Population

In population studies across the globe, natural lithium levels in drinking water are inversely correlated with suicide, aggression, and homicidal violence (Goldstein et. al., 2016; Liaugaudaite et. al., 2017).

Researchers have proposed that aggression is in fact a sign of a lithium-deficient state, and recently have suggested provisional recommended intakes set at a minimum of 1g/day for a 70kg adult, or the initiation of food fortification programs to ensure adequate universal intake (Szkarska et. al., 2019).

Evidence for ADHD

One study showed lithium outperforming methylphenidate in decreasing outbursts, irritability, and anti-social and oppositional behaviour in ADHD (Dorrego et. al., 2002). Lithium has also been shown to significantly reduce aggression in the context of ADHD (Steiner et. al., 2003; Connor et. al., 2006; List et. al., 2011)

Mechanism of Action

Lithium's anti-aggression and normothymic effect is due to its ability to modulate the activity of glutamate, dopamine, serotonin, GABA, acetylcholine, and glycine. It also inhibits glycogen synthase kinase-3 (GSK3), an effect which has strong anti-inflammatory outcomes in the brain (Beurel et. al., 2014). Inflammation has been shown to contribute to several mental health symptoms, including those associated with ADHD.

Other cellular mechanisms of Li include the increased production of BDNF, inhibition of neuronal apoptosis, and modulation of central nervous system calcium levels. Li also helps chaperone the important nutrients B12 and folate into the brain (Szkarska et. al., 2019).

These biochemical effects combine to significantly reduce aggression, suicidal behavior, irritability, hyperactivity, restlessness, and depression (Deepmala et al., 2014; Singh 2006; Dorrego et. al., 2002).

Minimizing Lithium Toxicity

While evidence supports the use of high-dose lithium in some behavioural and mood issues, the benefits must be weighed against serious side effects like damage to the kidneys, thyroid, muscle tissue, and auditory and visual systems. Low-dose nutritional lithium, on the other hand, shows many of the same mental health benefits as prescription lithium carbonate, with 100-200 times less toxicity and damage (Schrauzer et. al., 2002).

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TEST

Nutritional lithium supplementation will likely not raise blood lithium levels

and thus blood levels do not require monitoring, nor is there a therapeutic blood level to achieve. Scalp hair mineral analysis more effectively reveals long-term lithium status for patients with aggressive-type ADHD (Szklaarska et al., 2019). Often, hair tests come back with "undetectable lithium".

ESSENTIAL AND OTHER ELEMENTS							
	RESULT µg/g	REFERENCE INTERVAL	PERCENTILE				
			2.5 th	16 th	50 th	84 th	97.5 th
Calcium (Ca)	971	200- 750					
Magnesium (Mg)	84	25- 75					
Sodium (Na)	50	20- 180					
Potassium (K)	10	9- 80					
Lithium (Li)	< 0.004	0.007- 0.020					

INDICATIONS AND SAFETY

ADHD symptoms that benefit from Li treatment:

- Irritability and anger
- Impulsivity
- Suicidal tendencies
- Delinquent, oppositional, or aggressive behavior
- Substance use or family history of substance abuse

Safety

It is critical to note that a supplemental dose of elemental lithium of 1 mg daily is at least 200-fold less than the toxic dose of lithium. In some regions, natural dietary elemental lithium intakes of 10 mg daily have been observed with no adverse effects noted (Schrauzer et al., 2002). Lithium aspartate (not recommended) may cause headaches and brain inflammation in some individuals and should be avoided.

Some children may report feeling "off" or flat; if this occurs, discontinue the supplement.

TREAT

Use a capsule form of lithium orotate or lithium citrate. Avoid lithium aspartate. Liquid lithium is acceptable for children who cannot swallow capsules.

Dosing

- Age 14+: start at 1mg bid, consider increasing to 5mg qd after 30 days
- Age 12-13: Start at 1mg qd, consider increasing to 1mg bid after 30 days
- Age 12 and under: 1mg qd or 500mcg bid

You can expect to see a change in behaviour in 2-4 weeks of nutritional lithium treatment. If no change occurs after 3 months, discontinue.

SOURCES

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