# ADHD PLUS-MINUS TREATMENT PLAN

## +OMEGA 3 FATTY ACIDS

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.

## OMEGA 3 FUNCTION

Eicosapentaenoic acid (EPA) and docosahexaenoic (DHA) are omega-3 essential fatty acids that are crucial to mental and physical health. They are not synthesized de novo, and must be absorbed from the diet.

These omega-3s are unsaturated fatty acids that are preferentially incorporated into brain tissue and impact cell membrane fluidity, gene expression, dendritic branching of neurons, and protein diffusion and binding (Kitajka et al., 2004; Surette, 2008).

Sufficient levels of omega-3s are also required for proper serotonergic and dopaminergic function (Levant, 2013). Additionally, omega 3s decrease inflammatory cell function by various mechanisms (Calder, 2010).

## OTHER ESSENTIAL FATTY ACIDS

Other essential fatty acids are the omega-6s: gamma-linolenic acid (GLA), dihomo-gamma-linolenic acid (DGLA) and arachidonic acid (AA). Among many functions, this class has an overall pro-inflammatory effect on cells. Some researchers suggest that because omega-3s and -6s compete for enzymatic processing in the inflammatory cascade, the omega-6:omega-3 ratio is in fact more important than the absolute levels of either (Lands, 2014; LaChance, 2016).

Unfortunately, the Standard American Diet is typically low in omega-3 and high in omega-6, leading to an unfavourable dietary 6:3 ratio and negative effects on mental development and physical health (Simopolous, 2016; Healy-Stoffel, 2018).

## OMEGA 3 AND ADHD

Children with ADHD have lower estimated dietary intakes of omega-3s than controls (Fuentes-Albero, 2019). One study showed a higher rate of ADHD in children with low omega-3 intake compared to children with higher intake (Woo, 2014).

Low blood levels of omega-3 are also associated with higher risk of ADHD: three meta-analyses and even more recent studies have found lower EPA, DHA, total omega-3 levels, and increased ratio of 6:3 essential fatty acids in ADHD (Chang et al., 2018; Hawkey et al., 2014; LaChance et al, 2016; Yonezawa et al., 2018). Furthermore, omega-3 levels are inversely correlated with disorderly brain activity on EEG that is associated with ADHD (Sumich et al., 2009).

Many studies have shown the behavioural and cognitive benefit of omega-3 supplementation, including improvements in hyperactivity, attention, spelling, hostility, obedience, memory, reading ability, sleep, and overall clinical ADHD scores (Chang et al., 2018; Döpfner et al., 2019; Hawkey & Nigg, 2014; Milte et al., 2012; Milte et al., 2015; Rodríguez et al 2019; Widenhorn-Müller 2014; Yehuda et al., 2011).

Important to note is that improvement from omega-3 supplementation is partly dependent on baseline omega-3 status. A recent meta-analysis of fatty acid interventions concluded that the strongest benefits are seen in subgroups including children with ADHD or comorbid learning conditions, and in children with suboptimal baseline omega-3 status (Kirby et al., 2019). Other research confirms this by showing stronger response to high-dose EPA in children with ADHD with low baseline endogenous EPA levels than in children with higher baseline levels (Chang et al., 2019).

Additionally, omega-3 supplementation may significantly improve response to Ritalin when used as an adjunctive treatment in ADHD (Checa-Ros et al., 2019; Moghaddam et al., 2017; Perera et al., 2012).

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## INDICATIONS & TESTING

Patients with ADHD and concomitant learning conditions or documented low omega-3 status should be supplemented with omega-3 essential fatty acids.

Low essential fatty acid status has been associated with keratosis pilaris and generalized dermatitis.

Test: Essential fatty acid status can be assessed with a Comprehensive Fatty Acid Profile Test available in various labs.

## TREAT

If not testing, supplement 1-2g total EPA + DHA qd. Avoid supplementing higher than 2g of omega-3 fatty acids until testing for overt essential fatty acid deficiency.

When testing shows a deficiency of omega-3s specifically, supplement up to 4g EPA + DHA per day, in divided doses. Deficiency will likely be corrected by 6 months unless there is inefficient fat absorption. Once the omega-3 deficiency is corrected, it is important to use a supplement with both omega-3s and omega-6s to reduce the risk of omega-6 deficiency. If testing shows a global essential fatty acid deficiency, supplement with an omega-3 and -6 supplement.

## SAFETY

Intervention studies report high tolerability and low adverse effect risk (Königs & Kiliaan, 2016). The only major documented risk with omega-3 supplementation is an increase in clotting time. Avoid high dose fish oil supplementation in patients taking blood thinners and stop fish oil intake 2 weeks before surgery. Reported minor adverse events include nausea, diarrhea, unpleasant taste, and burping.

Long-term high-dose omega-3 fatty acid supplementation may competitively decrease levels of omega-6 essential fatty acids, most notably GLA. See treatment section above and consider a combination omega-3 and -6 supplement for longer-term use once overt omega-3 deficiency has been corrected.

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