



AUTISM SPECTRUM DISORDER AND ADHD



COULD THERAPEUTIC CARBOHYDRATE RESTRICTION BENEFIT?

REFERENCE HANDOUT

The evidence base for TCR in ASD and ADHD is currently weak but lines of evidence from epilepsy and mitochondrial disease studies, [mechanisms](#), and co-morbidity between conditions, point to a potential benefit of a TCR approach.



AUTISM SPECTRUM DISORDER

'At present, there is strong evidence that mitochondrial and metabolic dysfunction may underlie the complex pathophysiology of ASD' [Cheng et al](#)

1. Varesio C, Grumi S, Zanaboni MP, et al. Ketogenic Dietary Therapies in Patients with Autism Spectrum Disorder: Facts or Fads? A Scoping Review and a Proposal for a Shared Protocol. *Nutrients*. 2021;13(6):2057. doi:[10.3390/nu13062057](https://doi.org/10.3390/nu13062057)
2. Lee RWY, Corley MJ, Pang A, et al. A modified ketogenic gluten-free diet with MCT improves behavior in children with autism spectrum disorder. *Physiol Behav*. 2018;188:205-211. doi:[10.1016/j.physbeh.2018.02.006](https://doi.org/10.1016/j.physbeh.2018.02.006) PDF
3. Li Q, Liang J, Fu N, Han Y, Qin J. A Ketogenic Diet and the Treatment of Autism Spectrum Disorder. *Front Pediatr*. 2021;9. doi:[10.3389/fped.2021.650624](https://doi.org/10.3389/fped.2021.650624)



AREAS OF OVERLAP BETWEEN ASD, ADHD, AND EPILEPSY

ASD and ADHD can be [co-morbid](#). They share [common features](#) in presentation and pathophysiology that include [mitochondrial dysfunctions](#), [genetics](#), and the [microbiome](#). [Allergies](#), [food sensitivities](#), and [fussy eating](#) are common. The Gluten-free/Casein-free dietary approach is used in both ASD and ADHD with some success (see 1. and 2. below). When compared to the gluten-free casein-free diet, the ketogenic diet showed additional benefits (see 3. below).

1. Ly V, Bottelier M, Hoekstra PJ, Arias Vasquez A, Buitelaar JK, Rommelse NN. Elimination diets' efficacy and mechanisms in attention deficit hyperactivity disorder and autism spectrum disorder. *Eur Child Adolesc Psychiatry*. 2017;26(9):1067-1079. doi:[10.1007/s00787-017-0959-1](https://doi.org/10.1007/s00787-017-0959-1)
2. Alamri ES. Efficacy of gluten- and casein-free diets on autism spectrum disorders in children. *Saudi Med J*. 2020;41(10):1041-1046. doi:[10.15537/smj.2020.10.25308](https://doi.org/10.15537/smj.2020.10.25308)
3. El-Rashidy O, El-Baz F, El-Gendy Y, Khalaf R, Reda D, Saad K. Ketogenic diet versus gluten free casein free diet in autistic children: a case-control study. *Metab Brain Dis*. 2017;32(6):1935-1941. doi:[10.1007/s11011-017-0088-z](https://doi.org/10.1007/s11011-017-0088-z). PDF

Behavioural improvements seen in [epilepsy](#) (can be [co-morbid](#)) and [ASD](#) patients indicate that further research investigating the impact of a ketogenic diet on behaviour in ADHD may be warranted.

1. IJff DM, Postulart D, Lambrechts DAJE, et al. Cognitive and behavioral impact of the ketogenic diet in children and adolescents with refractory epilepsy: A randomized controlled trial. *Epilepsy Behav.* 2016;60:153-157. doi:[10.1016/j.yebeh.2016.04.033](https://doi.org/10.1016/j.yebeh.2016.04.033) ABSTRACT
2. Luz IR, Pereira C, Garcia P, et al. Ketogenic Diet for Refractory Childhood Epilepsy: Beyond Seizures Control, the Experience of a Portuguese Pediatric Centre. *Acta Médica Portuguesa.* 2019;32(12):760-766. doi:[10.20344/amp.12184](https://doi.org/10.20344/amp.12184) PDF



ADHD

There are a significant number of diet related studies for ADHD that lack consensus. Variations in the dietary approaches yield mixed results. Though none specifically use a low-carbohydrate approach, common themes include exclusion protocols and/or the removal of sugars/gluten/casein(dairy) which has many features in common with the therapeutic carbohydrate restriction approach.

Some of these results may also be influenced by different causal [subtypes of ADHD](#) where food choices may affect some more than others.

The totality of evidence suggests the potential benefits of an elimination diet (e.g. the few foods or oligoantigenic diet) in ADHD. With any dietary approach, nutritional sufficiency and the exclusion of ultra-processed food should be considered the first step.

1. Pelsser LM, Frankena K, Toorman J, Pereira RR. Diet and ADHD, Reviewing the Evidence: A Systematic Review of Meta-Analyses of Double-Blind Placebo-Controlled Trials Evaluating the Efficacy of Diet Interventions on the Behavior of Children with ADHD. *PLOS ONE.* 2017;12(1):e0169277. doi:[10.1371/journal.pone.0169277](https://doi.org/10.1371/journal.pone.0169277)
2. San Mauro Martin I, Sanz Rojo S, González Cosano L, Conty de la Campa R, Garicano Vilar E, Blumenfeld Olivares JA. Impulsiveness in children with attention-deficit/hyperactivity disorder after an 8-week intervention with the Mediterranean diet and/or omega-3 fatty acids: A randomised clinical trial. *Neurologia (Engl Ed).* Published online December 26, 2019:S0213-4853(19)30132-X. doi:[10.1016/j.nrl.2019.09.007](https://doi.org/10.1016/j.nrl.2019.09.007)
3. Bosch A, Bierens M, de Wit AG, et al. A two arm randomized controlled trial comparing the short and long term effects of an elimination diet and a healthy diet in children with ADHD (TRACE study). Rationale, study design and methods. *BMC Psychiatry.* 2020;20(1):262. doi:[10.1186/s12888-020-02576-2](https://doi.org/10.1186/s12888-020-02576-2)
4. Pelsser LMJ, Frankena K, Toorman J, Savelkoul HFJ, Pereira RR, Buitelaar JK. A randomised controlled trial into the effects of food on ADHD. *Eur Child Adolesc Psychiatry.* 2009;18(1):12-19. doi: [10.1007/s00787-008-0695-7](https://doi.org/10.1007/s00787-008-0695-7) PDF

Individual responses to dietary composition can vary so appropriate medical monitoring is advised. Patients who are taking medication should consult with their doctor as the following [clinical guidelines](#) (Society of Metabolic Health Practitioners - Hite et al.) may need to be considered.



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