

Dietary omega-3 fatty acids and locomotor activity in an animal model of attention deficit hyperactivity disorder (ADHD)

Klaus W. Lange, Ewelina Makulska-Gertruda, Jakob Reisinger, Thomas-A. Sontag, and Joachim Hauser

Department of Experimental Psychology, University of Regensburg, 93040 Regensburg, Germany

Corresponding author: Klaus W. Lange, PhD, Professor, Department of Experimental Psychology, University of Regensburg, 93040 Regensburg, Germany

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ABSTRACT:

Background: Attention deficit hyperactivity disorder (ADHD) is the most frequent behavioral disorder of childhood and is characterized by hyperactivity, attention problems and impulsivity. Pharmacological and behavioral therapies have been shown to be effective. In addition, the role of dietary compounds in the etiology and possibly the treatment of ADHD has attracted increasing attention. For example, the lack of dietary essential fatty acids has been suggested to be associated with symptoms of ADHD in humans.

Objective: To investigate the effects of omega-3 polyunsaturated fatty acids (n-3 PUFAs) on locomotor activity in the spontaneously hypertensive rat (SHR) which has been proposed as an animal model of ADHD.

Methods: Two groups of randomly assigned spontaneously hypertensive rats were fed with either n-3 PUFA-deficient or n-3 PUFA-enriched food (based on AIN93G) for six weeks and this was continued during the phase of behavioral testing. Locomotor activity was subsequently assessed using an open field test.

Results: The results showed a marked difference in locomotor activity between the two groups of SHRs. In comparison with rats fed with n-3 deficient food, the animals on an n-3 enriched diet showed a statistically significant decrease in motor activity as assessed by the distance traveled.

Conclusions: The present study demonstrates a marked reduction in locomotor activity following an n-3 PUFA-enriched diet in SHRs, i.e. the dietary enrichment with n-3 PUFAs reduced the motor activity in an established animal model of ADHD. Dietary n-3 PUFAs may therefore play a role in the pathophysiology of ADHD.

Key words: omega-3 polyunsaturated fatty acids, attention deficit hyperactivity disorder, ADHD, animal model, spontaneously hypertensive rat, SHR, motor activity