**Dietary omega-3 fatty acids and behavior in an animal model of attention deficit hyperactivity disorder (ADHD)**Ewelina Makulska-Gertruda¹, Andreas Reissmann¹, Oliver Tucha², and Joachim Hauser¹

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**Key words:** Omega-3 fatty acids, attention deficit hyperactivity disorder, animal model, spontaneously hypertensive rat, locomotor activity, working memory

**Background:** Attention deficit hyperactivity disorder (ADHD) is the most frequent behavioral disorder of childhood and is characterized by hyperactivity, attentional problems and impulsivity [1]. Pharmacological and behavioral therapies have been shown to be effective. In addition, the role of nutrition compounds in the etiology and treatment of ADHD has been discussed. For example, the lack of nutritional essential fatty acids has been suggested to be associated with symptoms of ADHD in humans.

**Objective:** To investigate the behavioral effects of omega-3 fatty acids on locomotor activity and working memory in the spontaneously hypertensive rat (SHR) which has been proposed as an animal model of ADHD [2].  
**Methods:** Two groups of randomly assigned SHRs were fed with either omega-3 fatty acid-deficient or omega-3 fatty acid-enriched food for six weeks and this was continued during the phase of behavioral testing. Locomotor activity was subsequently assessed using an open field test. Working memory was tested using a radial arm maze.

**Results:** The results showed a marked difference in locomotor activity between the two groups of SHRs. In comparison with rats fed with omega-3 fatty acid-deficient food, the animals on an omega-3 fatty acid-enriched diet showed a statistically significant decrease in various parameters assessing locomotor activity, such as the time spent and distance traveled in both the center and periphery of the open field (p < 0.05). No significant differences between the two groups were observed with regard to the measures related to working memory as assessed with the radial arm maze.

**Conclusion:** The present study demonstrated a marked reduction in locomotor activity following an omega-3 fatty acid-enriched diet in SHRs, i.e. the dietary enrichment with omega-3 fatty acids reduced the hyperactivity in an established animal model of ADHD without affecting working memory. Dietary omega-3 fatty acids may play a role in the pathophysiology of ADHD.

**References:**

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