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## **FISH OIL SUPPLEMENTATION DURING PRE - AND PERI-NATAL PERIOD: BEHAVIORAL PHENOTYPING OF TRANSGENIC MOUSE MODEL OF ALZHEIMER'S DISEASE**

Vladimir Avramovic, Desanka Milanovic, Marjana Brkic, Nikolina Babic, Milena Jovic, Milka Perovic, Vesna Tesic, Sanja Ivkovic, Selma Kanazir  
Institute for Biological Research, University of Belgrade, Blvd. Despota Stefana  
142, 11000 Belgrade, Serbia  
E-mail address: vladimir.avramovic@ibiss.bg.ac.rs

Clinico-pathological features of Alzheimer's disease (AD) include memory loss, cognitive impairment, depression and social isolation. Epidemiological studies show a positive role of omega-3 poly-unsaturated fatty acids (n-3 PUFA) on prevention and mitigation of mild AD pathology. The 5xFAD mouse model used in this study bears five mutations linked to familiar forms of AD and recapitulates in a few months the main features of AD. This study was aimed to evaluate the effect of pre- and peri-natal omega-3 fatty acids supplementation on cognitive and non-cognitive behavior of 5xFAD mice .

The fish oil, an abundant source of n-3 PUFA, was supplemented via oral gavages five days per week to dams throughout whole pregnancy and lactation. Six-month old offsprings were subjected to a battery of behavioral tests in order to assess typical rodent behavior, general locomotor activity, memory, depressive-like and social behavior.

We have observed that the fish oil-supplemented 5xFAD offspring showed no changes in tests assessing typical rodent behavior, such as marble and nesting test, in comparison with 5XFAD control mice. When assessing depression and anxiety like behavior in a light-dark box, forced swim and open field behavioral tests significant changes were observed only between non-transgenic and transgenic mice. However, in three chambers test, used for assessing social behavior, fish oil- treated 5xFAD mice showed a significant increase in sociability, evaluated by increased time spent in compartment with a mouse vs. empty compartment. Moreover, when the social novelty was tested through the introduction of a new mouse, the same trend was observed. This study shows that the pre- and peri-natal fish oil supplementation in 5xFAD mice can exert

long-lasting effects inducing the significant improvement in some of the behavioral aspects of AD pathology in the adult offspring.

**Keywords:** *omega-3, Alzheimer disease, 5xFAD, mouse behavior*