Omega-3 Reverts Oxidative Damage and the Inhibition of Mitochondrial Respiratory Chain in Animal Model of Depression

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Introduction: Major depression is a heterogeneous psychiatric disorder and its pathophysiology is not clearly established. Most depressed patients do not achieve complete remission of symptoms, and there is the necessity of new therapeutic alternatives. Omega-3 has been highlighted in this scenery. Moreover, some studies have shown oxidative stress and mitochondrial dysfunction are connected with major depression. Therefore, we have investigated the effects of omega-3 on behavioral and biochemical parameters in rats submitted to chronic mild stress (CMS).

Material and Methods: Male Wistar rats were submitted to CMS and after 40 days, omega-3 was administrated at the dose of 500mg/kg, orally, once a day, during 7 days, 60 min prior to anhedonia test. Body weight was measured in the beginning and in the end of the experiment. After last weighing, the animals were killed by decapitation, the brain was removed and the prefrontal cortex, hippocampus, striatum, cerebellum and posterior cortex were isolated.

Results and Discussion: The animals submitted to CMS presented anhedonia, there was no significant weight gain, as well they presented increase in the lipid peroxidation and protein carbonylation levels, and inhibition of activities of complexes I and IV of mitochondrial respiratory chain. The treatment with omega-3 did not reverse anhedonia, but reversed the body weight change, the increase in the lipid peroxidation and protein carbonylation levels, and partially reversed the inhibition of complexes of the mitochondrial respiratory chain. The results corroborate with studies that show major depression is associated with mitochondrial dysfunction and oxidative stress, and showed that omega-3 supplementation can reverse some of these changes. It is probable that omega-3 reverses these changes due to its antioxidant capacity, and the reduction of oxidative damage may reestablish the activity of mitochondrial respiratory chain.

Conclusions: The results support studies that indicate omega-3 presents great potential to help in the treatment of major depression.

Keywords: Chronic mild stress. Omega-3. Mitochondrial dysfunction.
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