

P072 Dietary enrichment with eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) reverses age-related decreases in the GluR2 and NR2B glutamate receptor subunits

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Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are omega-3 polyunsaturated fatty acids (PUFA), which have structural and signalling roles. Ageing is associated with a decrease in PUFA in brain glycerophospholipids and deficits in cognition, which correlates with decreases in specific glutamate receptor subunits. We investigated if treatment with EPA and DHA reverses age-related decreases in GluR2 and NR2B subunits. 24 month-old male Wistar rats were fed a diet supplemented for 12 weeks with 145-160 mg/kg EPA and 95-110 mg/kg DHA, by addition of Maxepa® oil. Controls received a standard powdered diet. Animals were killed, the brain hemispheres frozen and used for western blot analysis or for glycerophospholipid and fatty acid analysis after dissection into sub-regions. There was a significant age-related decrease of 22% in GluR2, and a similar decrease of 24% in NR2B (both $p < 0.05$), both reversed by supplementation. No effect of age or supplementation was identified for either GluR1 or NR1 subunits. Changes in fatty acid composition and glycerophospholipid content were assessed in the prefrontal cortex, striatum and hippocampus. Age-related decreases in DHA were corrected by supplementation in most glycerophospholipids. Therefore, PUFA treatment reversed the age-related decreases in GluR2 and NR2B and partially rectified structural DHA losses. This supports the neuroprotective potential of omega-3 fatty acids in ageing and suggests a potential therapeutic effect in age-related neurodegeneration.