**Short-term fish oil treatment suppresses the development of dystrophic neurites in the parietal cortex of 5xFAD AD mouse model during the early phase of the disease**

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Dystrophic neurites (DNs) are one of the neuropathological characteristics of Alzheimer's disease (AD) and represent the initial phase of neurodegeneration. Microtubule disruption in presynaptic dystrophic neurites that surround plaques impairs axonal transport and leads to the exacerbation of amyloid pathology in AD. Microglia plays a pivotal role in AD pathology as it is able to constitute a physical barrier around amyoid plaques and limit the accumulation of protofibrilar amylod beta around the fibrillar plaque core. In such a way microglia can mechanically shield the surrounding neurites from the neurotoxic protofibrillar AÎ² aggregates. The use of supplements with omega-3 (Ï‰3) fatty acids (FAs), docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), such as fish oil, is widespread due to proposed beneficial effects on the nervous system. High DHA consumption has been also associated with reduced risk and lessened AD pathology, yet the mechanisms and therapeutic potential of these supplements remain elusive. We analyzed the effects of the short-term fish oil (FO) supplementation on 4 months old 5xFAD mice, a mouse model with fast and robust development of the AD pathology hallmarks such as amyloid plaques and dystrophic neurites. We showed that even the short treatment with FO can affect the microglia clustering around amyloid plaques and increase the microglial plaque envelopment. Consequently, the AÎ² accumulation was reduced and the appearance of DNs substantially suppressed. Our findings suggest that increased DHA consumption may play and important role in modulating microglial response and ameliorating AD pathology at least in the early phase of the disease.

**Poster Position: 4B**