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The anti-inflammatory properties of DHA have been largely demonstrated *in vitro* and *in vivo* but research gaps remain regarding the contribution of the oxygenated metabolites. Among them, we are focusing on prostaglandin-like molecules termed Neuroprostanes (NeuroPs) which are produced through free-radical-mediated peroxidation of DHA. We hypothesized that these specific molecules which are highly reactive and produced in abundance during oxidative stress and inflammation could contribute to the anti-inflammatory properties of DHA.

Human peripheral blood mononuclear cells were isolated from healthy donors by Ficoll density gradient centrifugation. Monocytes were differentiated into resting macrophages (RM) for 6 days (37°C, 5% CO_2). RM were exposed to 2 different types of NeuroPs (i.e. 14-A_4-NeuroP and 4-F_{4t}-NeuroP, 10 µM) or ethanol (vehicle 0.15%) during 30 min. Then LPS (100 ng/mL) was added for 6 hours to induced inflammatory response.

Both types of NeuroPs (14-A_4-NeuroP and 4-F_{4t}-NeuroP) significantly decreased the mRNA levels of IL-6 (-49% and -26% respectively) and MCP-1 (-55% and -24 % respectively). Secretion of TNFα and MCP-1 was also reduced when RM were exposed to 14-A_4-NeuroP (-10%, ns and -34%, $p<0.05$) and 4-F_{4t}-NeuroP (-12%, $p<0.01$ and 25%, ns). Preliminary results regarding the expression and phosphorylation of IκBα suggest that 4-F_{4t}-NeuroP could exert its anti-inflammatory effects through the inhibition of IκBα phosphorylation. Finally, cotransfection of luciferase reporter vector with hPPARγ expression vector performed on Cos-7 cells suggests that NeuroPs probably act independently of PPARγ.

In conclusion, these results suggest that the anti-inflammatory properties of DHA could be mediated, at least in part, by NeuroPs which corroborates the importance of oxidative stress in cell signaling.