are precursors of arachidonic acid (AA; 20:4n-6) and docosahexaenoic acid (DHA; 22:6n-3) respectively which are key structural components of brain cell membrane phospholipids and precursors of bioactive lipid messengers (neuroprotectins, endocannabinoids, resolvins) involved in the regulation of inflammation. Most DHA and AA accumulate in the brain during the perinatal period via placenta and milk. In this work, we studied whether a dietary deficiency in ALA during perinatal period alters microglia activity and spine density in the brain of mice. For this purpose, mice were submitted to a diet deficient or not in ALA throughout pregnancy and lactation and microglia morphology, phenotype and function were analyzed in the brain of pups at post-natal day 21 (PND21). We show that microglia from mice fed with an ALA deficient diet present altered cytokine/chemokine expression profile and phagocytic activity. In addition, spatial memory and synaptic activity were altered in the hippocampus of these mice. All together, our results show that dietary n-3 PUFAs deficiency impairs microglia and synaptic pruning.

Fish oil supplementation in CCl4 injured rodents exclusively suppressed enzymatic and non-enzymatic lipid peroxidation of DHA and EPA (SUNDAY, M4.07)

Presenter Last Name: Lee

Fish oil contains high amount of omega-3 polyunsaturated fatty acids (PUFAs), particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), and helps in reducing risk of neurodegenerative diseases and coronary heart diseases. Because of the high numbers of double bonds, they are prone to undergo lipid peroxidation *in vitro* and *in vivo*. Many of the products generated through this process are claimed either to be bioactive or toxic. We, therefore, investigated the effect of fish oil supplementation with CCl_4 liver injured rats. Male Sprague Dawley rats were randomized into five groups: 1) water (Control), 2) canola oil, 3) CCl_4, 4) fish oil (omega-3, 350 mg/kg), 5) fish oil + CCl_4. Rats were treated orally once a day, for four weeks. Canola oil was used as vehicle for all administrations. Oxidised lipid mediators and their precursors were determined by LC/MS/MS. Compared with canola oil and control groups, similar levels of EPA and DHA were elevated and remained in the liver in omega-3 fed group even after exposure to CCl_4. No significant differences in the levels of F_2-isoprostanes and isofurans (from arachidonic acid), F_2-dihomo-isoprostanes and dihomo-isofurans (from adrenic acid) of non-enzymatic lipid peroxidation pathway in treated and non-treated samples were found. However, 8-F_{3t}-Isoprostane (from EPA), and 4(RS)-4-F_{4t}-Neuroprostane, 10-F_{4t}-Neuroprostane and neurofurans (from DHA) of non-enzymatic lipid peroxidation pathways, and hydroxyeicosatetraenoic acids products (from arachidonic acid) and resolvins (from EPA and DHA) of enzymatic pathway were significantly reduced in rats fed with fish oil, and similarly in the presence of CCl_4. This study shows that dietary fish oil supplementation specifically inhibited lipid oxidation in both enzymatic and

non-enzymatic pathways related to EPA and DHA; their role appears to be biphasic *in vivo*.

Can fish oil supplementation influence 8-13 year olds' school achievement? (MONDAY, N11.04)

Presenter Last Name: Lee

Background: Omega-3 (ω-3) PUFA derived from marine sources plays a fundamental role in brain development and cognitive function but few studies have investigated their effects on academic achievement using classroom tests. Aim: To investigate whether fish oil supplementation affected academic achievement and behaviour of 8-13 year olds. Methods: A 15 week double-blind randomised placebo controlled study was undertaken with 209 healthy mainstream school children. Children consumed either 900 mg of fish oil (540 mg EPA, 360 mg DHA) or placebo on 5 days of the week at school. Academic ability was investigated using the Thurstone Word Fluency Tests (testing fluency and spelling), the NZ generated asTTle reading test and maths basic facts tests. Behaviour and attitude were investigated using questionnaires completed by children, parents and teachers. Findings: Fish and seafood consumption was low as determined by recording children's previous day's intake (median (25, 75% percentiles): 4.0 (2.0, 8.0) servings over 15 weeks). Fish oil supplementation did not affect academic achievement in the groups as a whole. However, a subgroup of children, 8-9 year olds, showed improvements in a spelling error test with fish oil compared to placebo (mean (95%CI) difference: -6.18 (-4.42, 1.69)%, P=0.04, F=4.5 (1,56)df, treatment*age interaction P=0.03). Significant improvements in division scores were identified in highly literate children with fish oil compared to placebo (2.24 (0.32, 4.16), P=0.02, F=5.43 (1,63)df, treatment*literacy interaction P=0.03). Behaviour and attitude reported by parents and teachers did not differ. Children consuming fish oil reported, at 4 and 15 weeks, significant improvements related to getting along with others compared to placebo, a trend also reflected in the teacher questionnaires. Conclusions: Although no generalised effect was found for fish-oil supplementation in a heterogeneous population, the academic gains for some groups of children in some subject areas warrants further exploration.

Impact of TT mutant homozygote in CDH13 genes on adiponectin level in patients with statin treatment (MONDAY, S5.02)

Presenter Last Name: Lee

Adiponectin is expressed in adipose tissue and regulated by smoking, obesity, and genetic factors, such as CDH13 contributed the development of diseases.