

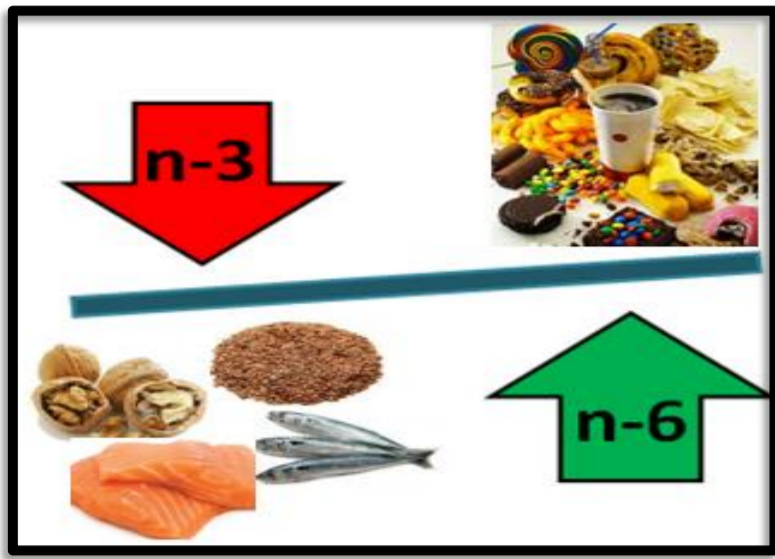
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Introduction

Over the last decades, human nutritional intake has undergone through major changes characterized by increased omega-6:omega-3 ratio (1-4 : 1) → (10-20:1).

This unbalanced dietary fatty acid intake has caused a major increase in inflammatory-related disorders.



Essential omega-3 polyunsaturated fatty acids (PUFAs):

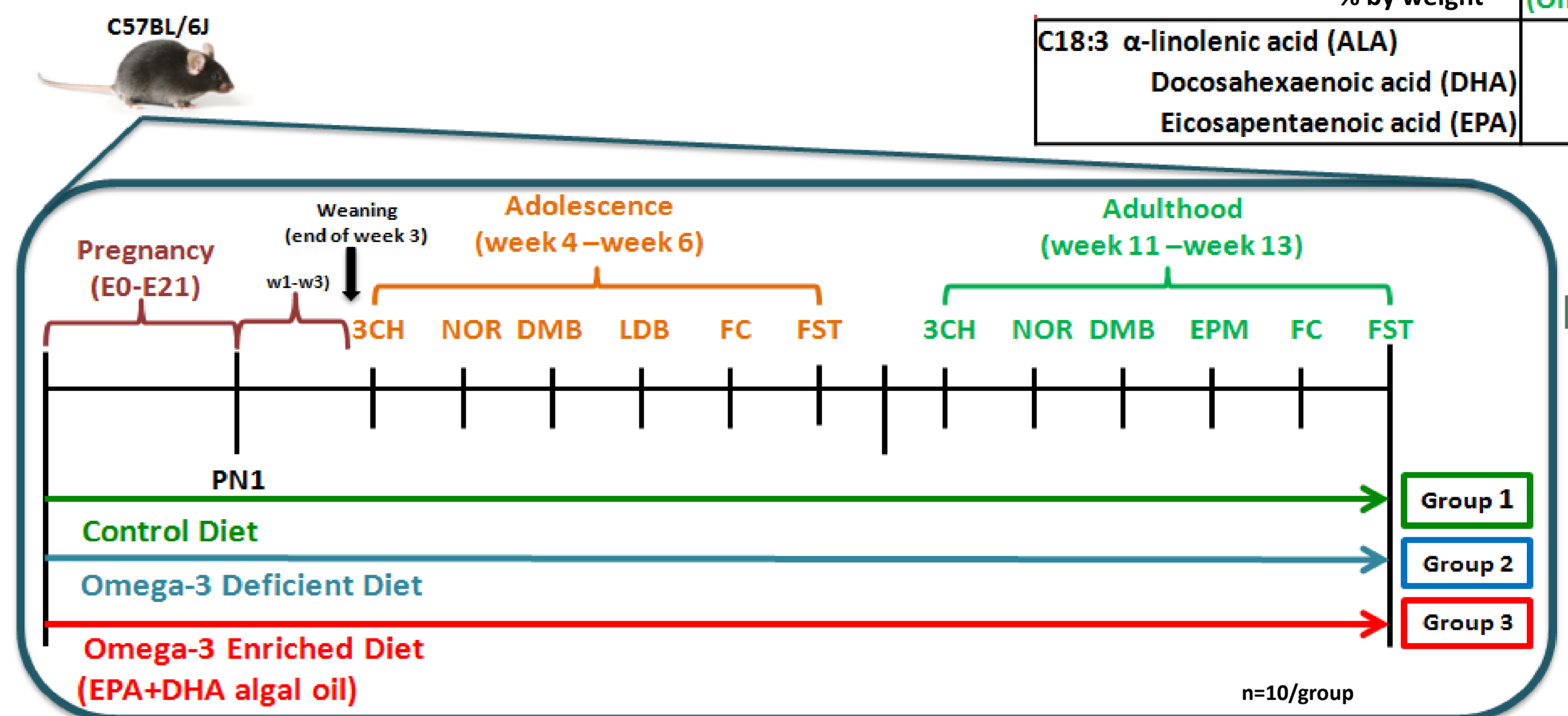
- Most abundant in brain [1].

- Key players in brain development and function, especially during perinatal development and early postnatal period [2].

AIM: To assess the effects of omega-3 PUFAs supplementation or deficiency, from gestation through to adulthood, on cognition, depressive-like behaviour, sociability, anxiety and on brain lipid composition in murine offspring.

Methods

Experimental design:



Diets:

	% by weight	Deficient (Omega 3-)	Control	Enriched (Omega 3+)
C18:3 α-linolenic acid (ALA)		0	0.44	0.44
Docosahexaenoic acid (DHA)		0	0	0.66
Eicosapentaenoic acid (EPA)		0	0	0.35

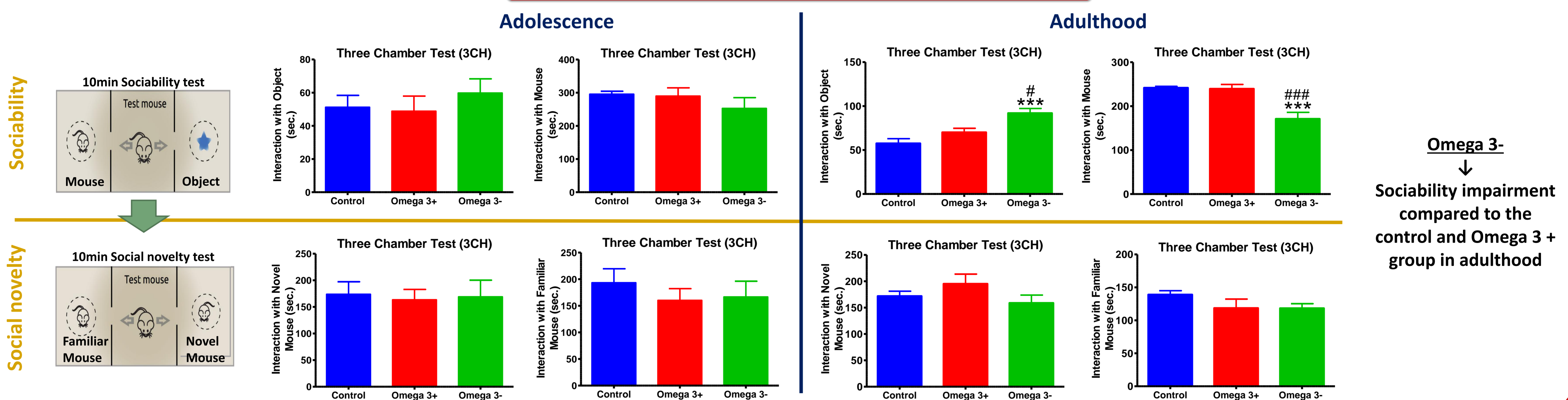
1g EPA+DHA/100g diet



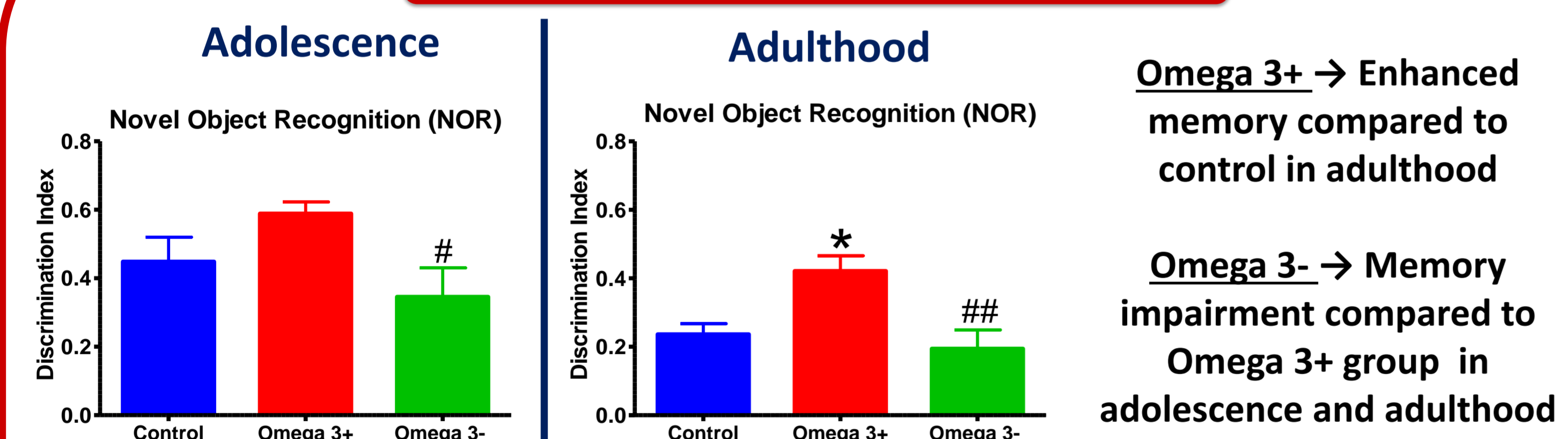
Statistical analysis: → 1 way Anova followed by Tukey's post-hoc analysis. * - Compared to Control Group/ # - Comparison between Omega 3+ and Omega 3- groups

Results

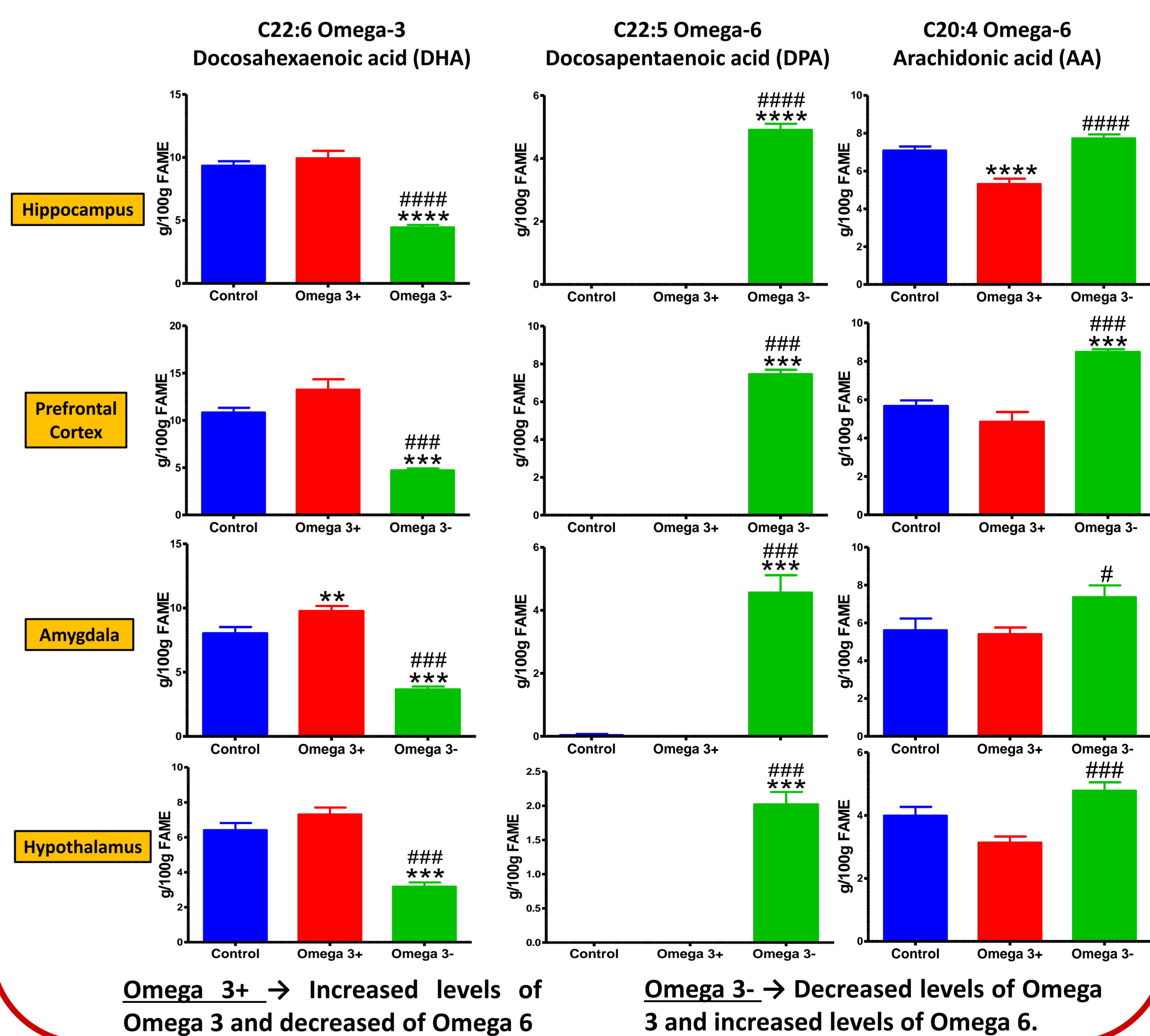
Social behaviour



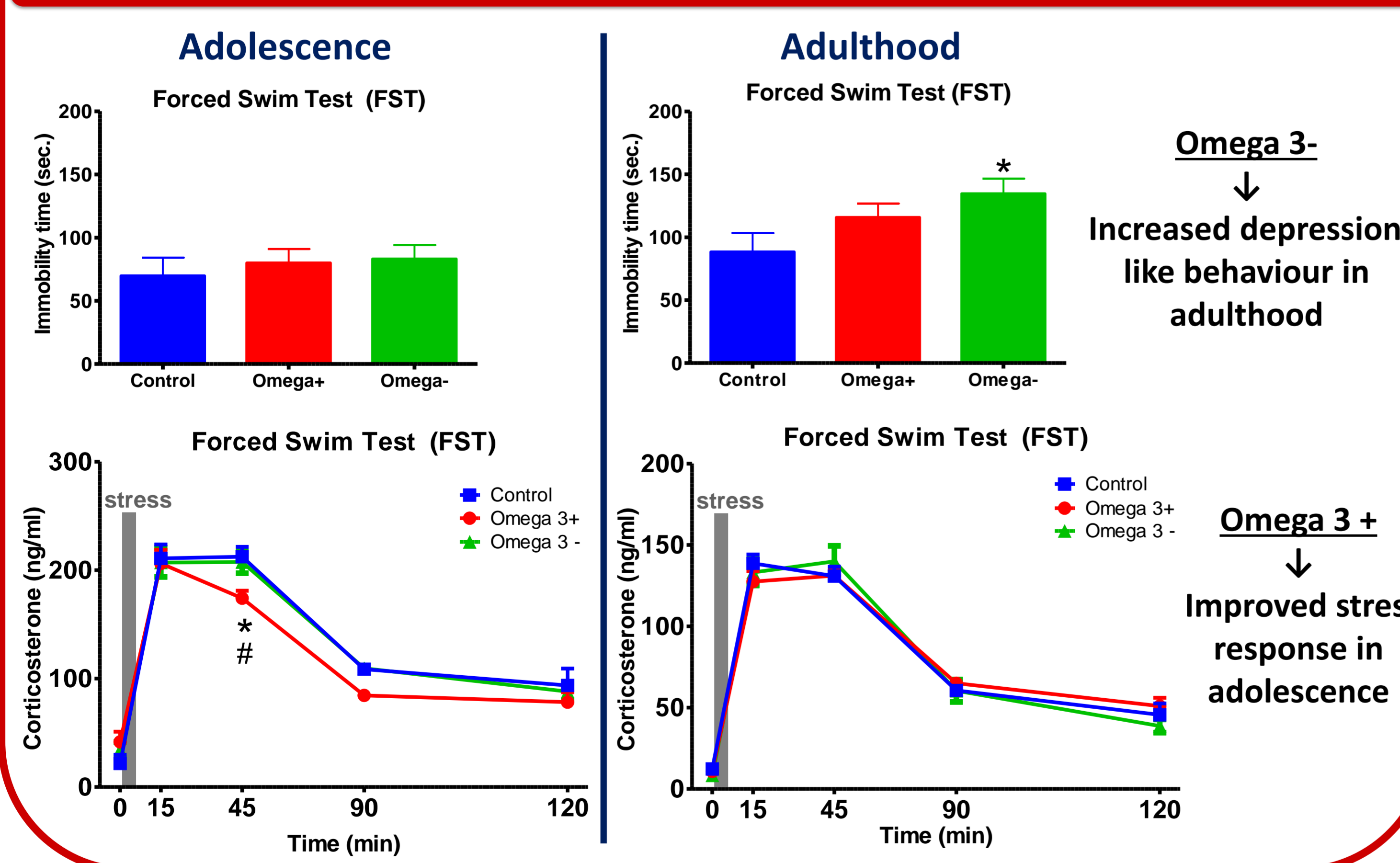
Cognition



PUFAs brain composition



Depression-like behaviour/HPA axis response to stress



References

- Innis, S.M., Omega-3 Fatty acids and neural development to 2 years of age: do we know enough for dietary recommendations? *Journal of pediatric gastroenterology and nutrition*, 2009. **48**: p. S16-S24.
- Janssen, C.I., et al., Impact of dietary n-3 polyunsaturated fatty acids on cognition, motor skills and hippocampal neurogenesis in developing C57BL/6J mice. *The Journal of nutritional biochemistry*, 2015. **26**(1): p. 24-35.

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Conclusions

- Omega-3 PUFAs deficiency caused impairments in cognition, sociability and depression-like behaviour.
- Omega-3 PUFAs supplementation enhanced cognition and stress response.
- The behavioural effects may be related with an increase of Omega-3 PUFAs in the brain.
- Omega-3 PUFAs supplementation/deficiency effects were more pronounced in adulthood than adolescence.
- These findings show the importance of n-3 PUFA intake on brain development indicating their possible implications in psychiatric disorders.