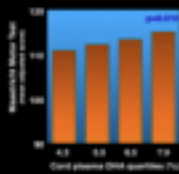


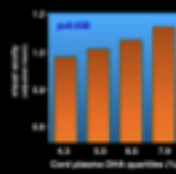
# Omega-3 LCPUFA are they really brain foods?

Role of LCPUFA during windows of opportunity throughout life on cognition and behavior

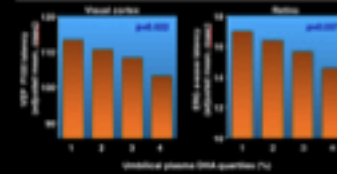
Brain development, as reflected by movement quality at 7 years of age, is positively related to DHA status at birth (n=328) (Baker, 2008)



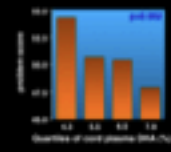
Brain maturation, as reflected by visual acuity at 8 years of age, is positively related to DHA status at birth (n=328)



Speed of visual information processing at 8 years of age is higher, the higher the DHA status at birth (n=328)



Internalizing behavior (CBCL) of formula-fed children at age 7 is less problematic, the higher their DHA status at birth (n = 114, Kosterink, 2010)



## Early 'programming' of brain function by perinatal LCPUFA availability?



- Various 'brain' outcomes at 7-8 years of age are positively related to prenatal exposure to DHA.
- None of these outcomes correlated significantly with DHA status at follow-up.
- Maternal supplementation during pregnancy with DHA or fish oil hardly benefits later child brain function (Helland, 2008; Makrides, 2010; Smithers, 2011).
- Since supplementation usually started around mid-pregnancy, this may have been too late to initiate a successful programming response.

## Are there other windows of opportunity for LCPUFA in brain function?



- Brain development continues until after age 20 (Gogtay, 2004; Paus, 2005; Toga, 2006)
- In this period development of higher order cognitive functions takes place.
- DHA increases prefrontal cortex activation (Mc Namara, 2010).
- Higher fish consumption at age 15 associated with better cognition at age 18 (Aberg, 2009).
- High fish consumption is associated with better vocabulary and trend for academic achievement, however more than the advised norm of 450 mg EPA/DHA/day is associated with lower scores (De Groot, 2012).

## We offer:

### The Maastricht Essential Fatty Acid Birth (MEFAB) cohort

- About 1100 newborns and their mothers
- ePUFA status at wk 14, 22, 36 of pregnancy, and at delivery
- Cognition and behavior at age 7-8
- And many, many other variables.....

AND

- New data collection at adolescent age
- Cognition and behavior at age 18-20
- School performance at age 12
- Fatty acid status at age 18-20

AND

- New studies



### Interdisciplinary research group

#### Experts:



Dr. Renate de Groot<sup>1-4</sup>



Prof. Dr. Gerard Hornstra<sup>3</sup>



Prof. Dr. Maurice Zeegers<sup>5</sup>



Prof. Dr. Paul Kirschner<sup>1, 2, 4</sup>



Prof. Dr. Jelle Jolles<sup>1-4</sup>

<sup>1</sup> Neurosciences, <sup>2</sup> Educational sciences, <sup>3</sup> Nutrition, <sup>4</sup> Cognitive sciences, <sup>5</sup> Genetics

### Proved methodologies

- Objective cognitive test batteries
- Experience with distance cognitive testing
- Well-validated behavioral questionnaires
- Eye tracking
- Fatty acid analyses
- Genetics



**Contact?** Dr. Renate de Groot  
Open Universiteit  
Tel. 045 5762276  
[renate.degroot@ou.nl](mailto:renate.degroot@ou.nl)  
[openu.nl/web/topic-brein-leefstijl-en-leren](http://openu.nl/web/topic-brein-leefstijl-en-leren)