

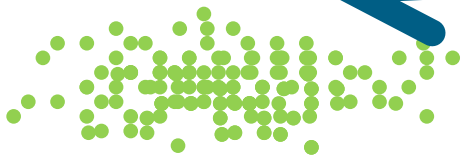
# Hvor kritisk er innholdet av omega-3 hos oss mennesker?

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Forskningsdirektør  
NIFES

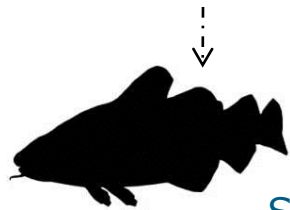
8. Maring FagDag 29. november 2012



## Marine omega-3



Phytoplankton



Seafood

## **EPA and DHA**

**Documented health effects –  
cardiovascular diseases**

## Plant omega-3



## **ALA (alpha-linolenic acid)**

**Essential, through diet**

## Dietary intake of plant omega-3 (ALA) versus marine omega-3 (EPA & DHA)?

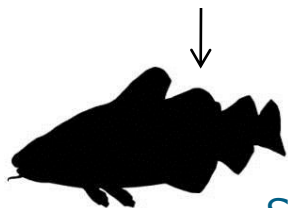


# Omega-3 from sea and land

## Marine omega-3



Phytoplankton



Seafood

## Plant omega-3



**EPA and DHA**



**ALA (alpha-linolenic acid)**

**Low conversion rate**

**Dietary intake of marine omega-6 versus omega-3 (particularly EPA + DHA?)**

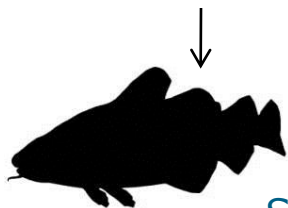


# Omega-3 from sea and land

## Marine omega-3



Phytoplankton



Seafood

**EPA and DHA**

## Plant omega-3



**ALA (alpha-linolenic acid)**

**Very low, competition  
with omega-6**

# Recommendations omega-3 fatty acids

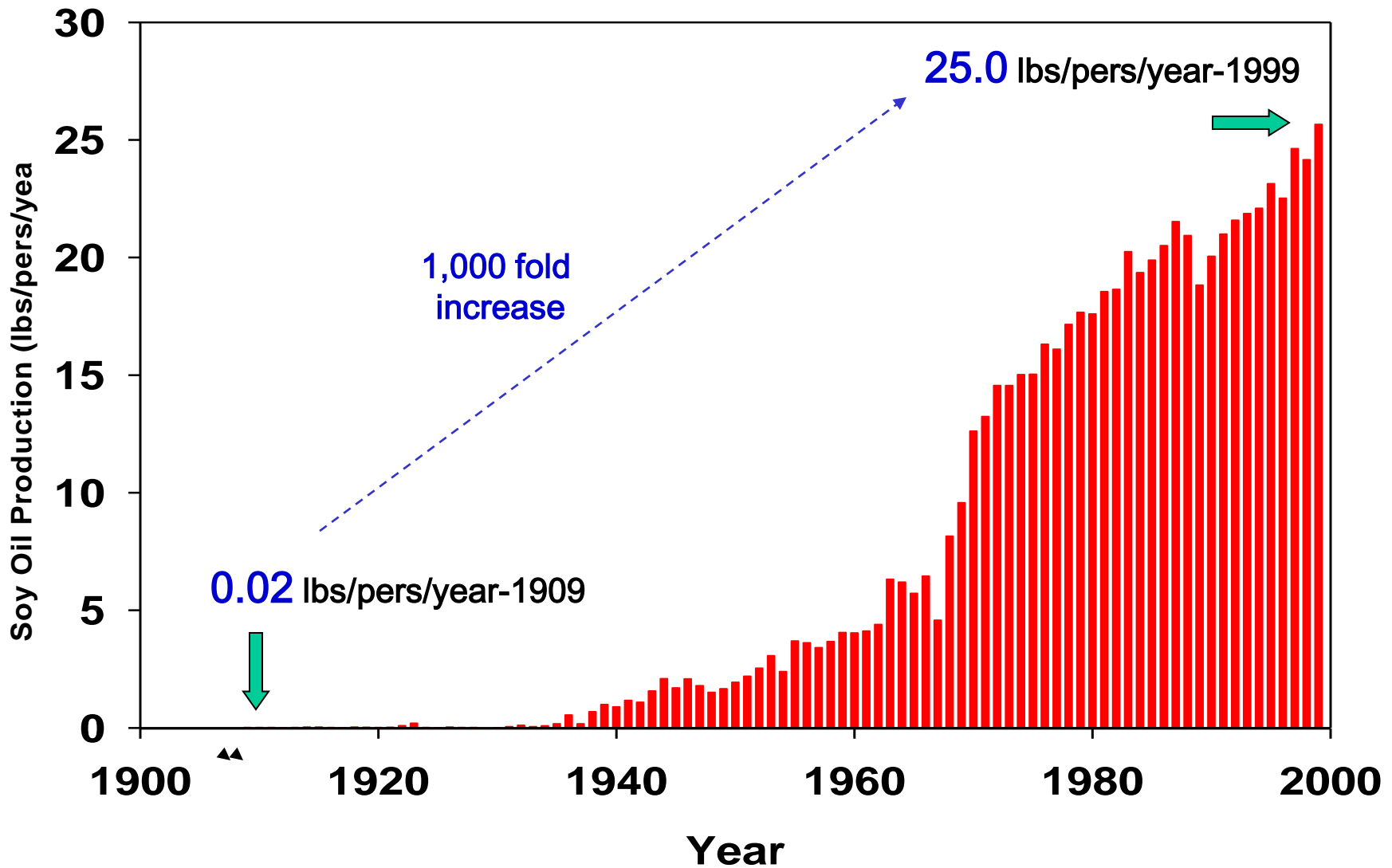
N I F E S

Organisation, source	Recommended intake
Norwegian Directorate of Health, Sosial- og helsedirektoratet, 2005.	At least 0.5 E% n-3 fatty acids for children from 2 years of age and adults, and at least 1 E% for infants 6-11 months and pregnant and lactating women.
Nordic Nutrition Recommendations, NNR Project Group, 2004.	1 E% n-3 fatty acids from 6 months of age.
The National Food Administration in Sweden, Becker <i>et al.</i> , 2007.	As the Norwegian recommendations. 100-300 mg DHA per day, preferably from fatty fish in pregnancy and during lactation.
EFSA, 2010b.	ALA 0.5 E%. Children from 2 to 18 years and adults; an intake of 0.25 g EPA and DHA per day. Pregnant and lactating women; 0.25 g EPA and DHA per day plus additional 0.10-0.20 g DHA per day. Older infants (>6 months of age) and young children below the age of 24 months of age; 0.10 g DHA per day.





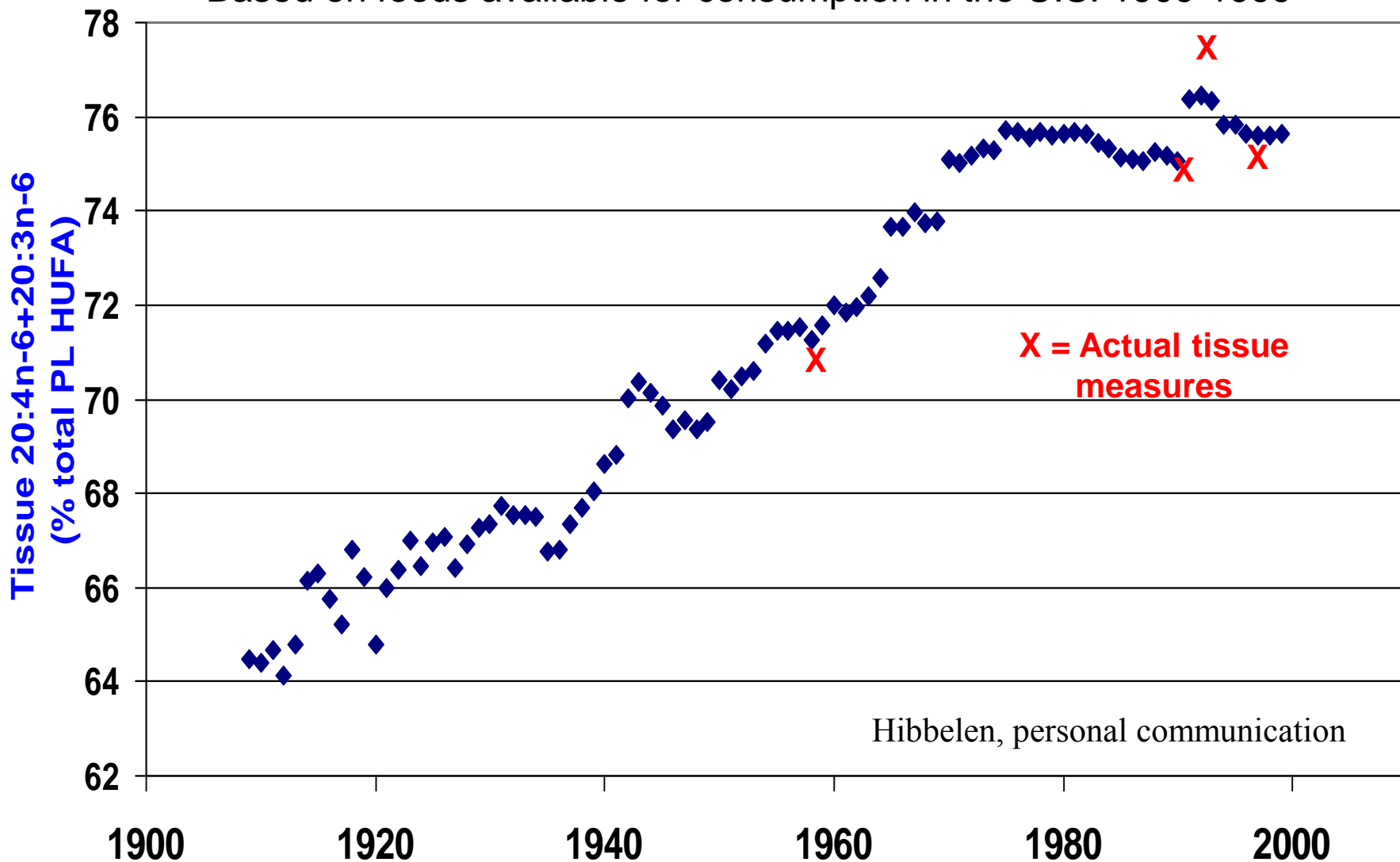
# Soy oil production for food consumption USA, 1909-1999



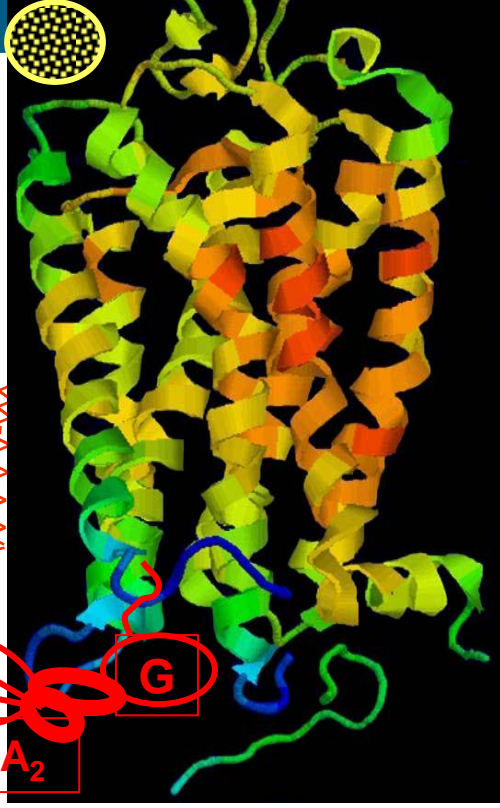
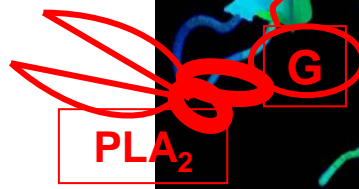
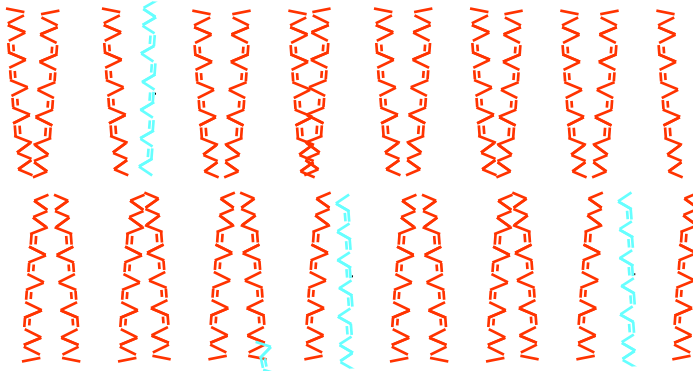
Hibbelen, personal communication

Estimated tissue availability of n-6 eicosanoid precursors,  
(20:4n-6+20:3n-6, % PL-HUFA)

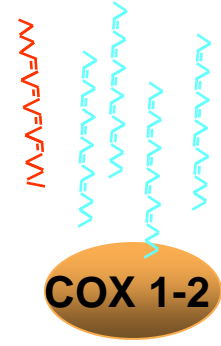
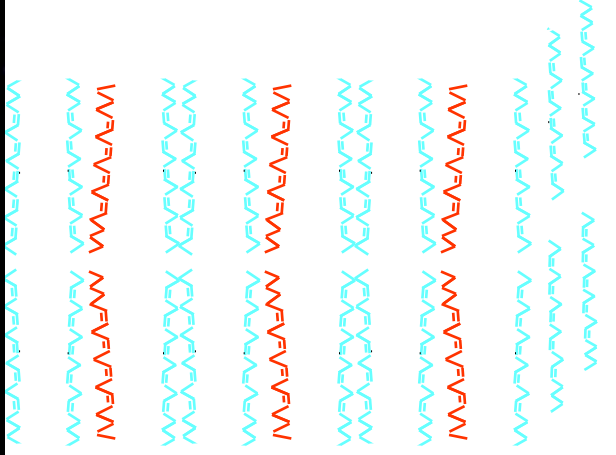
Based on foods available for consumption in the U.S. 1909-1999



# U.S. Diet



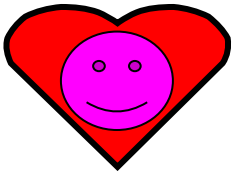
# Japanese Diet N I F E S



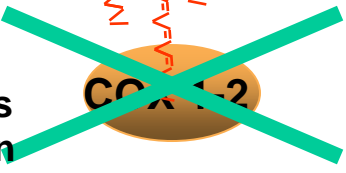
PGE3



TXA3

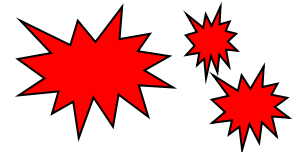
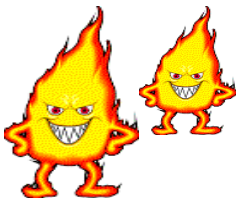


Aspirin  
Other drugs  
>\$ 10 Billion

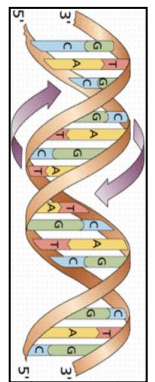


PGE2

TXA2

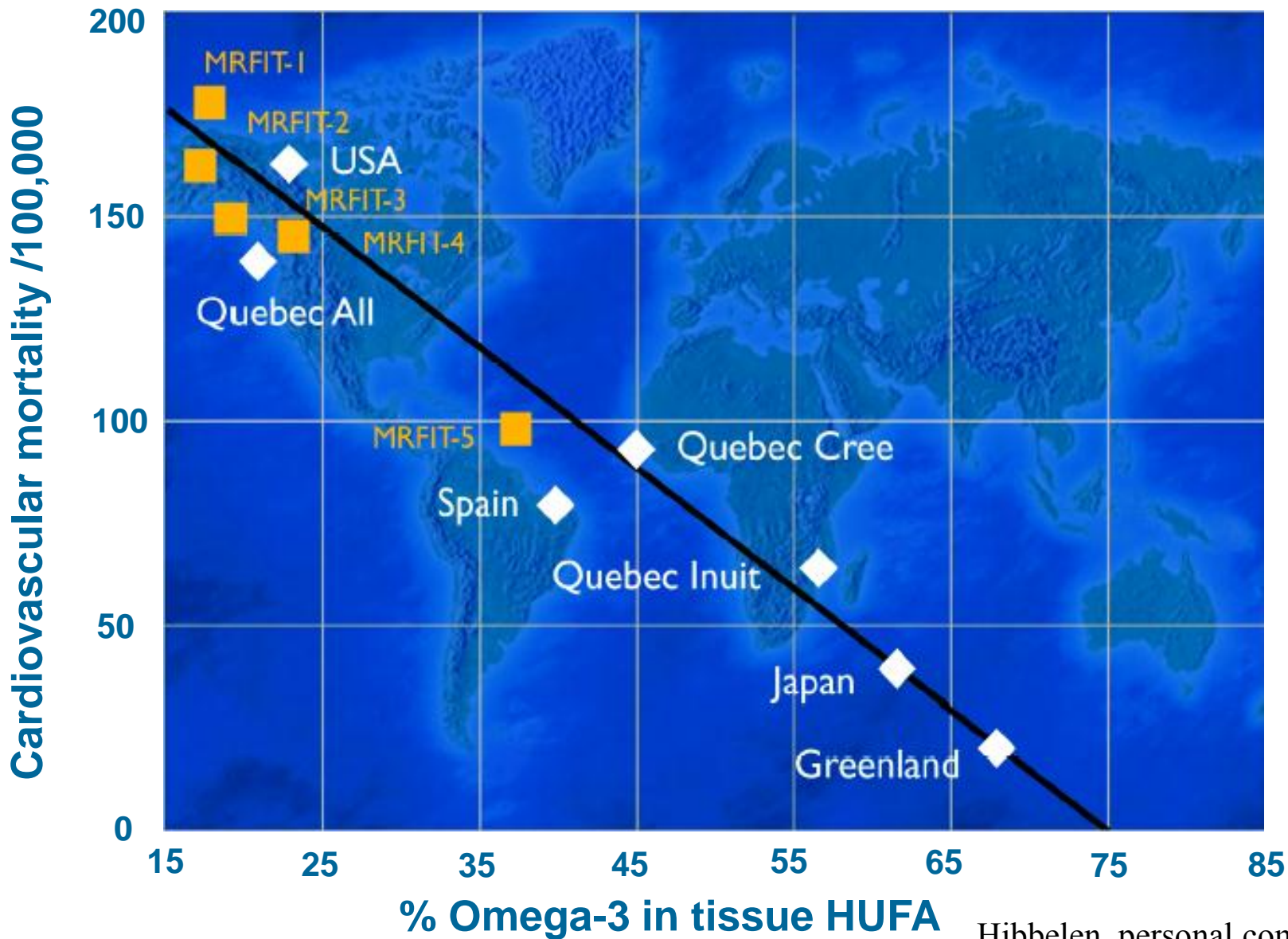


Thrombosis



Gene  
Expression

# Cardiovascular deaths and Omega-3 in tissues



## Recommendations omega-3 (only EPA and DHA) for primary prevention of coronary heart diseases

Organisation, source <sup>1</sup>	Recommendations
FAO/WHO, 2003.	Regular fish consumption, 1-2 servings per week; each serving should provide the equivalent of 200-500 mg of EPA and DHA.
The American Dietetic Association/Dietitians in Canada, (Kris-Etherton <i>et al.</i> , 2007).	500 mg/day of EPA and DHA provided by two servings of fatty fish/week.
American Heart Association, (Lichtenstein <i>et al.</i> , 2006).	Two servings of fish (preferably fatty) per week.
American Diabetes Association, (Bantle <i>et al.</i> , 2008).	Two or more servings of fish per week (with the exception of commercially fried fish fillets) providing omega-3 polyunsaturated fatty acids are recommended.
Australia and New Zealand National Health and Medical Research Council., 2006.	A suggested dietary target for women and men 19- >70 years of age is 430 and 610 mg/day of DHA/EPA/DPA, respectively.

## Recommendations omega-3 (only EPA and DHA) for primary prevention of coronary heart diseases

EFSA, 2010b.	1-2 fish meals of fatty fish per week or 250 mg EPA and DHA per day.
European Society for Cardiology, (DeBacker <i>et al.</i> , 2003).	Fatty fish and n-3 fatty acids have particular protective properties for primary cardiovascular disease prevention.
The National Food Administration in Sweden, (Becker <i>et al.</i> , 2007).	2-3 servings of fish per week of which one serving with fatty fish covers the requirement for EPA and DHA.
AFFSA, CNERNA & CNRS in France, (A.Martin (Ed.), 2001).	500 mg per day of EPA and DHA; minimum 120 mg DHA per day.
Health Council of the Netherlands, 2010.	Fish twice per week, one of which should be fatty to achieve the dietary reference intake of 450 mg per day of n-3 fatty acids from fish.
Superior Health Council of Belgium, 2004.	Minimum 0.3E% from EPA and DHA for adults (approximately 667 mg per day).

## Recommendations omega-3 (only EPA and DHA) for primary prevention of coronary heart diseases

International Society for the Study of Fatty Acids and Lipids, (ISSFAL, 2004).	A minimum intake of EPA and DHA (500 mg per day) is recommended for cardiovascular health.
United Kingdom Scientific Advisory Committee on Nutrition, (SACN, 2004).	Consume at least two portions of fish per week, of which one should be fatty, and provide 450 mg of EPA and DHA per day.
Report from the National Council of Nutrition, (Nasjonalt råd for ernæring, 2011).	A daily supplement of cod liver oil or other n-3 supplement may be an alternative to ensure a sufficient intake of long-chain n-3 fatty acids (EPA, DHA) for those who do not eat fatty fish. The primary advice is to eat fatty fish.

Kostråd for å fremme folkehelsen  
og forebygge kroniske sykdommer

Metodologi og vitenskapelig kunnskapsgrunnlag

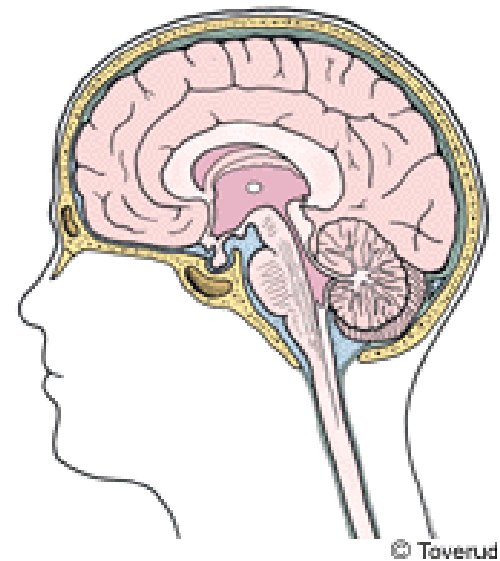
Nasjonalt råd for ernæring  
2011

Dokumentasjon for årsaks-sammenheng	Redusert risiko		Økt risiko	
	Eksponering	Sykdom	Eksponering	Sykdom
Overbevisende årsaks-sammenheng	Utskifting av mettede fettsyrer med flerumettede fettsyrer (7)	Koronar hjertesykdom		
	Lange flerumettede omega-3-fettsyrer (EPA, DHA) (7)	Død av koronar hjertesykdom		
Sannsynlig årsaks-sammenheng	Matvarer med selen (27)	Kreft i prostata		
	Regelmessig inntak av 2 porsjoner fet fisk i uken (ca. 200 g/uke) (6)	Død av koronar hjertesykdom		

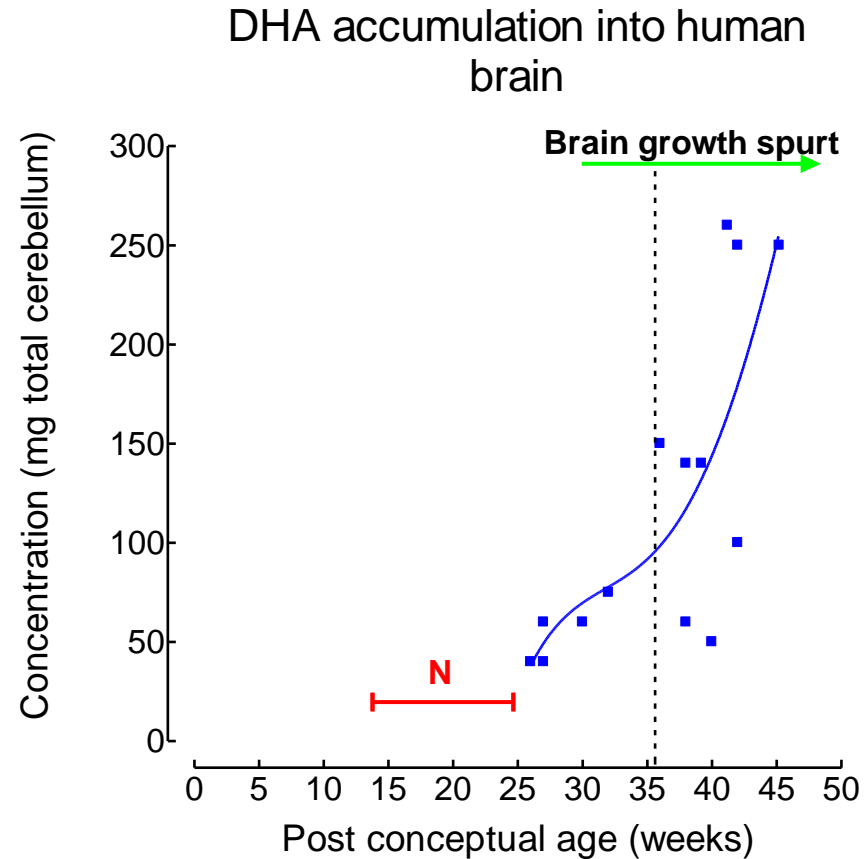


# Hjerne

- Bortsett fra fettvev, er det hjernen som inneholder mest lipider (fett) i kroppen vår.
- Hvis vi tørker hjernen, er 50-60 % vekten lipider
  - Av dette er 35% umettede fettsyrer, og de fleste er langkjedete slik som eikosapentaensyre (EPA) og dokosaheksaensyre (DHA)
- DHA er særlig viktig for utvikling og vekst av hjerne

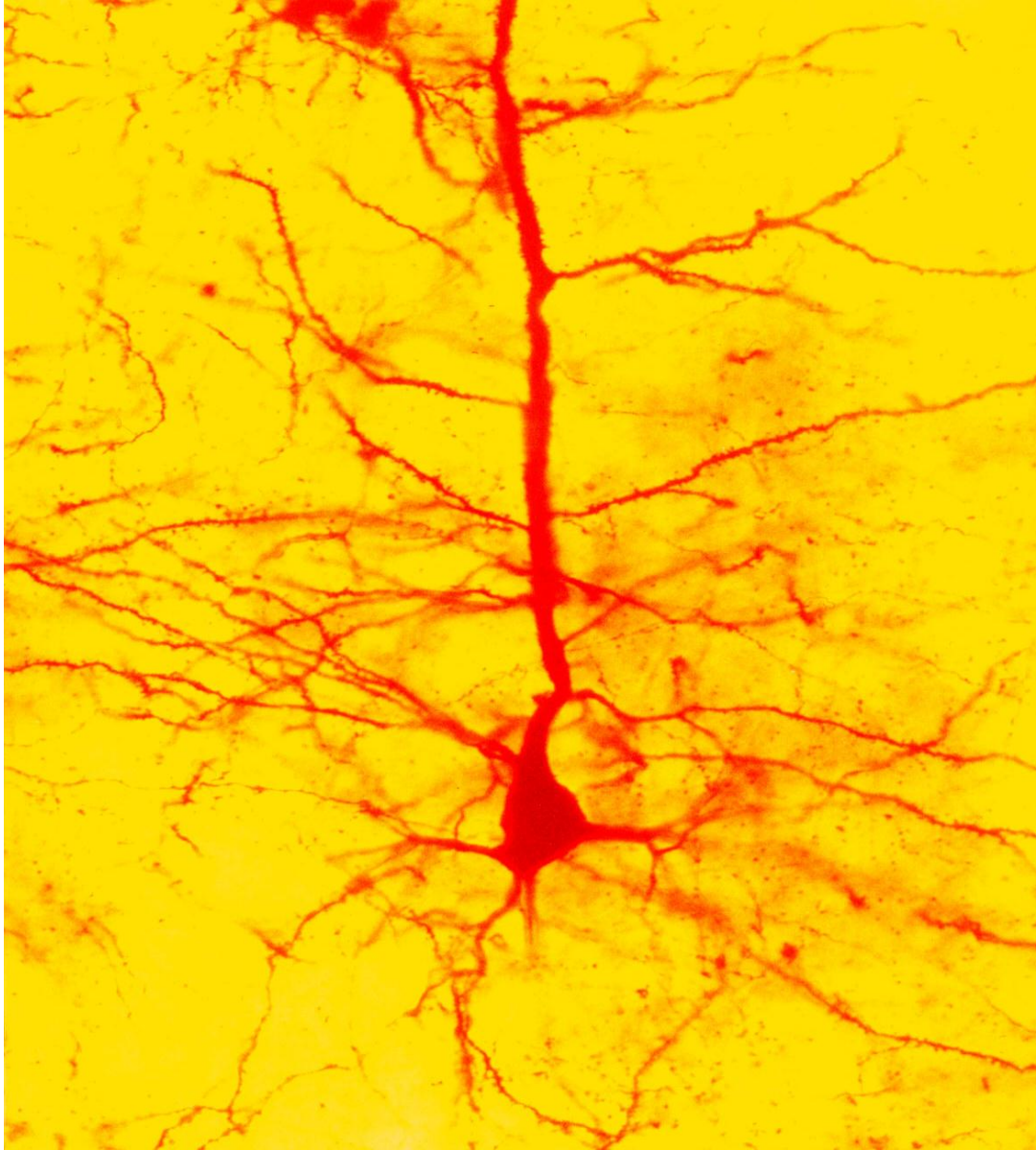


# Accumulation of DHA into the developing human brain



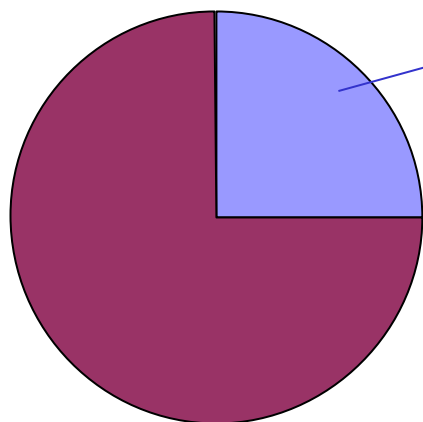
N = neuritogenesis

# Bilde av "økt RAM"



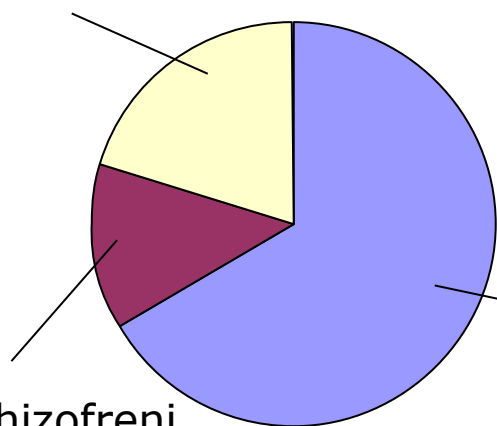
Hibbeln, personal communication

## Mental helse; hvordan er situasjonen i dag?



25% utvikler mentale lidelser eller adferdslidelser i løpet av livet.

Demens (Alzheimer)

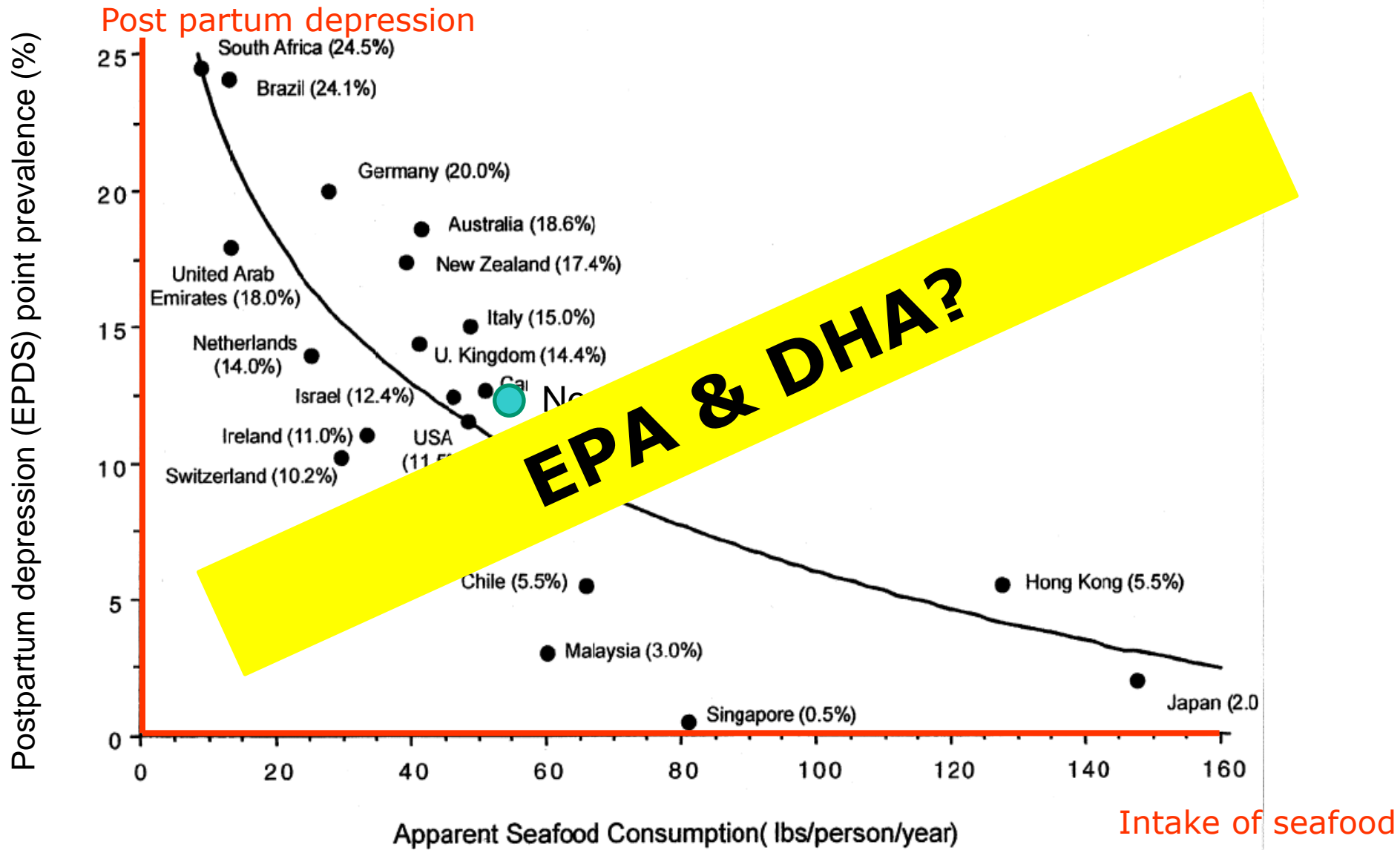


>450 millioner lider av mentale, nevrologiske eller adferdsrelaterte lidelser på verdensbasis

Depresjon

Schizofreni





# Prevention (most people) versus treatment (patients)

- Prevention, 0.25-0.5 g EPA+DHA/d
- Treatment, 1-4 g EPA+DHA/d (medicine)
- Health claims, 2-4 g EPA+DHA/d ("medicine")
- **What about prevention?**

# Takk for oppmerksomheten

