Omega-3, omega-6 and contaminants in Atlantic salmon

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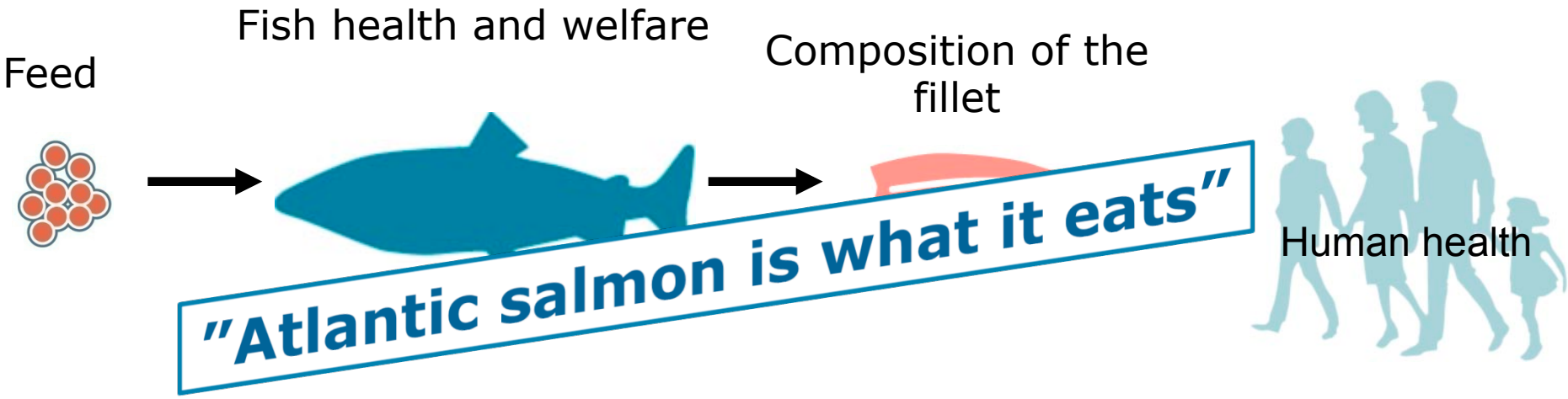
MIC 2013

Atlantic salmon is changing due to the diet

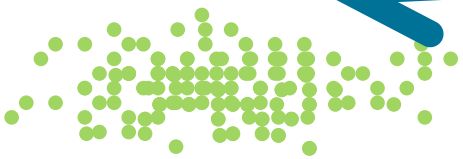


omega-3, omega-6 and marine contaminants

Omega-3 from sea and land

NIFES

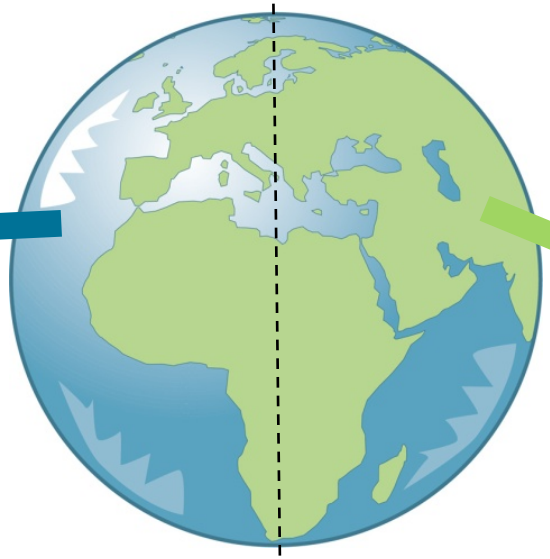
Marine omega-3



Plant plankton

Seafood

EPA and DHA



Plant omega-3

Alfa-linolenic acid
LNA

Positive health effects

How much EPA and DHA is required?

Health

Background diet

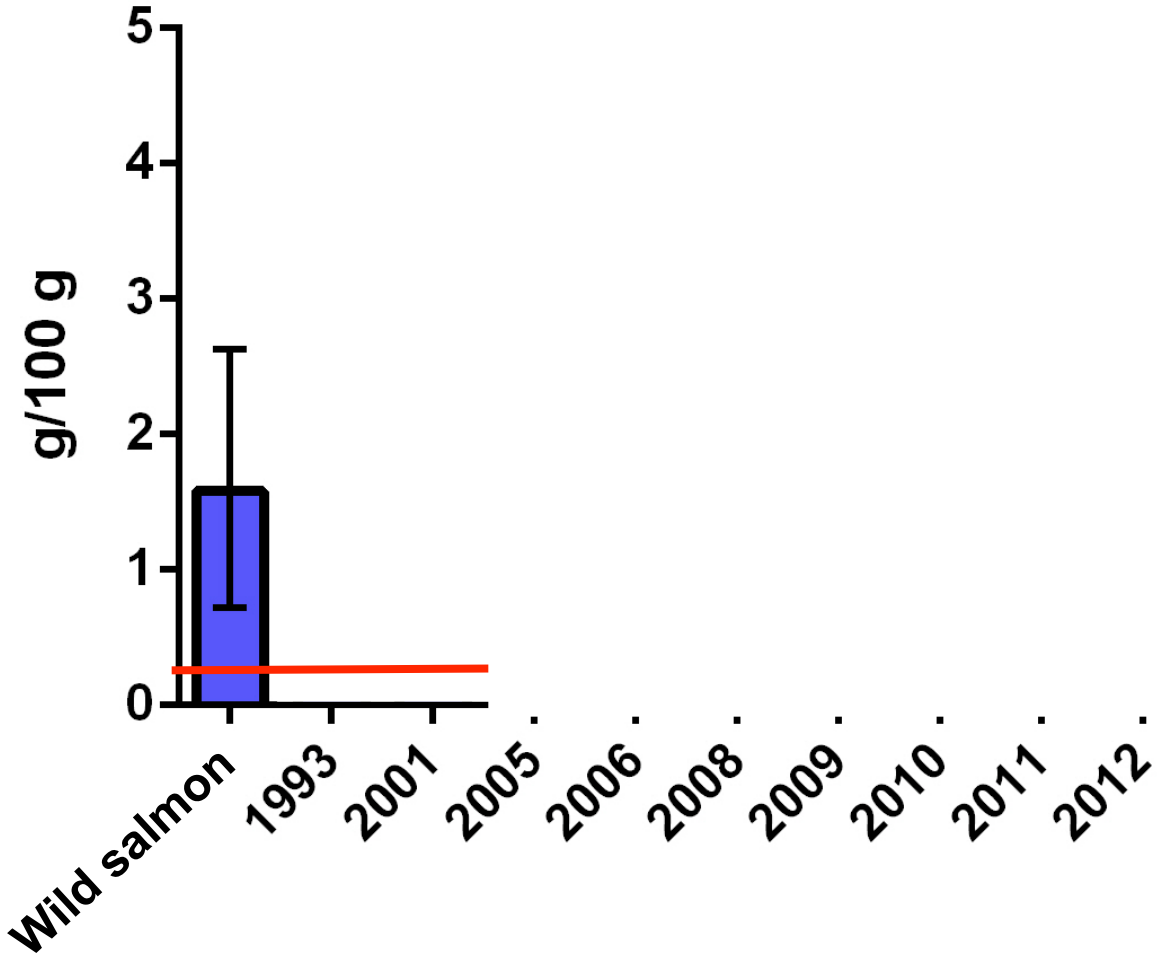
Healthy adults and children (2-18 år): 0,25 gram EPA+DHA.

Healthy
Children (6 mnd – 2 years):
0,1 gram (only DHA)

Pregnant and lactating:
0,35-0,45 gram.

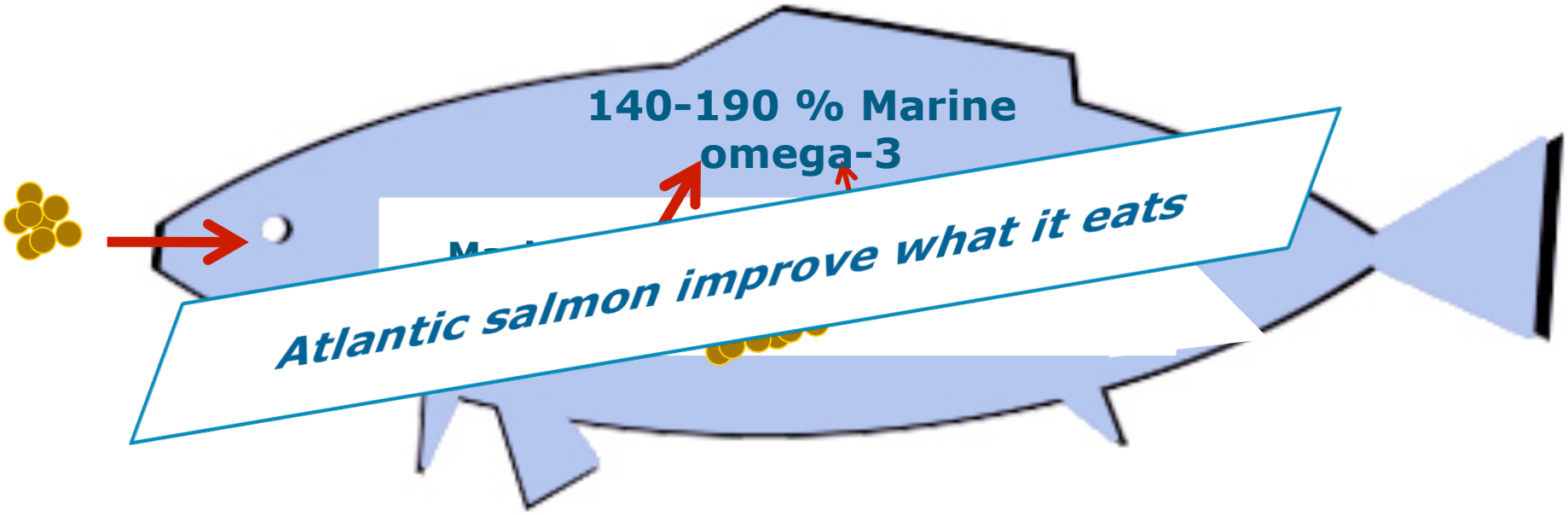
Adult women and men with increased blood pressure and blood TAG levels:
To reduce plasma TAG: ca 2-4 g/d
To reduce blood pressure: ca 3 g/d

EPA and DHA in Atlantic salmon fillet



1) Atlantic salmon conserve marine omega-3 in its tissues

2) Atlantic salmon PRODUCE marine omega-3 from plant omega-3

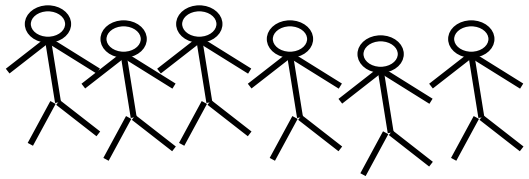


Sanden et al (2011) and Rosenlund, Sissener et al (in prep)

1 kg fish oil with 30% marine omega-3 (300g)

0.05 kg oil with 90% marine omega-3

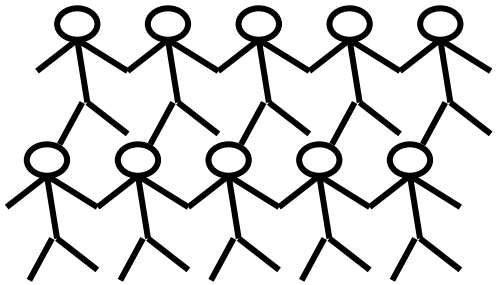
45 g omega-3



EFSA: 0.250g/day, 1 month

2010 farmed Atlantic salmon fillet

78 g omega-3



+

96 g omega-3

By products - marine ingredients

Kilde: Ytrestøyl et al, 2011 (Nofima-rapport)

1 kg fish oil with 30% marine omega-3 (300g)

Feed with 0,5% marine omega-3
Calculated using the same model:

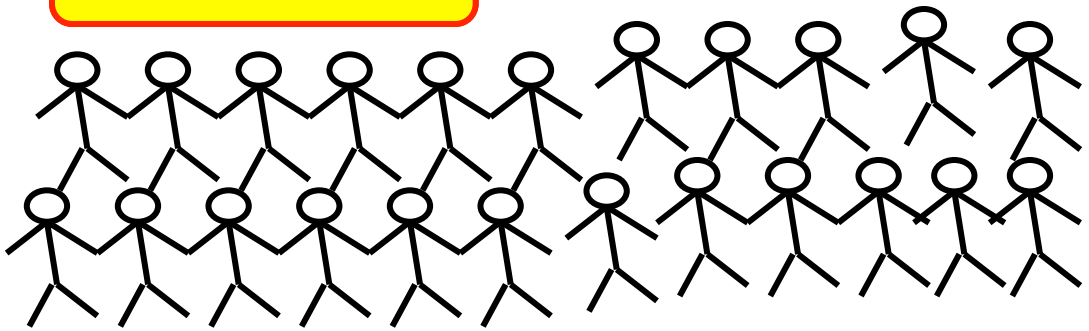
Experimental Atlantic salmon fillet

169 g omega-3

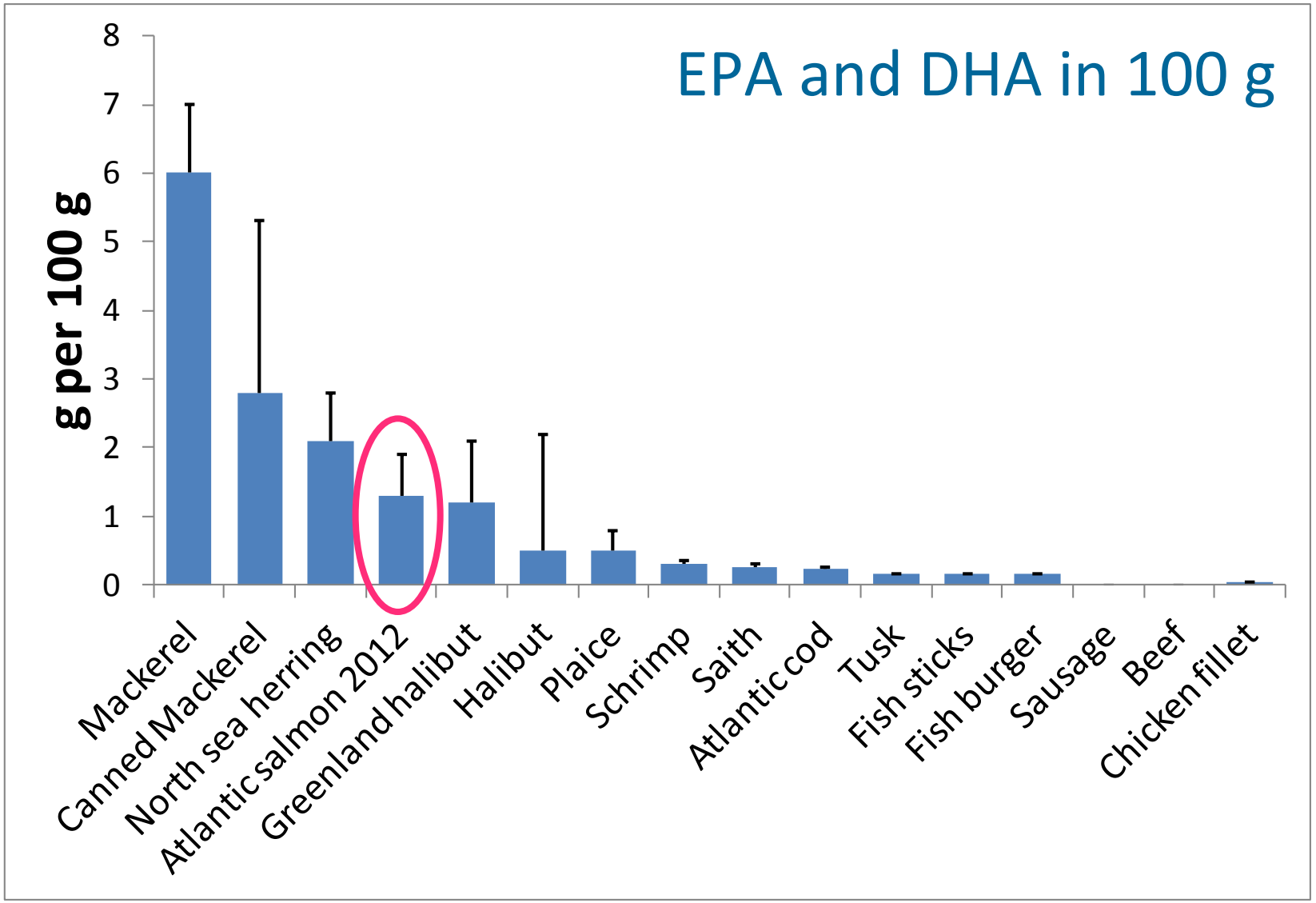
+

206 g omega-3

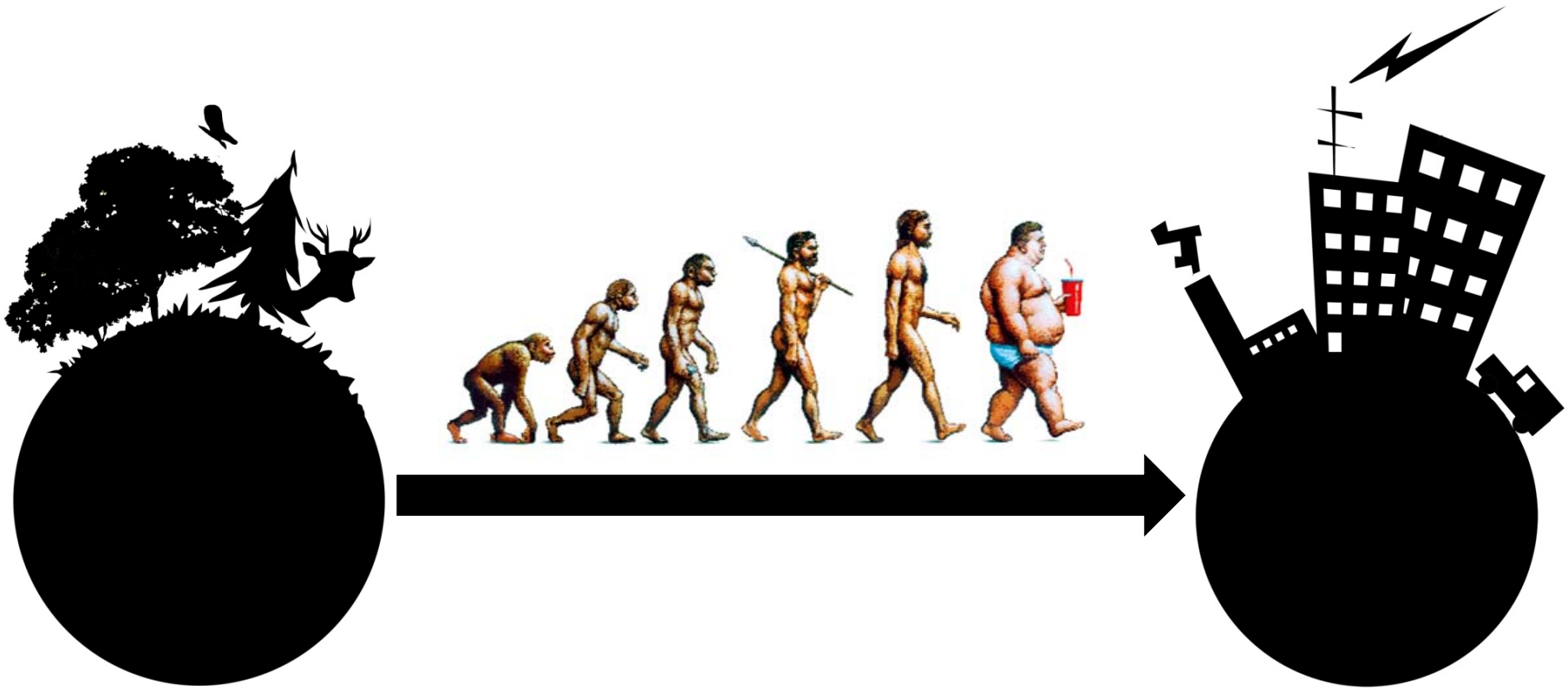
By products for marine ingredients

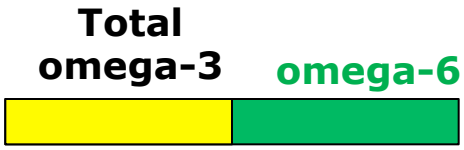


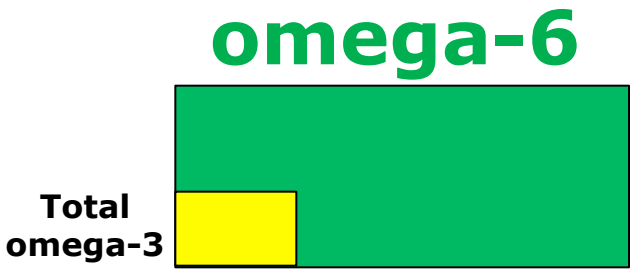
Marine omega-3 sources - seafood



Both society and our diet has changed

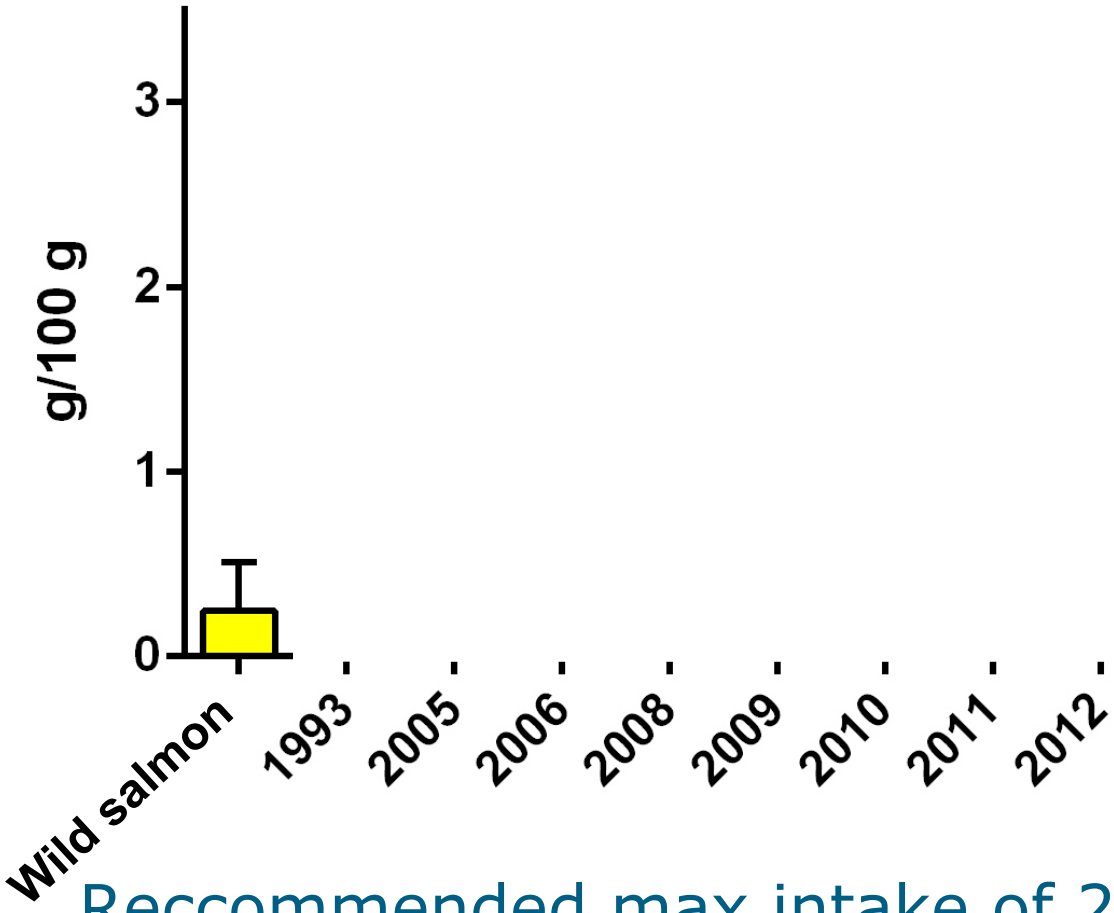






Changes in omega-6 in Atlantic salmon

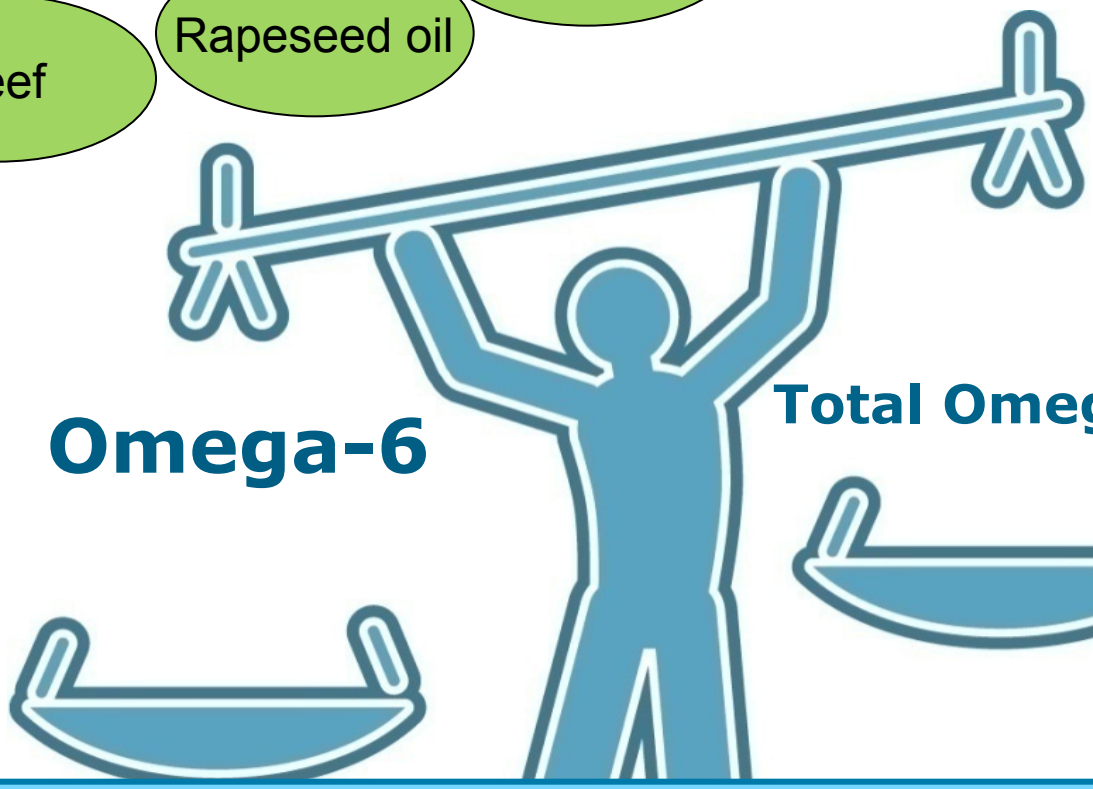
NIFES



Reccommended max intake of 21 g per day

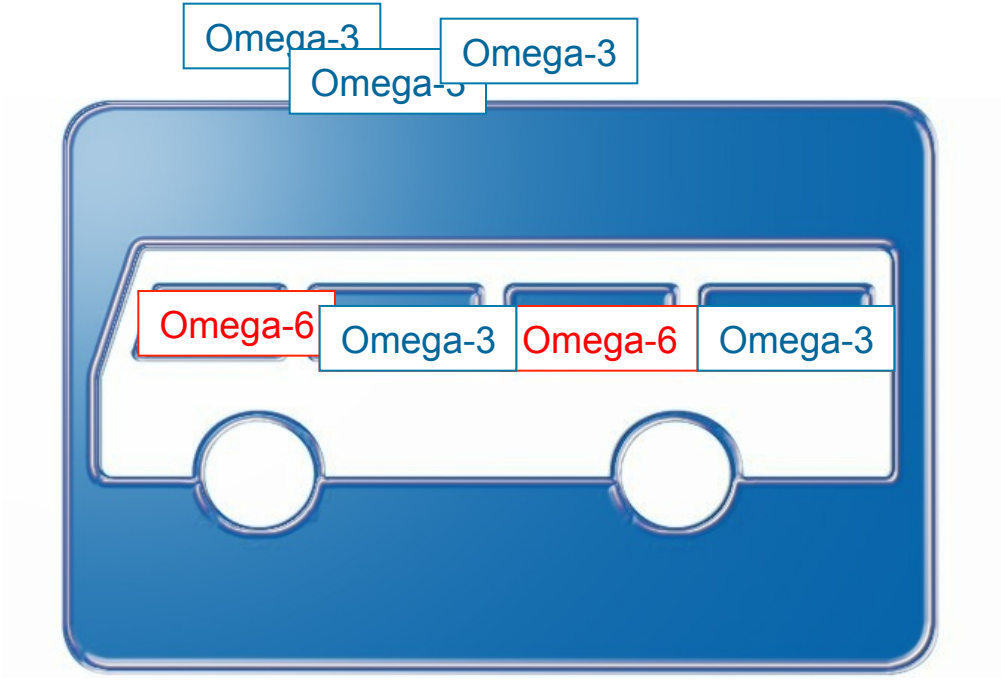
(based on a 2000 kcal diet)

Dietary recommendation:
5 times more omega-6 than omega-3

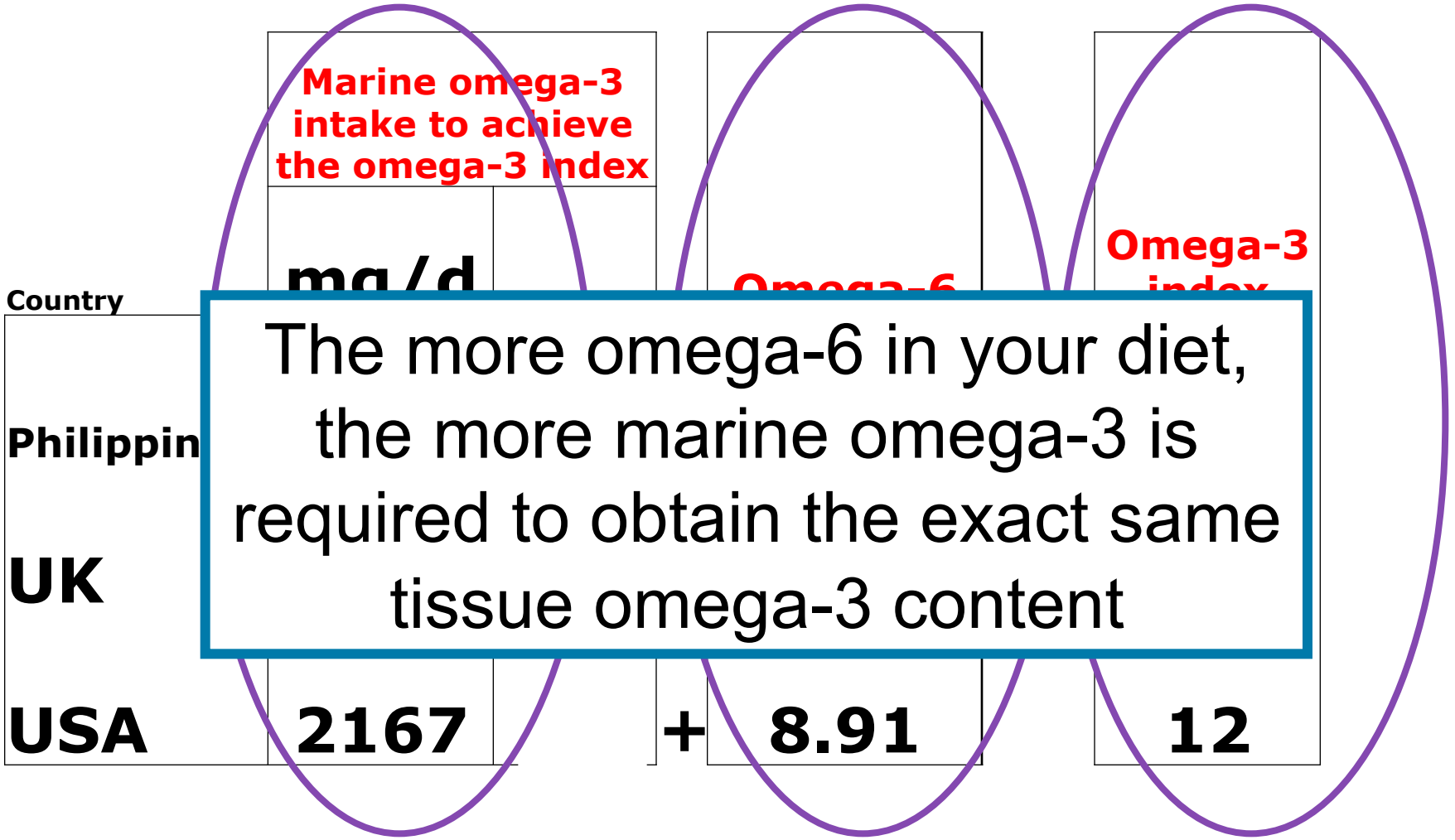


Marine omega-3 hold the positive health effects

The content of marine omega-3 in the tissue determine the health effects



Omega-6 intake affect tissue marine omega-3 content



Hibbeln et al Am J Clin Nutr 2006

Marine contaminants

Feed

Fish health and welfare

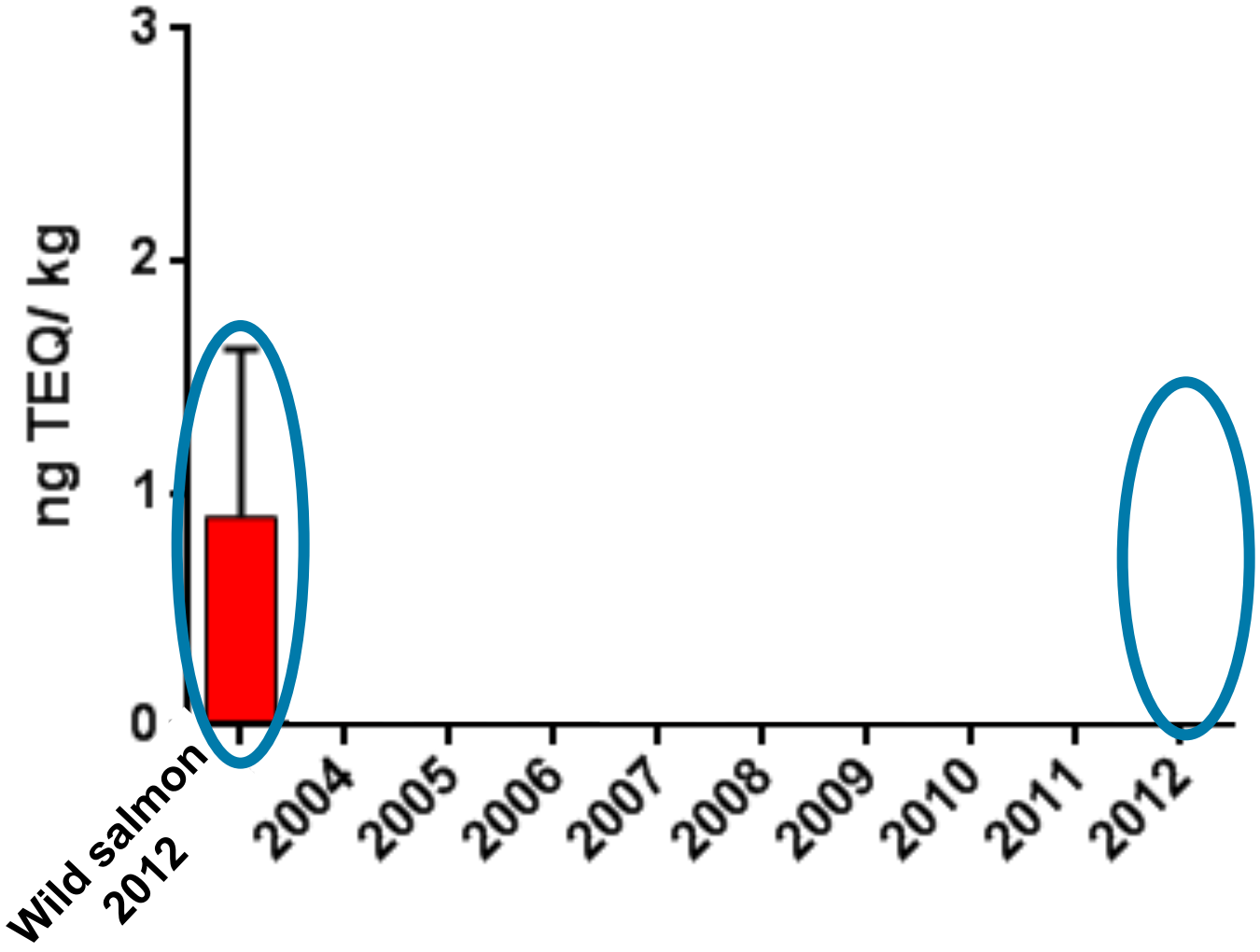
Composition of the fillet

Dioxins and dioxin like PCB's

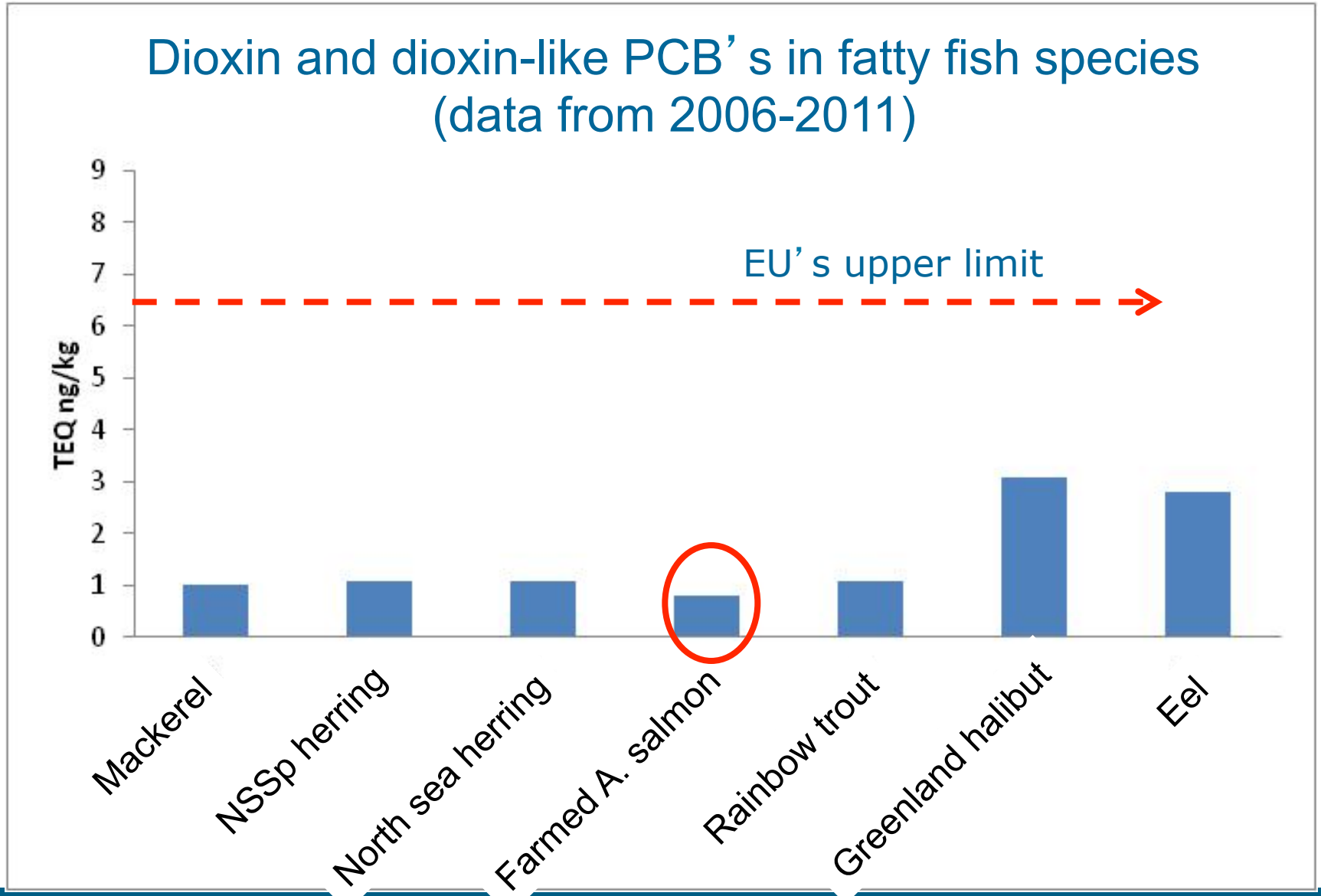
Safe feed

Dioxins and dioxin like PCB's

Dioxin and dioxin-like PCB's



Atlantic salmon compared to other fatty fish



Tolerable weekly intake (TWI)

TWI for dioxins and dioxin-like PCB's
= 0,98 nanogram

9
portions

Contribution from other foods

Farmed salmon (2012)

Wild salmon (2012)

Farmed salmon is analysed annually for contaminants and other undesireable components

Last update:
Illegal substances: no detections
Drug residues and contaminants: all below upper limits
In accordance with findings since the surveilance startet in 2003

- Illegal su… …rugs
- …
- …sphorous …mponds
- …. Metals (As, Cd, Hg, Pb)
  - B3d. Mycotoxins
  - B3e. Dyes
  - B3f. Other (f.eks. antioxidants, PFAS, PAH)
- Samples are collected at all stages in the production
- Norwegian food authorities collect the samples, NIFES analyse, report and publish the results.

…ireable
… production

…per **per 100 tonn**

Farmed salmon in development

- A good source of marine omega-3
- Still a limited source of omega-6
- Still contribute to improve the balance between omega-6 and omega-3 in our diet
- Safe food which is carefully monitored

Omega-6 in farmed salmon should not increase further

Thank you



MARINE PROTEIN

NIFES

Feed

Fish health and welfare

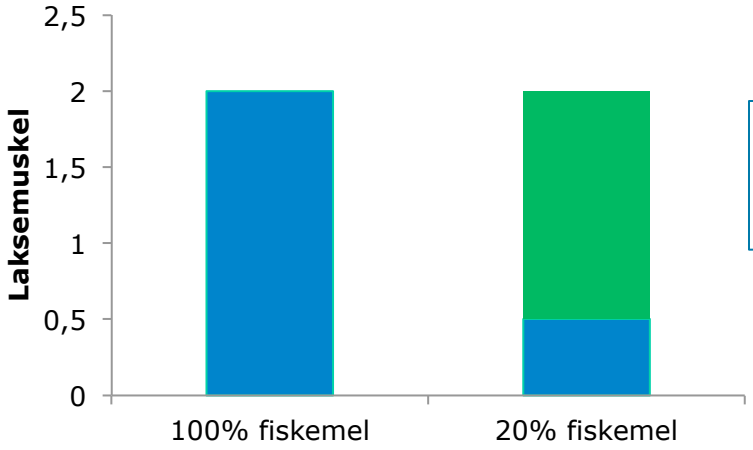
Composition of the fillet

"composition of the fillet DOES NOT reflect the feed"

Protein
=amino acids

Cover the nutrient reuirements for essential amino acids

Fish muscle protein composition is detemined by the genetic code



Net production of marine protein