



UNIVERSITY OF
ABERDEEN

The Rowett Institute

Shellfish and the Health of the Nation

Baukje de Roos

Health properties of fish



Omega-3 fatty acids (EPA, DHA)

Protects against stroke
and lowers the risk of
mortality from
coronary heart disease

Vitamins D and B12

Vitamin D: essential for the growth and
maintenance of healthy bones;
Vitamin B12: involved in the functioning of the
nervous system, the formation of red blood cells
and in energy production

Other micronutrients (selenium, iodine, zinc)

Various functions

Fish is a good source of omega-3 fatty acids

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Health & wellbeing

Fool's gold: what fish oil is doing to our health and the planet

Omega-3 is one of our favourite supplements - but a huge new study has found it has little or no benefit for heart health or strokes. How did it become a \$30bn business?



“Amid all the conflicting reports, there is one bit of data that shines out: fish and seafood can bring considerable health and environmental benefits”


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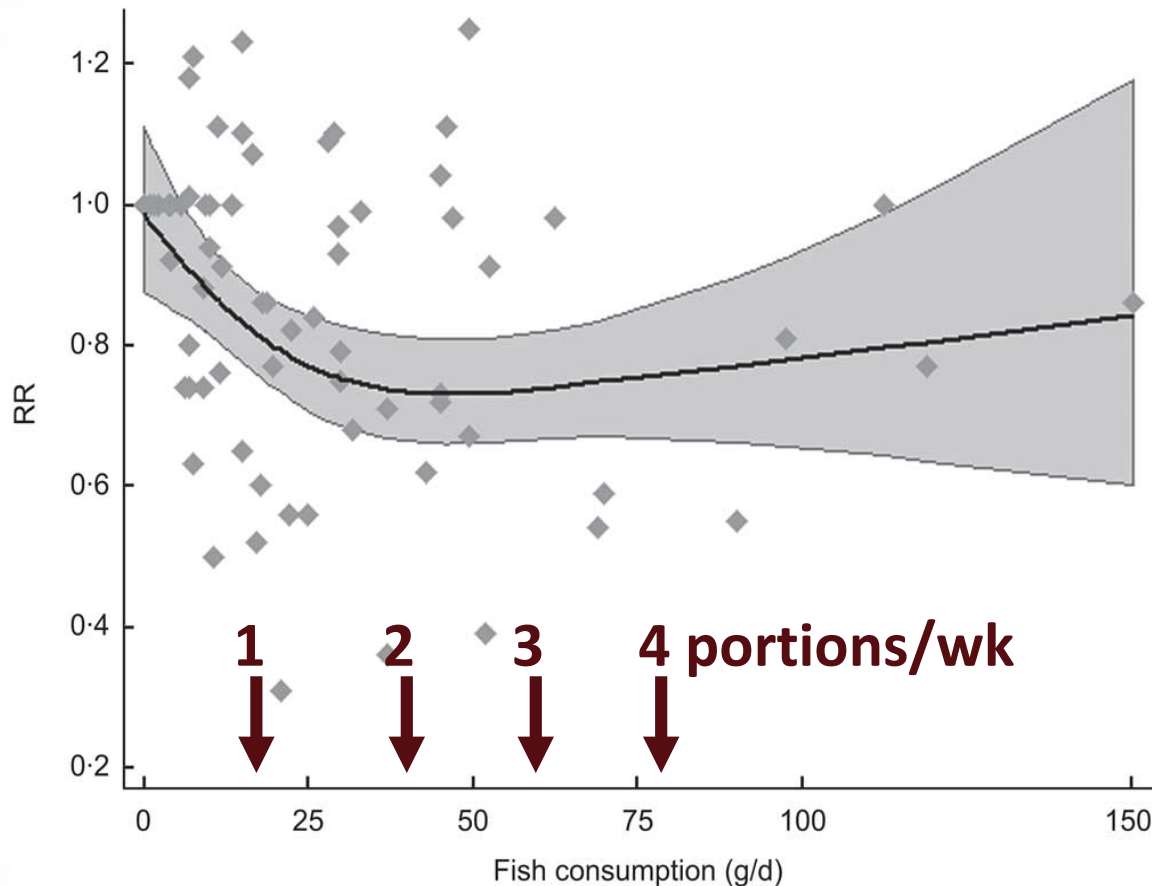
Fish oil supplements for a healthy heart 'nonsense'

18 July 2018 | f | | | | Share



GETTY IMAGES

Fish consumption and mortality

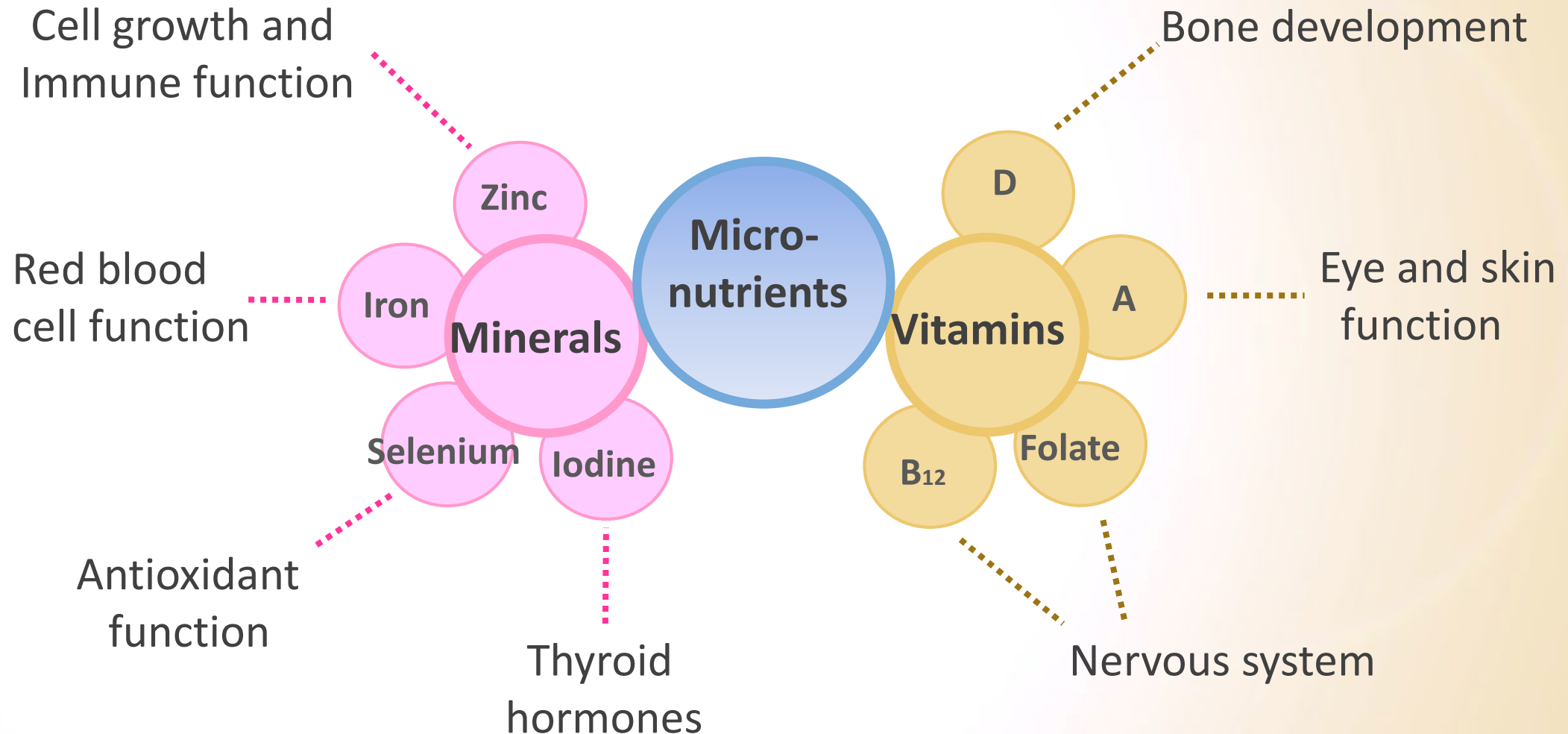


Either low (1 serving/week) or moderate fish consumption (2-4 servings/week) has a significantly beneficial effect on the prevention of mortality from heart disease, reducing risk by 16 and 21%, respectively.

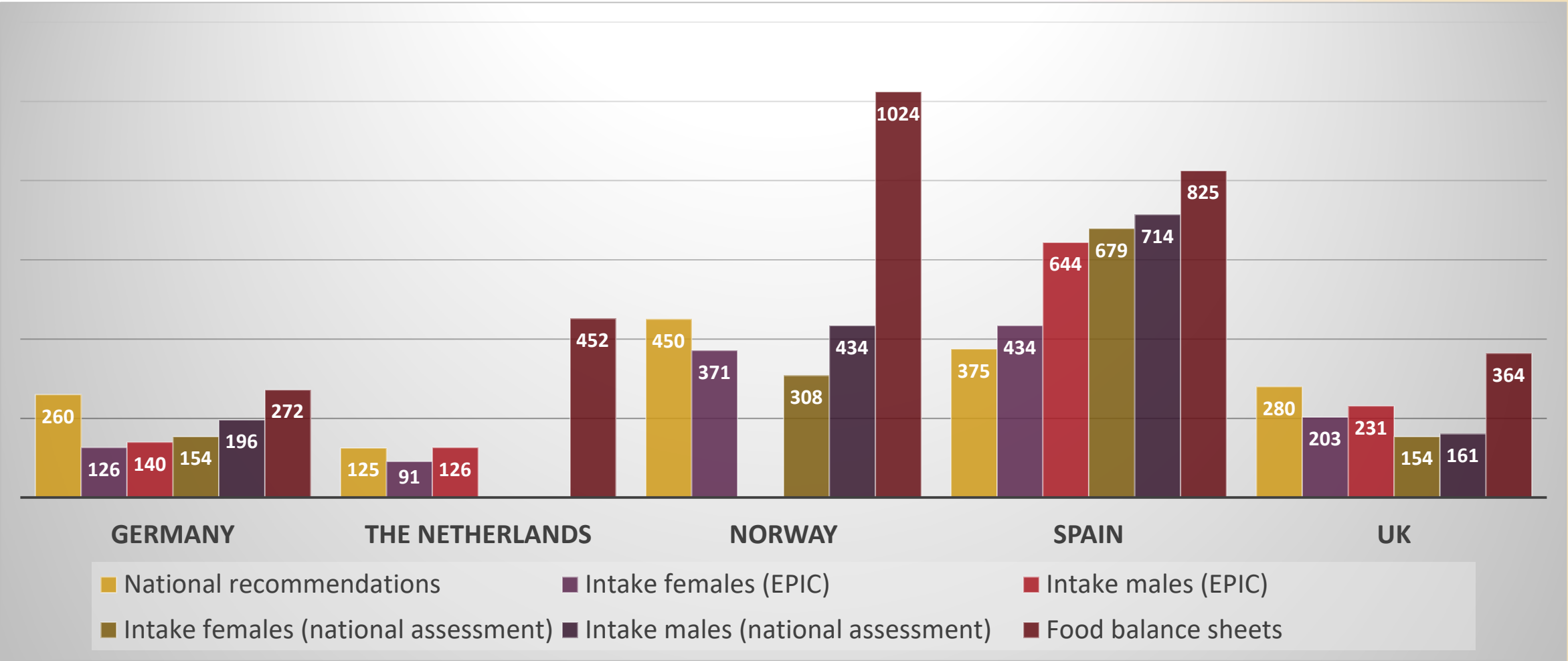
Zheng J et al. Public Health Nutr 2012;15:725-37

Fish, rather than fish oil, appears to affect cardiovascular health

Seafood is a good source of micronutrients

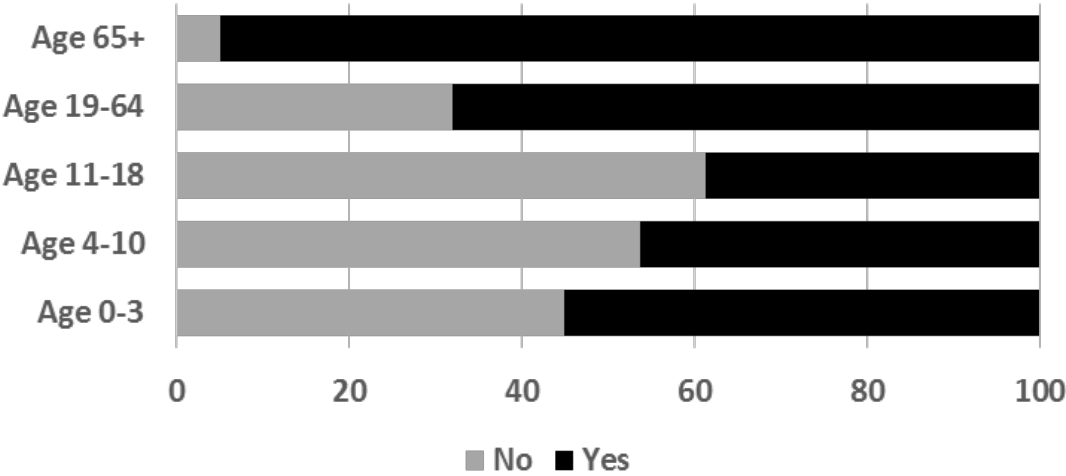


What do we eat and what should we be eating?

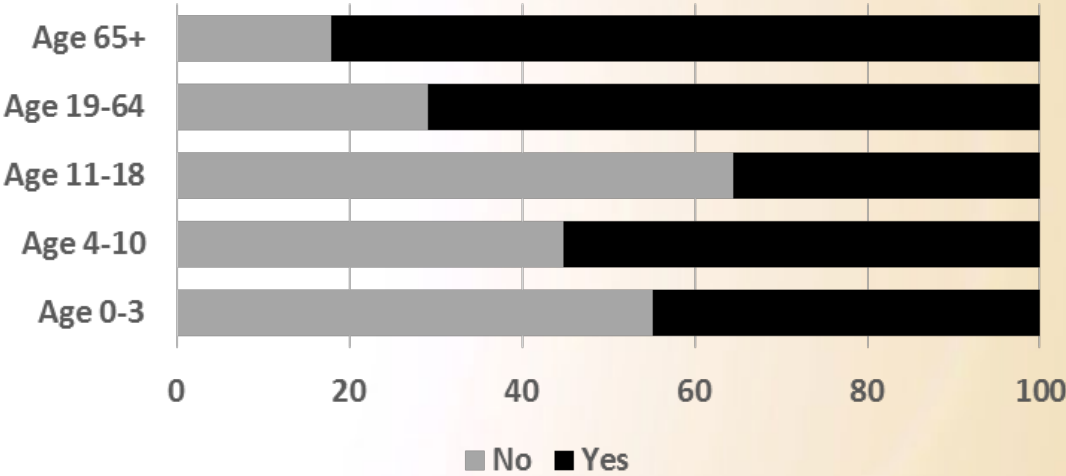


Who eats fish?

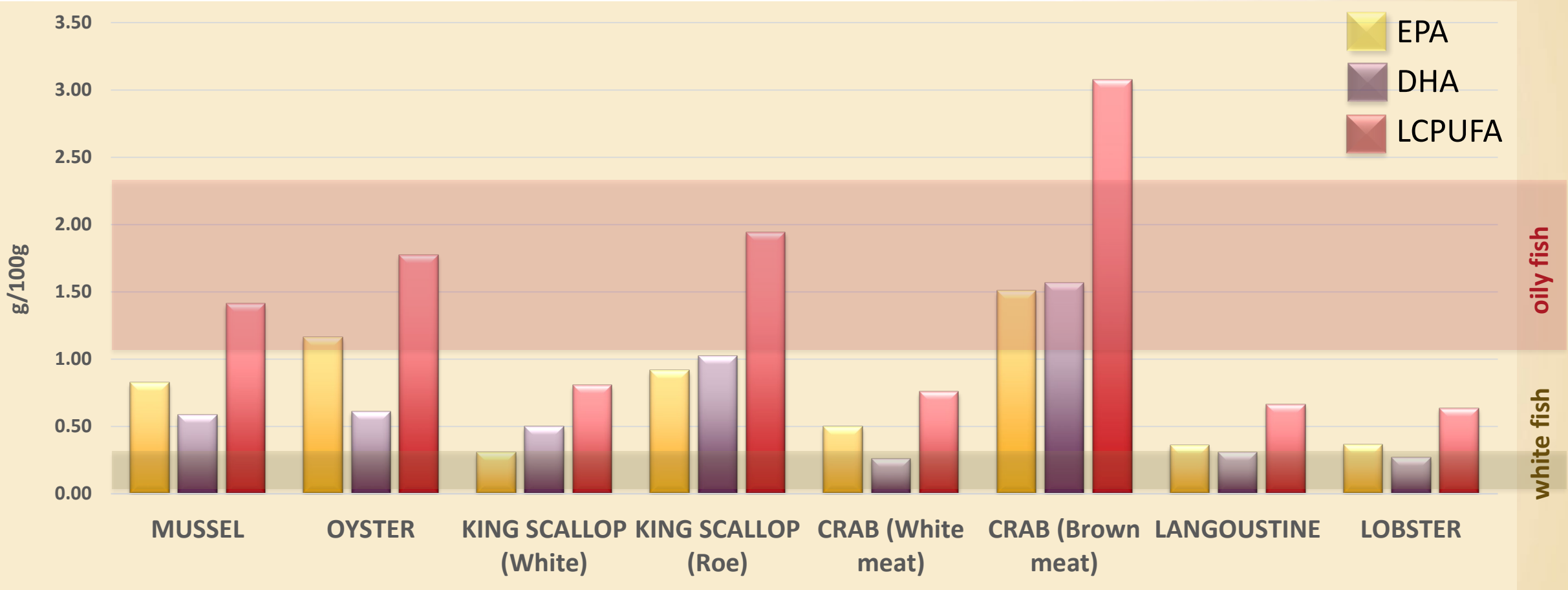
Percentage of women eating fish



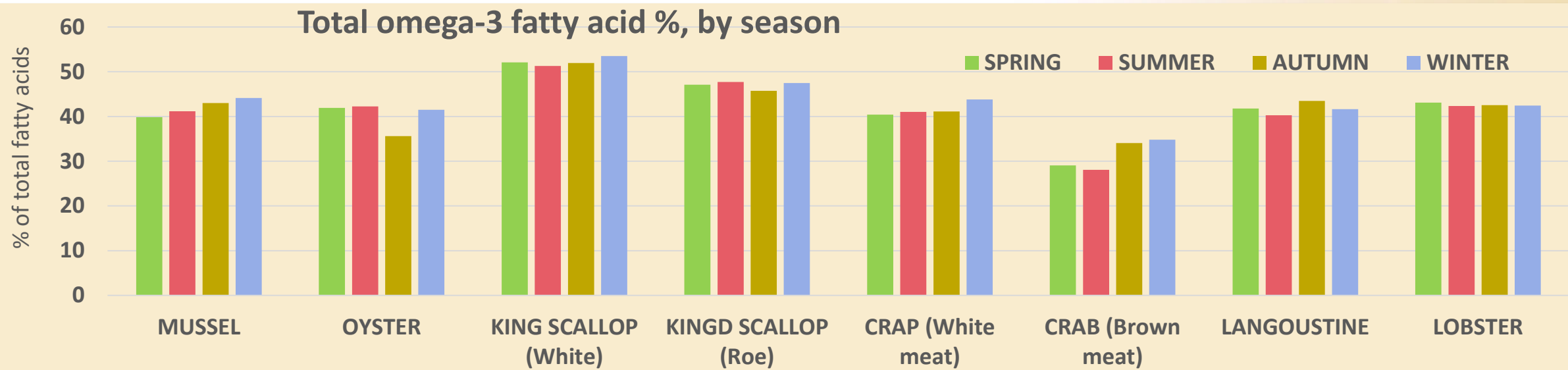
Percentage of men eating fish



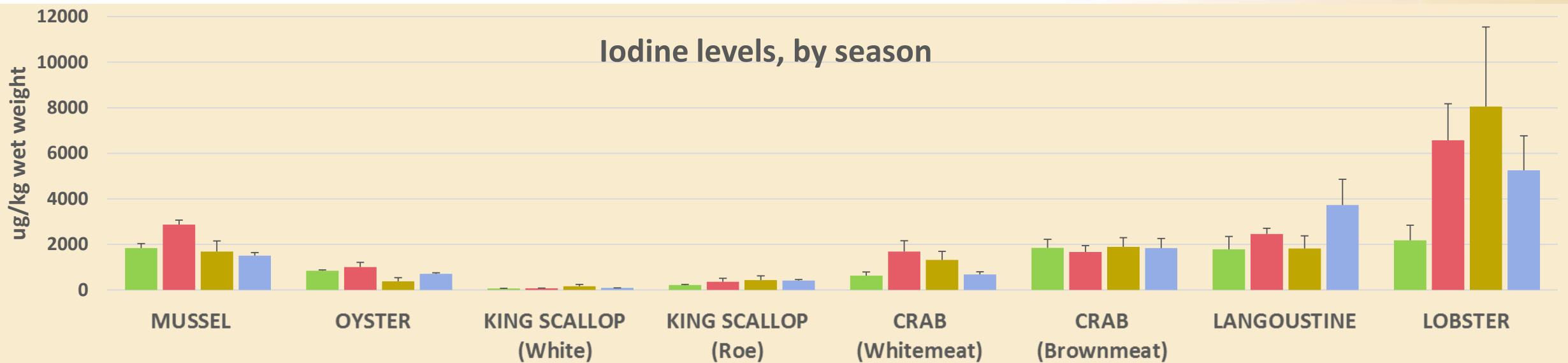
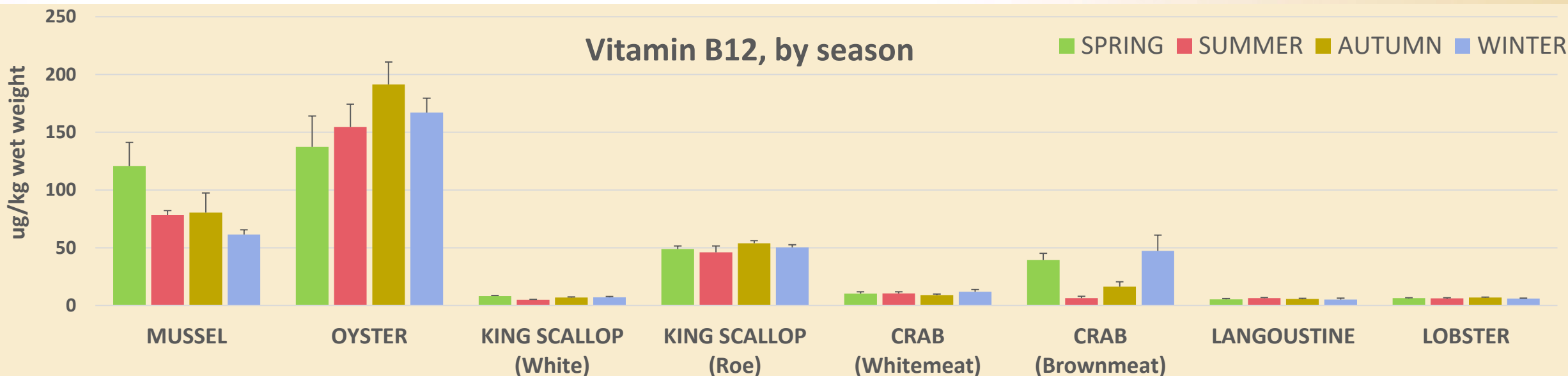
Shellfish – nutrients of importance to human health



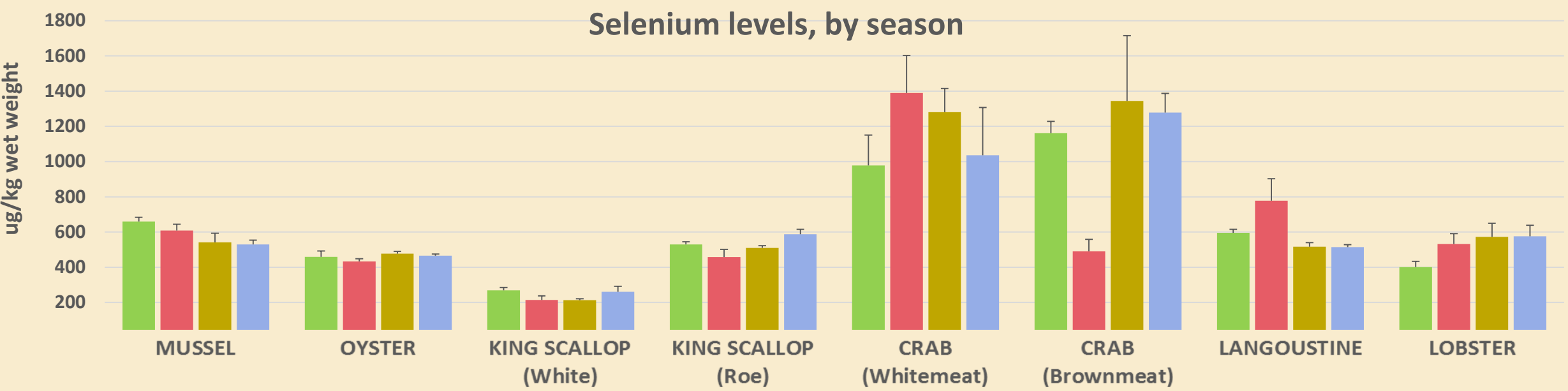
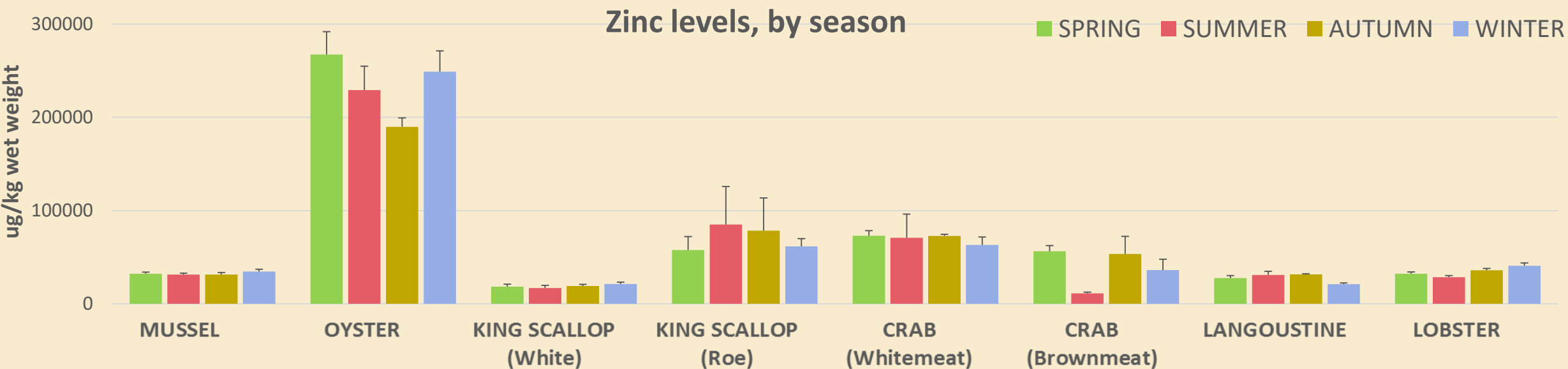
Shellfish – nutrients of importance to human health



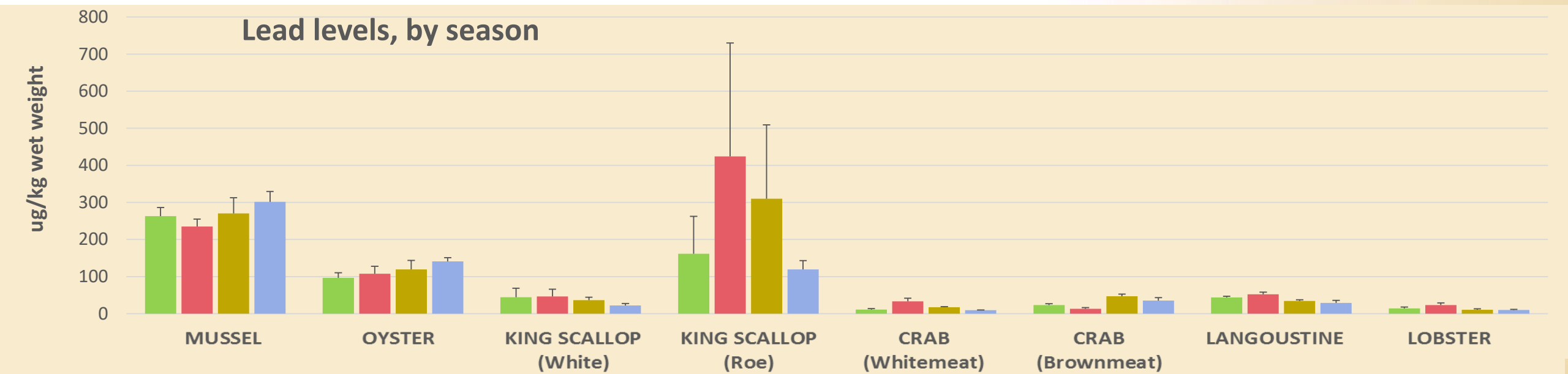
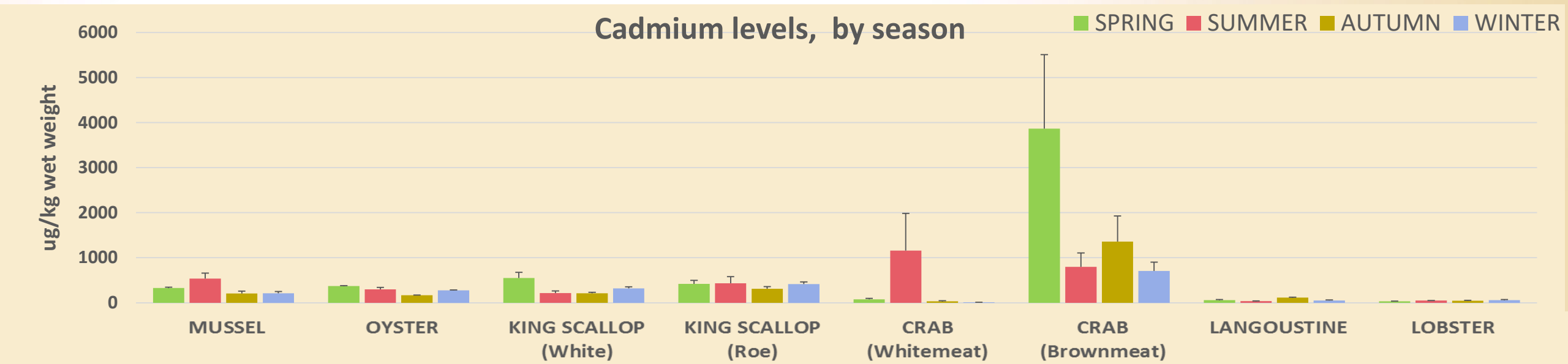
Shellfish – nutrients of importance to human health



Shellfish, nutrients of importance to human health

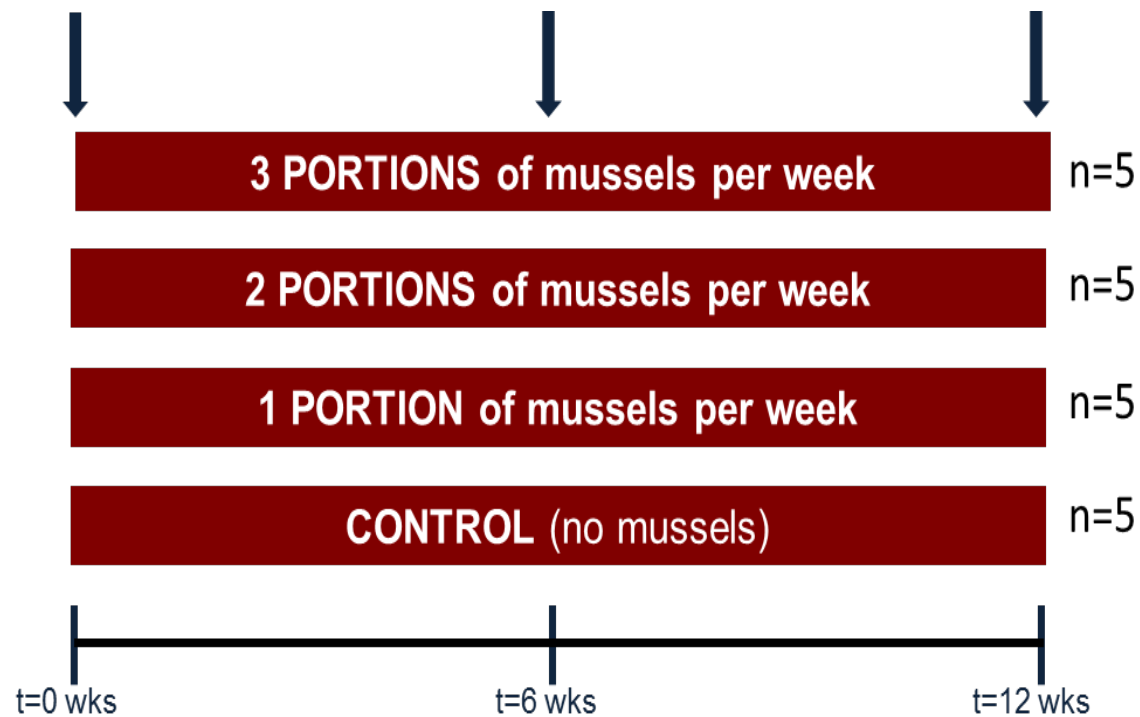


Shellfish – contaminant levels

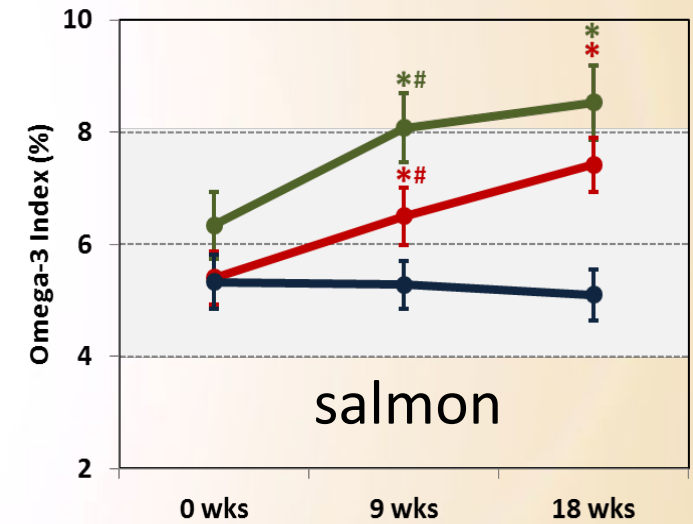
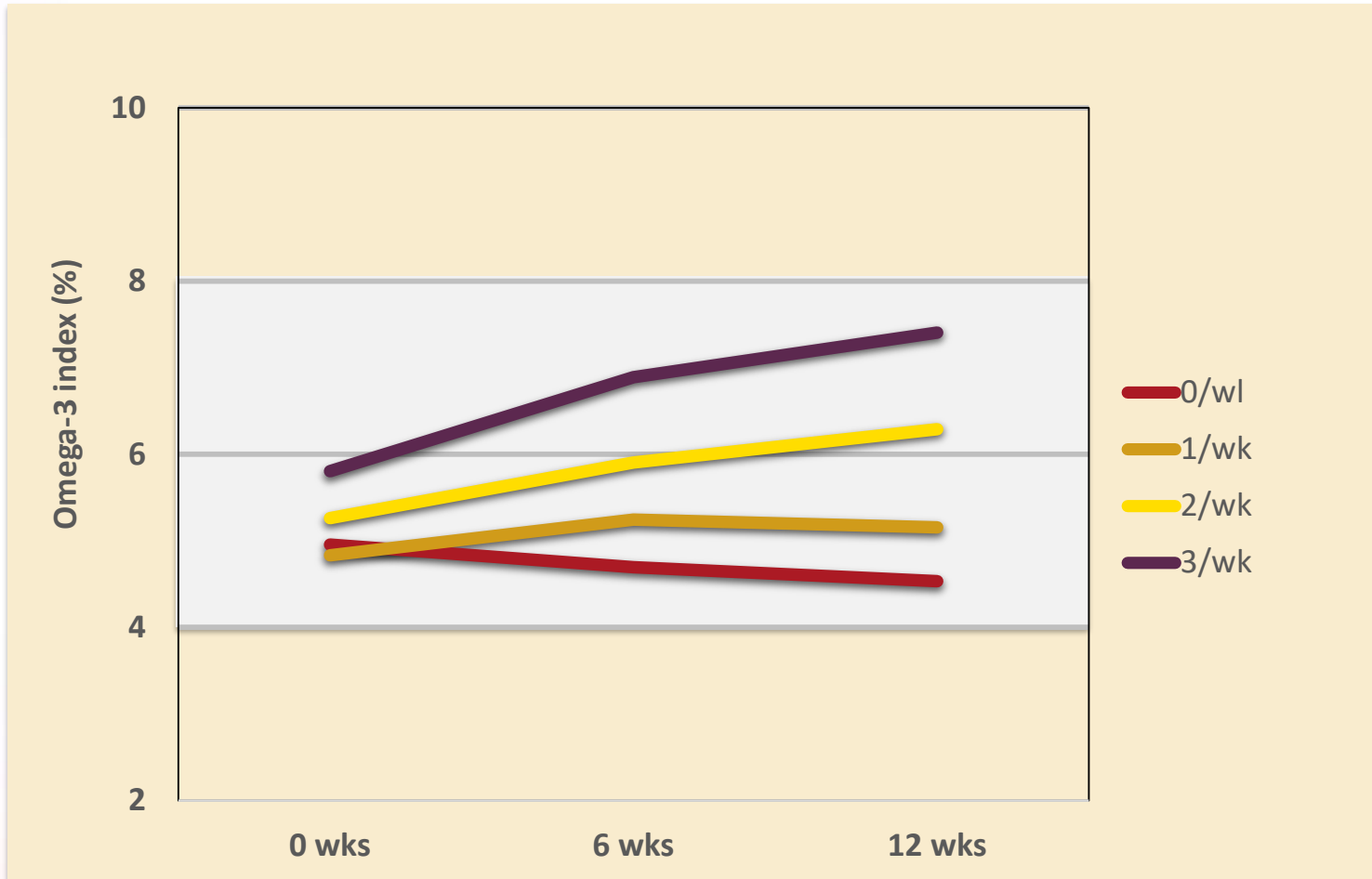


Shellfish human intervention study

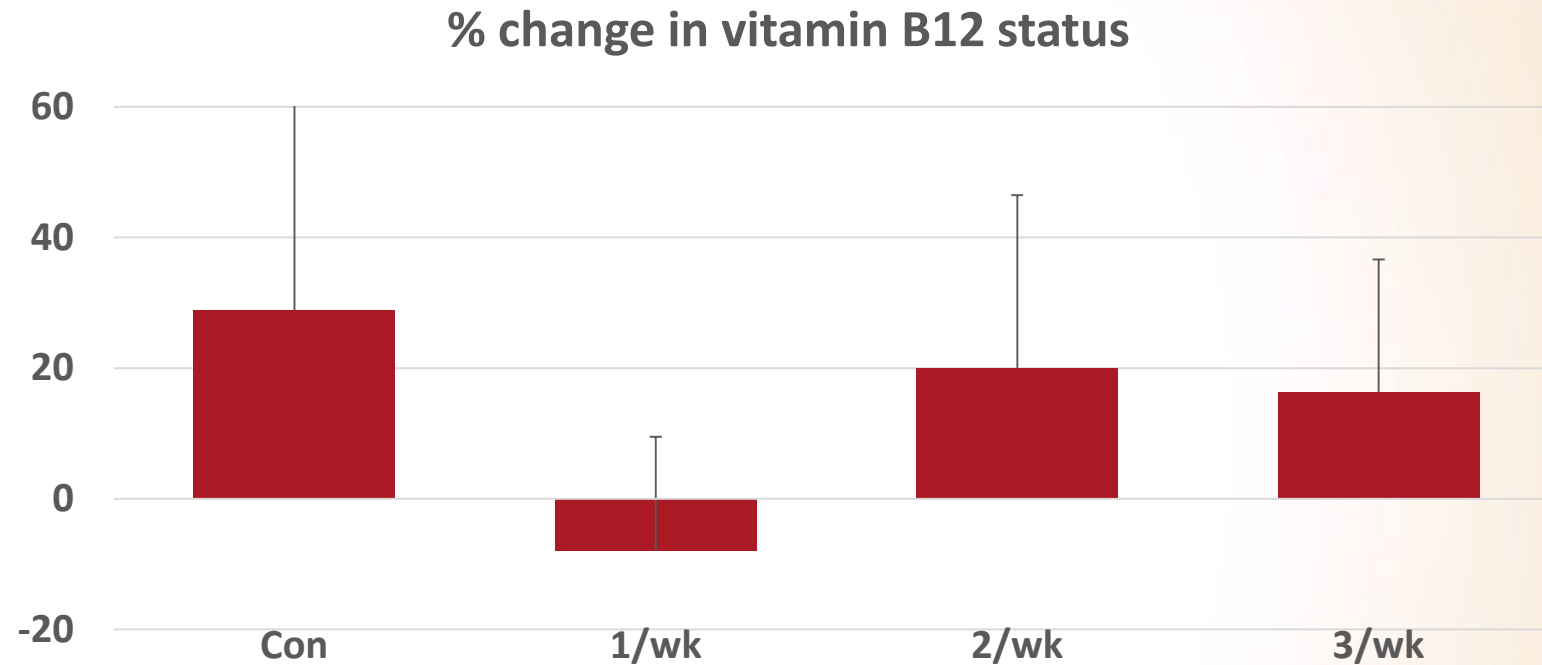
AIM: Establish the dose of mussels (i.e. 1, 2 or 3 portions per week) necessary to produce a physiologically meaningful change in nutrient status



Eating mussels increases the omega-3 index

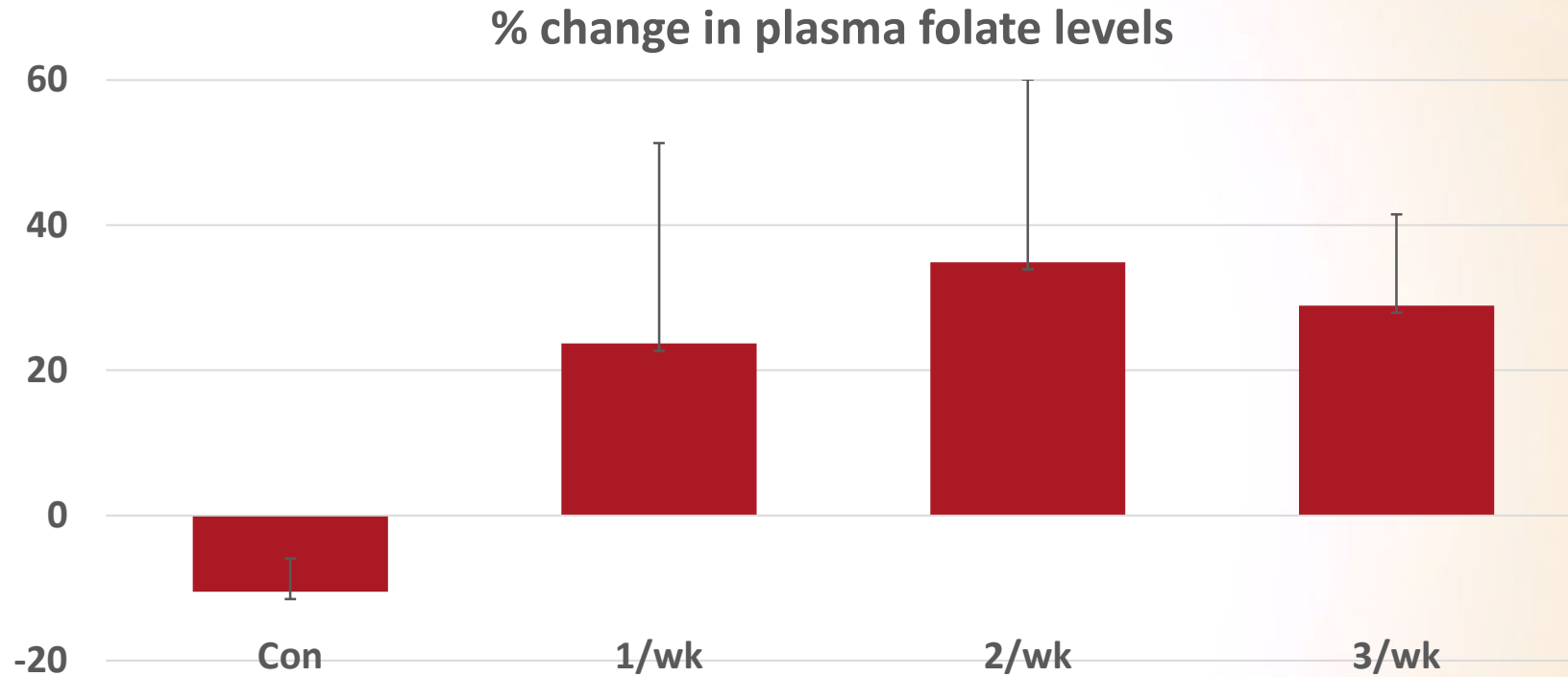


Eating mussels does not affect plasma vitamin B12 levels



Mean plasma vitamin B12 levels: 340 pg/ml
(Normal plasma vitamin B12 levels: 300-600 pg/ml)

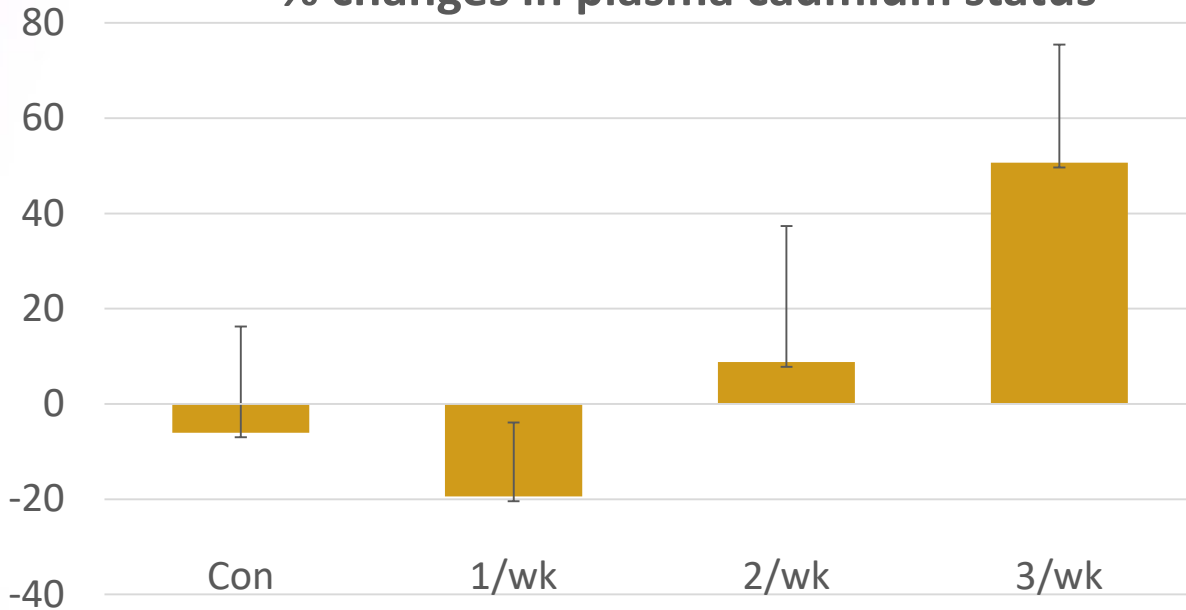
But... eating mussels does improve folate status



Mean plasma folate levels: 5ng/ml
(Normal plasma folate levels: 5-12ng/ml)

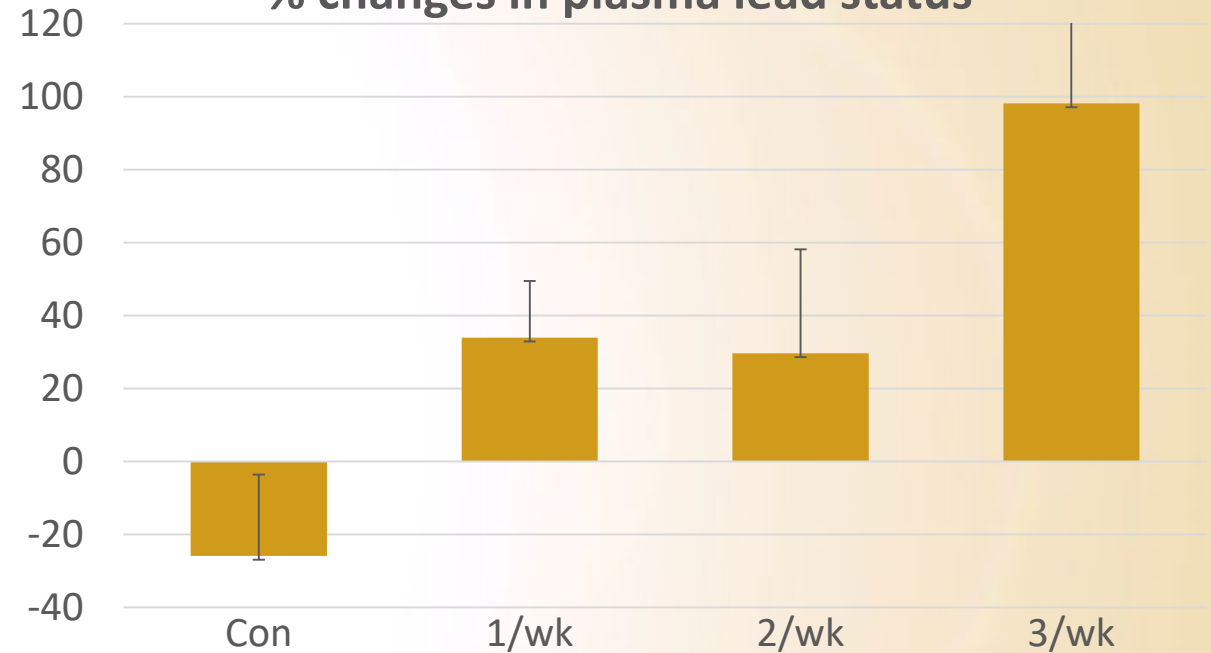
And, eating mussels does increase cadmium and lead levels

% changes in plasma cadmium status



Mean plasma cadmium levels: 0.3 $\mu\text{g/L}$
(whole blood cadmium levels >5 $\mu\text{g/L}$ hazardous)

% changes in plasma lead status



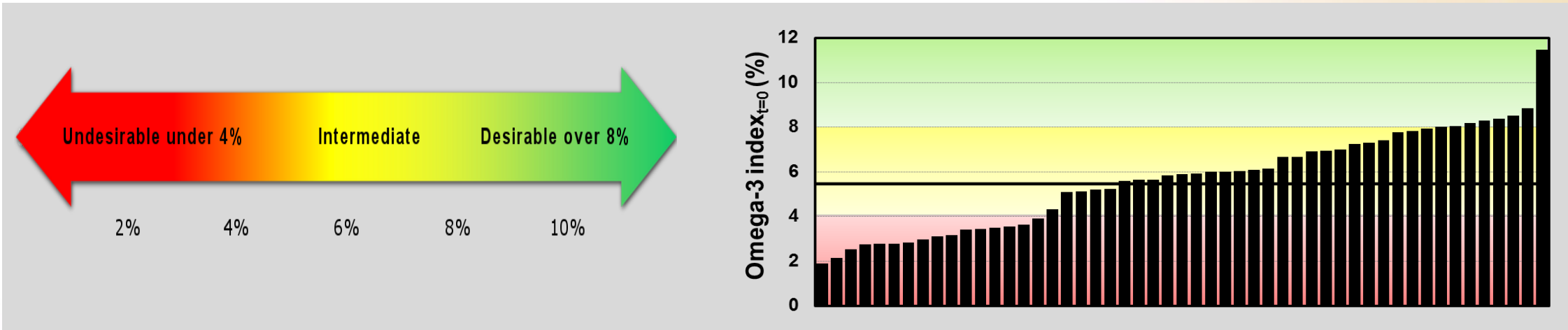
Mean plasma lead levels: 0.7 $\mu\text{g/L}$
(whole blood lead levels >100 $\mu\text{g/L}$ hazardous)

But levels remain well below levels considered 'hazardous'

Opportunity for increasing awareness on omega-3 status



Measurement of the **omega-3 index** in finger prick blood



Opportunity for nutrition claims

- To claim that a product is a '**source of**' a nutrient it should contain 15% of the recommended daily amount (RDA - which is the European equivalent of the UK Reference Nutrient Intake or RNI) in 100g, or from the amount they could reasonably be expected to consume (for fish it may need to be on a weekly basis).
- Or, to make a '**high in**' **nutrient claim**, the product should contain 30% of the RDA in 100g, or from the amount they could reasonably be expected to consume (for fish it may need to be on a weekly basis).



Nutrient	RNI	'Source of'	'High in'
n-3 PUFA	450 mg/day 3150 mg/week	470 mg/85g mussels, oysters, king scallops, crab, lobster, langoustine	945 mg/85g mussels, oysters, king scallops (roe), crab (brown meat)
Vitamin B12	1.5 µg/day 10.5 µg/week	1.6 µg/85g mussels, oysters, king scallops (roe) crab (brown meat)	3.2 µg/85g mussels, oysters, king scallops (roe)
Folate	200 µg/day 1400 µg/week	210 µg/85g	420 µg/85g
Iodine	140 µg/day 980 µg/week	147 µg/85g mussels, crab (brown meat), lobster, langoustine	294 µg/85g lobster
Selenium	60-75 µg/day 420-525 µg/day	63-79 µg/85g crab	126-158 mg/85g
Zinc	7-9.5 mg/day 49-66.5 µg/day	7.4-10 mg/85g oysters	14.7-20 mg/85g oysters

RNI: Reference Nutrient Intake

Conclusions

- Increased consumption of shellfish increases the nutritional status of omega-3 fatty acids and folate.
- Shellfish are a rich dietary source of omega-3 fatty acids, vitamins and micronutrients; a nutrient claim may be achievable for a range of shellfish species



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