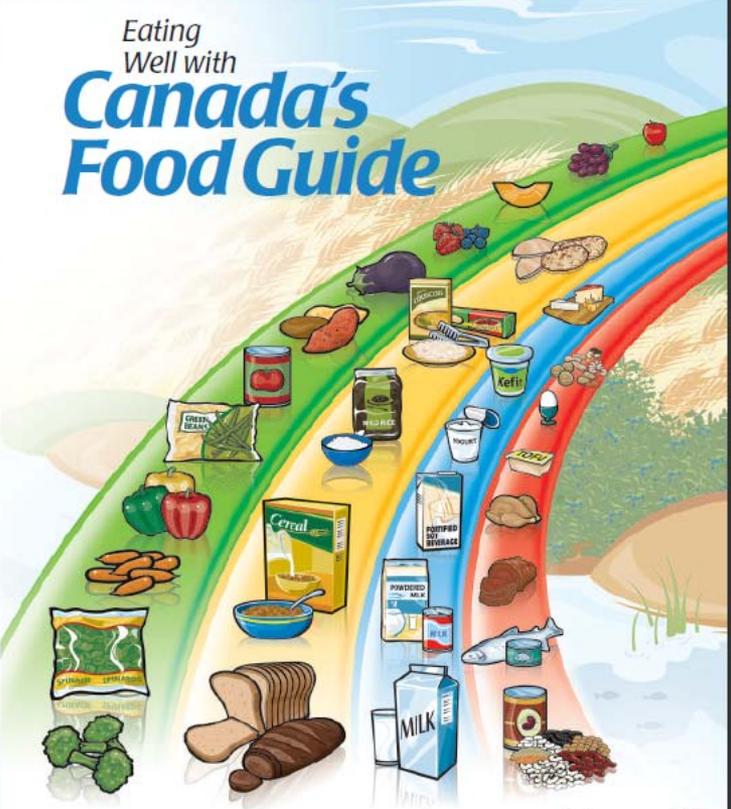




 Health Canada Santé Canada

Your health and safety... our priority. *Votre santé et votre sécurité... notre priorité.*

Eating Well with
Canada's Food Guide

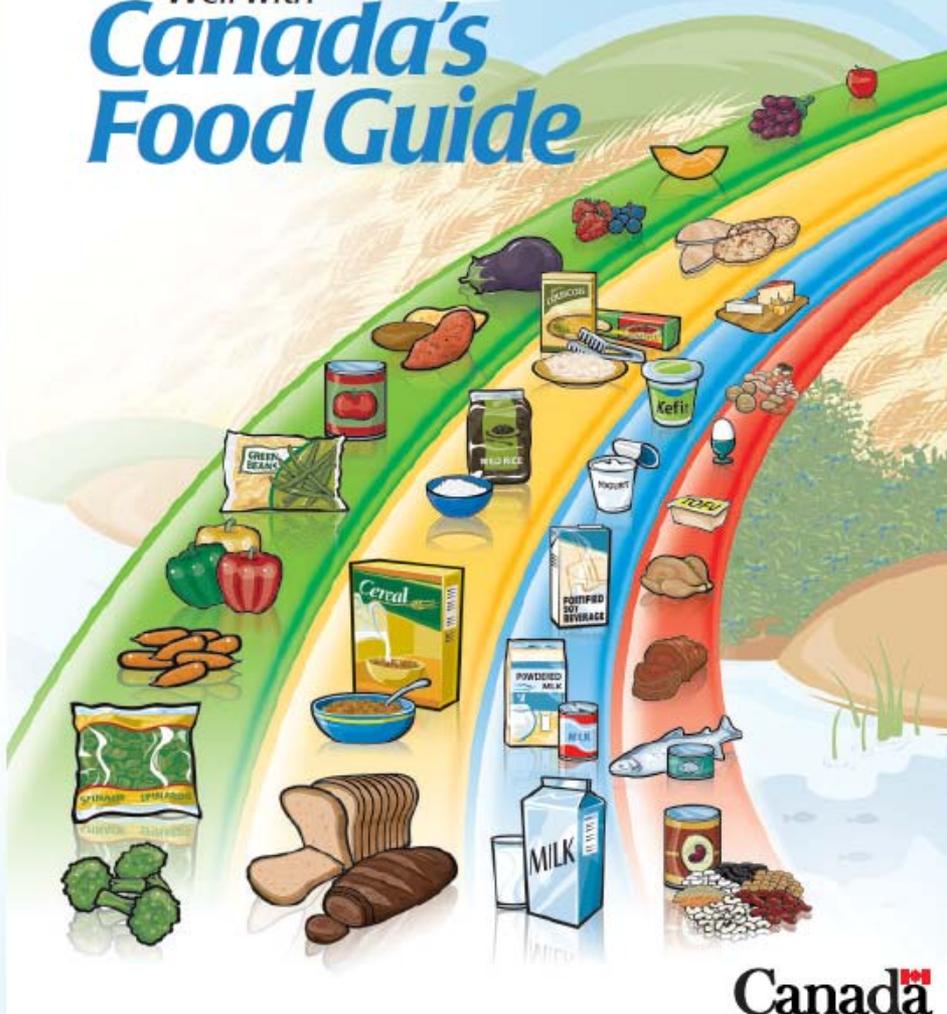


Canada 





Eating Well with Canada's Food Guide



Canada

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Meat and Alternatives



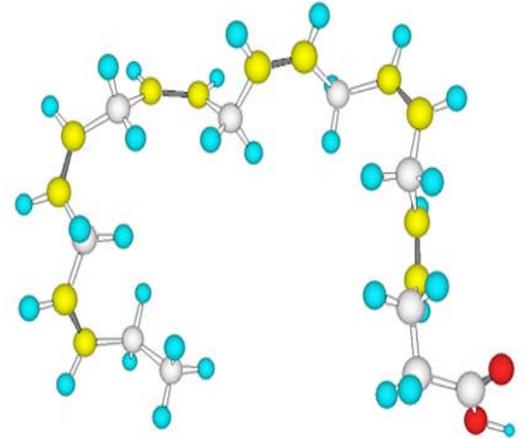
- ▶ Have meat alternatives such as beans, lentils and tofu often.
 - ▶ Eat at least two Food Guide Servings of fish each week.*
 - Choose fish such as char, herring, mackerel, salmon, sardines and trout.
- * Health Canada provides advice for limiting exposure to mercury from certain types of fish.

Why include 2 fish servings/ week?

- Fatty fish are a rich source of n-3 fatty acids
- Numerous health benefits

Healthy Eating has become more complicated

- Omega 3 fatty acids
- n-3 fatty acids
- Eicosapentaenoic acid – EPA
- Docosahexaenoic Acid – DHA
- Fish Oils
- Highly Unsaturated Fatty Acids HUFAS



What Are Functional Foods?

- resembles / is a conventional food
- physiological benefit chronic disease prevention beyond basic nutritional function of conventional food



* USA



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What Are Nutraceuticals?

- compound isolated / purified from foods
- medicinal form
- physiological benefit / chronic disease prevention



Increasing Omega-3 Fatty Acid Intakes through Nutraceutical, Functional Food and Whole Food Strategies

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WATERLOO

uwaterloo.ca

Rhona Hanning, PhD RD

Ashley Patterson, PhD (Cand)

Laboratory of Nutritional and Nutraceutical Research

Dietary Fatty Acid

-Metabolism

-Methodology

-Clinical Application

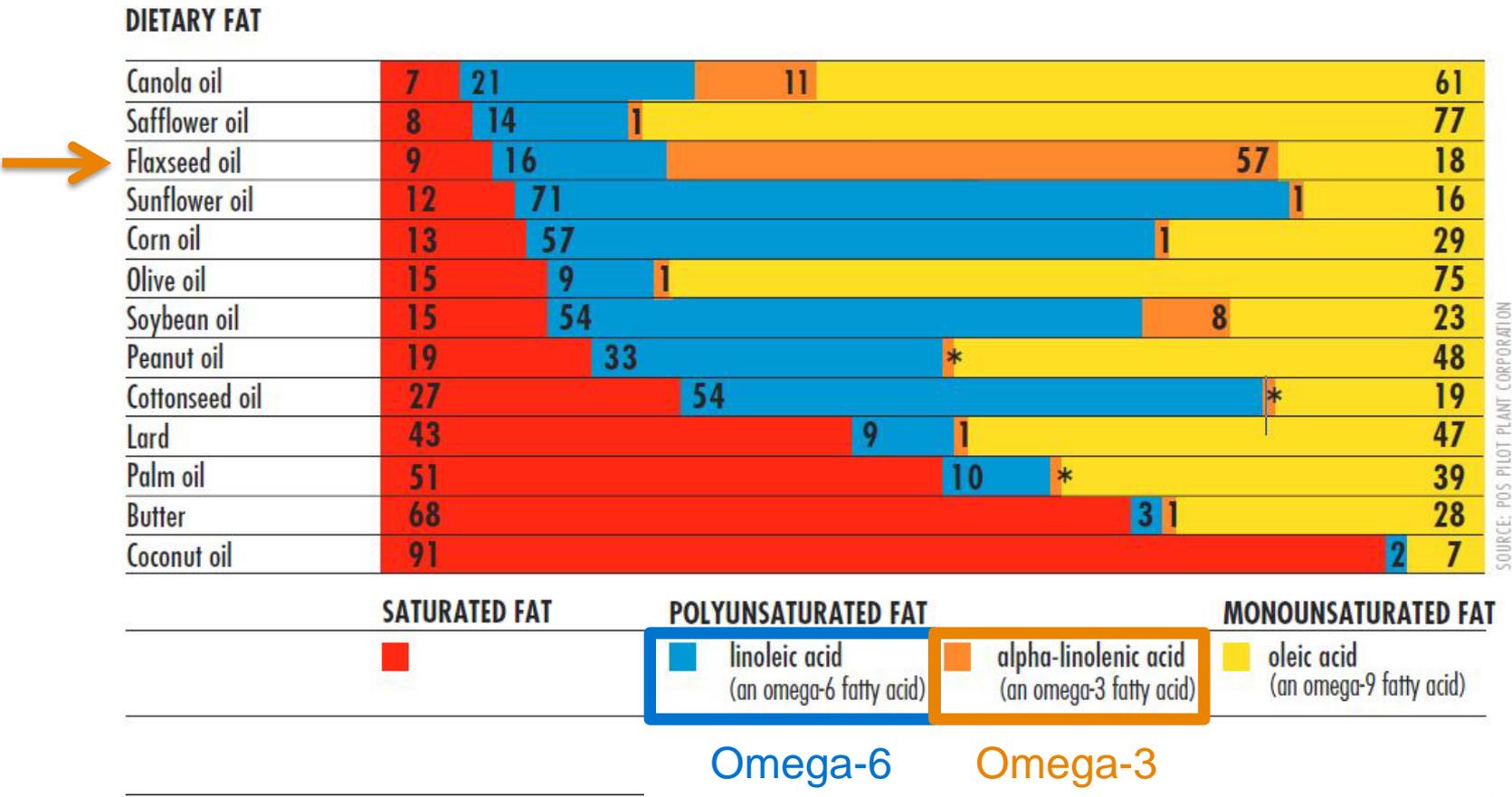


Clinical Application:

How can traditional whole foods, novel functional foods & nutraceuticals be used to improve diet & health?



Foods Contain Different Types of Fatty Acids in Varying Amounts



SOURCE: POS PILOT PLANT CORPORATION

The Family of **Omega-3** Polyunsaturated Fatty Acids

Plant Synthesis



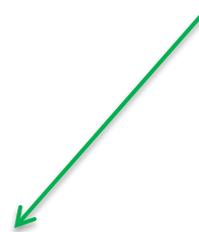
α -Linolenic Acid

ex: flax



Diet

Human Conversion <1%



Eicosapentaenoic Acid, **EPA**

Docosahexaenoic Acid, **DHA**

ex: Fish

**Omega-3 Highly
Unsaturated Fatty Acids
(n-3 HUFA)**

EPA & DHA (n-3 HUFA) are Associated with Numerous Health Benefits

Prevention of:

Cardiovascular Disease

Cognitive Decline / Dementias

Macular Degeneration

Breast, Prostate & Colorectal Cancer

Inflammatory Disorders
- Arthritis, Inflammatory Bowel



Promotion of:

Brain/Cognitive Development

Visual Acuity

...

Recommended EPA & DHA Intakes



Goal	Agency	EPA+DHA (mg/d)	Source
Healthful Diet	Dietitians of Canada & American Dietetic Association ¹	500	8oz/wk Fish (oily)
2° Coronary Heart Disease Prevention	American Heart Association ²	1000	Fish/Nutraceutical
Triglyceride Lowering	American Heart Association ²	2000-4000	Fish/Nutraceutical

1 Kris-Etherton PM & Innis S, J Am Diet Assoc, 2007;107:1599-1611

2 Kris-Etherton PM, *et al.*, Circulation, 2002;106:2747-2757

Canadians Can Meet EPA&DHA Recommendations Using a Variety of Sources

Food	Amount	EPA+DHA (mg)
Atlantic Salmon	75g	1611
Tilapia	75g	102
Shrimp	75g	236
Chicken Breast	75g	13
Regular Eggs	1 large	20
Omega-3 Eggs	1 large	75-140
Concentrated Fish Oil Capsule	1	500
Omega '3-6-9' Capsules	1	75-120
Ground Flax Seed	1 tbsp	0



An n-3 HUFA-specific food frequency questionnaire indicates Canadian intakes are below recommendations of 500mg/d EPA + DHA for a healthy diet.



Dietary Forensics: Blood levels of Omega-3 Highly Unsaturated Fatty Acids (n-3 HUFA) Provide Clues About Dietary Intake



Finger-Tip Prick Assessment Tool

Canadian Blood Levels of n-3 HUFA are Below Cardio-Protection Level

% n-3 HUFA in total HUFA

$$= \frac{\text{Omega-3 Highly Unsaturated Fatty Acids}}{\text{Total Highly Unsaturated Fatty Acids (Omega-6 + Omega-3)}} \times 100\%$$

Reference Values

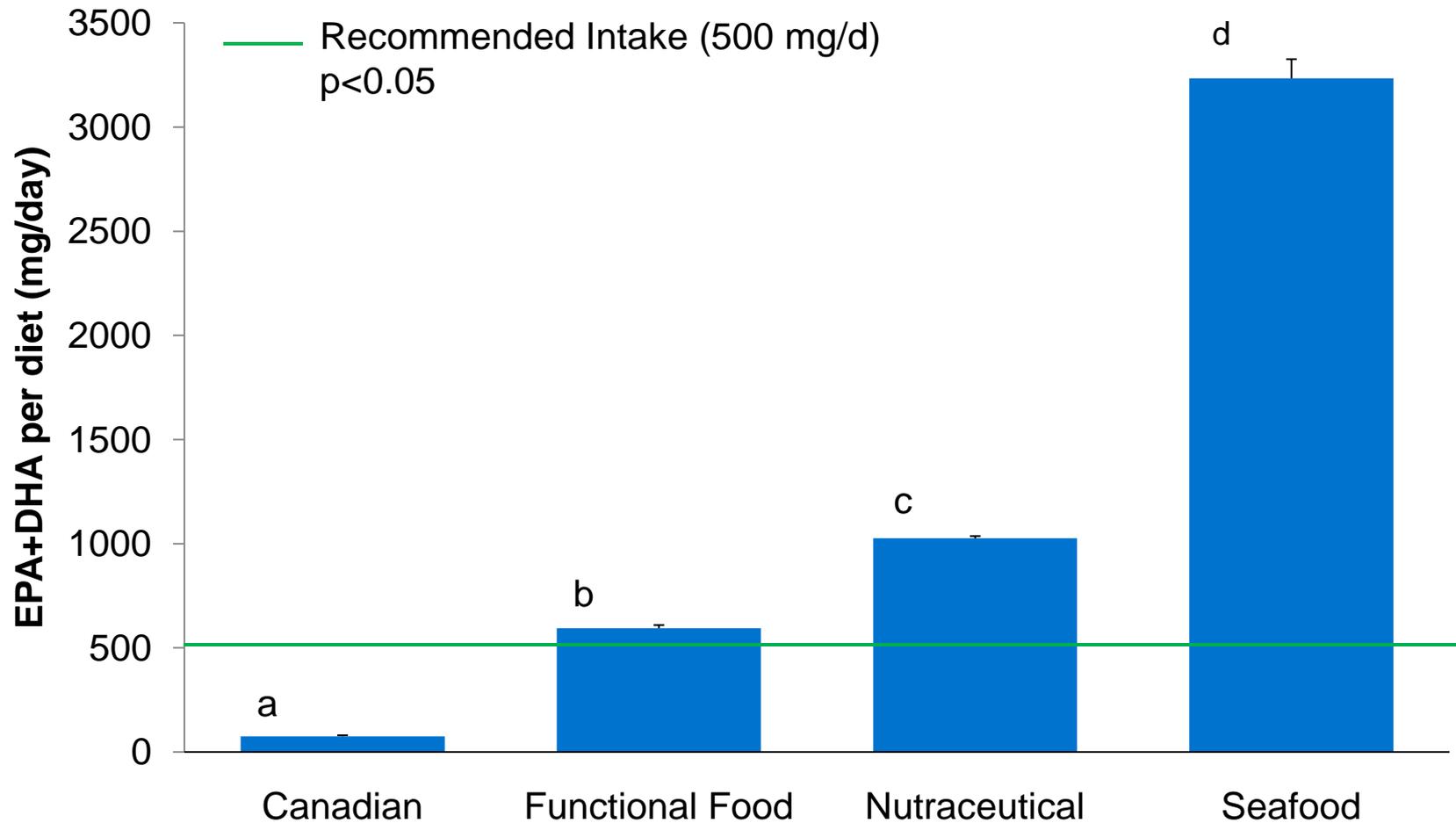
Canadian Average	Cardio-Protection
20	40

Stark KD *et al.*, J Lipid Res, 2005;46:516-525



Finger-tip prick samples indicate omega-3 levels in the blood of Canadians are below cardio-protection levels.

Dietary Strategies Can Increase Canadian EPA & DHA Intakes



Evaluation of the Adherence to Nutraceutical, Functional Food and Whole Food Strategies to Increase Omega-3 Fatty Acid Intakes in Men and Women at Risk for Cardiovascular Disease

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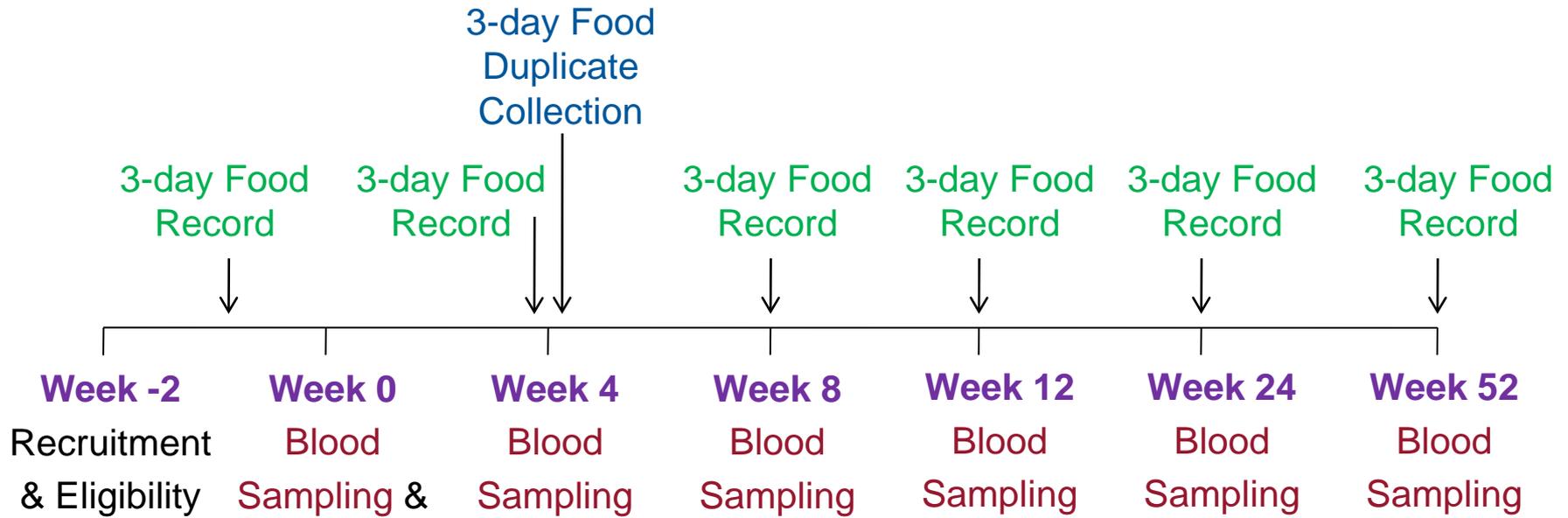
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FOR DIETETIC RESEARCH

Which Strategy Results In:

- Greatest increase in EPA+DHA intake?
- Greatest adherence over 1 year?



Timeline & Methodology



+ FFQ

Dietary Advice



All Four Dietary Strategies Can Increase Blood Levels of n-3 HUFA. Greatest adherence is observed with nutraceutical strategy.



All four strategies can increase EPA+DHA intakes to recommended levels of 500mg/d.

EPA & DHA-Enriched Functional Foods on the Canadian Market

Category	Product	EPA+DHA (mg)/ SVG	SVG Size
Enhanced	Omega-3 egg (in shell)	75-140	1 large
	Cows Milk (Homo)	30	1 cup
	Cheese (stick)	20	1 stick
	Cows Milk (1%, 2%, chocolate)	10-15	1 cup
Encapsulated Fish Oil	Omega-3 egg (liquid)	250	1/4 cup
	Margarine	50	2 tsp
	Juices	50	1 cup
	Yogurt	7-40	1 pot
	Peanut Butter	25	1 tbsp
Vegan	Soy Beverage	30-35	1 cup
F/V	Bread	15-30	2 slices

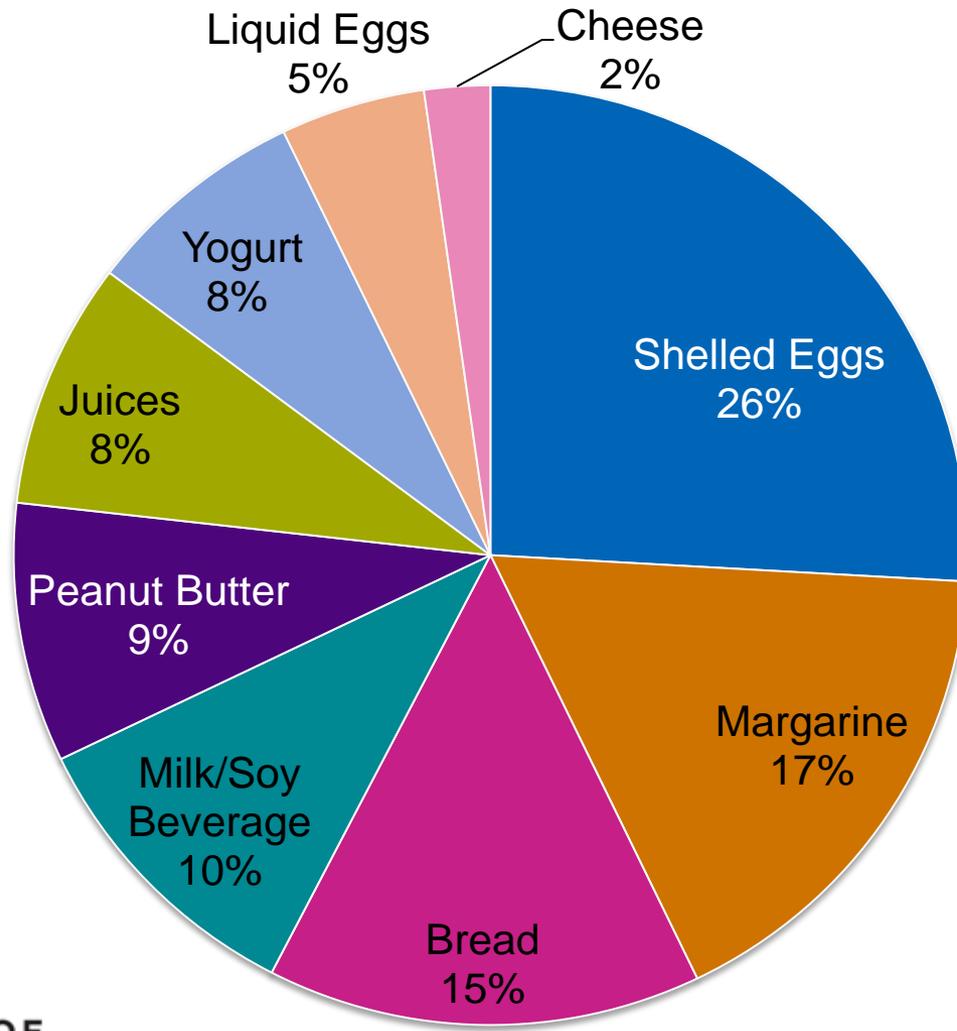
Which Factors *Facilitate* Eating EPA&DHA-Enriched Functional Foods?

	Comment
1	The foods selected for enrichment are part of my regular diet so I just sub in the functional foods
2	The functional foods are easy/convenient to incorporate into my regular diet
3	The functional foods are appealing to eat

Which Factors *Prevent* Eating EPA&DHA-Enriched FF?

	Comment
1	The functional foods are too expensive
2	The functional foods do not contain enough EPA+DHA per serving to supply 1g/day
3	There is not enough variety of EPA&DHA-enriched functional foods

Most Frequently Consumed EPA&DHA-Enriched Functional Foods



Participant Suggestions For New EPA&DHA-Enriched FF Products

Rank	Product
1	Cold Cereal
2	Oatmeal
3	Brick Cheese
4	Pasta
4	Bigger Containers
5	Pasta Sauce
5	Vegetables

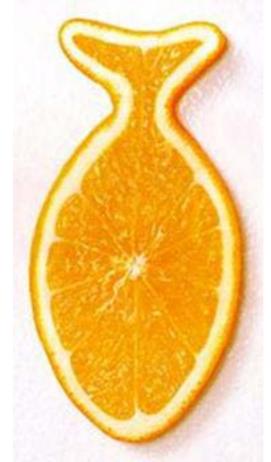


Take-Away Message



1. Nutraceuticals, functional foods & seafood can be useful to increase EPA+DHA intakes to recommended levels in healthy middle aged adults.

2. Long-term adherence to dietary advice to increase EPA+DHA intake is greatest for strategies involving least dietary change (ie: Nutraceuticals).



Next Steps in Functional Food Research



9th Conference of the
International Society for
the Study of Fatty
Acids and Lipids



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Thank You

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