20 OCTOBER 2026

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Next-Generation Nutrients: Advancing Nutrition Science Throughout the Lifespan

Resilience | Functional Capacity | Healthspan

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Next-Generation Nutrient:

OMEGA-3s DHA/EPA

More in the CRN-I 2026 Symposium Series

5 NOVEMBER · HYBRID 9:00–11:00 CET

CHOLINE



Rima Obeid, Ph.D., M.P.H.

Saarland University Hospital



Emma Derbyshire, Ph.D.

Founder and CEO · Nutritional Insight Ltd.



Trygve Bergeland, Ph.D.

Moderator · Balchem

Join us in Nuremberg or access virtually worldwide to explore findings related to neurological health, liver health, and metabolic outcomes across the lifespan, and consider what the science means for nutrition policy.

17 NOVEMBER · VIRTUAL 11:00–12:30 EST

LUTEIN & ZEAXANTHIN



Naiman A. Khan, Ph.D., R.D.

University of Illinois Urbana-Champaign



Elizabeth J. Johnson, Ph.D.

Tufts University



Lisa M. Renzi-Hammond, Ph.D.

University of Georgia



Deshanie Rai, Ph.D.

Moderator · Kemin

Examine evidence on visual function, macular health, cognitive outcomes, and aging populations, along with the maturity of the science, research gaps, and implications for nutrition policy and regulatory frameworks.

AVAILABLE ON DEMAND WATCH ANY TIME

NICOTINAMIDE RIBOSIDE



Charles Brenner, Ph.D.

University of Helsinki



Mary M. McDermott, M.D.

Northwestern University



Andrew Shao, Ph.D.

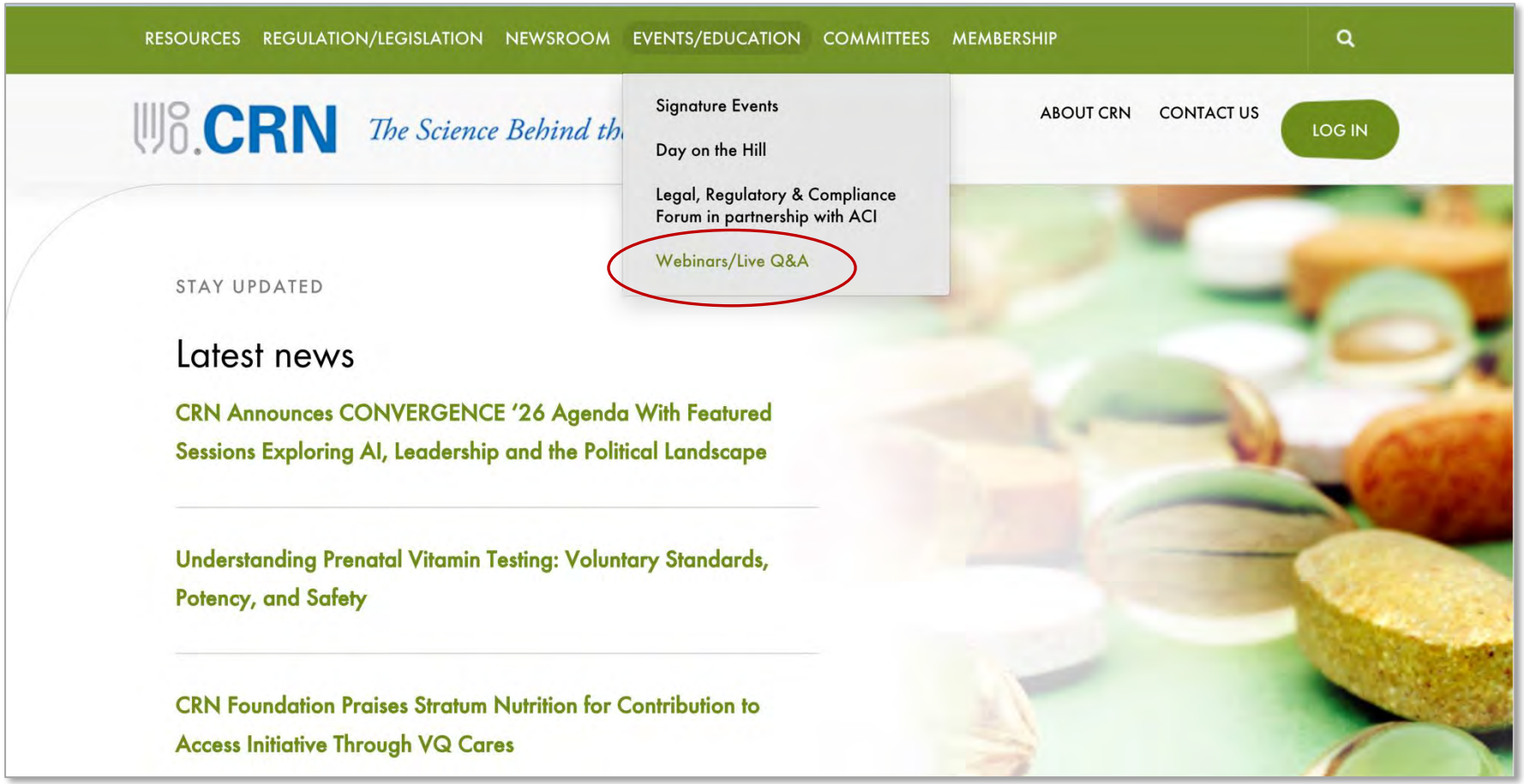
Moderator · Niagen Bioscience

Explore nicotinamide riboside (NR), an NAD+ precursor, and the science of cellular metabolism and healthy aging—from its foundational discovery to clinical evidence on functional outcomes.

SCAN FOR DETAILS AND REGISTRATION

Council for Responsible Nutrition
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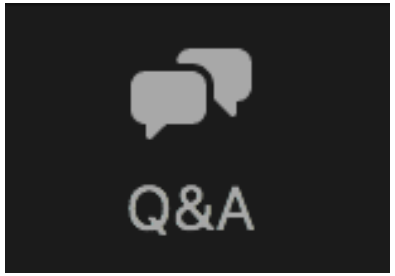
Visit the CRN Webinar Page



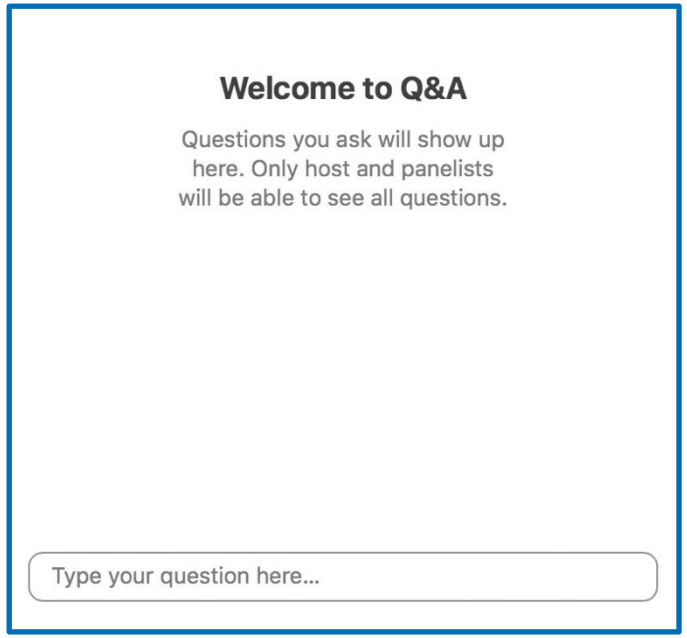
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INTERNATIONAL

How to ask a question

Q&A Function



Q&A Window



Today's presenters and moderator



Danielle Christifano, Ph.D.

Associate Professor of Dietetics and Nutrition, University of Kansas Medical Center



Philip C. Calder, Ph.D.

Professor of Nutritional Immunology, University of Southampton, United Kingdom



MODERATOR

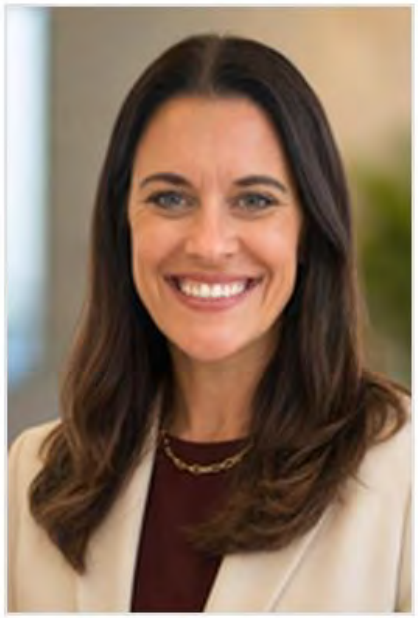
Sonia Hartunian-Sowa, Ph.D.

Director, Nutrition Science & Advocacy, dsm-firmenich



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Danielle Christifano, Ph.D.

Associate Professor of Dietetics and Nutrition, University of Kansas Medical Center

CRN-International Symposium Series
Next-Generation Nutrient: Omega-3s DHA/EPA

DHA & EPA in Pregnancy & Infancy

- *Maternal and child health outcomes*
- *Early-life neurodevelopment*
- *Translating evidence into practical strategies*



Danielle Christifano, PhD
Associate Professor
Department of Dietetics and Nutrition
University of Kansas Medical Center

Danielle Christifano, PhD

Associate Professor
University of Kansas Medical Center

Mother

Wife | Mom of two boys
Family is my greatest inspiration

Training & Expertise

PhD in Medical Nutrition Sciences (KUMC)
DHA/EPA | Choline | Carotenoids
Maternal & Infant Neurodevelopment

Research

Maternal & child nutrition, metabolic health,
ANS/HRV, preterm birth, community interventions

Teaching & Mentorship

Nutrition courses | Graduate student mentor
Building the next generation

Service & Leadership

US DOHaD Society (Past President) | ISSFAL Board
Academic Affairs Chair | Peer Reviewer

KU THE UNIVERSITY OF KANSAS MEDICAL CENTER



Objectives



Evaluate

DHA/EPA evidence for maternal health and birth outcomes



Interpret

Findings on early-life neurodevelopment and their limitations



Apply

Practical strategies for assessment, dosing, and nutrition through infancy

Evidence and Outcomes

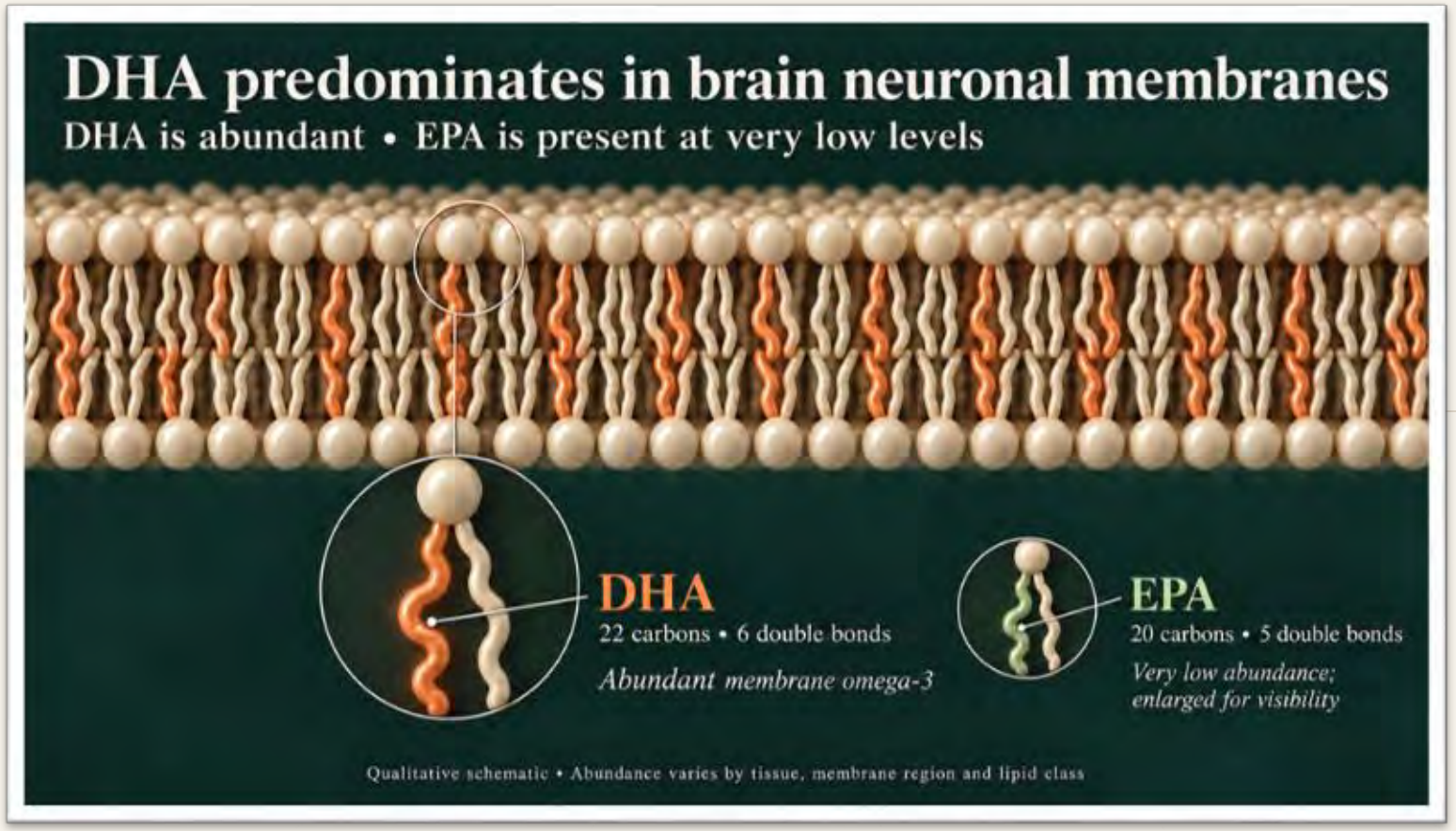
1	**Birth outcomes**	Strongest clinical evidence Preterm birth
2	**Neurodevelopment**	Promising, domain-specific signals Attention and physiology
3	**Practice and policy**	Translation depends on delivery Dose, timing, baseline supply, access

Evaluate

Maternal health and birth outcomes



DHA and EPA: Related & Distinct Roles



DHA

22:6 n–3

Neural and retinal membranes
Focus of prenatal dose trials

EPA

20:5 n–3

Lipid signaling and inflammatory regulation

NIH ODS, Omega-3 Fatty Acids Fact Sheet

DHA supply connects pregnancy with infancy



Pregnancy

PLACENTAL TRANSFER

Rapid neural accretion late in gestation

Lactation

MATERNAL INTAKE

Contributes to milk DHA

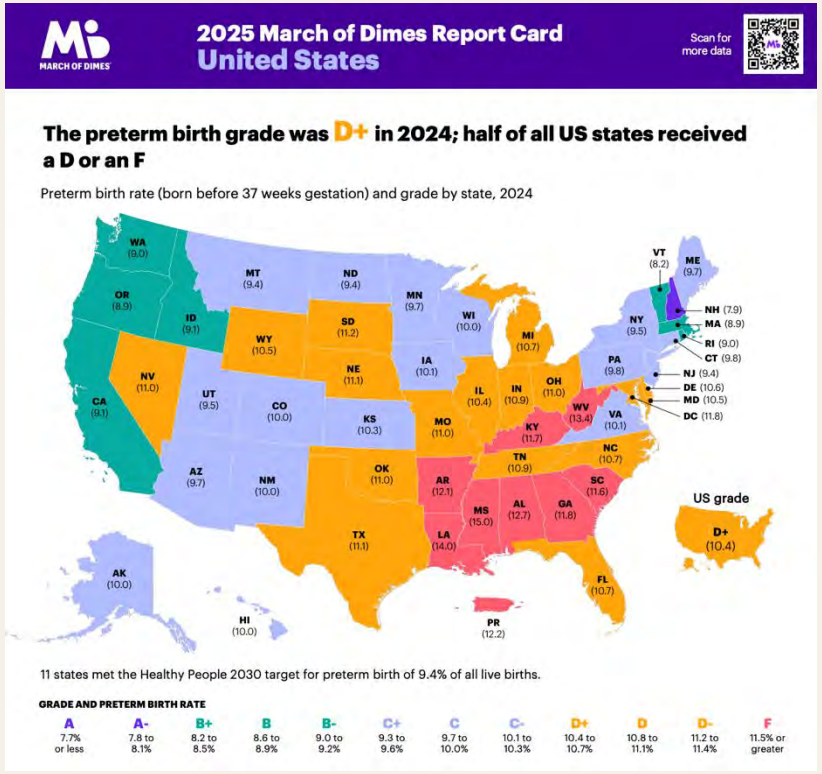
Infancy

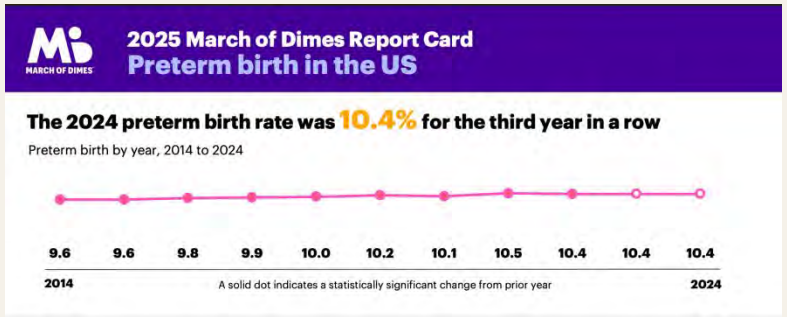
INFANT FEEDING

Human milk or formula
Complementary foods

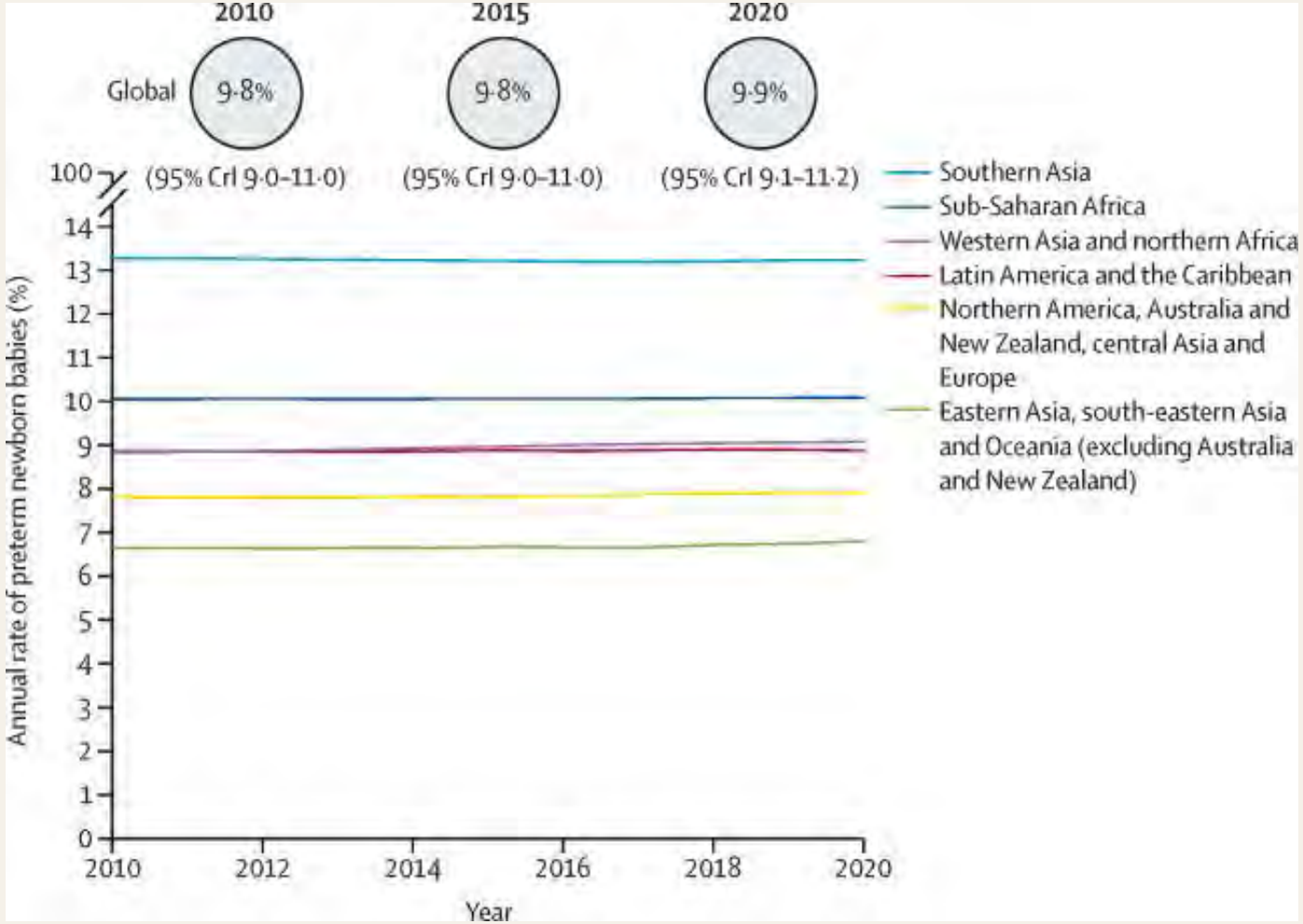
EFSA 2010; Gustafson et al. 2022, PMID 34552200

Preterm Birth: A Growing Problem

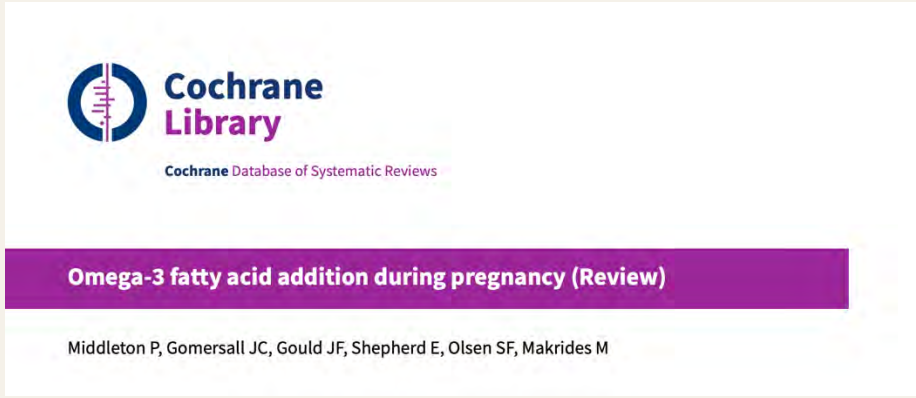




Regional and worldwide trends in preterm birth between 2010 and 2020



Omega 3s Reduce Risk (2018)



42%

Birth before 34 weeks

Early preterm birth

11%

Birth before 37 weeks

Preterm birth

10%

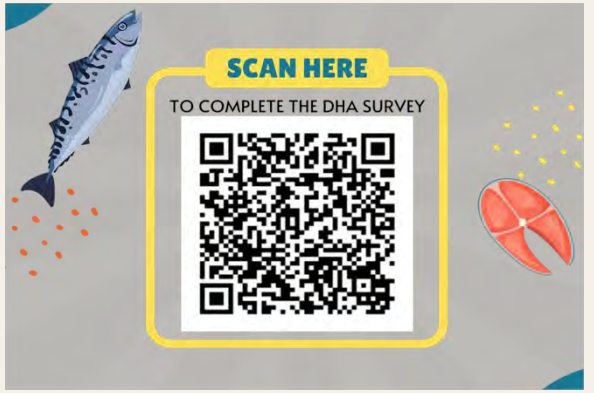
Low birthweight

Birthweight <2,500 g

Relative risk reductions, not absolute changes. Middleton et al. Cochrane. 2018. CD003402

ADORE Trial: DHA Supplementation

Primary Outcome: Significant reduction in early preterm birth

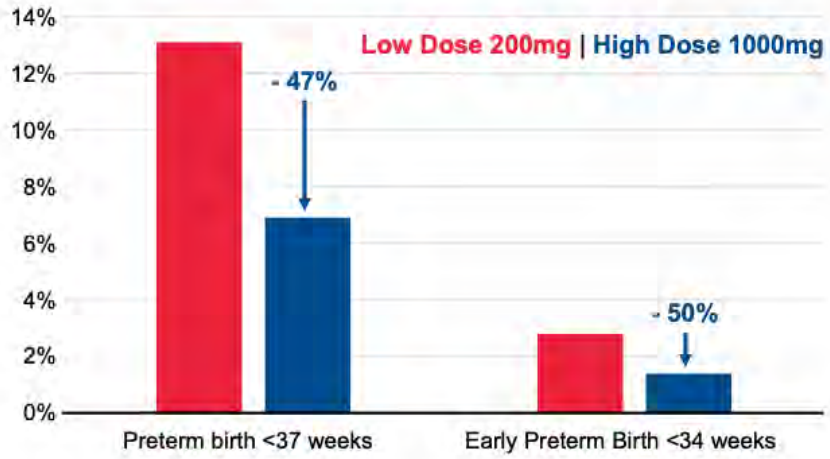




Byron Gajewski, PhD

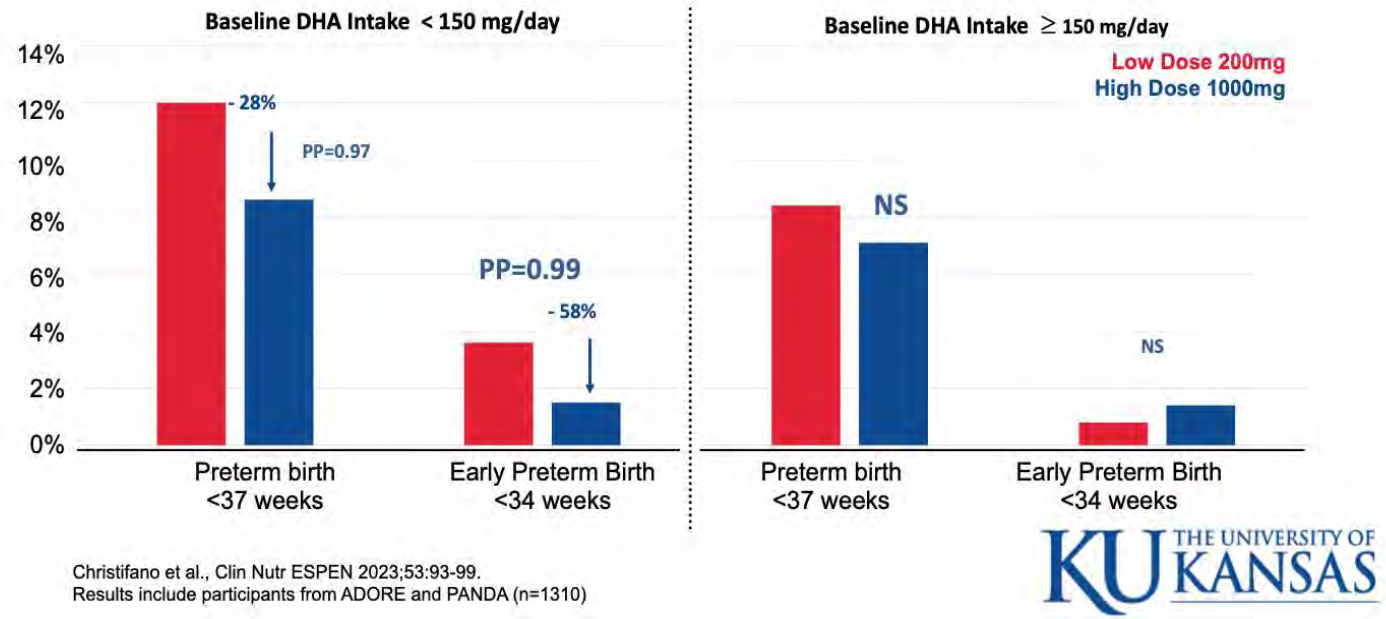


Susan Carlson, PhD



4 Carlson et al., (2023) Early and late preterm birth rates in participants adherent to randomly assigned high dose docosahexaenoic acid (DHA) supplementation in pregnancy. Clinical Nutrition 42: 235-243.

Women with low baseline DHA Intake need a higher dose



Christifano et al., Clin Nutr ESPEN 2023;53:93-99.
Results include participants from ADORE and PANDA (n=1310)

THE UNIVERSITY OF KANSAS

ORP Trial: DHA Supplementation (Australia)

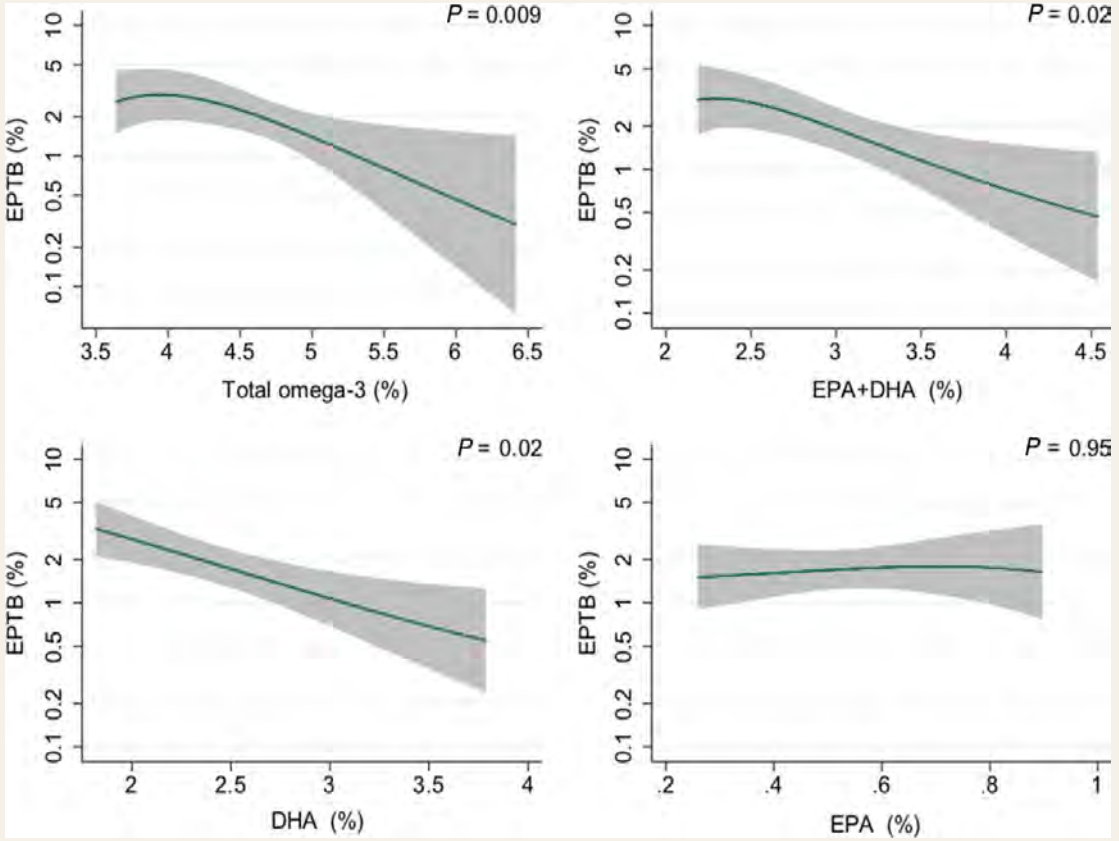
Primary Outcome: No overall reduction in early preterm birth

WHAT CHANGES THE INTERPRETATION

Baseline supply	Low-status subgroups showed benefit
Adherence	Assigned dose and consumed dose can differ
Thresholds	Exact decision boundaries retain uncertainty

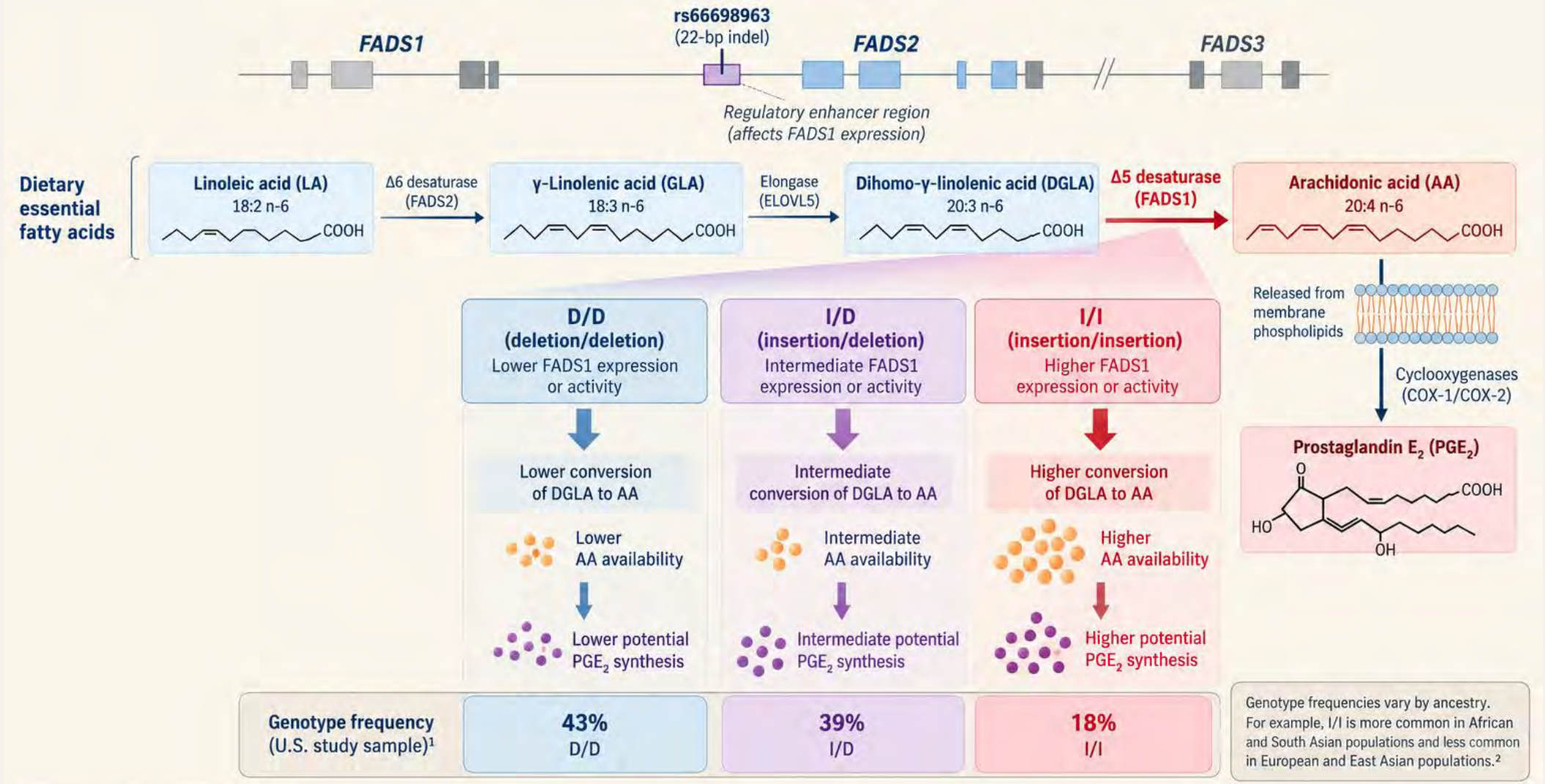
Makrides et al. NEJM. 2019.
Carlson et al. 2021, 2023.

Omega-3 fatty acid supplementation in pregnancy: baseline omega-3 status and EPTB



Makrides et al. BJOG. February 2020.

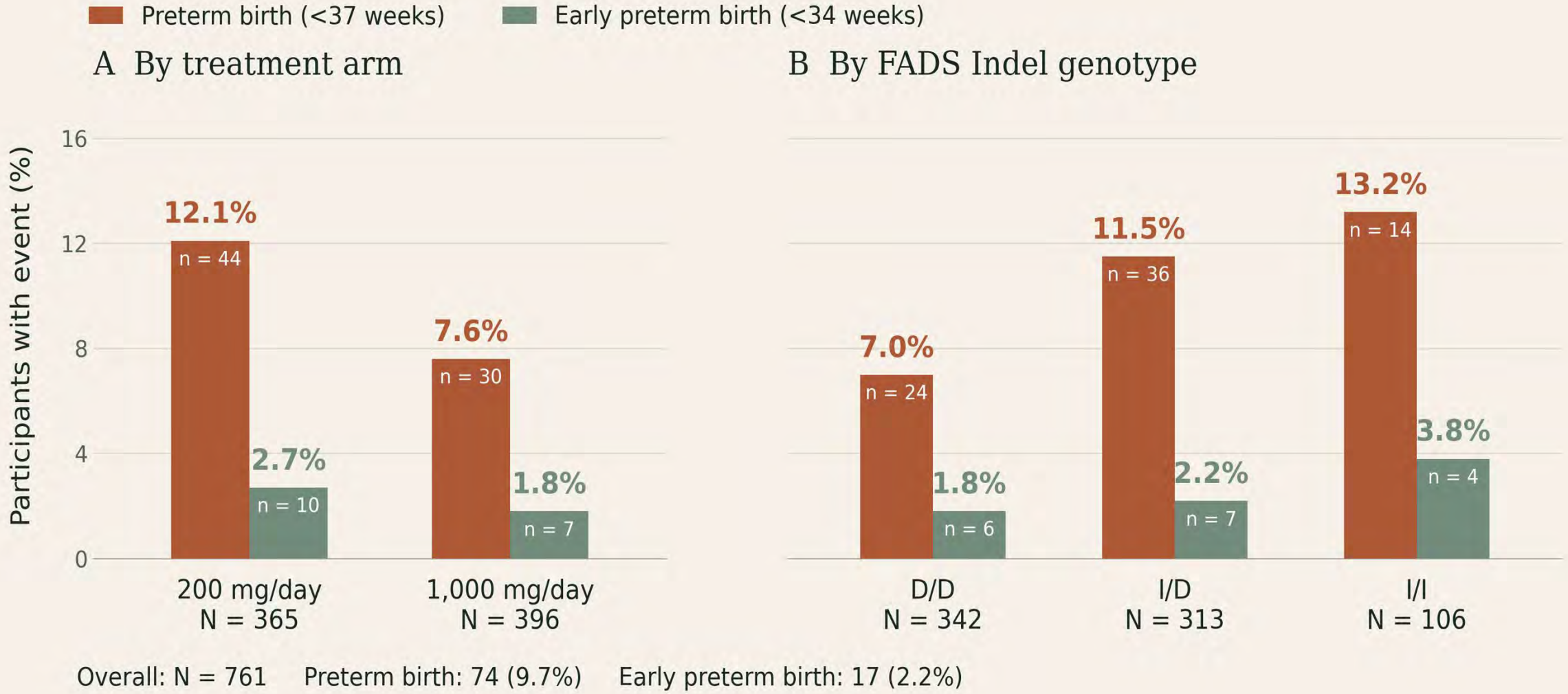
FADS Indel: Genetic Variation in Fatty Acid Status



The *FADS2* rs66698963 indel influences FADS1 expression and activity, leading to genotype-dependent differences in endogenous AA synthesis from **linoleic acid**, which may **increase** the potential for AA-derived PGE_2 production and inflammatory signaling.

1. Kothapalli et al. *Mol Biol Evol*. 2016;33:968–979. (U.S. sample n=311: 43% D/D, 39% I/D, 18% I/I)
2. 1000 Genomes Project. Genotype frequencies vary by ancestry (e.g., European, African, East Asian, South Asian populations).

FADS Indel: ADORE PTB Rates



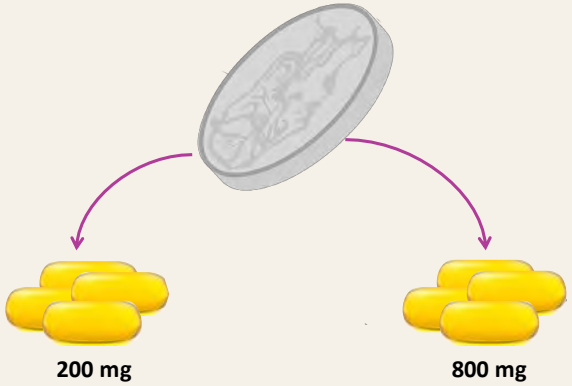
Li et al. PLOS Medicine. Oct 2026.

Maternal physiology: An emerging outcome

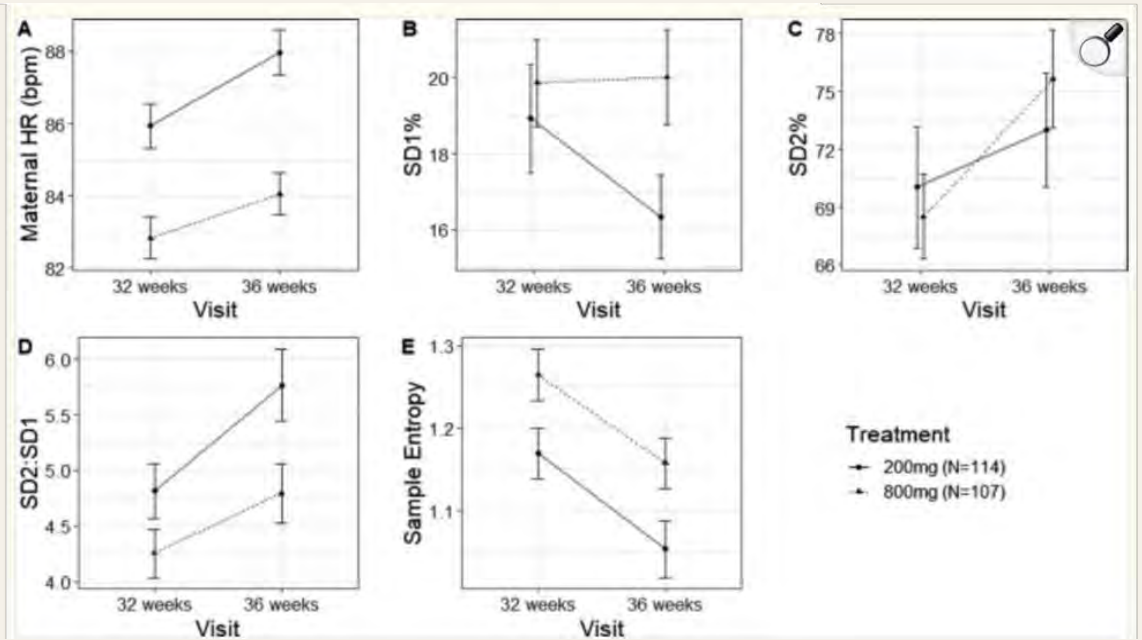


PI: Kathleen Gustafson, PhD

= Prenatal Autonomic Neuro-Developmental Assessment







Christifano et al. J Nutr. 2022;152:2708–2715. PMID 35953431

Interpret

Early-life neurodevelopment



KUDOS Study: Infant Attention

Kansas University DHA Outcomes Study (KUDOS)

HHS Public Access
Author manuscript
Nutr Neurosci. Author manuscript; available in PMC 2023 January 01.

Published in final edited form as:
Nutr Neurosci. 2022 January ; 25(1): 80–90. doi:10.1080/1028415X.2020.1712535.

Prenatal docosahexaenoic acid supplementation has long-term effects on childhood behavioral and brain responses during performance on an inhibitory task

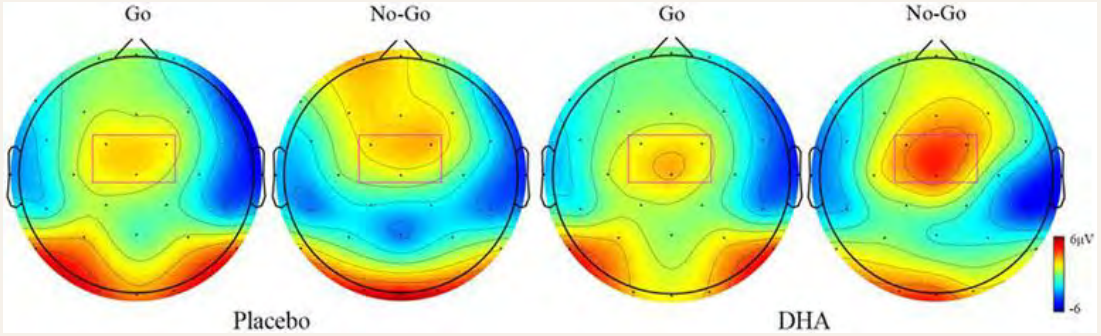
Kathleen M. Gustafson[a,b,*], **Ke Liao**[b], **Nicole B. Mathis**[a,b], **D. Jill Shaddy**[c], **Elizabeth H. Kerling**[c], **Danielle N. Christifano**[b,c], **John Colombo**[d], **Susan E. Carlson**[c]

[a]Department of Neurology, University of Kansas Medical Center (KUMC), Kansas City, KS, USA

[b]Hoglund Brain Imaging Center, University of Kansas Medical Center, Kansas City, KS, USA

[c]Department of Dietetics and Nutrition, University of Kansas Medical Center, Kansas City, KS, USA

[d]Department of Psychology/Schiefelbusch Institute for Life Span Studies, University of Kansas (KU), Lawrence, KS, USA

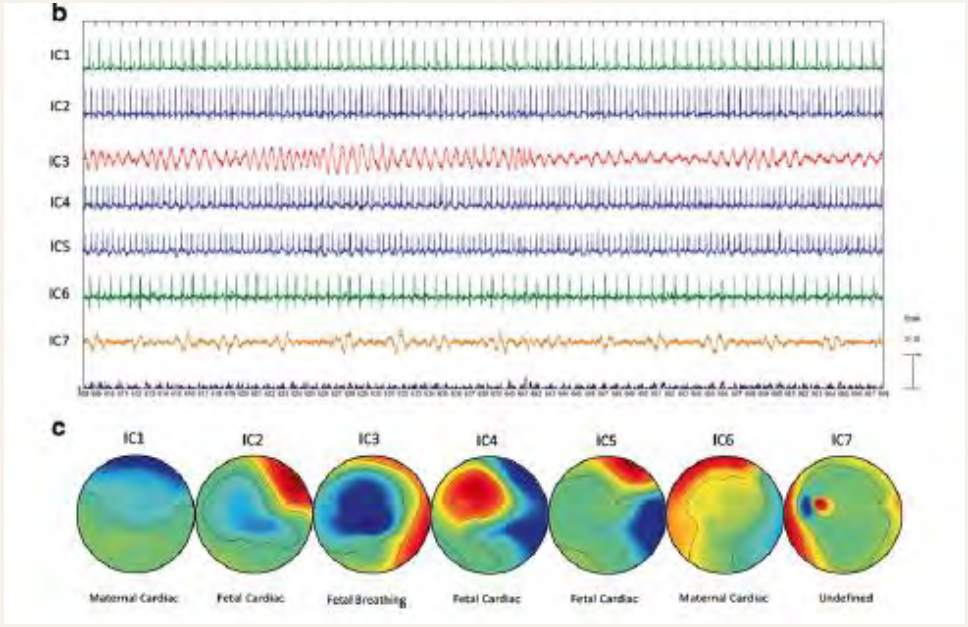




PANDA Study: Fetal Neurodevelopment

= Prenatal Autonomic Neuro-Developmental Assessment







www.nature.com/pr

CLINICAL RESEARCH ARTICLE

Prenatal docosahexaenoic acid effect on maternal-infant DHA-equilibrium and fetal neurodevelopment: a randomized clinical trial

Kathleen M. Gustafson, Danielle N. Christifano, Dirk Hoyer, Alexander Schmidt, Susan E. Carlson, John Colombo, Nicole B. Mathis, Scott A. Sands, Lynn Chollet-Hinton, Alexandra R. Brown, Dinesh Pal Mudaranthakam and Byron J. Gajewski

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INTRODUCTION: Maternal–infant equilibrium occurs when cord blood docosahexaenoic acid (DHA) is less than or equal to maternal DHA at delivery. Equilibrium may be an indicator of sufficient DHA for optimal fetal and infant neurodevelopment. The purpose of this study was to test the effect of maternal DHA supplementation on equilibrium status and fetal neurodevelopment.
METHODS: Women enrolled between 12 and 20 weeks gestation and were randomized to 200 or 800 mg DHA/day until delivery. Maternal red blood cell (RBC) phospholipids were measured at enrollment, 32 weeks, delivery, and in cord blood at delivery. Fetal neurodevelopment was measured at 32 and 36 weeks gestation. Intent-to-treat analyses were conducted to test differences in equilibrium status by group. Fetal outcomes were assessed by equilibrium status and group.
RESULTS: Three hundred women enrolled and 262 maternal–infant dyads provided blood samples at delivery. No maternal–infant dyads with maternal RBC-DHA ≤ 6.96% at delivery achieved equilibrium. The incidence of equilibrium was significantly higher in the 800 mg group. There was no effect of maternal group or equilibrium status on fetal neurodevelopment.
CONCLUSION: The significance of maternal–infant DHA equilibrium remains unknown. Ongoing research will test the effect of treatment group, equilibrium, and nutrient status on infant behavior and brain function.

Pediatric Research https://doi.org/10.1038/s41390-021-01742-w

IMPACT:

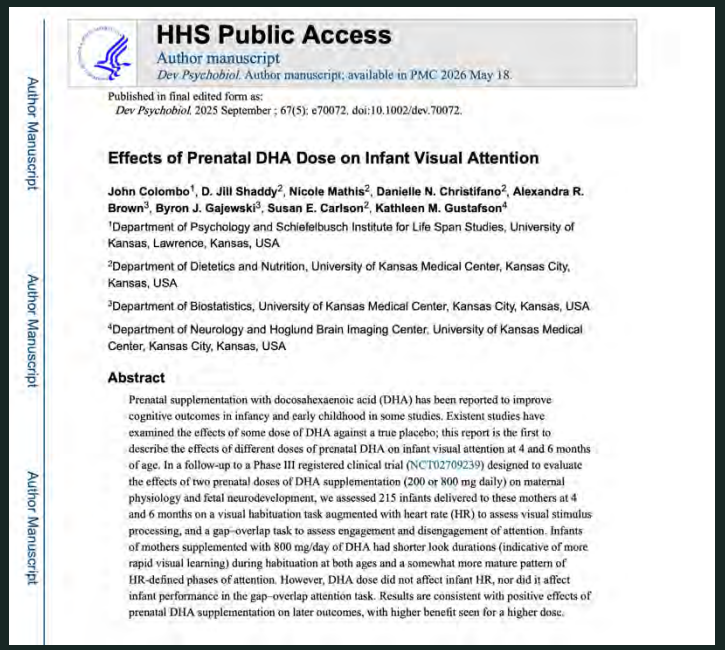
- Pregnant women who received a higher dose of docosahexaenoic acid (DHA) were more likely to achieve maternal–infant DHA equilibrium at delivery.
- Equilibrium status had no effect on fetal neurodevelopment in this sample.
- While DHA is crucial for early life neurodevelopment, the significance of achieving maternal–infant equilibrium above the lower threshold is uncertain.
- There is a lower threshold of maternal DHA status where maternal–infant DHA equilibrium never occurs.
- The lack of equilibrium associated with low maternal DHA status may indicate insufficient maternal status for optimal placental transfer.

PANDA Study: Infant Visual Learning

PANDA FOLLOW-UP • 2025

215 infants at 4 and 6 months

Shorter looking during habituation
No effect on gap–overlap task or infant HR



HHS Public Access
Author manuscript
Dev Psychobiol. Author manuscript; available in PMC 2026 May 18.

Published in final edited form as:
Dev Psychobiol. 2025 September ; 67(5): e70072. doi:10.1002/dev.70072.

Effects of Prenatal DHA Dose on Infant Visual Attention

John Colombo[1], D. Jill Shaddy[2], Nicole Mathis[2], Danielle N. Christifano[2], Alexandra R. Brown[3], Byron J. Gajewski[3], Susan E. Carlson[2], Kathleen M. Gustafson[4]

[1]Department of Psychology and Schiefelbusch Institute for Life Span Studies, University of Kansas, Lawrence, Kansas, USA

[2]Department of Dietetics and Nutrition, University of Kansas Medical Center, Kansas City, Kansas, USA

[3]Department of Biostatistics, University of Kansas Medical Center, Kansas City, Kansas, USA

[4]Department of Neurology and Hoglund Brain Imaging Center, University of Kansas Medical Center, Kansas City, Kansas, USA

Abstract

Prenatal supplementation with docosahexaenoic acid (DHA) has been reported to improve cognitive outcomes in infancy and early childhood in some studies. Existent studies have examined the effects of some dose of DHA against a true placebo; this report is the first to describe the effects of different doses of prenatal DHA on infant visual attention at 4 and 6 months of age. In a follow-up to a Phase III registered clinical trial (NCT02709239) designed to evaluate the effects of two prenatal doses of DHA supplementation (200 or 800 mg daily) on maternal physiology and fetal neurodevelopment, we assessed 215 infants delivered to these mothers at 4 and 6 months on a visual habituation task augmented with heart rate (HR) to assess visual stimulus processing, and a gap–overlap task to assess engagement and disengagement of attention. Infants of mothers supplemented with 800 mg/day of DHA had shorter look durations (indicative of more rapid visual learning) during habituation at both ages and a somewhat more mature pattern of HR-defined phases of attention. However, DHA dose did not affect infant HR, nor did it affect infant performance in the gap–overlap attention task. Results are consistent with positive effects of prenatal DHA supplementation on later outcomes, with higher benefit seen for a higher dose.



Colombo et al. 2025. PMID 40791013. Conceptual artwork.

PANDA Study: Infant Brain Outcomes



241

maternal–infant dyads

SECONDARY ANALYSIS • 2025

DHA status
Choline
Lutein / zeaxanthin

- **1 month** — Auditory responses

  DHA status related to selected ERP measures

- **6 months** — Visual responses

  Nutrient interactions suggest a broader dietary context

Christifano et al. Clin Nutr ESPEN. 2025;68:417–422. PMID 40412614

Early signals and later cognition are different questions

Physiology	EEG and autonomic measures
Infant behavior	Specific attention tasks
Later cognition	Broad cognitive outcomes remain mixed

DOMInO: Makrides et al. 2010. KUDOS follow-up: Colombo et al. 2019.

N3RO and ImNut: Infant Development and Cognition

N3RO

DHA

Higher IQ at 5 years

Respiratory safety findings complicate interpretation

ImNuT.2025

ARA + DHA

No significant difference at 2 years

Different regimen, population, and endpoint

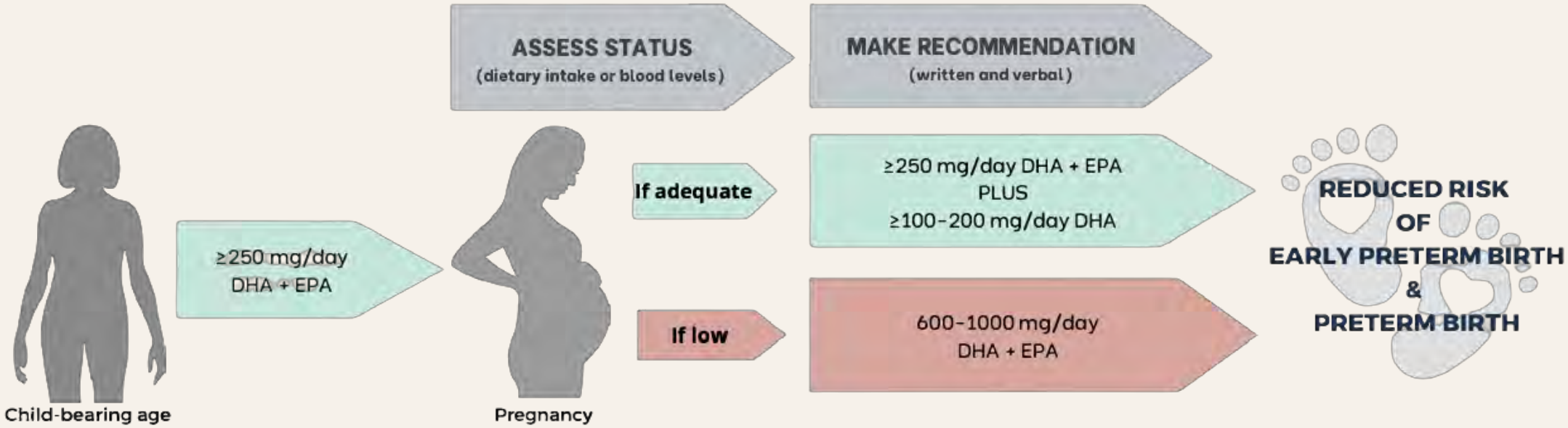
Gould et al. NEJM. 2022;387:1579–1588; Gunnarsdottir et al. Clin Nutr. 2025;51:198–205

Apply

From evidence to practical strategies



Clinical Practice Guidelines: Omega 3 Fatty Acids and Preterm Birth



Cetin and Carlson et al. 2024. PMID: 38070679

Omega 3 Intake Screening



7

questions

Clinical integration in
3,610 prenatal patients

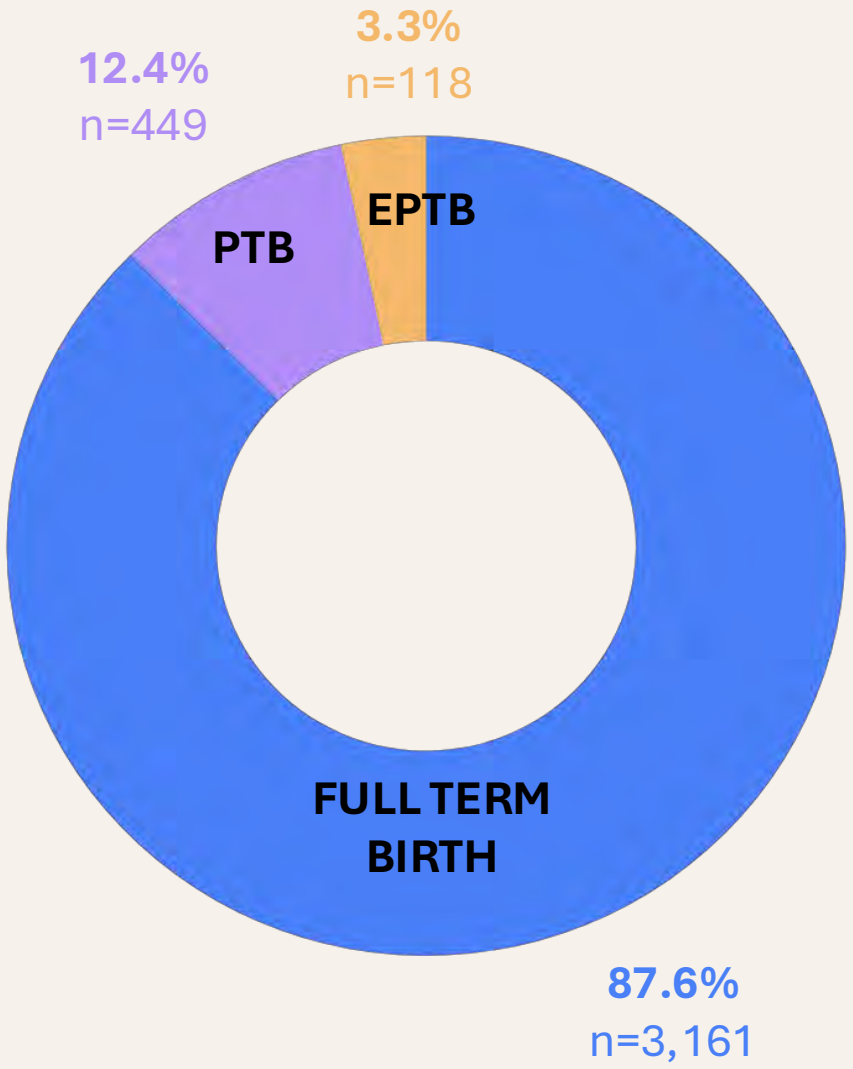
ROUTINE-CARE OBSERVATIONAL COHORT

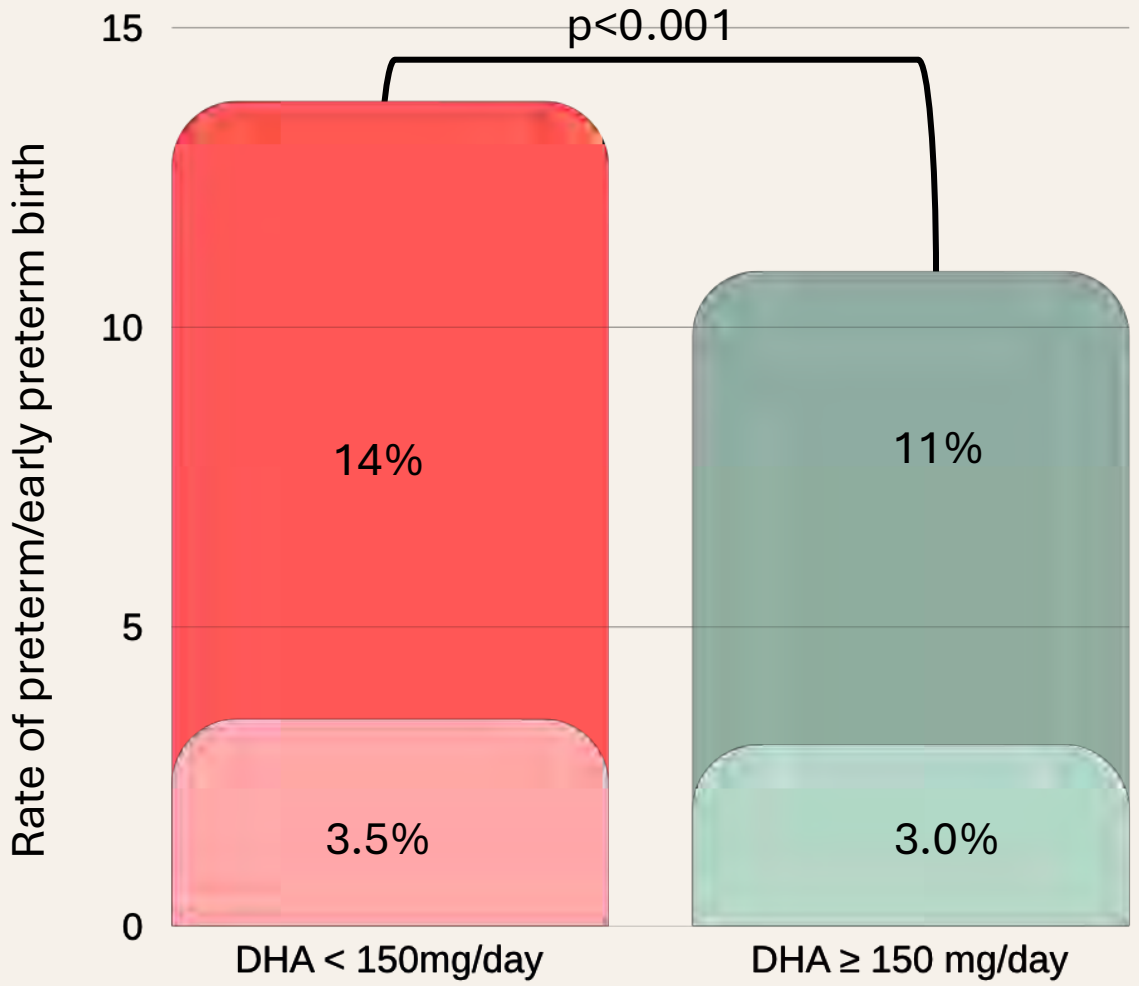
1. **Assess**
   Seafood + all DHA supplements
2. **Classify**
   Low supply using a validated tool
3. **Recommend**
   Specify and document the daily dose
4. **Follow up**
   Access, tolerance, and actual use

7-question DHA-FFQ: Christifano et al. 2023; clinical integration in 3,610 patients, ASN 2026

Preterm Birth Rates by DHA Intake

KU MEDICAL CENTER
The University of Kansas





Christifano DN, et al. Current Developments in Nutrition. 2026;10. doi: 10.1016/j.cdnut.2026.108620.

Food and Supplements

8–12 oz/week

U.S. example: lower-mercury fish
salmon, sardines, trout, herring

Food	DHA (mg)
3 oz pink salmon	638
3 oz white tuna	535
3 oz crab	196
12 large shrimp	96
3 oz tuna salad	47
2 pieces chicken	37
1 large egg	19-50

USDA, ARS 2003; USDA Nutrient Database for



FDA/EPA fish advice; Cetin et al. 2024; NIH ODS. Illustrative meal.

Maternal DHA Intake After Birth

RECOMMENDATIONS FOR LACTATING WOMEN

Adequate maternal DHA intake supports breast milk DHA content and infant neurodevelopment.



FDA / EPA

DIETARY GUIDANCE

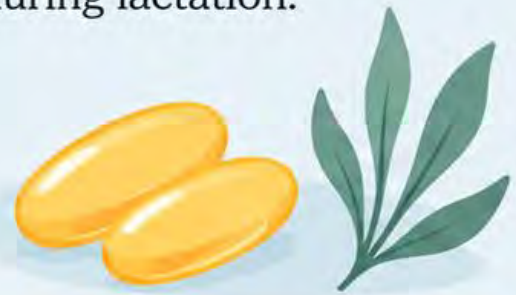
8–12 oz (2–3 servings) per week of a variety of lower-mercury seafood during lactation.



EFSA

NUTRIENT RECOMMENDATION

250 mg/day EPA + DHA plus an additional **100–200 mg/day DHA** during lactation.



ACOG

CLINICAL PRACTICE

Encourage consumption of DHA-containing foods or supplements during lactation.



Practical strategies for lactating women



Choose lower-mercury fish 2–3×/week (e.g., salmon, sardines, trout).



Include plant sources of omega-3s (e.g., flaxseed, chia seeds, walnuts).



Consider an algae- or fish oil supplement if dietary intake is low.



Continue a balanced, nutrient-rich diet.

FDA/EPA. Advice About Eating Fish for Women Who Are Pregnant or Breastfeeding. 2024. **EFSA.** Scientific Opinion on nutrient requirements and dietary intakes for infants and young children in the EU. 2013. **ACOG.** Nutrition During Lactation. Committee Opinion No. 820. 2021.

Infant DHA Intake: Birth to 24 Months

RECOMMENDATIONS FOR INFANT FEEDING AND COMPLEMENTARY FOODS

0–6 MONTHS

Exclusive breastfeeding is recommended, when possible.



BREAST MILK

Contains DHA (average ~0.2–0.5% of total fatty acids).

INFANT FORMULA

DHA is required in standard term formulas (0.2–0.5% of total fatty acids).

WHO / UNICEF
FEEDING RECOMMENDATION

Exclusive breastfeeding for the first 6 months of life, if possible.

EFSA
FORMULA REQUIREMENT

DHA is mandatory in infant formula at 0.2–0.5% of total fatty acids (for term formulas).

FDA
FORMULA REQUIREMENT

DHA is required in infant formula (0.2–0.5% of total fatty acids).

6–24 MONTHS

Continue breast milk or formula and introduce complementary foods containing DHA.



EFSA
TOTAL INTAKE RECOMMENDATION

100 mg/day DHA from total dietary intake for infants and young children >6 to <24 months.

FDA / EPA
DIETARY GUIDANCE

Introduce a variety of nutrient-dense foods including fish. For children 1–3 years: ~1 oz of lower-mercury fish, twice per week.

WHO
COMPLEMENTARY FEEDING

Introduce complementary foods at 6 months, while continuing breastfeeding through 2 years and beyond.

Practical takeaways

From pregnancy to early life

Pregnancy

Assess early and match the dose to supply

Neurodevelopment

Name the specific outcome the evidence supports

Infancy

Continue supply through appropriate feeding

Translation

Make the plan clear, affordable, easy to follow



Thank you!

Danielle Christifano, PhD
Associate Professor
Department of Dietetics and Nutrition
University of Kansas Medical Center

LinkedIn

Lab website



References: birth outcomes and translation

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References: maternal health, neurodevelopment and FADS

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Resources for practical guidance

01 FDA/EPA. 2021. Advice about eating fish: pregnancy, breastfeeding, and children ages 1–11 years. fda.gov/food/consumers/advice-about-eating-fish

02 NIH Office of Dietary Supplements. Omega-3 fatty acids: health professional fact sheet. ods.od.nih.gov/factsheets/Omega3FattyAcids-HealthProfessional/

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05 Omega-3 use and postpartum hemorrhage: hospital-register study. 2024. doi:10.1111/aogs.14987

06 WHO. 2026. Infant and young child feeding. Updated 4 August 2026. who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding

07 WHO. 2023. Guideline for complementary feeding of infants and young children 6–23 months of age. ISBN 978-92-4-008186-4. who.int/publications/i/item/9789240081864



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Professor of Nutritional Immunology, Faculty of Medicine, University of Southampton, United Kingdom

University of Southampton

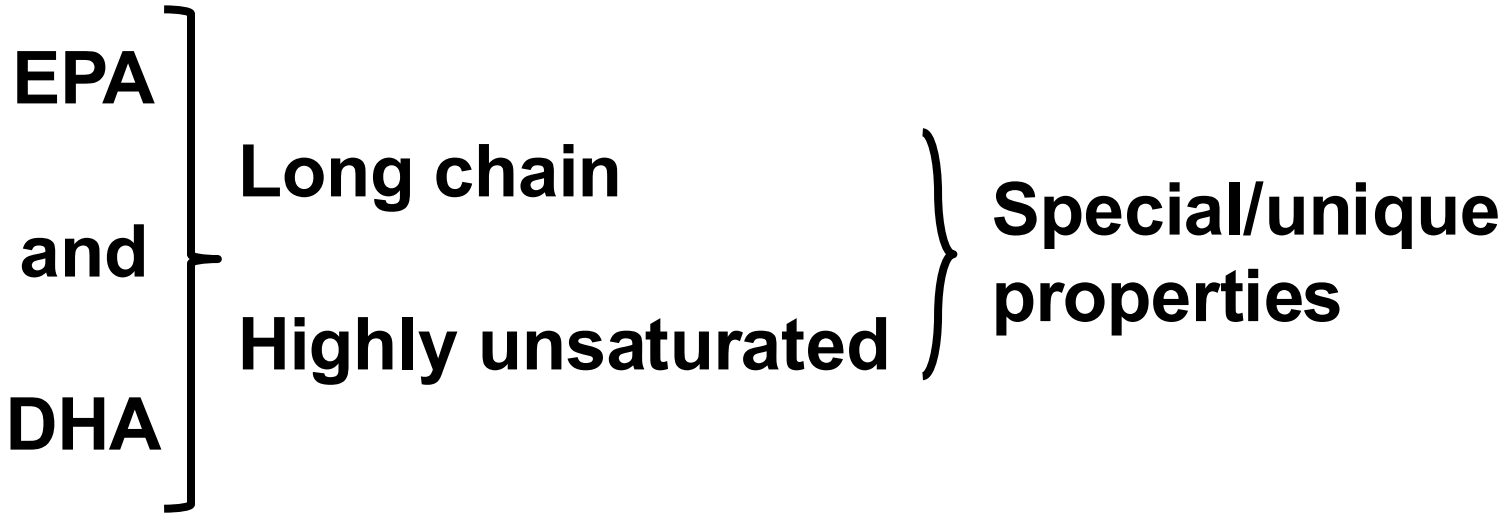
Omega-3 biology and evidence for health benefit across the lifecourse

Philip Calder
Professor of Nutritional Immunology

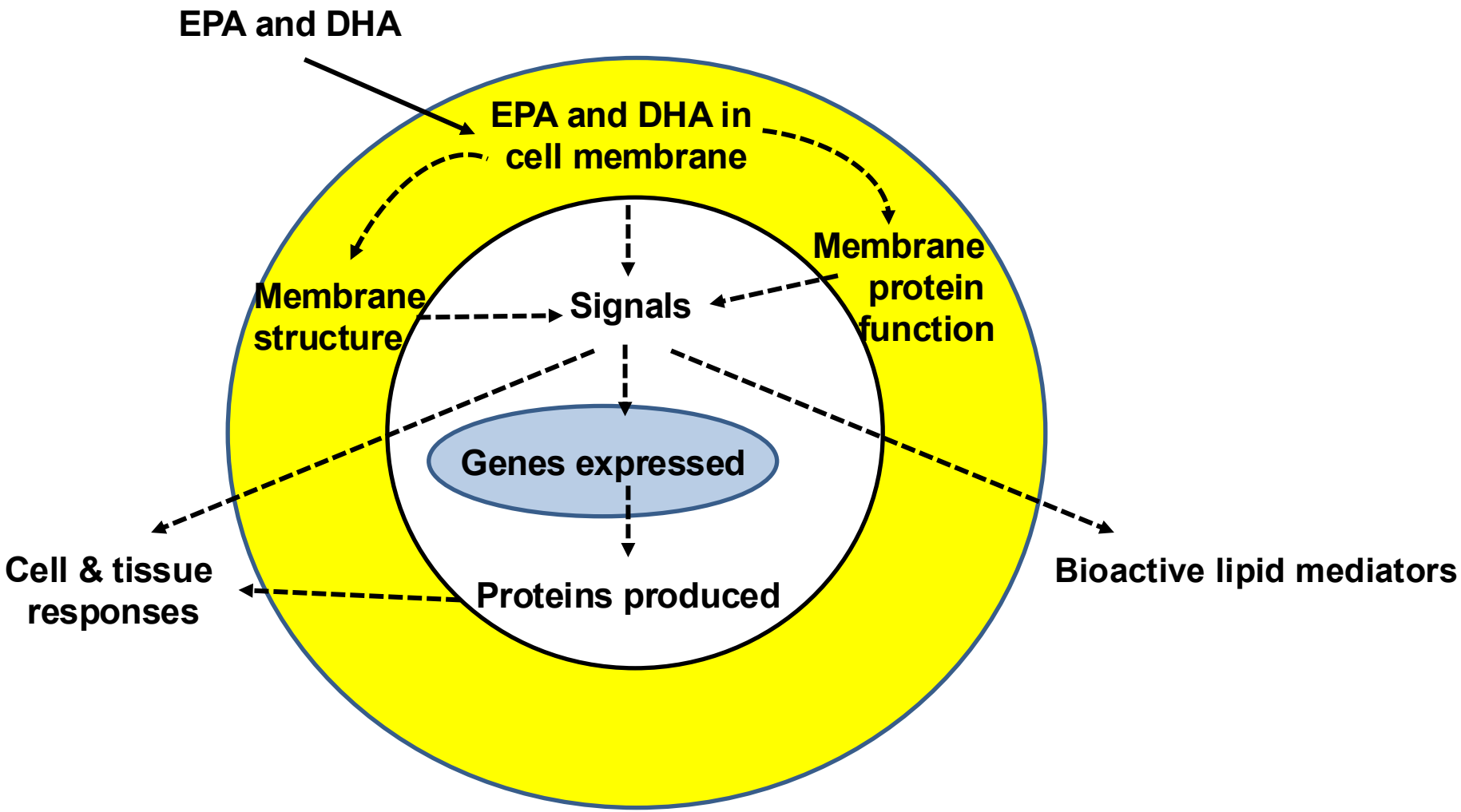
CRN-International Symposium Series
Next-Generation Nutrient: Omega-3s DHA/EPA

To cover

- How EPA and DHA act to support optimal physiology and resilience
- Biomarkers of EPA and DHA status and how these change with increased EPA and DHA intake – effect of dosing and timing
- Some of the health benefits of EPA and DHA
- Why increased intake of EPA and DHA is important to promote and support health and well-being across the life course


EPA
and
DHA
Long chain
Highly unsaturated
Special/unique properties

EPA and DHA influence how cells work



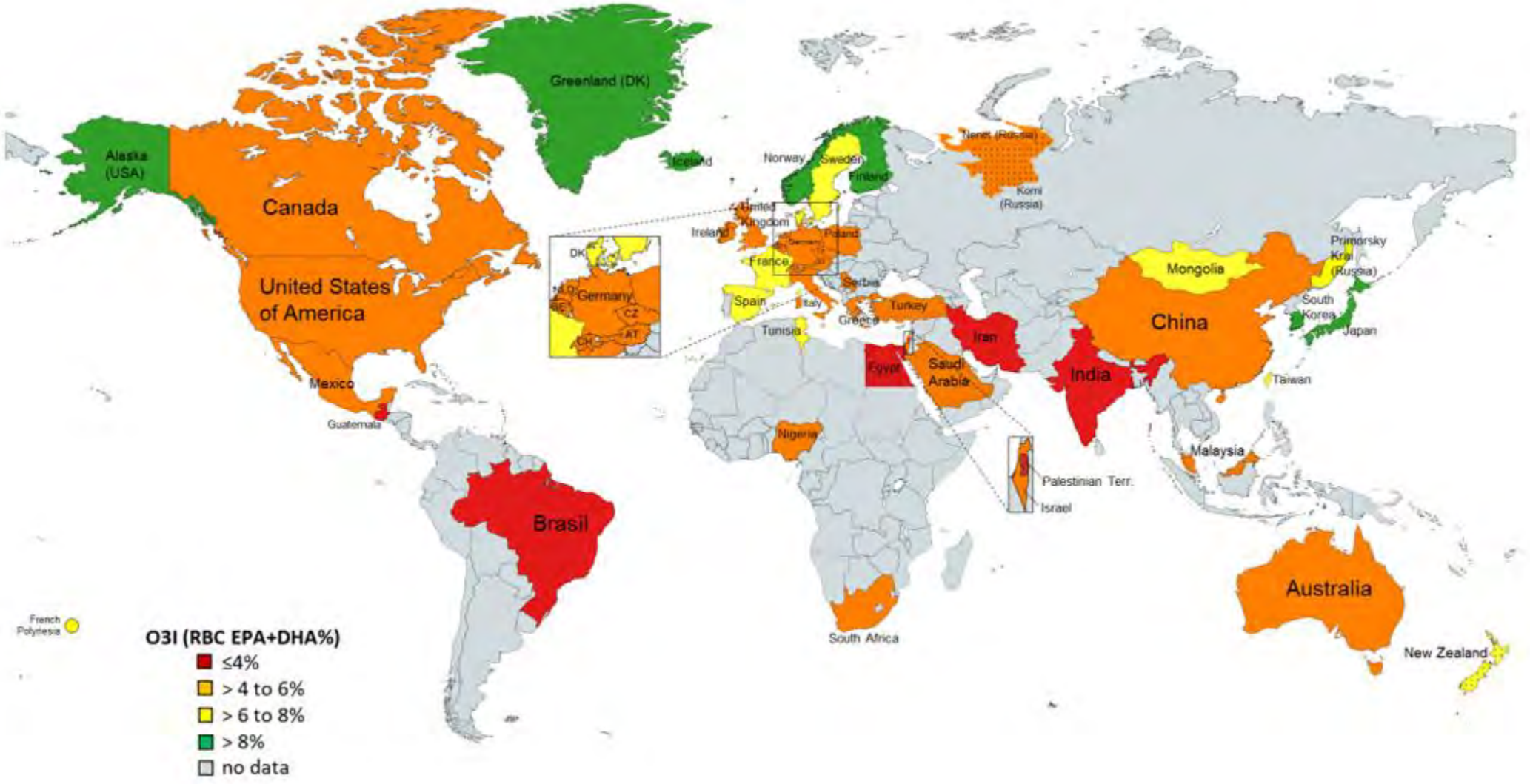
EPA and (especially) DHA are poorly synthesised in humans

-> preformed dietary sources are important

Assessment of EPA and DHA status

- **Omega-3 index** (EPA+DHA in erythrocytes): < 4% is undesirable and > 8% is desirable (based on CVD risk and outcomes especially CHD)
- Omega-3 index is related to dietary intake of EPA+DHA (higher intake -> higher index)
- Omega-3 index is related to levels of EPA and DHA in some tissues including the heart
- Omega-3 index is related to many health outcomes (higher index -> better outcome)
- So omega-3 index is a marker of intake, tissue levels and health

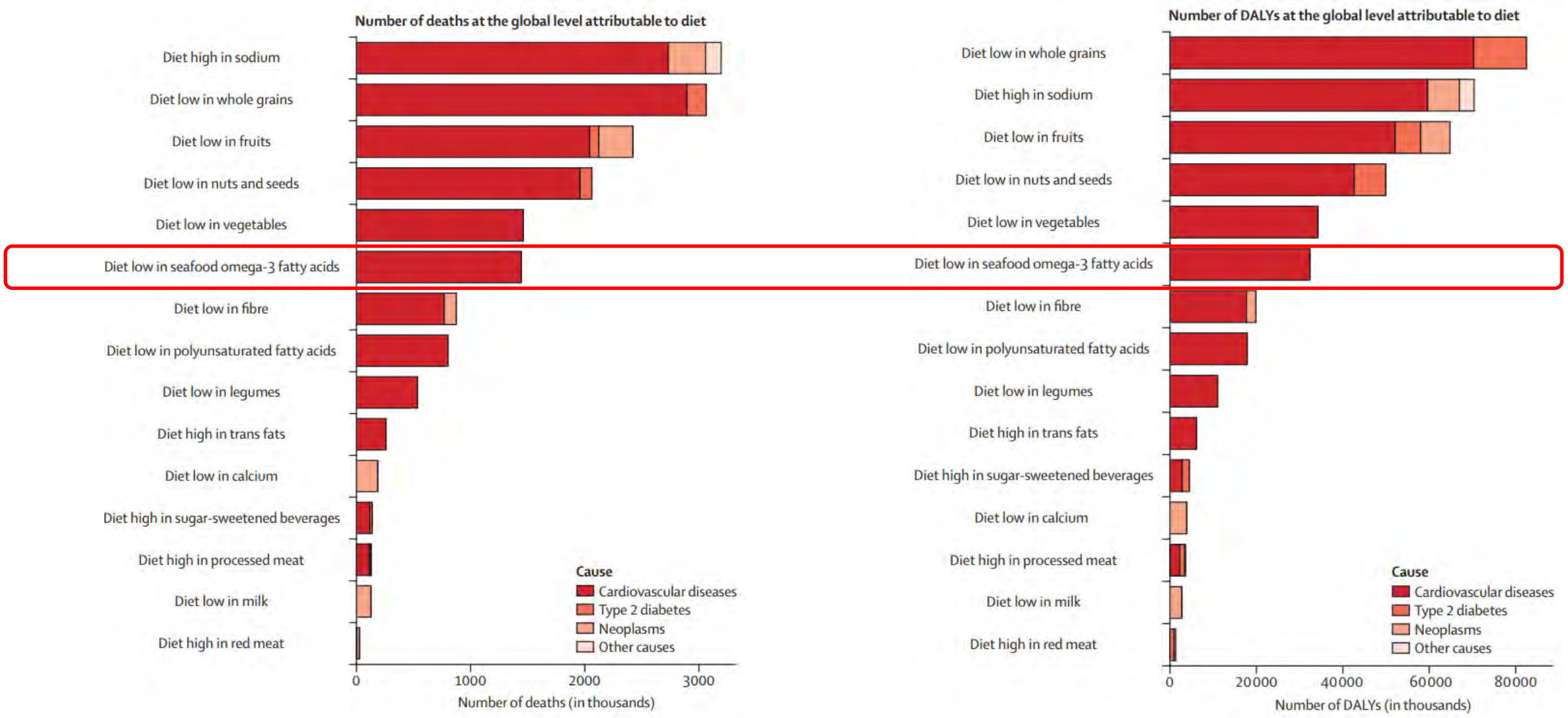
The global omega-3 index map



Schuchardt et al. (2024) Prog. Lipid Res. 95, 101286

EPA+DHA levels are low in many countries
=> there is a health cost to this

Low intake of EPA and DHA is estimated to be the SIXTH biggest dietary contributor to DALYs and to mortality



Lancet (2019) 393, 1958-1972

Increasing EPA+DHA intake increases the EPA and DHA content of blood lipids, blood cells, and many tissues including liver, heart & skeletal muscle – effect is dose, time and tissue dependent

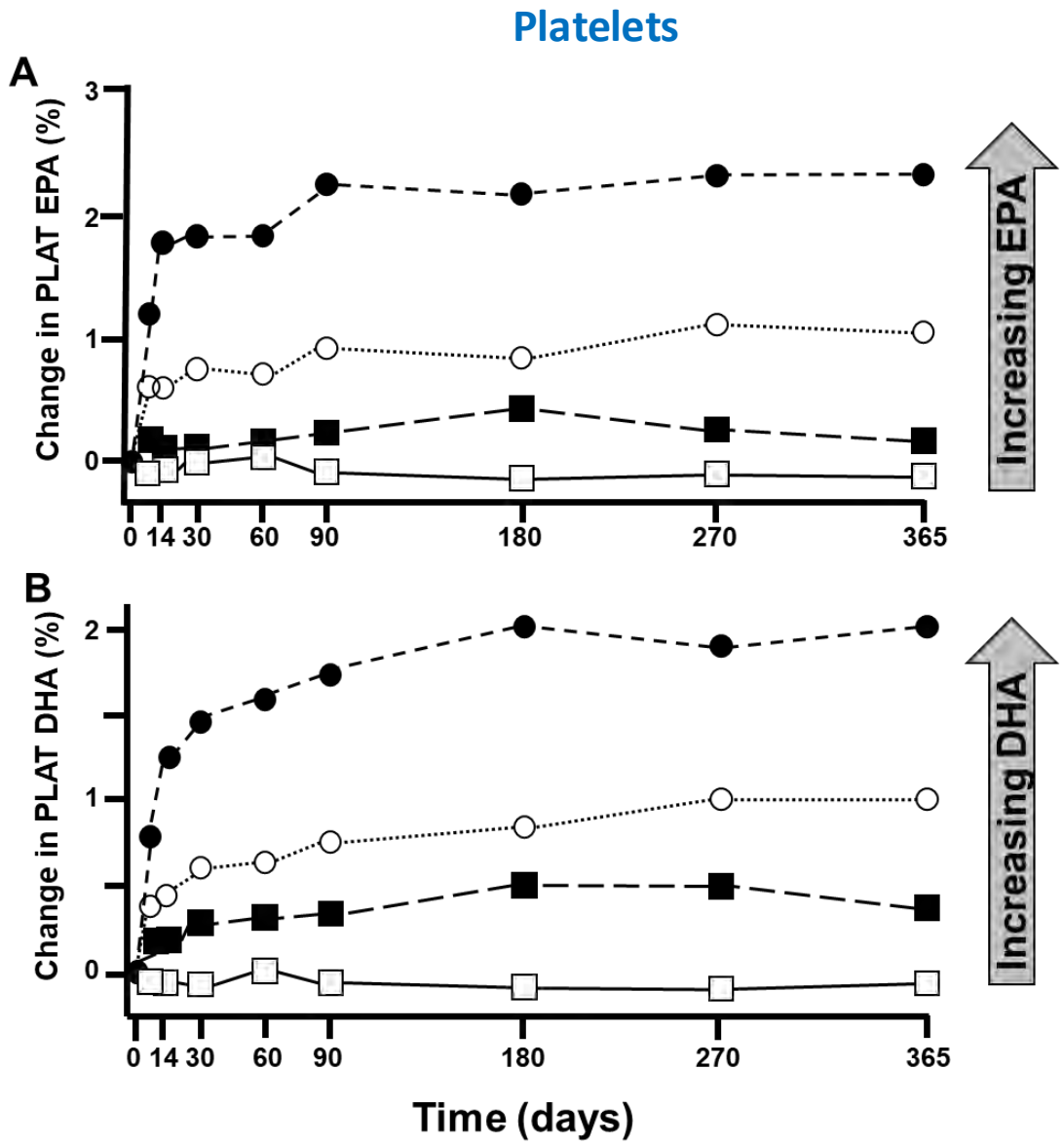






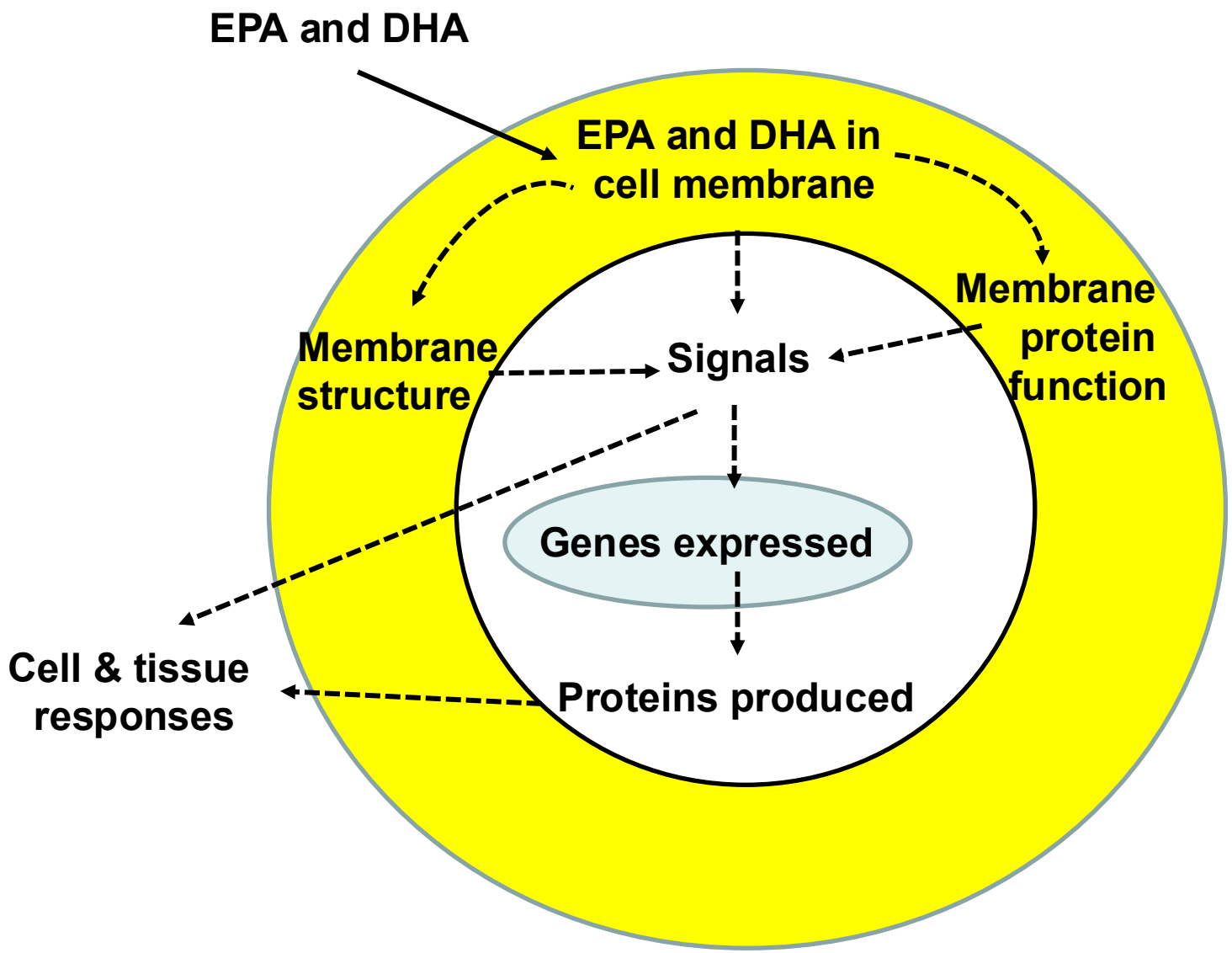


- RCT, n = 210 healthy participants aged 18 to 70 yr
- Placebo vs 3 doses of EPA+DHA
- One year
- Fatty acids measured in 9 pools at 9 timepoints
- -> Dose & time course of incorporation of EPA and DHA into 9 different body pools



Browning et al. (2012) Am. J. Clin. Nutr. 96, 748-758

EPA and DHA influence how cells work



- EPA and DHA usually low in membranes
- Increased intake results in more EPA and DHA in membranes (dose and time dependent) – often replace arachidonic acid (less eicosanoid precursor -> effects on inflammation, immunity, thrombosis, bone turnover, pregnancy duration etc)
- Alter membrane fluidity and raft formation
- Transcription factors sensitive to EPA and DHA:
  - NFκB (inflammation)
  - PPARs (inflammation & metabolism)
  - SREBPs (metabolism)

Through these mechanisms EPA and DHA can influence …

- Visual function
- Cognitive function
- Metabolism
- Inflammation
- Immune responses
- Oxidative stress
- Blood coagulation
- Organ function (e.g. Heart, Liver, Lung, Muscle)
- Wound healing
- ……



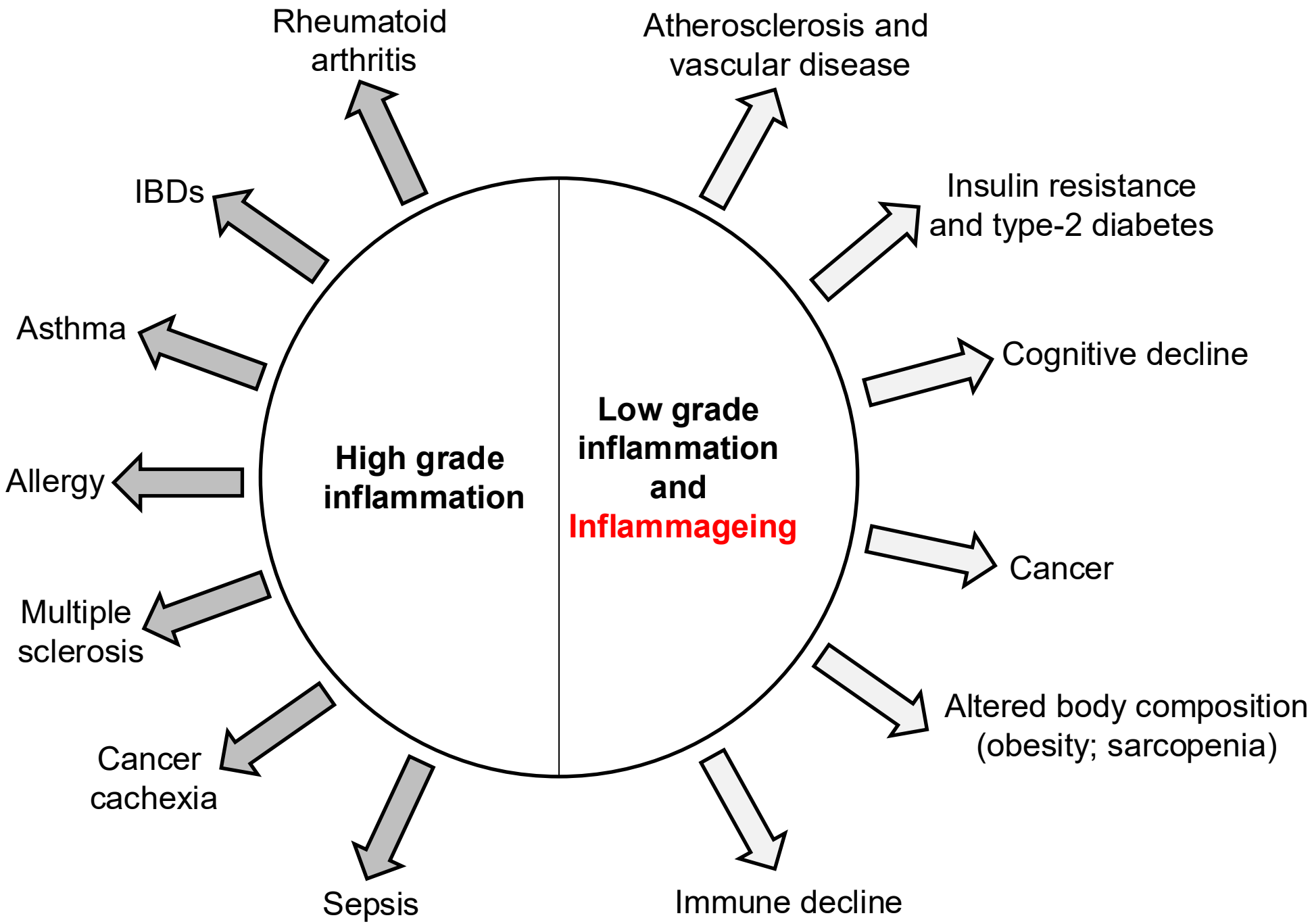
There is robust, including recent, evidence that increased intake and higher status of EPA and DHA are associated with decreased risk of developing coronary heart disease (mainly large association studies)

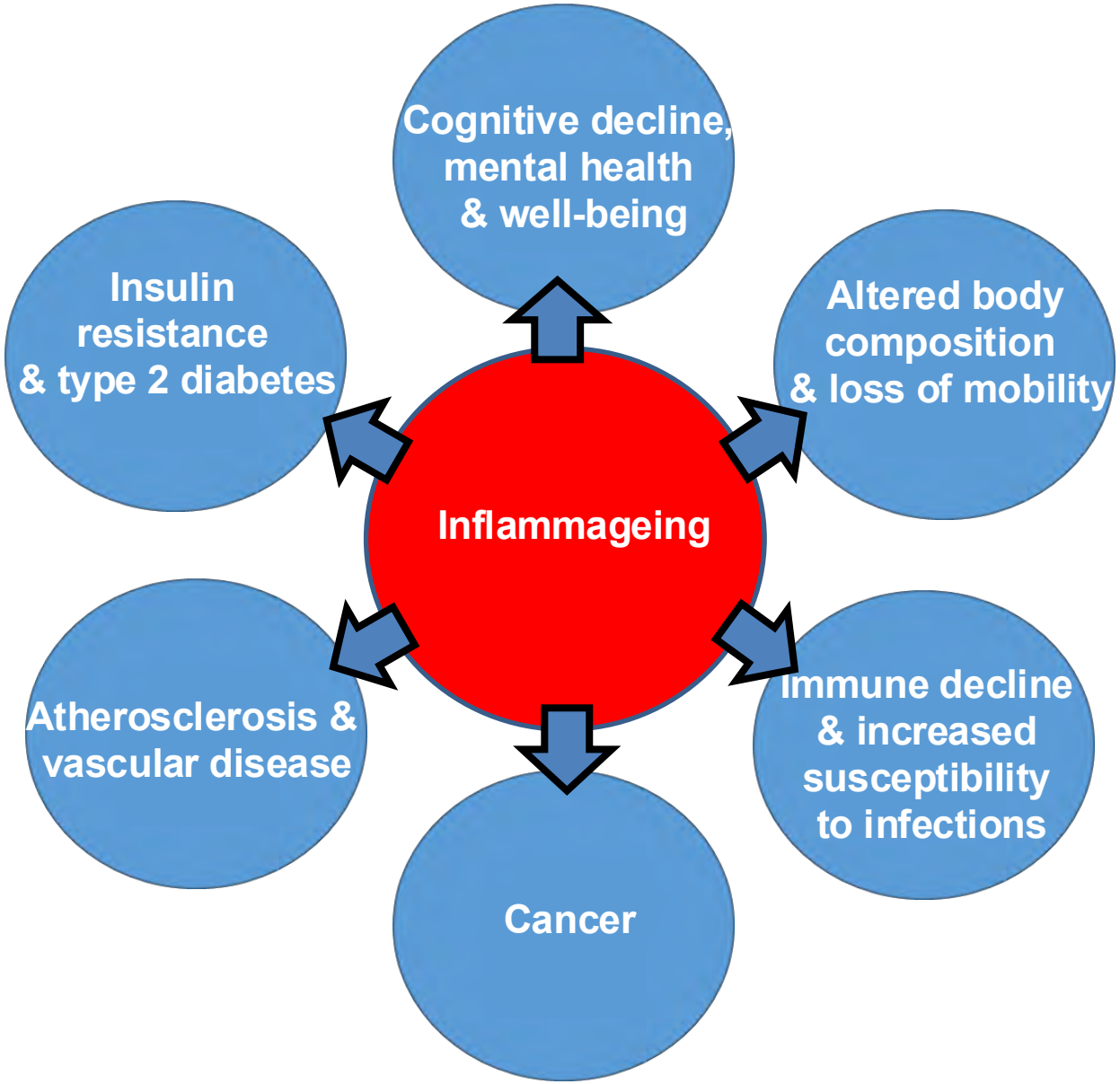
Innes & Calder (2020) Int. J. Mol. Sci. 21, 1362.

Djuricic & Calder (2025) Curr. Atheroscl. Rep. 27, 116.

Relevant cardioprotective actions of EPA and DHA (demonstrated through RCTs)

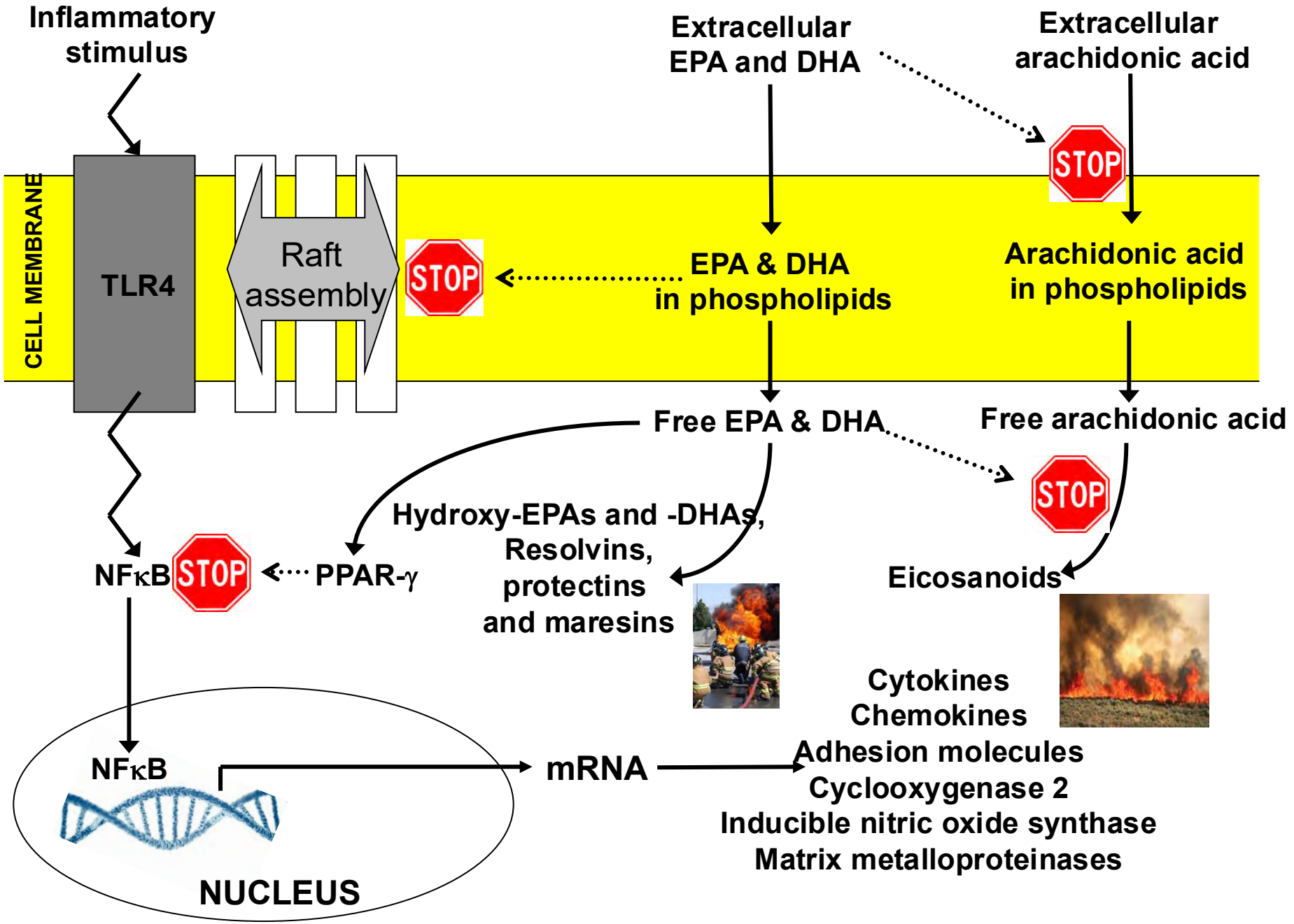
- Decreased blood triglycerides
- Increased HDL-cholesterol
- Larger, less atherogenic LDL particles
- Decreased blood pressure
- Decreased inflammation
- Decreased heart rate
- Increased heart rate variability
- Decreased thrombosis
- Improve endothelial/vascular function


Rheumatoid arthritis
Atherosclerosis and vascular disease
IBDs
Insulin resistance and type-2 diabetes
Asthma
Cognitive decline
Allergy
High grade inflammation
Low grade inflammation and Inflammageing
Cancer
Multiple sclerosis
Altered body composition (obesity; sarcopenia)
Cancer cachexia
Sepsis
Immune decline

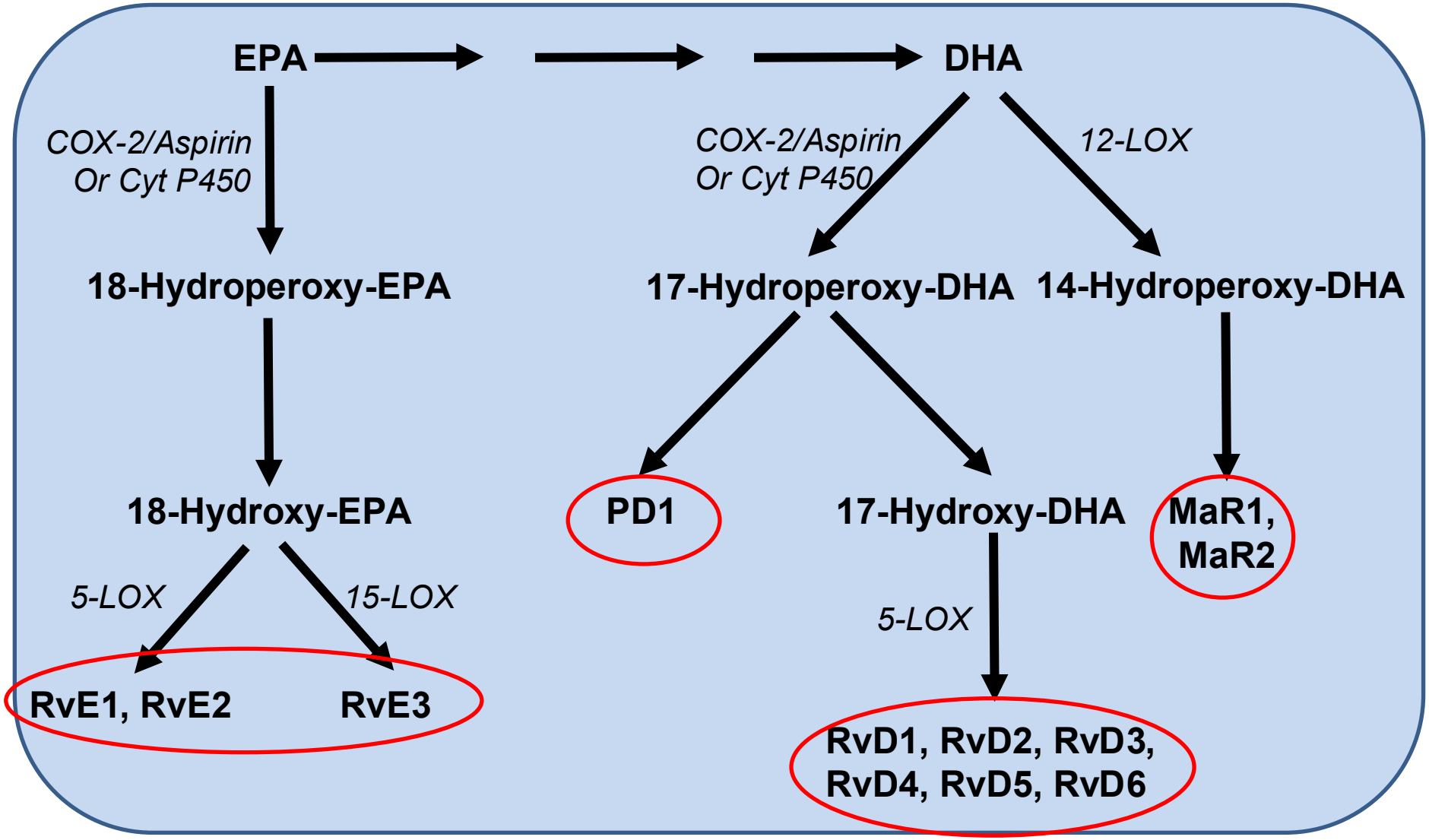


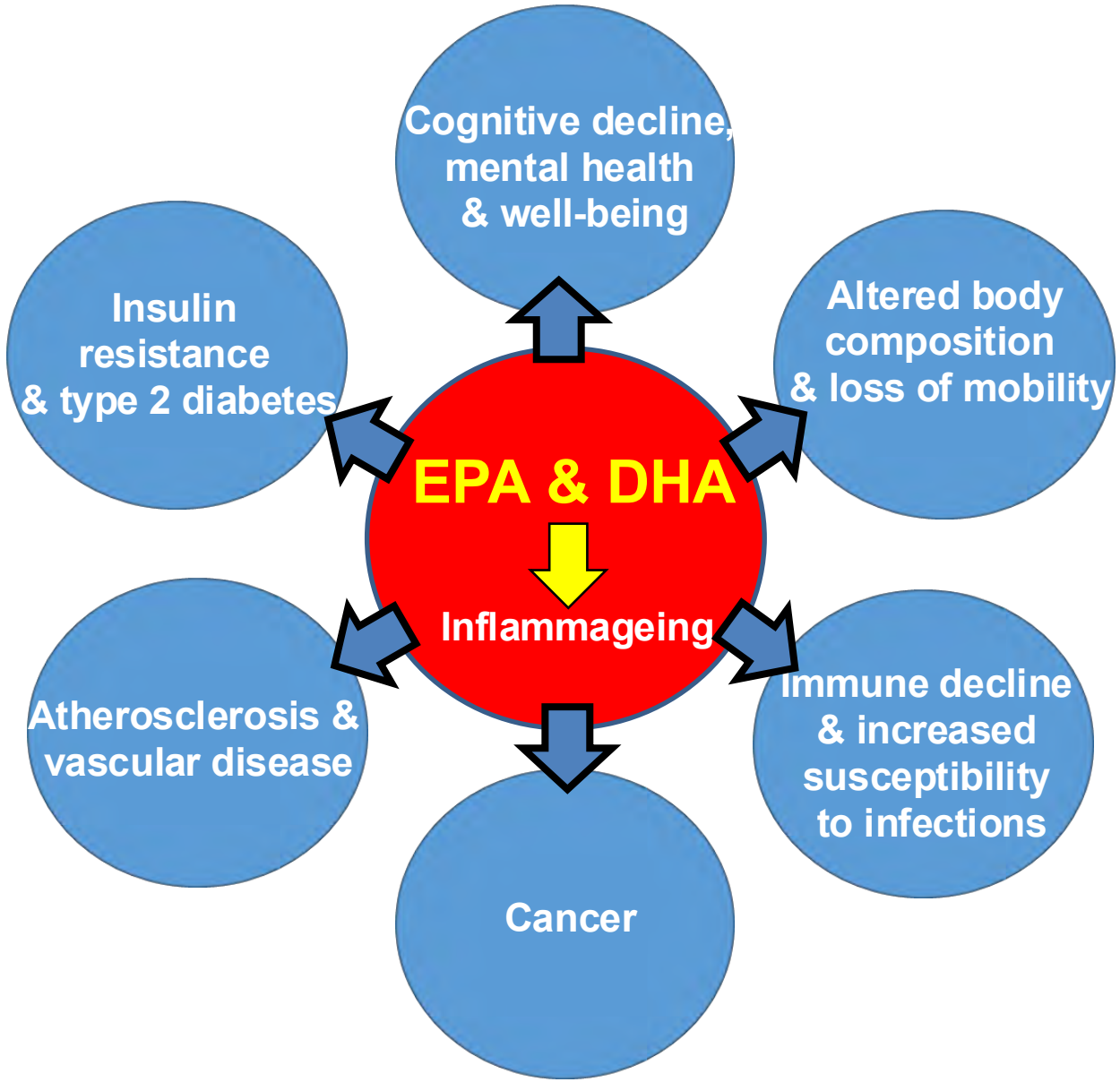
Calder et al. (2017) Ageing Res. Rev. 40, 95-119

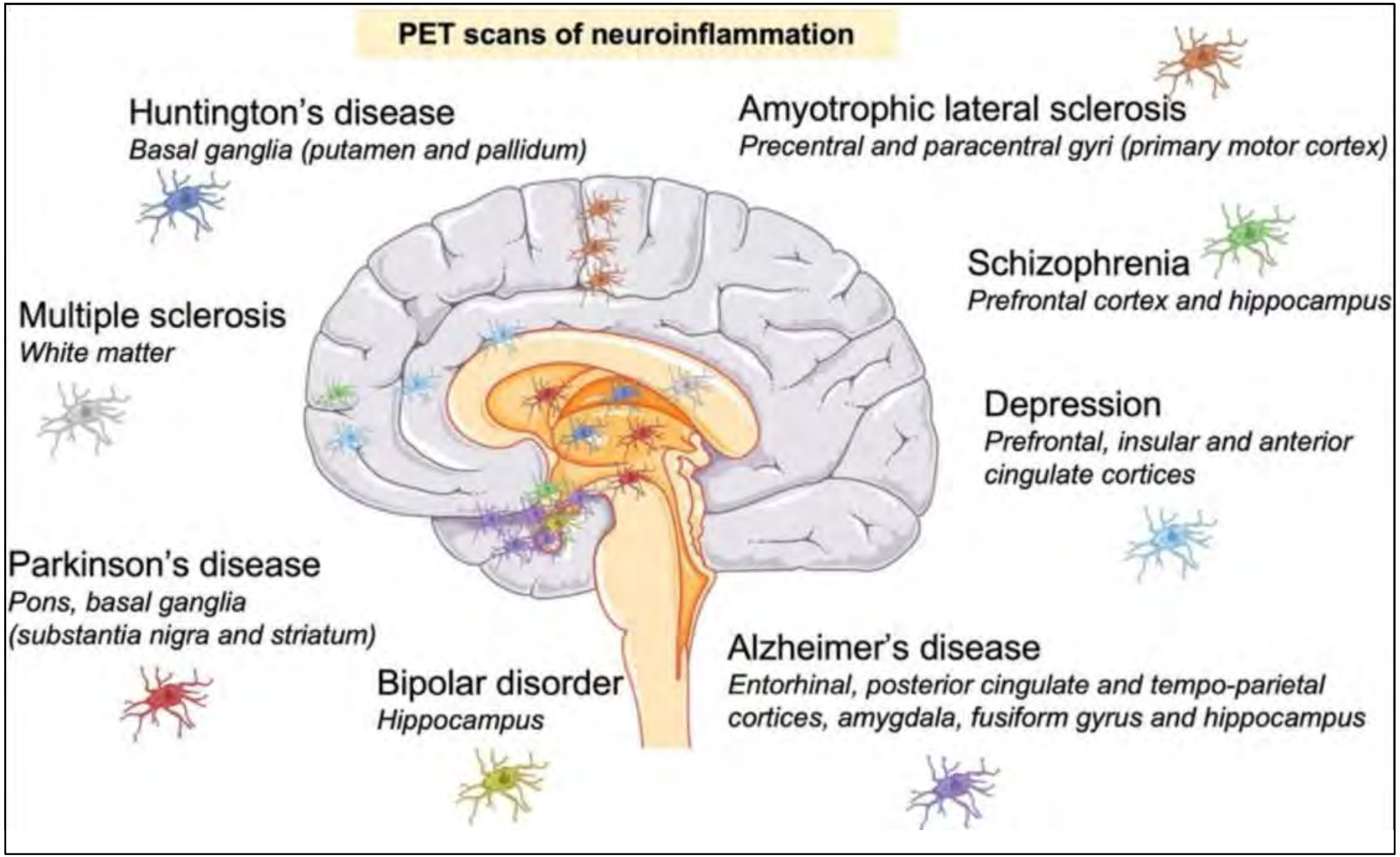
EPA and DHA have multiple anti-inflammatory effects



EPA and DHA produce specialised pro-resolution mediators (SPMs): resolvins, protectins & maresins




Cognitive decline, mental health & well-being
Insulin resistance & type 2 diabetes
Altered body composition & loss of mobility
EPA & DHA
Inflammageing
Atherosclerosis & vascular disease
Immune decline & increased susceptibility to infections
Cancer



Kip and Parr-Brownlie (2023) Front. Neurosci. 17, 1092537

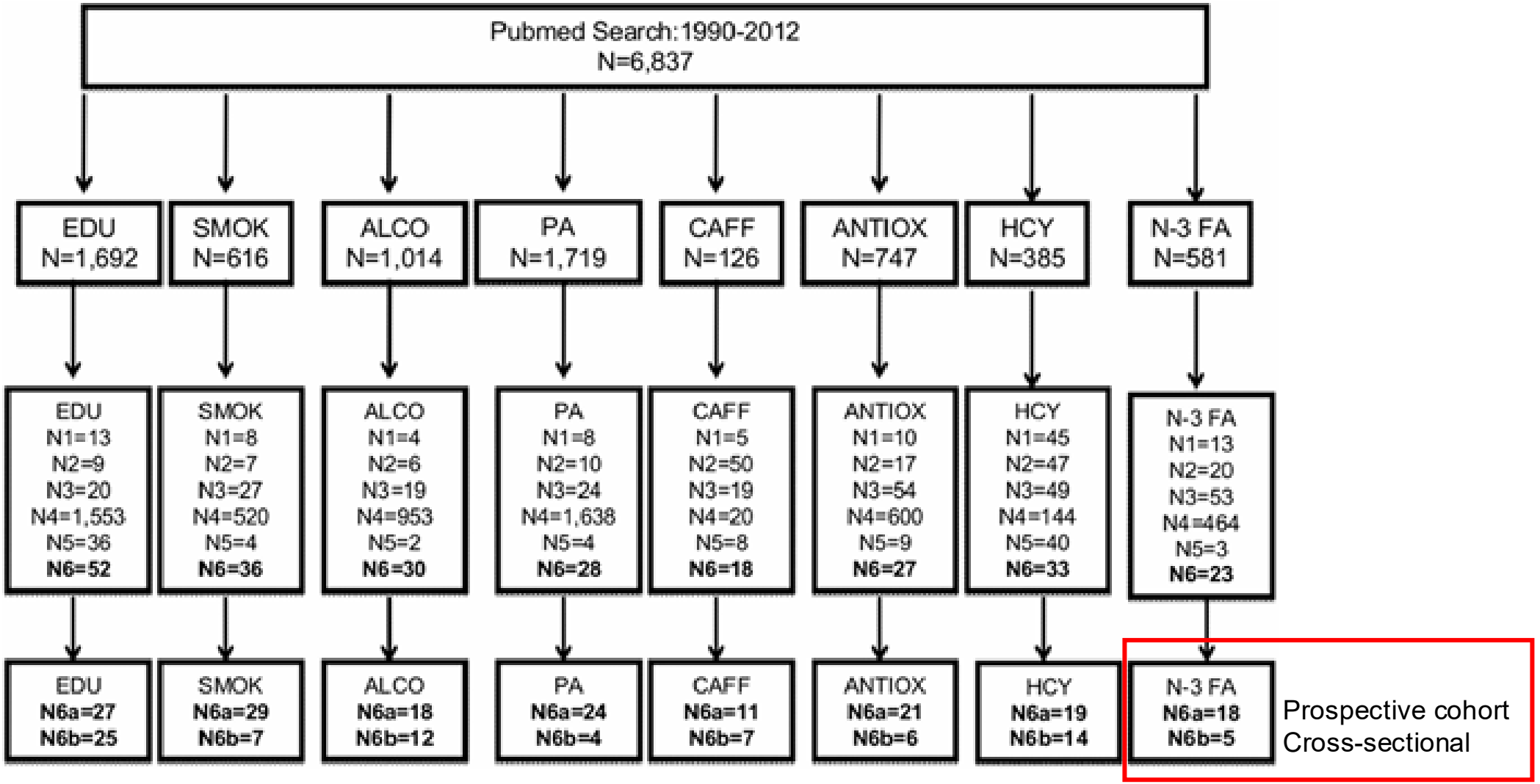
Beydoun et al. BMC Public Health 2014, 14:643
http://www.biomedcentral.com/1471-2458/14/643

BMC Public Health

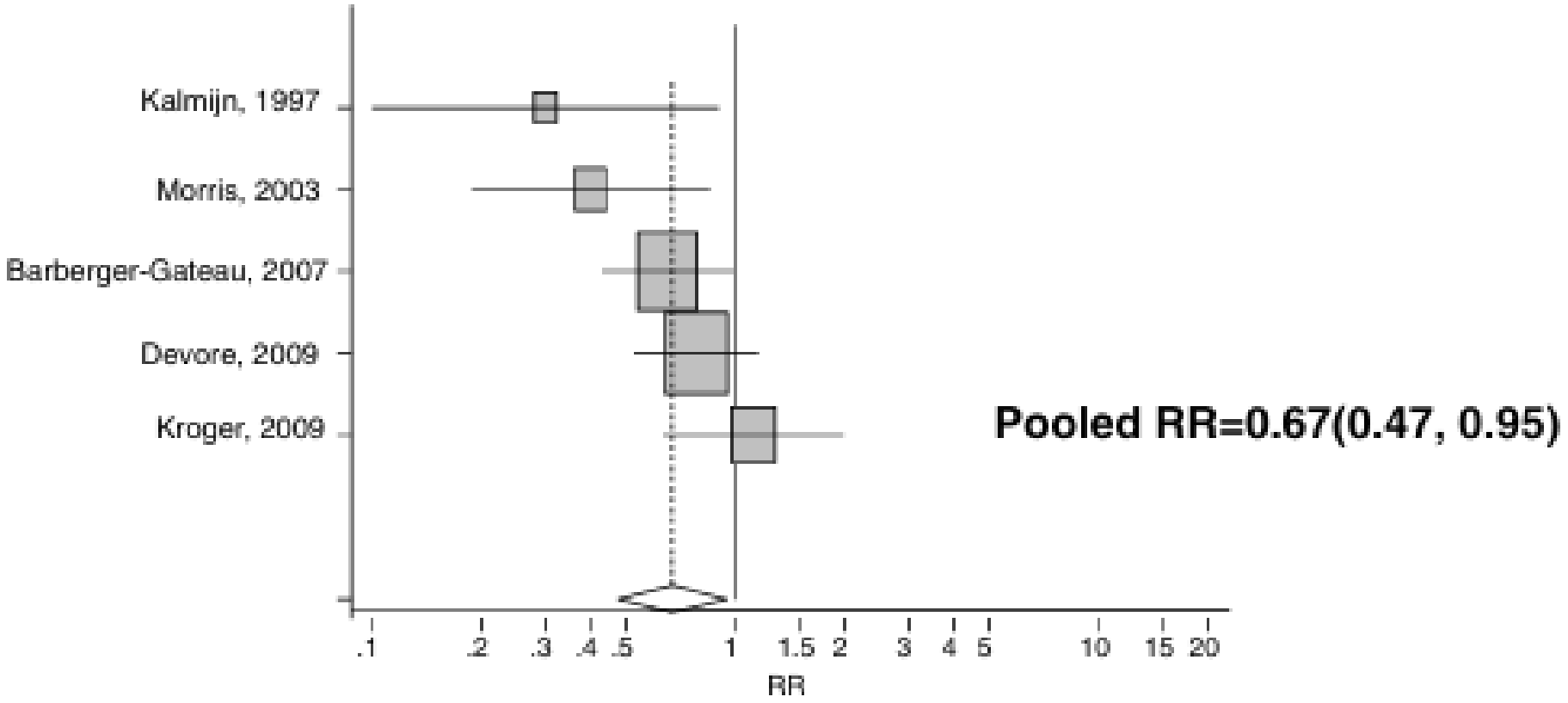
RESEARCH ARTICLE Open Access

Epidemiologic studies of modifiable factors associated with cognition and dementia: systematic review and meta-analysis

May A Beydoun[1*], Hind A Beydoun[2], Alyssa A Gamaldo[1], Alison Teel[2], Alan B Zonderman[1] and Youfa Wang[3,4]

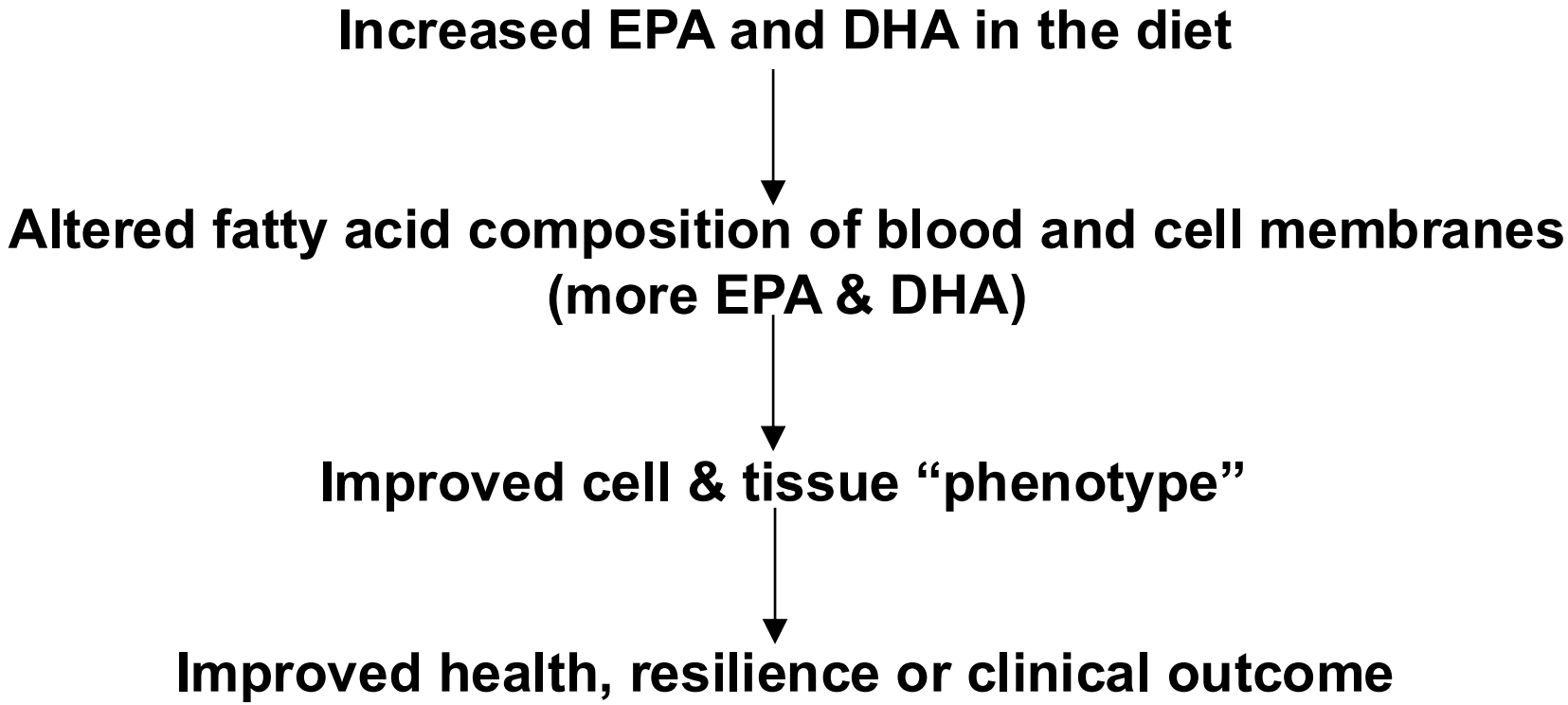

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HCY
N6a=19
N6b=14
N-3 FA
N6a=18
N6b=5
Prospective cohort
Cross-sectional

Higher EPA+DHA is associated with lower risk of AD



n-3 fatty acids (high vs. low) and risk of incident AD

Beydoun et al. (2014) BMC Public Health 14, 643


Increased EPA and DHA in the diet
Altered fatty acid composition of blood and cell membranes
(more EPA & DHA)
Improved cell & tissue “phenotype”
Improved health, resilience or clinical outcome

nature aging (2025) 5, 376-368

Letter

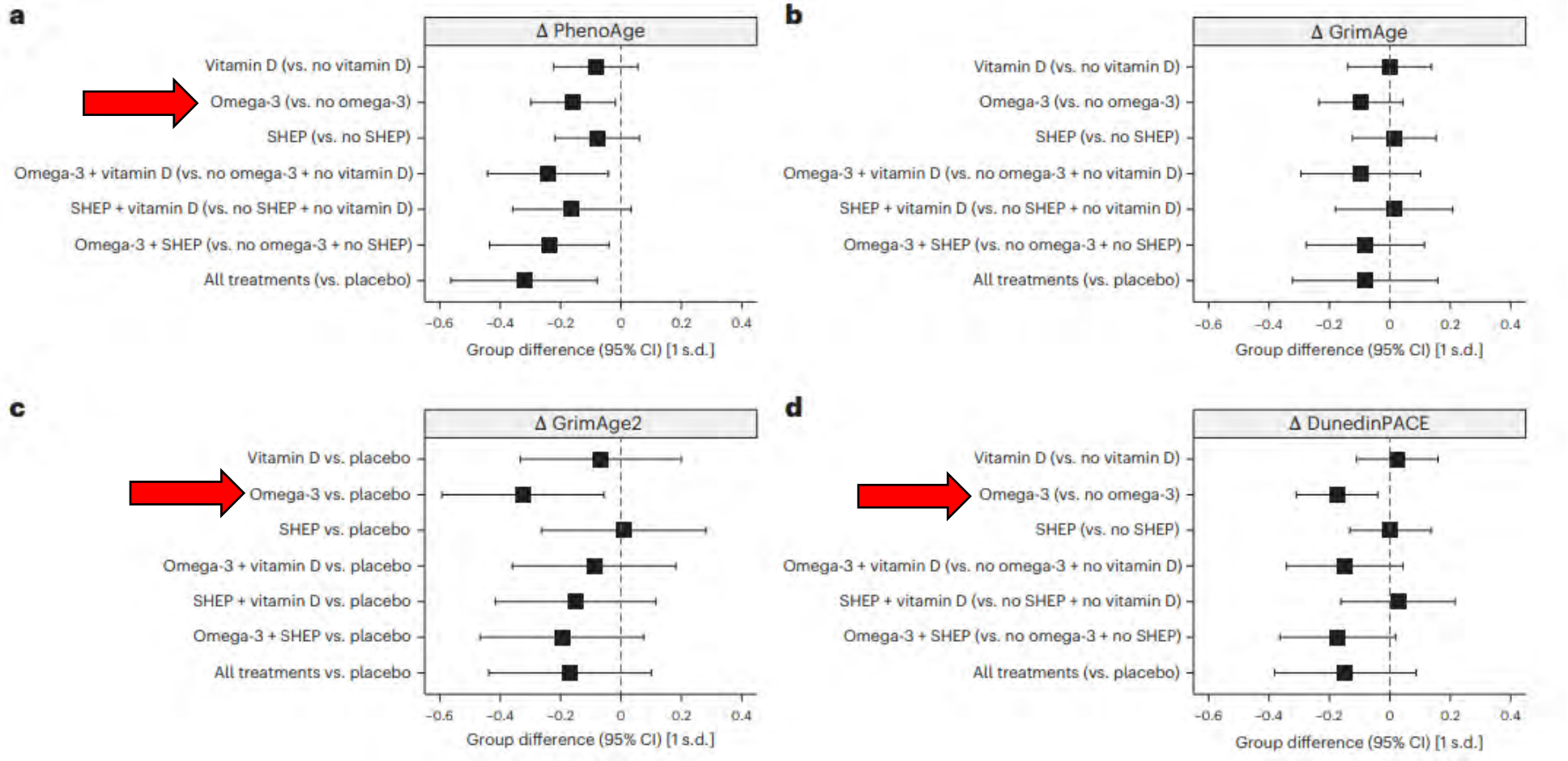
https://doi.org/10.1038/s43587-024-00793-y

Individual and additive effects of vitamin D, omega-3 and exercise on DNA methylation clocks of biological aging in older adults from the DO-HEALTH trial

Heike A. Bischoff-Ferrari[1,2,3], Stephanie Gängler[1,2,3], Maud Wieczorek[1,2,3], Daniel W. Belsky[4], Joanne Ryan[5], Reto W. Kressig[6], Hannes B. Stähelin[7], Robert Theiler[1,2], Bess Dawson-Hughes[8], René Rizzoli[9], Bruno Vellas[10,11,12], Laure Rouch[12,13,14], Sophie Guyonnet[10,11,12], Andreas Egli[1,2], E. John Orav[15,16,17], Walter Willett[18] & Steve Horvath[19]

Tested combinations of daily EPA+DHA (1 g), vitamin D and exercise for 3 years on DNA methylation based biological clocks

EPA and DHA slowed biological ageing based on 3 out of 4 of the clocks: a gain of 3 months in 3 years



Improve healthy ageing

?Improve cognition

?Improve muscle mass & strength

Decrease risk of heart disease

Decrease blood triglycerides

Decrease inflammation

Improve fertility

?Improve muscle strength



Reduce risk of preterm birth



Vital for infant visual, brain and immune development

Lower risk of allergy and asthma





Improve learning

?Improve behaviour








EPA+DHA support optimal function and health across the life course


Thank you!

More in the CRN-I 2026 Symposium Series

5 NOVEMBER · HYBRID 9:00–11:00 CET

CHOLINE



Rima Obeid, Ph.D., M.P.H.

Saarland University Hospital



Emma Derbyshire, Ph.D.

Founder and CEO · Nutritional Insight Ltd.



Trygve Bergeland, Ph.D.

Moderator · Balchem

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17 NOVEMBER · VIRTUAL 11:00–12:30 EST

LUTEIN & ZEAXANTHIN



Naiman A. Khan, Ph.D., R.D.

University of Illinois Urbana-Champaign



Elizabeth J. Johnson, Ph.D.

Tufts University



Lisa M. Renzi-Hammond, Ph.D.

University of Georgia



Deshanie Rai, Ph.D.

Moderator · Kemin

Examine evidence on visual function, macular health, cognitive outcomes, and aging populations, along with the maturity of the science, research gaps, and implications for nutrition policy and regulatory frameworks.

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NICOTINAMIDE RIBOSIDE



Charles Brenner, Ph.D.

University of Helsinki



Mary M. McDermott, M.D.

Northwestern University



Andrew Shao, Ph.D.

Moderator · Niagen Bioscience

Explore nicotinamide riboside (NR), an NAD+ precursor, and the science of cellular metabolism and healthy aging—from its foundational discovery to clinical evidence on functional outcomes.

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