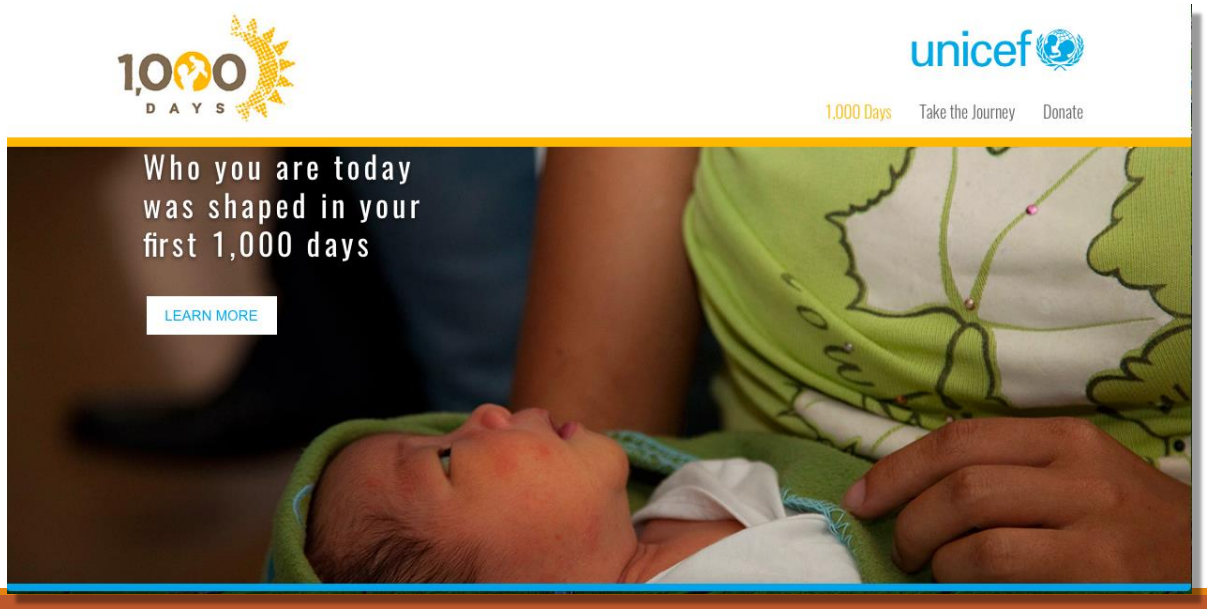
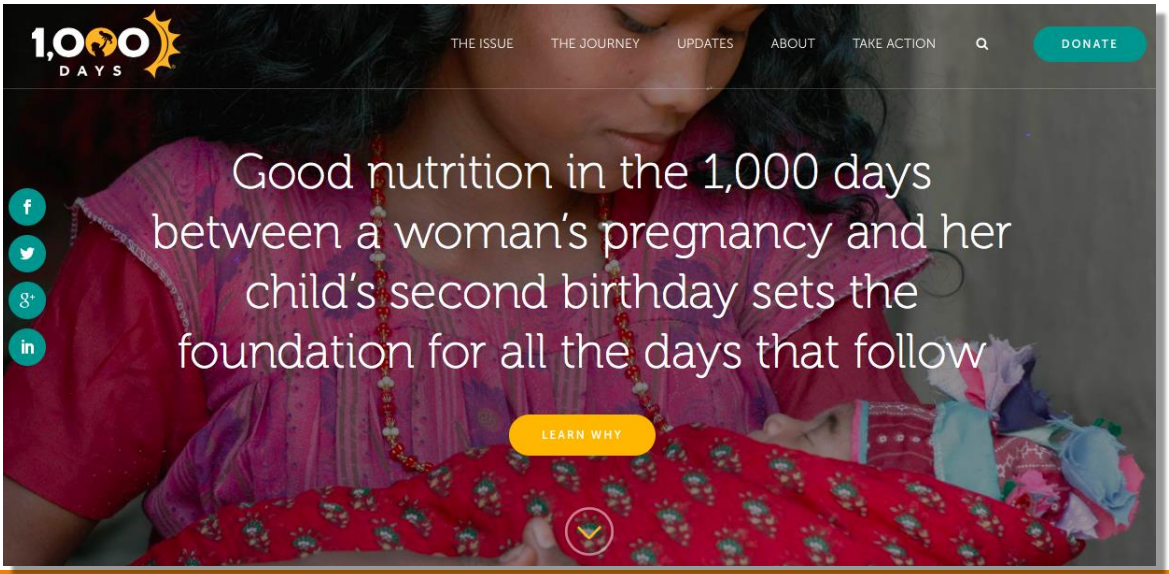
1000 NGÀY ĐẦU ĐỜI – TƯƠNG LAI LÂU DÀI

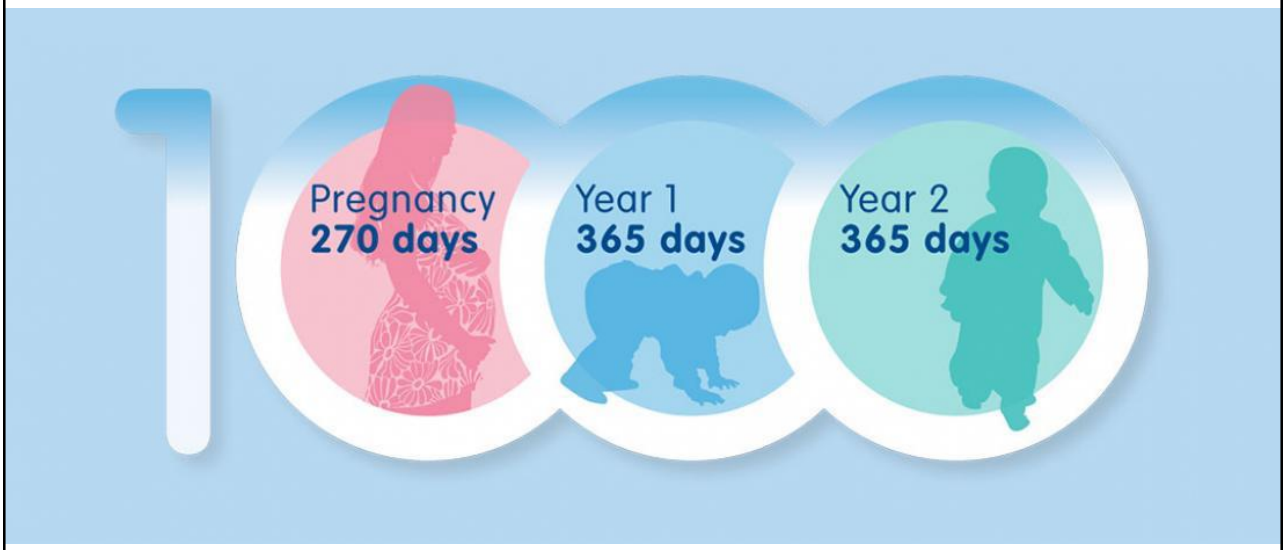
PGS. TS. BS. NGUYỄN ANH TUẤN
PHÓ TRƯỞNG KHOA TIÊU HOÁ – BV NHI ĐỒNG 1
PHÓ CHỦ NHIỆM BỘ MÔN NHI – ĐẠI HỌC Y DƯỢC TP.HCM

www.1000days.unicef.pf

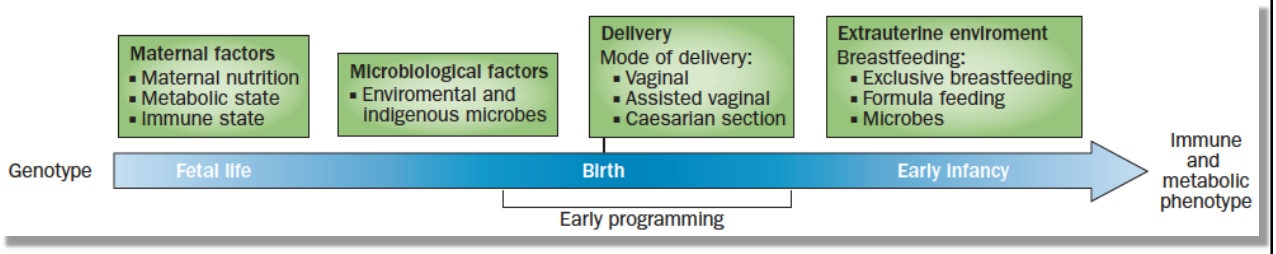


www.thousanddays.org





Lập trình sớm và cửa sổ cơ hội



Rautava S. et al., Nat Rev Gastroenterol Hepatol 2012;9:565-576

1000 NGÀY ĐẦU ĐỜI
VÀ
NGUY CƠ BÉO PHÌ SAU NÀY

Nguy cơ béo phì sau này liên quan đến 1000 ngày đầu đời

Nutritional Phase	Risk Factor
Prenatal (0–280 days)	Higher maternal pre-pregnancy BMI Excess maternal Gestational Weight Gain Maternal Diabetes Mellitus (gestational or Type 1) Genetic predisposition
Breast/Formula Feeding (280 days–6 months of age)	Formula feeding • Accelerated growth curve • High energy intake • High protein content • Low concentration of polyunsaturated fatty acids
Complementary and Early Diet (6 months–2 years of age)	Rapid weight gain Early introduction of solids High protein intake Gut microbiome

Mameli C. et al., Int J Environ Public Health 2016;13:838-846

Thời gian bú mẹ và thừa cân lúc 2 tuổi

Theo dõi đoàn hệ 2624 trẻ em Đức

	Incidence (%)
All	
0-1 month	14.1 [11.5, 17.0]
2-3 months	11.9 [9.0, 15.4]
4-5 months	10.1 [7.7, 12.9]
≥ 6 months	6.7 [5.3, 8.4]

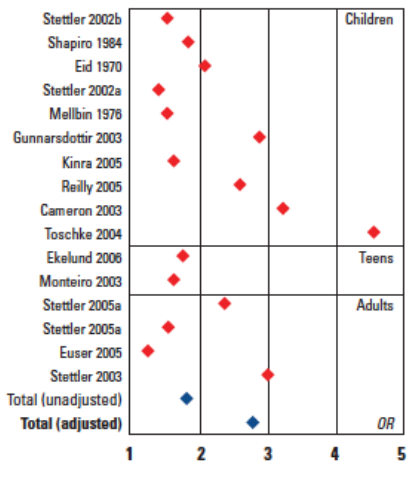
Kalies et al., Eur J Med Res 2005;10:36-42

Đạm tỷ lệ thuận với tăng trưởng

Loài	Đạm trong sữa (g/100ml)	Số ngày để tăng trọng gấp đôi lúc sinh
Người	1,2	180
Ngựa	2,3	60
Bò	3,3	47
Dê	4,1	19
Chó	7,1	8
Mèo	9,5	7
Chuột	11,8	4,5

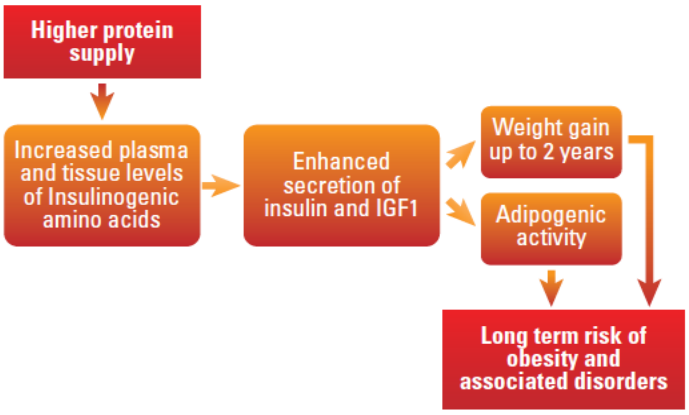
Tăng cân nhanh trong 1-2 năm đầu đời làm tăng nguy cơ béo phì sau này

Figure 3: High weight gain in the first and second year of life, defined as an increase in weight-for-age standard deviation score > 0.67 standard deviation, increases the risk of obesity in childhood, adolescence and adulthood (figure adapted from Brands et al.[29]).

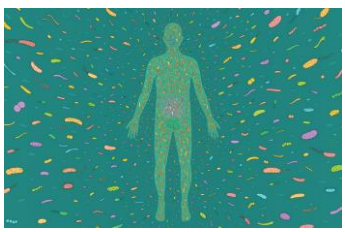


Cơ chế

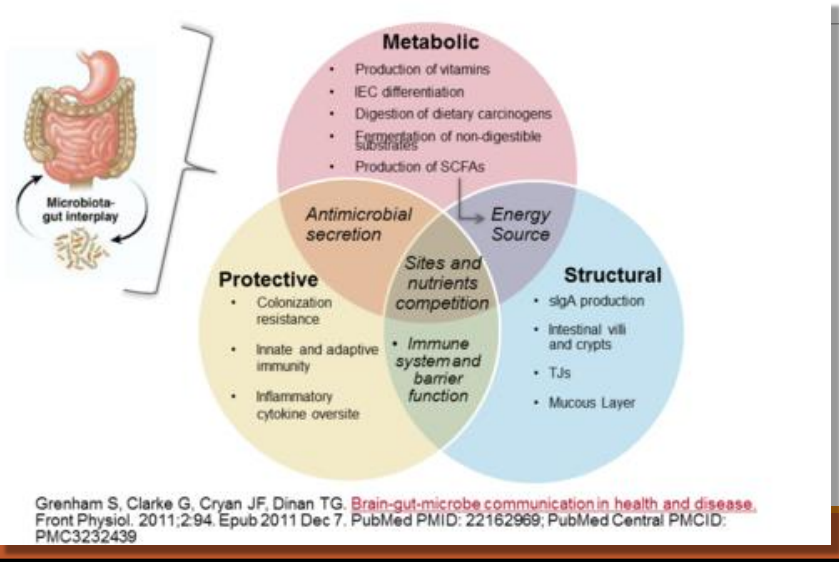
Figure 2: The early protein hypothesis (figure adapted from Koletzko *et al.*[25]).



1000 NGÀY ĐẦU ĐỜI VÀ MICROBIOME

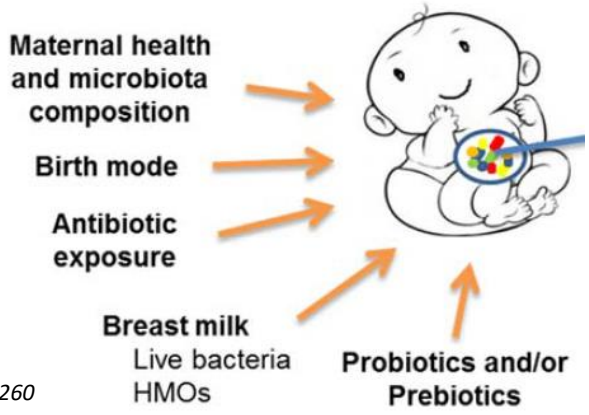


Ảnh hưởng qua lại của microbiome và cơ thể



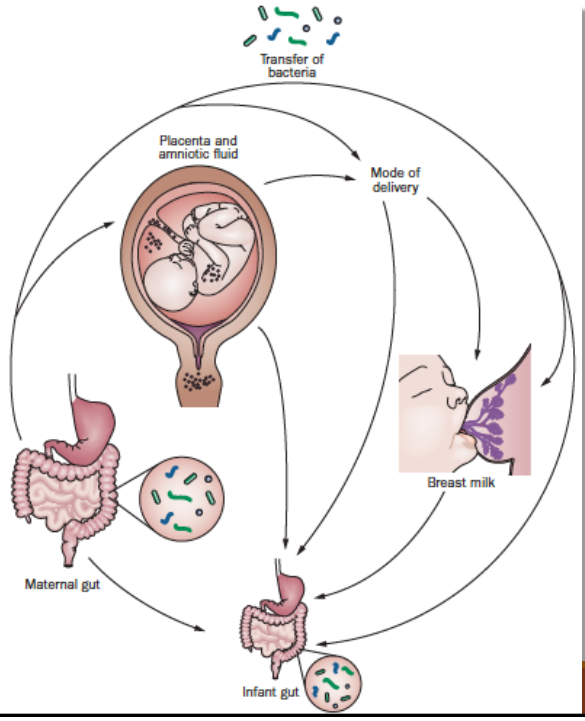
Grenham S, Clarke G, Cryan JF, Dinan TG. Brain-gut-microbe communication in health and disease. Front Physiol. 2011;2:94. Epub 2011 Dec 7. PubMed PMID: 22162969; PubMed Central PMCID: PMC3232439

Các yếu tố ảnh hưởng đến microbiome của trẻ



Koleva PT et al., Nutrients 2015;7:2237-2260

Lập trình microbiota – Từ mẹ sang con



Rautava S. et al., Nat Rev Gastroenterol Hepatol 2012;9:565-576

Tác động của vi sinh vật và TGF-bα2 trong sữa mẹ

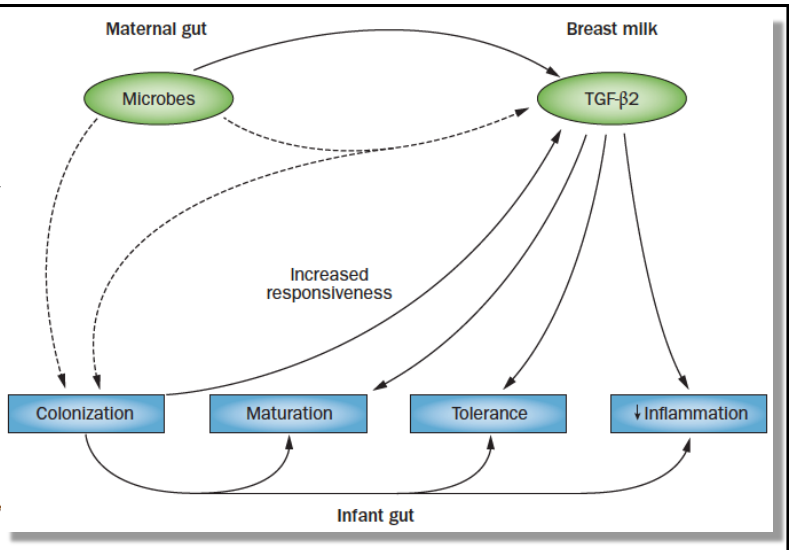
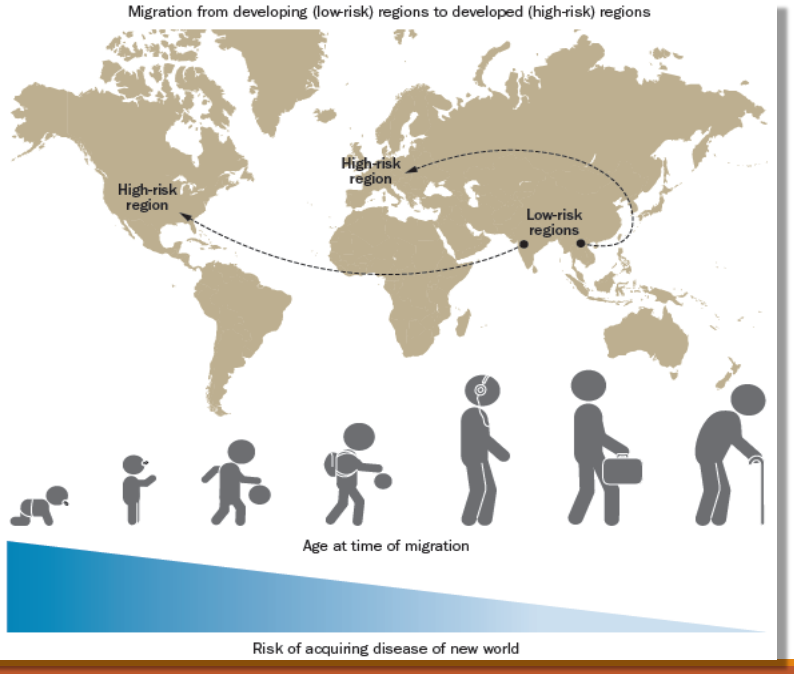


Figure 3 | Interactions between indigenous microbes and TGF-β2 in breast milk. TGF-β2 is essential for breast-milk-induced tolerance towards environmental antigens, attenuates excessive inflammatory responses in the neonatal gut and induces gut maturation and production of IgA antibodies. These processes are also dependent on the indigenous gut microbiota. According to a novel hypothesis, maternal gut bacteria are actively transported into the mammary gland and secreted in breast milk and are thus transferred to the infant in a tolerogenic immune milieu with TGF-β2. Moreover, maternal supplementation with probiotic lactobacilli is associated with increased levels of TGF-β2 in the breast milk and bifidobacteria in the infant gut optimize responsiveness to breast milk TGF-β2. Abbreviation: TGF, transforming growth factor.

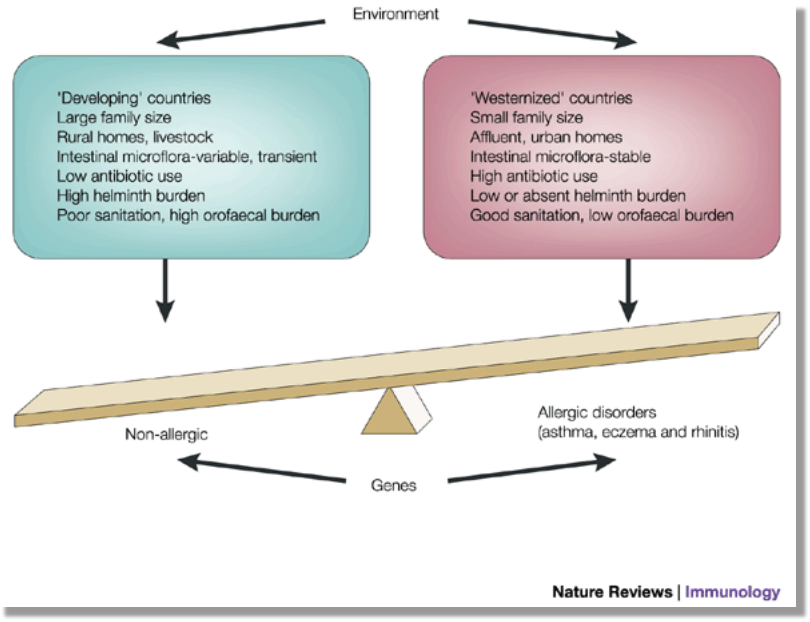
Rautava S. et al., Nat Rev Gastroenterol Hepatol 2012;9:565-576



Shanahan Fergus, Nat Rev Gastroenterol Hepatol 2012;9:209-216

1000 NGÀY ĐẦU ĐỜI VÀ DI ỨNG SAU NÀY

Hygiene hypothesis



Primary Prevention of Allergic Disease Through Nutritional Interventions

David M. Fleischer, MD[a], Jonathan M. Spergel, MD, PhD[b], Amal H. Assa'ad, MD[c], and Jacqueline A. Pongracic, MD[d]
Denver, Colo; Philadelphia, Pa; Cincinnati, Ohio; and Chicago, Ill

AMERICAN ACADEMY OF ALLERGY ASTHMA & IMMUNOLOGY

2013

(J Allergy Clin Immunol: In Practice, 2013; 1:29-36)

Nhắc lại khuyến cáo

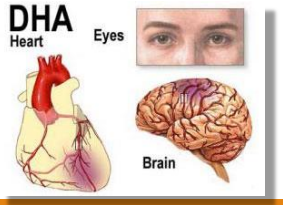
- Mang thai: ăn uống đa dạng, không kiêng cữ.
- Sinh ra: bú mẹ hoàn toàn cho đến 4-6 tháng.

  Nếu không có sữa mẹ: công thức thuỷ phân.
- Ăn dặm: trong khoảng 4-6 tháng

  Ăn đa dạng

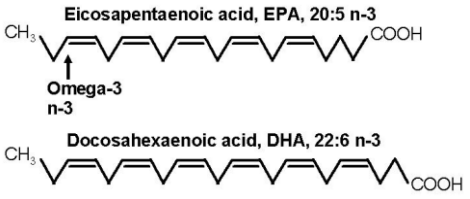
  Không trì hoãn loại thức ăn nào

LCPUFA TRONG 1000 NGÀY ĐẦU ĐỜI VÀ PHÁT TRIỂN NHẬN THỨC

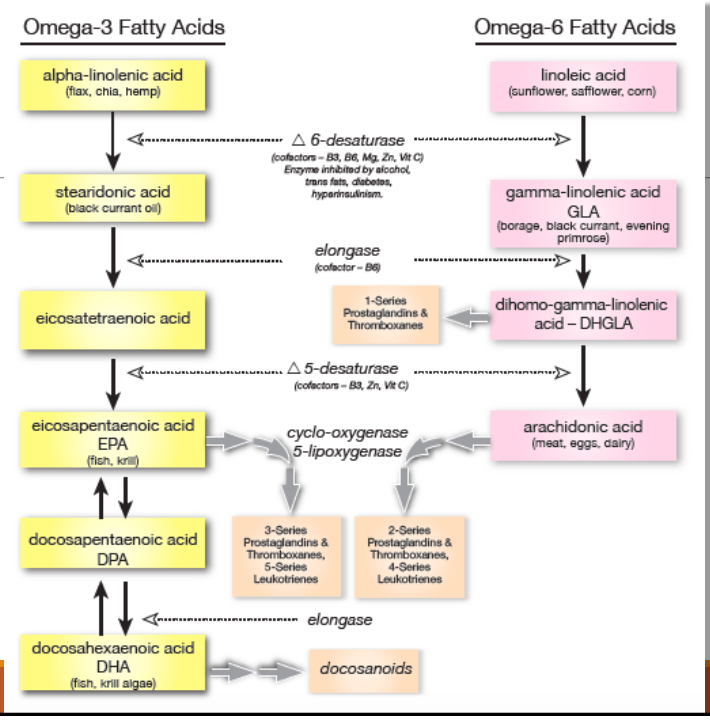


DHA

- DHA: docosahexaenoic acid
- LC-PUFA: long chain polyunsaturated fatty acids
- Omega-3
- Chiếm 40% PUFA trong não và 60% trong võng mạc



Sinh tổng hợp DHA và AA



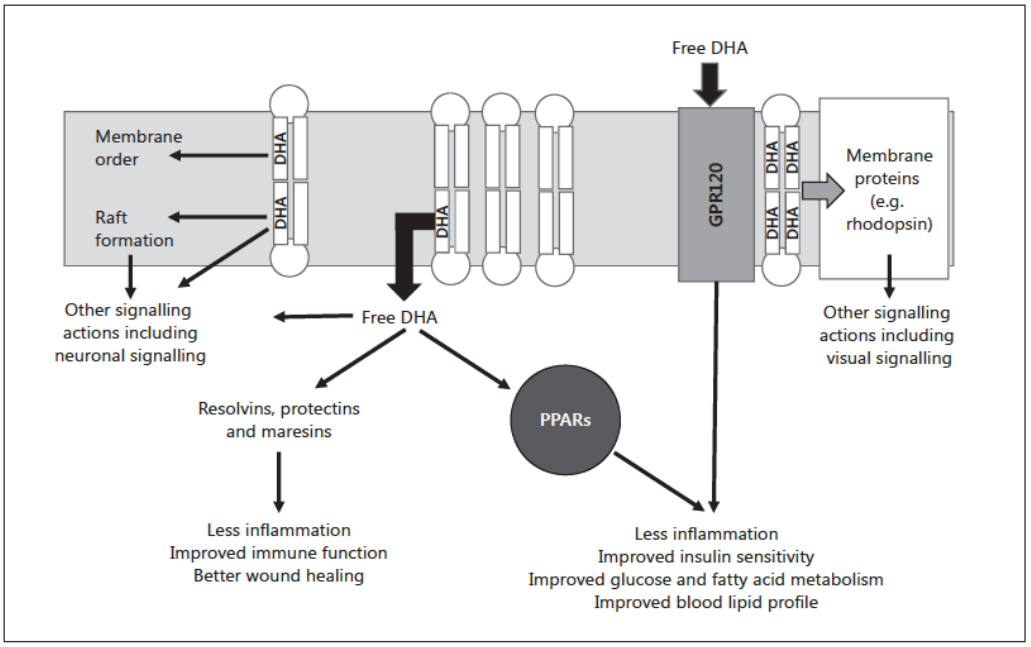


Fig. 7. A schematic summary of the mechanisms of action of DHA.

Calder FC, Ann Nutr Metab 2016;69(suppl 1): 8-21

DHA trong thai kỳ và máu cuống rốn

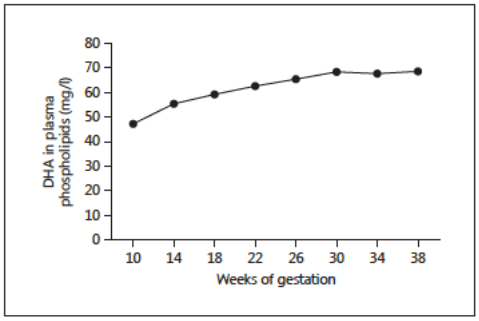


Fig. 3. The change in DHA concentration (mg/l) in plasma phospholipids during human pregnancy. Maternal blood was collected from the same women at different time points in pregnancy. Data are taken from Al et al. [31] and represent the mean values from 110 women.

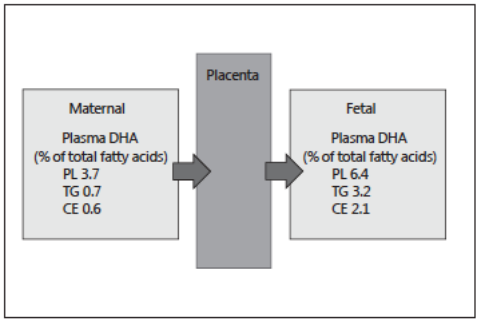


Fig. 4. DHA concentration (as % of total fatty acids) in maternal blood plasma lipids in late pregnancy and in umbilical cord blood plasma at birth. Maternal blood was collected at week 38 of pregnancy. Data are previously unpublished and represent mean values from 50 pregnancies. PL = Phospholipid; TG = triglyceride; CE = cholesteryl ester.

Calder FC, Ann Nutr Metab 2016;69(suppl 1):8-21

Ăn cá hồi trong thai kỳ và DHA trong sữa mẹ

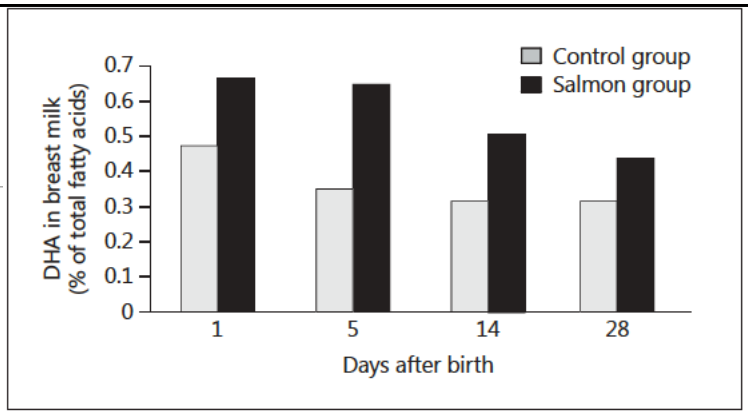


Fig. 6. The effect of eating salmon during pregnancy on DHA concentration (as % of total fatty acids) in human breast milk. Pregnant women consumed two portions of salmon per week from week 20 of pregnancy until birth. The control group reported very low or no consumption of fatty fish. Breast milk was collected at days 1, 5, 14 and 28 after giving birth. Data are taken from Urwin et al. [48] and represent mean values from 7 to 27 samples depending upon group and time point.

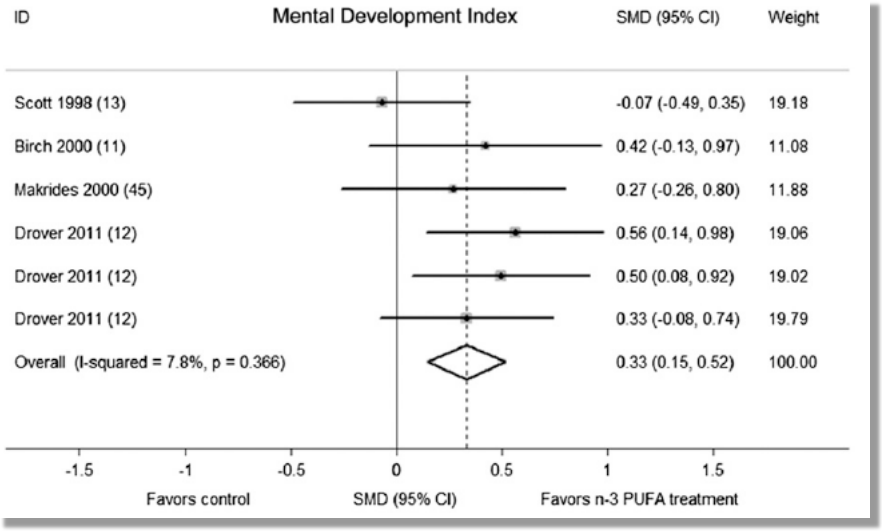
Calder FC, Ann Nutr Metab 2016;69(suppl 1):8-21

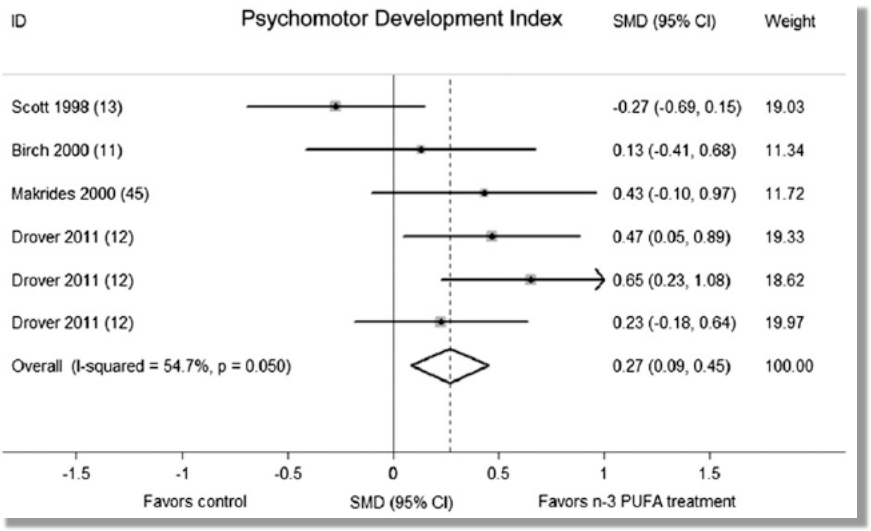
The American Journal of
CLINICAL NUTRITION
Official Journal of The American Society for Clinical Nutrition, Inc

Effect of n−3 PUFA supplementation on cognitive function throughout the life span from infancy to old age: a systematic review and meta-analysis of randomized controlled trials[1–4]

Jingjing Jiao, Qingqing Li, Jingjing Chu, Weijiang Zeng, Min Yang, and Shankuan Zhu

Am J Clin Nutr 2014;100:1422–36.


ID
Mental Development Index
SMD (95% CI)
Weight
Scott 1998 (13)
-0.07 (-0.49, 0.35)
19.18
Birch 2000 (11)
0.42 (-0.13, 0.97)
11.08
Makrides 2000 (45)
0.27 (-0.26, 0.80)
11.88
Drover 2011 (12)
0.56 (0.14, 0.98)
19.06
Drover 2011 (12)
0.50 (0.08, 0.92)
19.02
Drover 2011 (12)
0.33 (-0.08, 0.74)
19.79
Overall (I-squared = 7.8%, p = 0.366)
0.33 (0.15, 0.52)
100.00
-1.5
-1
-0.5
0
0.5
1
1.5
Favors control
SMD (95% CI)
Favors n-3 PUFA treatment


ID
Psychomotor Development Index
SMD (95% CI)
Weight
Scott 1998 (13)
-0.27 (-0.69, 0.15)
19.03
Birch 2000 (11)
0.13 (-0.41, 0.68)
11.34
Makrides 2000 (45)
0.43 (-0.10, 0.97)
11.72
Drover 2011 (12)
0.47 (0.05, 0.89)
19.33
Drover 2011 (12)
0.65 (0.23, 1.08)
18.62
Drover 2011 (12)
0.23 (-0.18, 0.64)
19.97
Overall (I-squared = 54.7%, p = 0.050)
0.27 (0.09, 0.45)
100.00
-1.5
-1
-0.5
0
0.5
1
1.5
Favors control
SMD (95% CI)
Favors n-3 PUFA treatment

THE JOURNAL OF PEDIATRICS • www.jpeds.com ORIGINAL ARTICLES

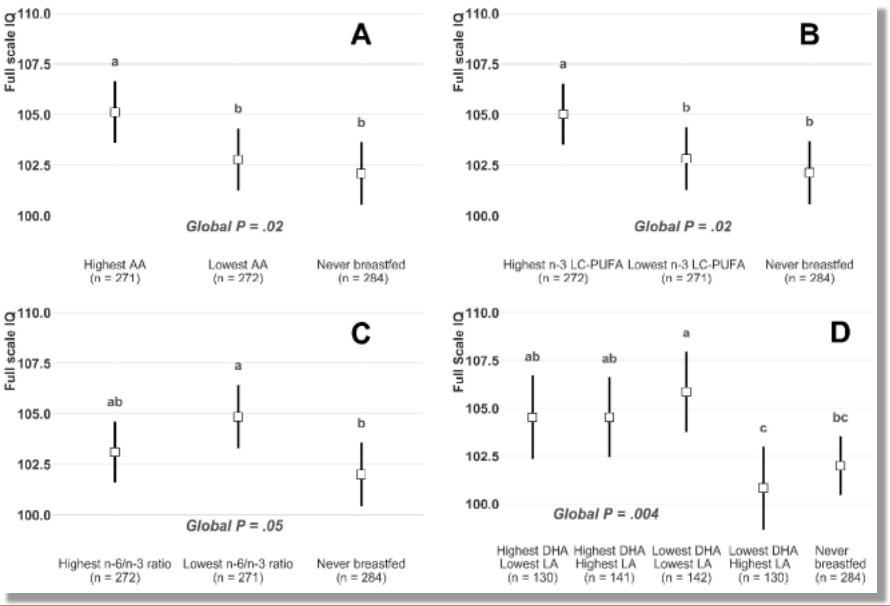
Breastfeeding, Polyunsaturated Fatty Acid Levels in Colostrum and Child Intelligence Quotient at Age 5-6 Years

Jonathan Y. Bernard, PhD[1,2], Martine Armand, PhD[3], Hugo Peyre, MD, PhD[4,5], Cyrielle Garcia, PhD[3], Anne Forhan, MPH[1,2], Maria De Agostini, PhD[1,2], Marie-Aline Charles, MD, PhD[1,2,6], and Barbara Heude, PhD[1,2], on behalf of the EDEN Mother-Child Cohort Study Group (Etude des Déterminants pré- et postnatals précoces du développement et de la santé de l'Enfant)*

(J Pediatr 2017;183:43-50).

- Nghiên cứu EDEN, Pháp, từ năm 2003.
- 2002 bà mẹ có thai tham gia
- Định lượng 12 loại PUFA trong sữa non
- Chế độ ăn của mẹ khi mang thai và của con được ghi nhận
- Trẻ được đánh giá ngôn ngữ, hành vi và chỉ số IQ lúc 5-6 tuổi

Kết quả IQ theo hàm lượng PUFA trong sữa non



Kết quả đánh giá nhận thức theo thời gian bú mẹ

Table II. Children's IQs according to breastfeeding status and duration in the EDEN cohort

	Full scale IQ		Verbal IQ		Performance IQ	
	Unadjusted	Adjusted*	Unadjusted	Adjusted*	Unadjusted	Adjusted*
Breastfeeding status†						
Ever breastfed (n = 799)	104.7 (103.8, 105.5)	103.8 (103.0, 104.7)	108.3 (107.3, 109.2)	107.4 (106.5, 108.3	100.7 (99.8, 101.6)	100.1 (99.2, 100.9)
Never breastfed (n = 281)	100.2 (98.7, 101.7)	102.5 (101.1, 103.9)	103.5 (101.9, 105.0)	105.9 (104.4, 107.4)	96.8 (95.2, 98.3)	98.6 (97.1, 100.2)
P	<.0001	.12	<.0001	.09	<.0001	.13
Breastfeeding duration, mo (n = 799)‡						
Any breastfeeding	0.34 (0.13, 0.56)	0.20 (0.00, 0.41)	0.46 (0.23, 0.69)	0.31 (0.09, 0.52)	0.22 (0.00, 0.44)	0.10 (–0.12, 0.32
P	.001	.05	<.0001	.006	.05	.37
Exclusive breastfeeding	0.47 (0.15, 0.79)	0.25 (–0.07, 0.56)	0.60 (0.26, 0.95)	0.38 (0.05, 0.72)	0.24 (–0.09, 0.58)	0.06 (–0.28, 0.40)
P	.005	.12	.0007	.03	.16	.73
Breastfeeding duration, mo (n = 539)‡,§						
Any breastfeeding	0.33 (0.07, 0.57)	0.22 (–0.03, 0.46)	0.49 (0.23, 0.76)	0.37 (0.11, 0.63)	0.13 (–0.12, 0.39)	0.04 (–0.22, 0.30)
P	.01	.08	.0003	.005	.29	.77
Exclusive breastfeeding	0.47 (0.10, 0.84)	0.29 (–0.08, 0.66)	0.66 (0.26, 1.06)	0.48 (0.10, 0.87)	0.17 (–0.21, 0.55)	0.01 (–0.38, 0.40)
P	.01	.12	.001	.01	.39	.95

Cũng có kết quả âm tính

BMJ Open Neurodevelopmental outcomes at 7 years' corrected age in preterm infants who were fed high-dose docosahexaenoic acid to term equivalent: a follow-up of a randomised controlled trial

Carmel T Collins,[1,2,3,4] Robert A Gibson,[1,2,4] Peter J Anderson,[5,6] Andrew J McPhee,[2,3,7] Thomas R Sullivan,[8] Jacqueline F Gould,[1,4] Philip Ryan,[8] Lex W Doyle,[5,6,9] Peter G Davis,[5,9] Judy E McMichael,[10,11] Noel P French,[10,11] Paul B Colditz,[12] Karen Simmer,[10,11] Scott A Morris,[13] Maria Makrides[1,2,3,4]

Collins CT, *et al. BMJ Open* 2015;**5**:e007314. doi:10.1136/bmjopen-2014-007314

Conclusions: Supplementing the diets of preterm infants with a DHA dose of approximately 1% total fatty acids from days 2–4 until term CA showed no evidence of benefit at 7 years' CA.

Cũng có kết quả âm tính

Omega-3 Long-Chain Polyunsaturated Fatty Acids for Extremely Preterm Infants: A Systematic Review

CONCLUSIONS: Large-scale interventional studies are required to determine the clinical benefits of omega-3 LCPUFA, specifically in extremely preterm infants, during the neonatal period. *Pediatrics* 2014;134:120–134

Kết luận

- 1000 ngày đầu đời có ý nghĩa đặc biệt với cơ thể
- Không chỉ cho những năm đầu đời mà còn cho cả những năm sau này, nhất là các bệnh lý không lây.
- Vai trò của sữa mẹ, microbiome, lượng đạm và chất lượng đạm hợp lý, bổ sung DHA, … là những yếu tố cần được quan tâm nhằm mang lại sức khoẻ tốt nhất cho cơ thể.

Xin cám ơn!