

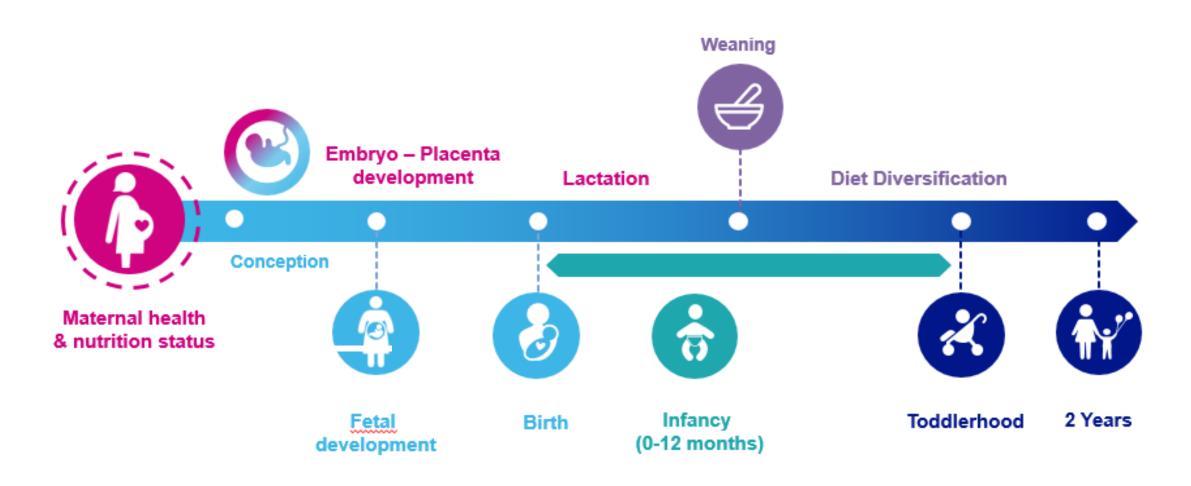


IMMUNITY THROUGH GUT

HCN SCIENCE, 2019



THE FIRST 1000 DAYS: A PERIOD OF RAPID GROWTH AND DEVELOPMENT





NUTRICIA PIONEERING IN EARLY LIFE NUTRITION

years
ago, mothers
who could not
breastfeed used wet
nurses or cows
milk



One
in five
children did not
live to see their
first
birthday



A scientist
A health inspector
A milk producer
made
a differance



They introduced the first infant milk formula in Netherlands. They Named it NUTRICIA.

NUTRICIA.

1896

They Named it

NUTRICIA.

Prof. Backhaus Kindermelk,

Bacteriënvrije melk. Blijft onbepaalden tije goe

Roomboter - Roomkaas.

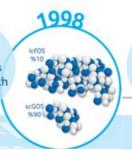
Roomboter - Roomkaas.





scGOS: 90% + IcFOS: 10%*

Patented
prebiotics
mixture has
proven health
benefits



first to introduce LCPUFA blend



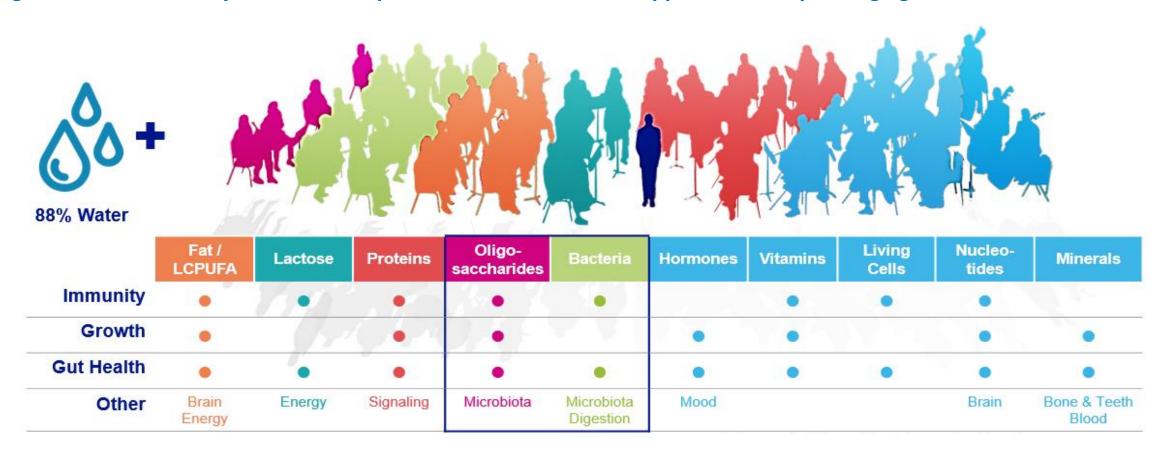
Nutricia
has launched
the products which
can support the
preterm & allergic
babies





BREAST MILK COMPLEX COMPOSITION SUPPORTS A HEALTHY GUT AND THE DEVELOPMENT AND FUNCTIONING OF THE IMMUNE SYSTEM 1-3

Oligosaccharides and key bioactive compounds in human milk to support immunity through gut



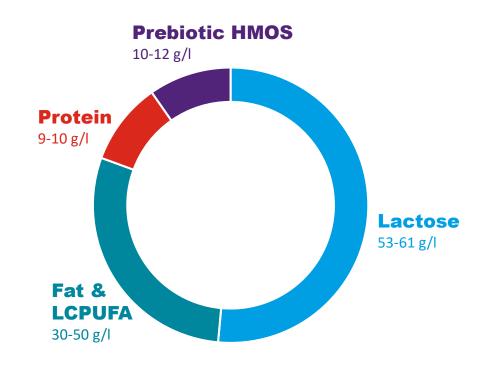
^{1.} Chirico et al. Journal of Nutrition. 2008.



^{2.} Ballard O et al. Pediatr Clin North Am. 2013. 3. Walker WA et al. Pediatr Res. 2015.

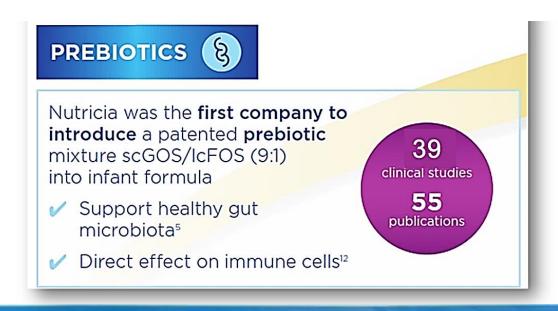
HUMAN MILK IS CRUCIAL IN EARLY LIFE IMMUNE DEVELOPMENT

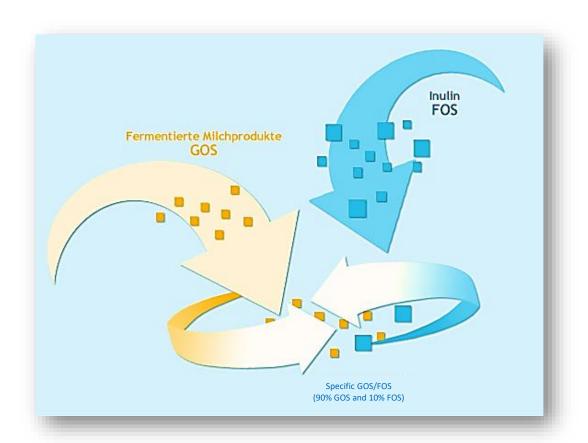
- The third main component in human milk after lactose and fat are oligosaccharides in around 5-15 g/L¹.
- Among its various functions, human milk is tailored to support immune system through gut functioning and development
- Prebiotic oligosaccharides, live bacteria and immune compounds naturally present in human milk play a key role in its gut and immune boosting properties ²⁻⁴
- The amount of prebiotic oligosaccharides in human milk is almost the same as protein which certifies its importance.



NUTRICIA PATENTED PREBIOTICS (0.8 G/100 ML, SCGOS: LCFOS 9:1)

- Combination of short-chain Galacto-Oligosaccharides (GOS) and long-chain Fructo-Oligosaccharides (FOS); 0.8 g/100 ml (9:1/)
- Amounts and molecular size and distribution similar to HMOS
- Functional Benefits similar to HMOs
- Made from natural ingredients (lactose and chicory)
- In line with EC 2006 recommendation

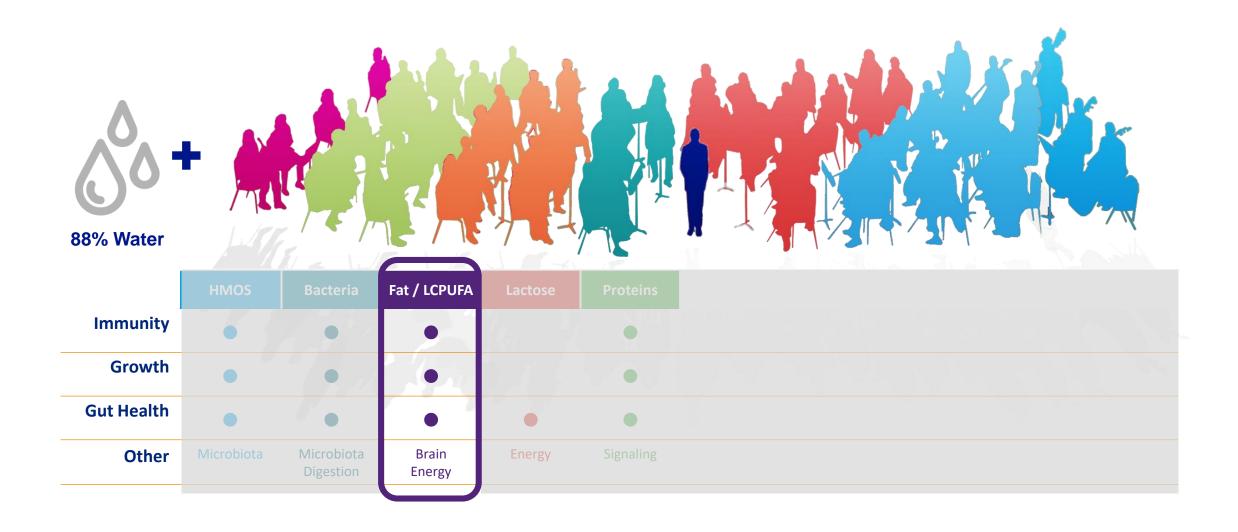








DISCOVER A COMPLEX SYSTEM, AN ORCHESTRA OF FUNCTIONS



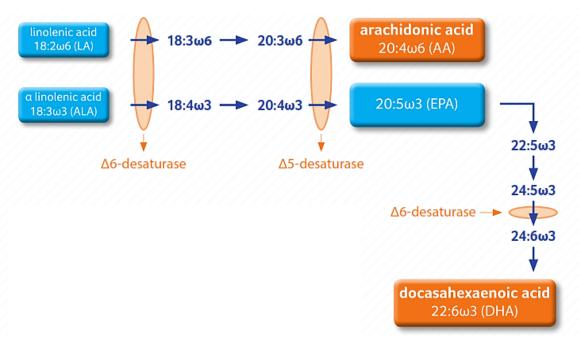
LONG CHAIN POLYUNSATURATED FATTY ACIDS (LCPUFA)

Long chain polyunsaturated fatty acids are unsaturated fats with at least 18 carbons & at least 2 double bonds:

- Omega-6 (or n-6) via linoleic acid (LA)
- Omega-3 (or n-3) families α-linolenic acid (ALA)

Chain length	Name	Abbr.
C18:2n-6	linoleic acid	LA
C18:3n-3	α-linolenic acid	ALA
C18:3n-6	γ-linolenic acid	GLA
C20:4n-6	Arachidonic acid	ARA
C20:5n-3	Eicosapentaenoic acid	EPA
C22:6n-3	Docosahexaenoic acid	DHA

Although both pre-term and full-term infants are able to synthesis DHA and AA from the precursors of ALA and LA, this amount is not sufficient in non-breastfed infants to create stable LCP values in plasma.



Pathway for n-3 and n-6 fatty acids. A(R)A, arachidonic acid; ALA, α -linolenic acid; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; LA, linoleic acid



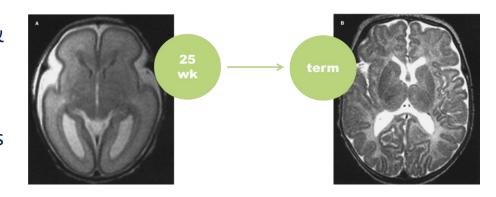
LCPUFAs ARE IMPORTANT FOR IMMUNE, COGNITIVE & VISUAL DEVELOPMENT

Cognitive & visual

- More than 60% of the human brain is fat, where >25% of FA is DHA + AA.
- DHA and AA constitute a structural part of the central nervous system & retina cells membrane.¹
- DHA accounts for 60% of the fatty acids in the retina ² DHA supply is essential for visual function.

Immune system

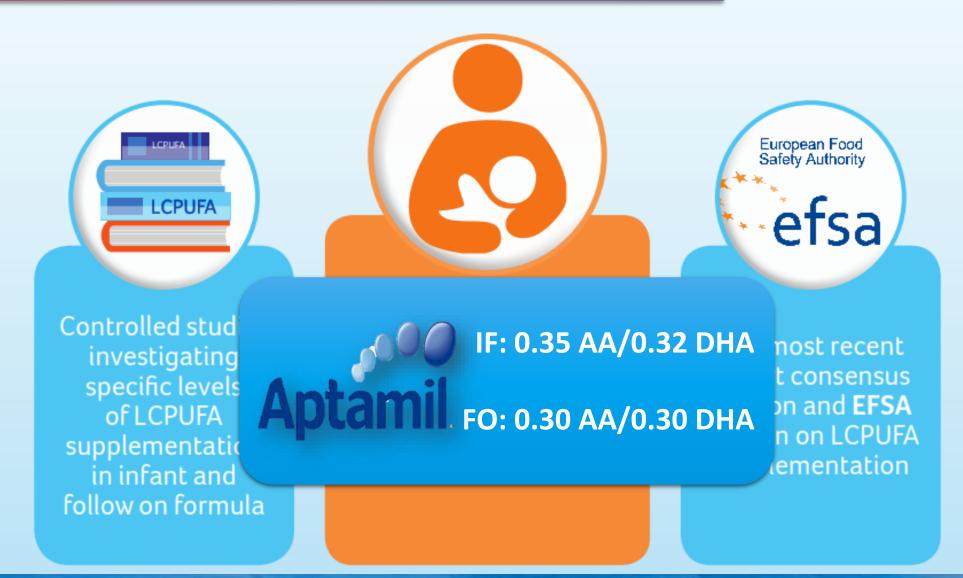
- LCPUFAs are the most important fats for immune cells (%25 of lipids in immune cells consist of LCPUFAs).³⁻⁷
- Amount and the ratio of DHA/AA (Omega3/Omega6) regulate lymphocyte populations, cytokine production by T-cells, and immune cell maturation.⁸



T3: Critical period for brain growth and synapse formation



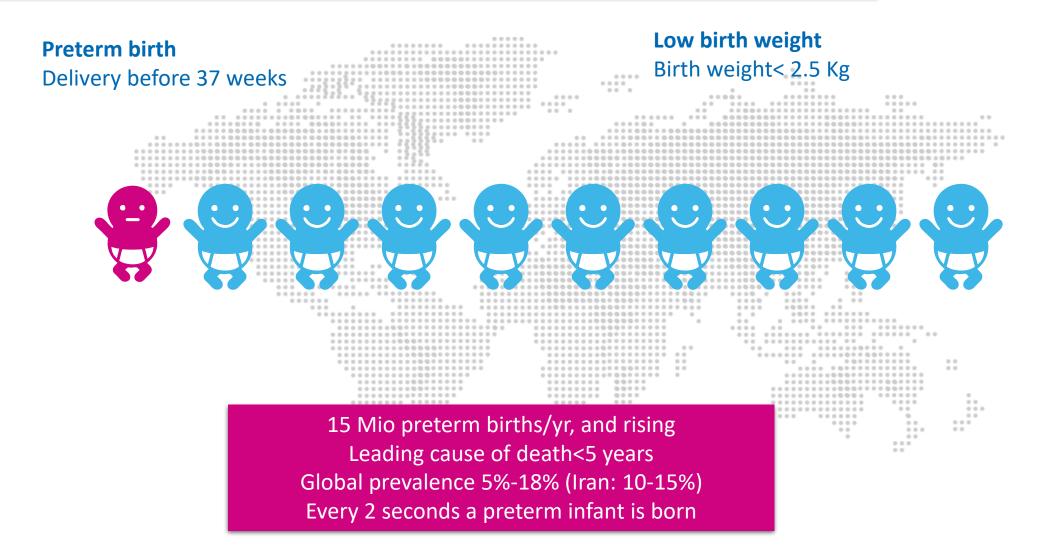
SOURCES OF SUPPLEMENTATION LEVEL





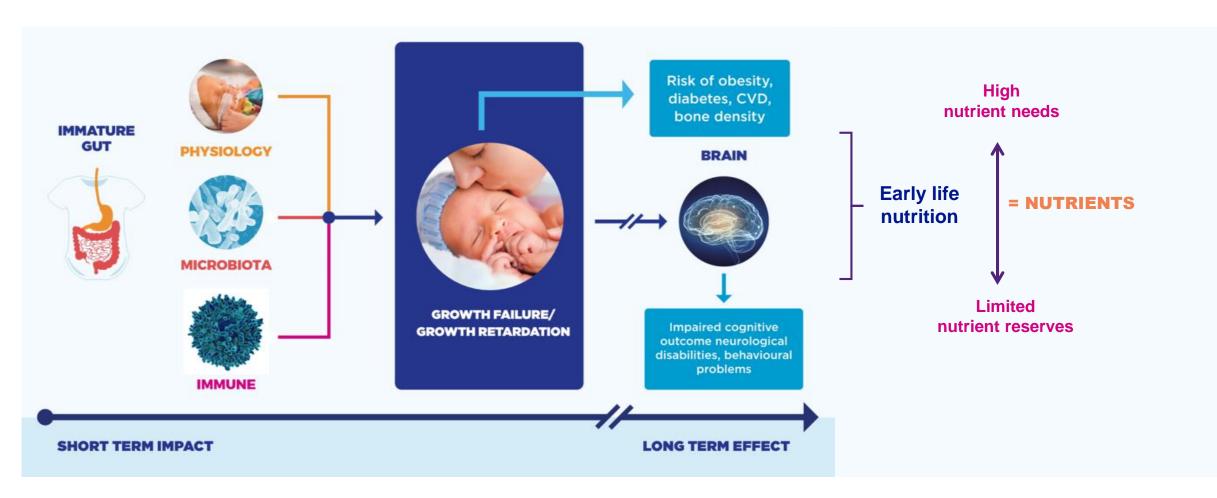


1 IN 10 INFANTS WORLD WIDE IS BORN PRETERM





SHORT TERM HEALTH CHALLENGES PUT HIGH EXPECTATIONS TO NUTRITION





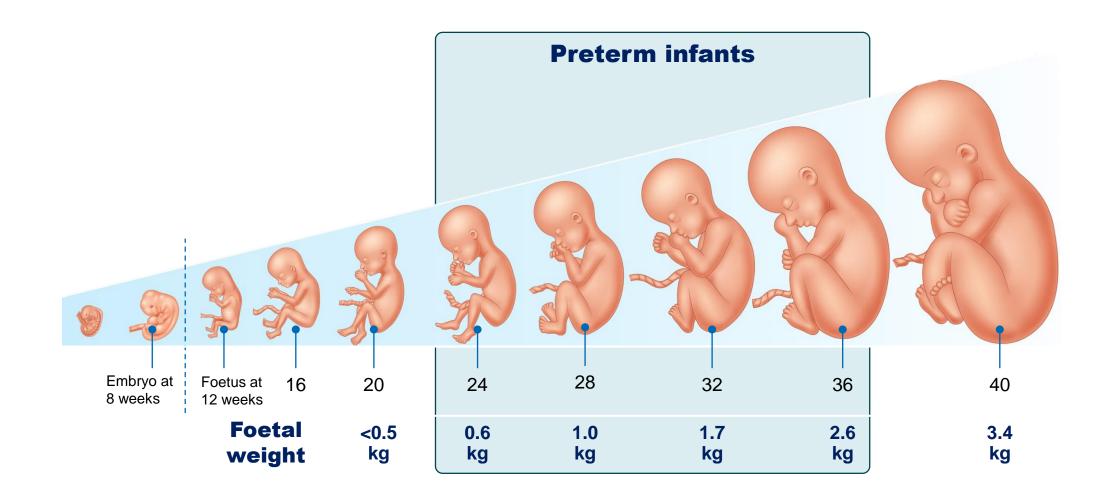


Aim is to promote growth and nutrient accretion comparable to that of the fetus at the same gestational age to:

- Avoid postnatal growth failure,
- Minimize the risk of NEC
- Optimize neurodevelopment and long term health outcomes.



FOETAL GROWTH DEVELOPMENT DURING PREGNANCY



WHAT SHOULD A PREMATURE INFANT RECEIVE FROM NUTRITION:

- Sufficient level of Energy and Protein: Desired weight gain is 20g/kg/day.
 - A milk intake of 140-170 ml/kg/d, energy intake (110-135 kcal/kg/d) complying with the ESPGHAN guidelines
 - PROTEIN: ESPGHAN 2010 Recommendation for Preterm babies 1000-1800 g: 3.2 3.6 g/100 kcal or 3.5-4 g/kg/day
- A well absorbed fat blend rich in EFA, LCPs, MCT
- A well absorbed carbohydrate Lower Lactose and (Maltodextrin, low osmolar)
- Increased levels of vitamins and minerals: Vit D,Ca and P for bone mineralisation, extra Na,
- Prebiotics

RECOMMENDATION FRAMEWORK-ESPGHAN COMPLIANCE

Currently, 4 recommendations are in circulation

	EUROPE	USA
Endorsement by Medical Association	ESPGHAN 2010	AAP 2014
Statements of experts in the field	Koletzko, Uauy, Pointdexter (eds) 2014	Tsang (eds). 2005

 Nutricia Research orients the preterm product composition towards the European recommendations and legislation.

Europe endorses higher protein, mineral, vitamin concentrations than the USA

*

A COMPLETE RANGE OF PRODUCTS FOR THE SPECIFIC NEEDS OF PRETERM INFANTS IN THEIR DIFFERENT GROWTH STAGES









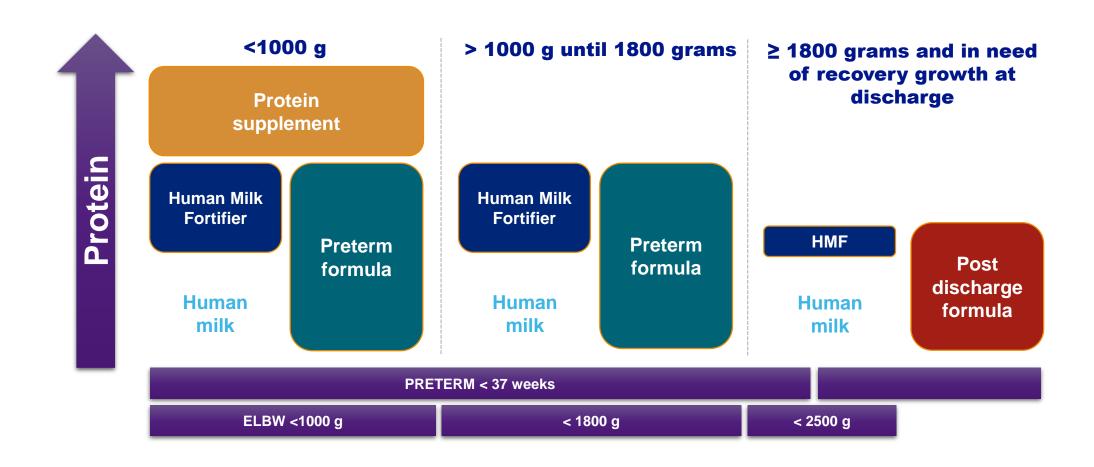


HOSPITAL CARE

HOME CARE



PRETERM FEEDING OPTIONS IN RELATION TO BIRTH WEIGHT



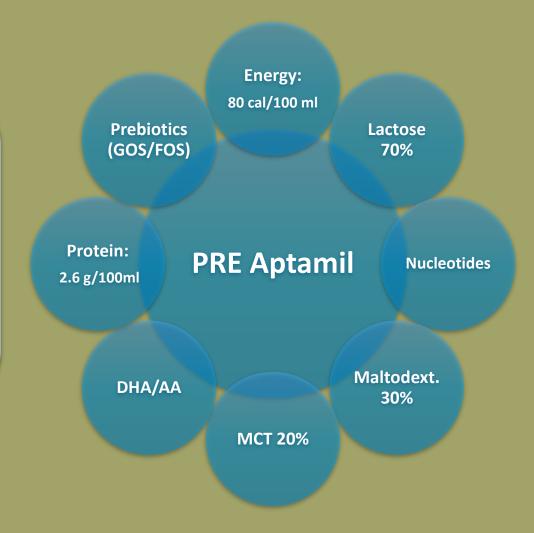
PRE-APTAMIL

MEETING THE SPECIAL NUTRITIONAL NEEDS OF PREMATURE INFANTS



All levels of nutrients are within the ranges recommended for 1000-1800 g by ESPGHAN 2010

The goal is to achieve the body composition and growth rate of a normal fetus/infant of the same postmenstrual age



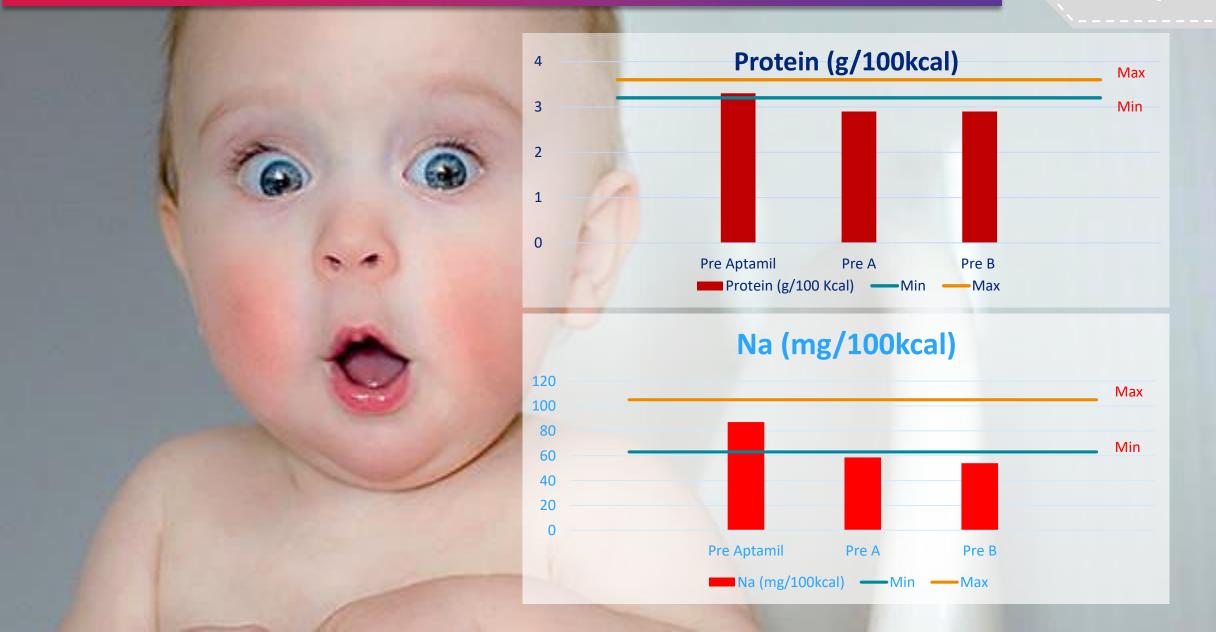
	Breastmilk	Pre Aptamil	Standard infant formula
Phospholipid-bound LCPs	up to 20%	15%	0%
Triglyceride-bound LCPs	80-90%	85%	100%

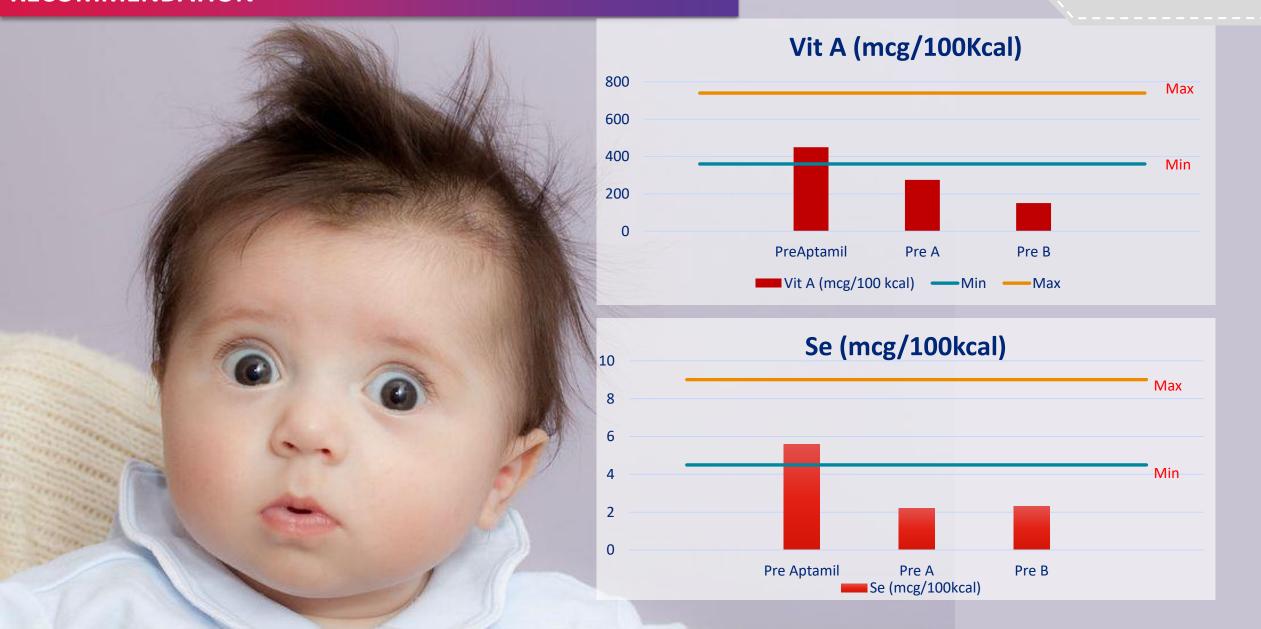




PROTEIN BASED ON ESPHGAN MAX & MIN RECOMMENDATION

Pre Aptamil









Premature with SUBOPTIMAL WEIGHT, should receive fortified human milk or an enriched formula after discharge because they are at risk for long-term growth failure

PDF Has an intermediate composition between PRE & Regular Stage 1:

- Higher Calorie (75 vs 66 kcal/100 mL)
- Higher Protein (2 vs 1.3 g/100ml)
- 20% MCT
- High LCP
- Higher content of Na, Ca, P, Zn, and Vit.A, E, and D



ENERGY AND NUTRIENT LEVELS OF A PDF ARE INTERMEDIATE BETWEEN THOSE OF A PRETERM AND TERM INFANT FORMULA

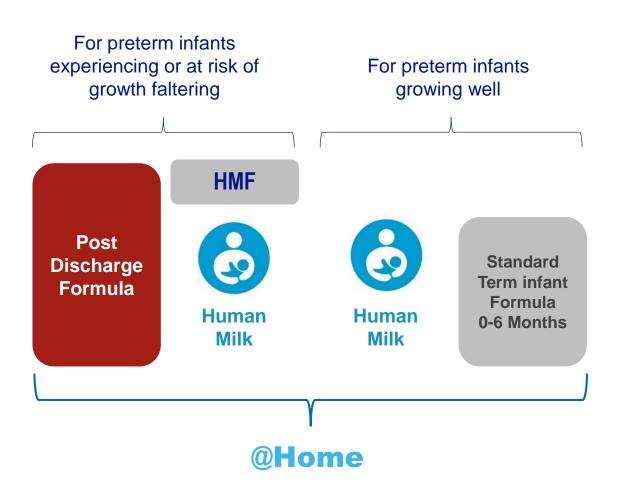
Aptamil PDF

Per 100 ml	Term formula	Post discharge formula	Preterm formula
Energy kcal	66	75	80
Protein g	1.3	2.0	2.6
Fat g	3.4	4	3.9
Carbohydrate g	7.4	7.5	8.4
Lactose g	7	5.9	5.6
Ca mg	47	87	100
P mg	26	47	56
Na mg	17	28	70
K mg	65	77	80
Fe mg	0.83	1.2	1.6
Vit A micro g RE	54	100	361
Vit D micro g	1.2	1.7	3





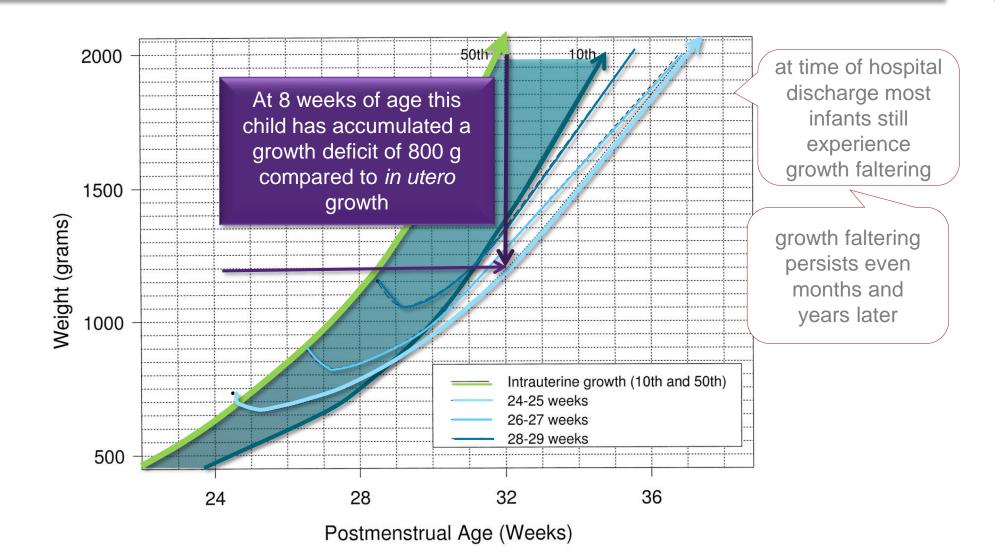
- Not every preterm infants needs enriched feeding at discharge
- Infants that grow well, can receive standard infant feeding options
- Infants experiencing growth faltering or growth retardation need PDF to prevent long term problems with growth and neurodevelopment.





GROWTH IN THE NEONATAL INTENSIVE CARE UNIT AND BEYOND

Aptamil PDF





Aptamil PDF

PDF INDICATION: INFANTS AT HIGHEST RISK FOR NUTRITIONAL DEFICIENCIES AFTER NICU DISCHARGE

COMPLICATIONS

ELBW, VLBW

SGA, IUGR

Exclusively breastfed

Requiring tube feedings at home

Fail to gain at least 20g/day before D/C

G Tube / tracheostomies

TPN >4 wks

DIAGNOSED WITH

Chronic renal insufficiency

Congenital GI anomalies

Cyanotic CHD

Malabsorption

Osteopenia

Poverty/LSES

Severe neurologic impairment



