GETTING TO KNOW OUR GUT MICROBIOTA

'Gut microbiome' and 'gut microbiota' describe either the collective genomes of the microorganisms that reside in the gut, or the microorganisms themselves

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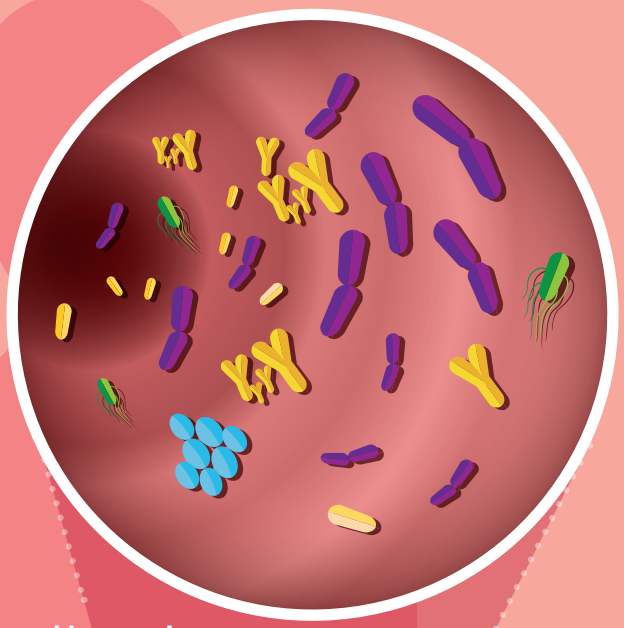
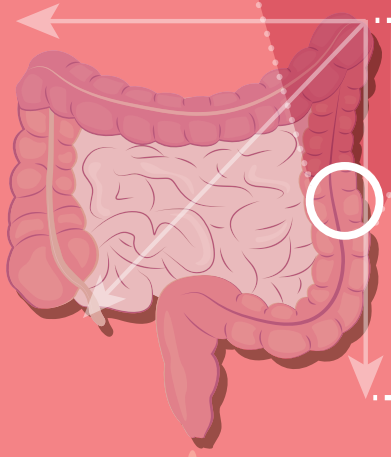


BIG facts about TINY microbes in the gut

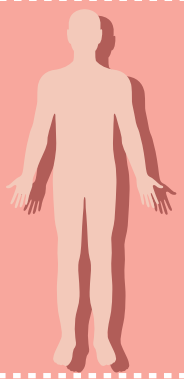
The gut contains more than **3 million microbial genes** (150 times more than human genes)[1]

Human's gastrointestinal tract is home to **100 trillion of microorganisms**[1]

Gut microbiota weighs up to **2 kg**[1]



Host-microbe interactions can occur on a surface area of about **30–40m²** (20 times of the skin surface area)[4]



Skin surface area = 1.5–2.0m²

Just like our fingerprints, the composition of gut microbiota is unique to each individual (although we share some similar features). It is influenced by genetics, age, lifestyle, environmental microbial exposure, diet and health factors[1,2,3]

1. Van de Wiele T *et al. Nature Reviews Rheumatology,* 12:398–411, 2016.
2. Munyaka PM *et al. Frontiers in Pediatrics,* 2(109):1-8, 2014.
3. Collado MC *et al. Gut Microbes,* 3(4): 352-65, 2013.
4. Helander HF and Fändriks L. *Scand J Gastroenterol.,* 49(6):681-9, 2014

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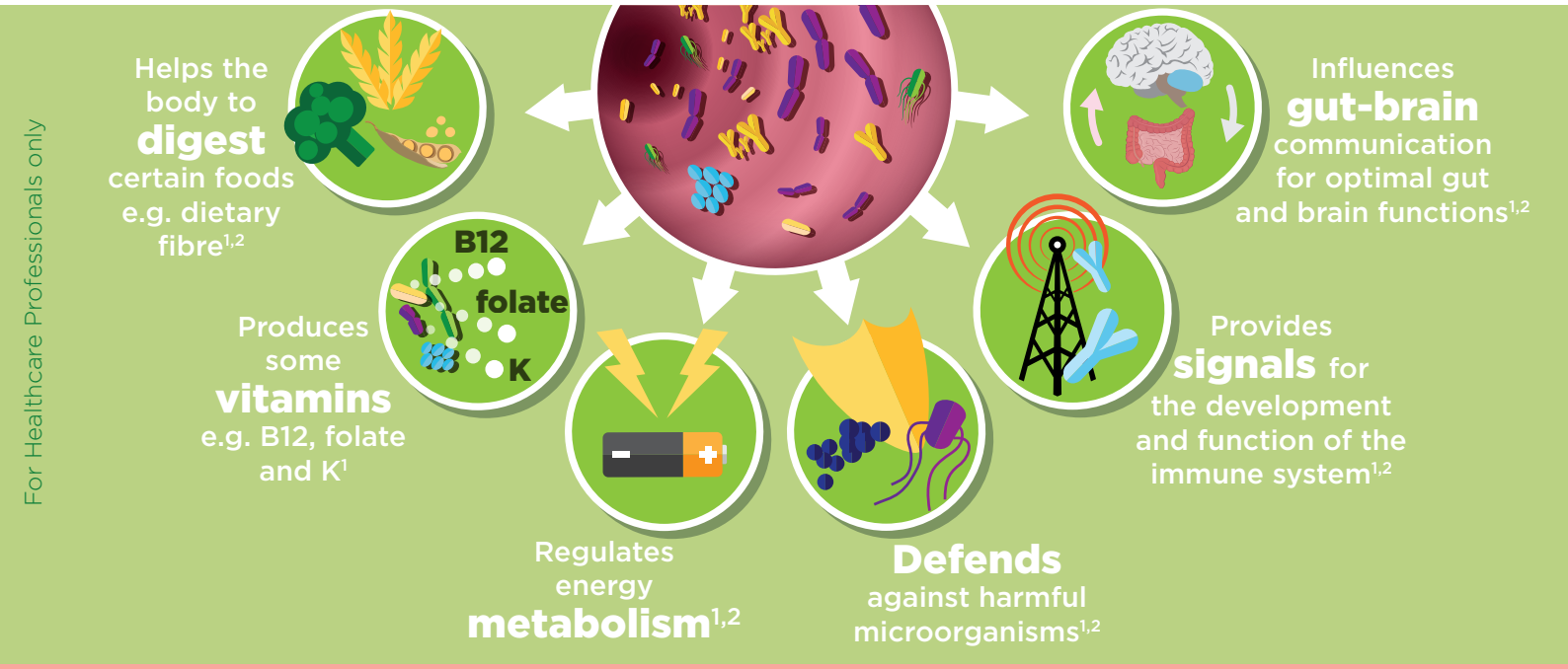
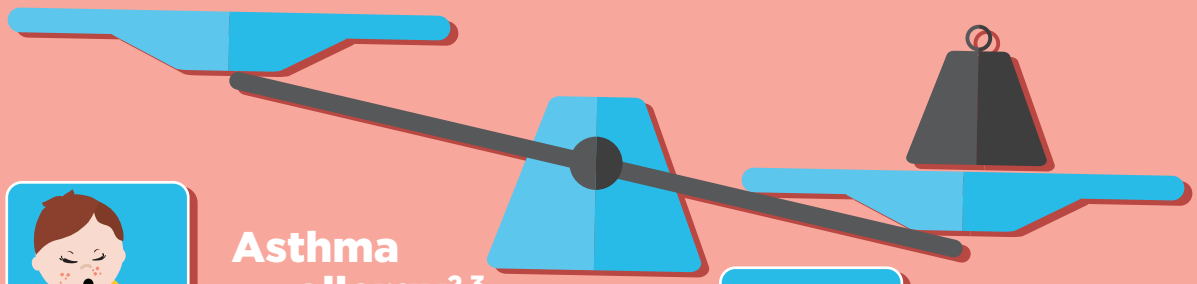
WHY IS GUT MICROBIOTA IMPORTANT?

A healthy gut microbiota contains a balanced composition of many classes of bacteria that have health-promoting functions



Imbalances in gut microbiota have been linked to:

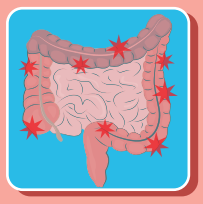


Asthma and **allergy**[2,3]

Infections[2,3]

Obesity and **metabolic disorders**[2,3]

Infantile colic and functional **gastrointestinal** disorders[3]



Inflammatory bowel disorders[3]

Aberrant behaviour and **autism spectrum disorders**[3]

1. Shamir R, van Elburg R, Knol J, Dupont C. Gut Health in Early Life: Significance of the Gut Microbiota and Nutrition for Development and Future Health. Essential Knowledge Briefing, Wiley, Chichester (2015).
2. Van de Wiele T *et al. Nature Reviews Rheumatology*, 12:398–411, 2016.
3. Collado MC *et al. Gut Microbes*, 3(4): 352-65, 2012.

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THE FIRST 1000 DAYS

offers a unique window of opportunity in which different factors may have an impact on the gut microbiota composition and its development[1,2,3]

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Factors that have DESIRABLE IMPACT on microbiome

Healthy diet, good health status of mother

Pre- and probiotic supplementation, balanced maternal microbiota

Term birth

Vaginal delivery

Breastfeeding

Healthy complementary foods

Interaction with nature (biodiversity)

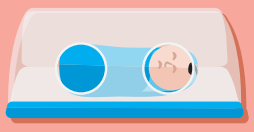
High dietary fibre or pre- and probiotic supplementation

Factors that have UNDESIRABLE IMPACT on microbiome

Unhealthy diet, poor health status of mother

Maternal antibiotic

Pre-term birth



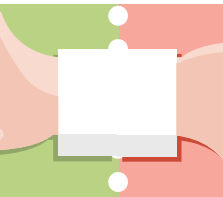
C-section delivery

Formula feeding without pre- or probiotics

Antibiotic use

Excessive sanitation

Unhealthy diet




fetus


newborn


infant


toddler

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Different factors such as GOOD NUTRITION during the first 1000 days can have benefits that last a lifetime

1. Tamburini S, Shen N, Wu HC, Clemente JC. The microbiome in early life: implications for health outcomes. *Nat Med.* 2016; 7;22(7):713-22.
2. Nuriel-Ohayon M, Neuman H, Koren O. Microbial changes during pregnancy, birth, and infancy. *Front Microbiol.* 2016; 14;7:1031.
3. Chu DM, Antony KM, Ma J, et al. The early infant gut microbiome varies in association with a maternal high-fat diet. *Genome Medicine.* 2016;8:77.

DIET AND GUT MICROBIOTA

The composition and functionality of gut microbiota can be influenced by the consumption of diet that includes PREBIOTICS, PROBIOTICS, or both (SYNBIOTICS)

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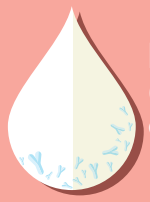
PREBIOTICS

Non-digestible dietary carbohydrates, that travel to the colon intact and are able to selectively stimulate the growth and activity of beneficial bacteria in the colon[1]

Naturally present in:



human milk (known as human milk oligosaccharides)

chicory root

artichokes

garlic

onions

leeks

asparagus

PROBIOTICS

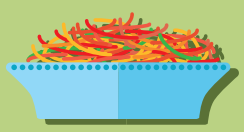
Live microorganisms, which when administered in adequate amounts, confer a health benefit on the host[1]

Can be found in:

fermented milk

yoghurts

fermented vegetables (e.g. Sauerkraut, Kimchi)



SYNBIOTICS

Combination of prebiotics and probiotics[1]

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1. Shamir R, van Elburg R, Knol J, Dupont C. Gut Health in Early Life: Significance of the Gut Microbiota and Nutrition for Development and Future Health. Essential Knowledge Briefing, Wiley, Chichester (2015).

NUTRITIONAL INNOVATIONS FOR A HEALTHY GUT

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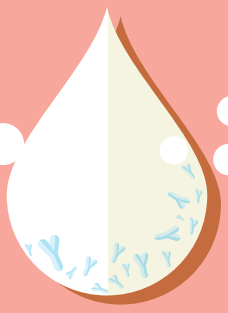
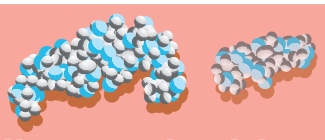
Inspired by HUMAN MILK





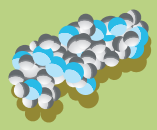
Oligosaccharides are the third largest component (after lactose and lipids) of human milk[1]

Human milk contains live bacteria such as ***Bifidobacterium breve, B. adolescentis,*** and ***B. bifidum***[2]

INNOVATIONS

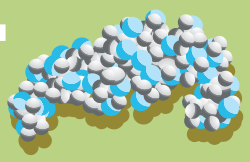
Prebiotics mixture of:

short-chain galacto-oligosaccharides (scGOS)



+

long-chain fructo-oligosaccharides (lcFOS)



Synbiotics mixture of:

scGOS/lcFOS

+

Bifidobacterium breve M-16V

BENEFITS

Promotes the growth of beneficial bacteria for healthy gut[3]

Creates a favorable milieu for defense against pathogens[3]

Supports immunity through positive modulation of gut microbiota[3]

Reduces the incidence of atopic dermatitis and other allergic symptoms[3,4,5]

Reduces the risks of infections[3]

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1. Kunz C, Rudloff S, Baier W, *et al. Annu. Rev. Nutr.* 2000;20:699–722.
2. Martín R, Jiménez E, Heilig H, *et al. Appl Environ Microbiol*. 2009; 75(4): 965–969.
3. Moro EG, Boehm G. *Functional Food Reviews.* 2012; 4 (3): 101-113.
4. van der Aa LB, Heymans HS, van Aalderen WM *et al.* Synbad Study Group. *Clin Exp Allergy.* 2010;40(5):795-804.
5. van der Aa LB, van Aalderen WM, Heymans HS *et al.* Synbad Study Group. *Allergy.* 2011;66(2):170-7.

NUTRICIA RESEARCH

DANONE NUTRICIA RESEARCH

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At Nutricia, we have 120 years of experience in early life nutrition

40 years of research in gastrointestinal functions in early life

40 years of research inspired by human milk

Pioneering innovations in prebiotic oligosaccharides and unique process of fermentation

Breastfeeding is best for babies

Breastfeeding is best for babies and provides many benefits. It is important that, in preparation for and during breastfeeding, mother eats a healthy, balanced diet. Combined breast and bottle feeding in the first weeks of life may reduce the supply of mother's own breast milk, and reversing the decision not to breastfeed is difficult. Always consult healthcare professional for advice about feeding your baby. If infant formula is used, manufacturer's instructions for use should be followed carefully.

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