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Does my baby need probiotics ?

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NEW ZEALAND

**MEDICAL AND
HEALTH SCIENCES**



Diet & the Microbiome in Early life

- How does diet in early life influence the microbiome ?
- Do differences in the microbiome structure and function affect health outcomes?
- What can we advise parents/caregivers – food, prebiotics and probiotics?

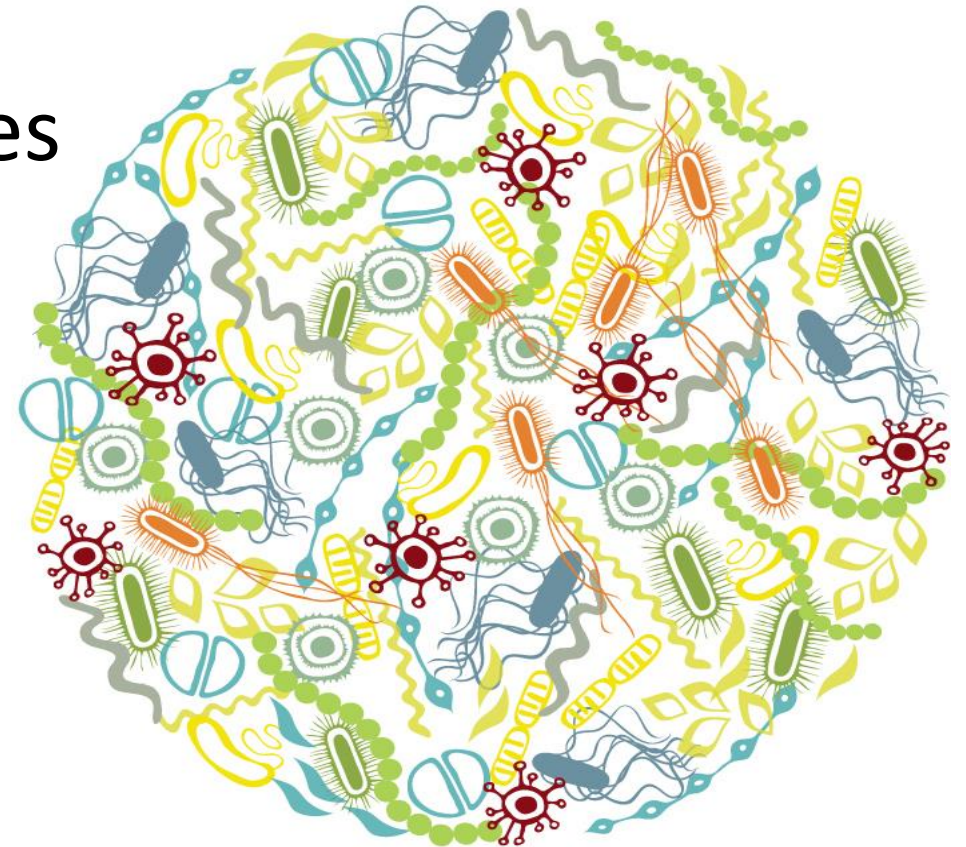


Microbiota:

A collection or community of microbes

Microbiome:

A collection of all the cells
and genes of all the microbes in a
community



Taxonomy

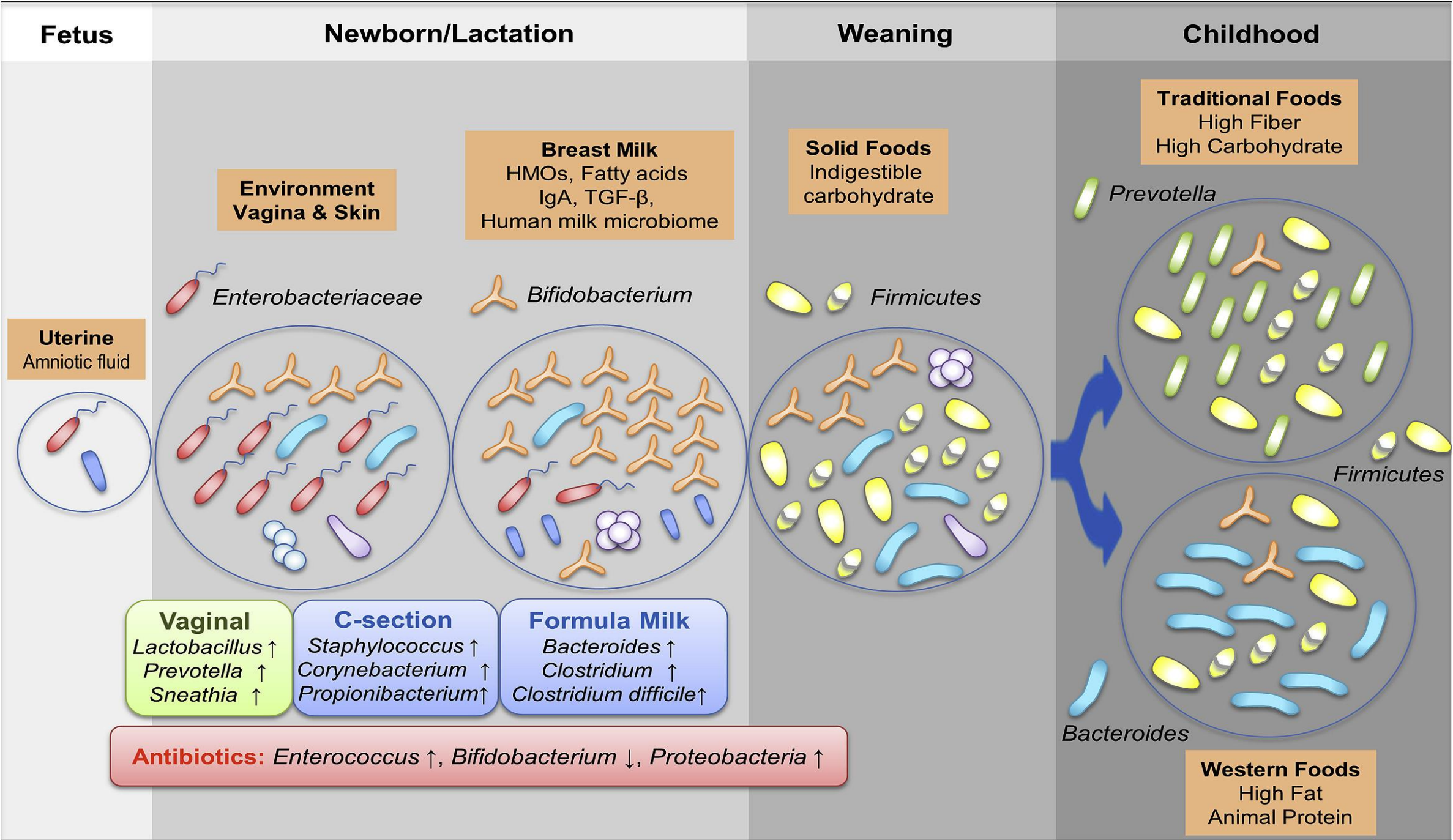
Domain: Bacteria

Phylum: Actinobacteria

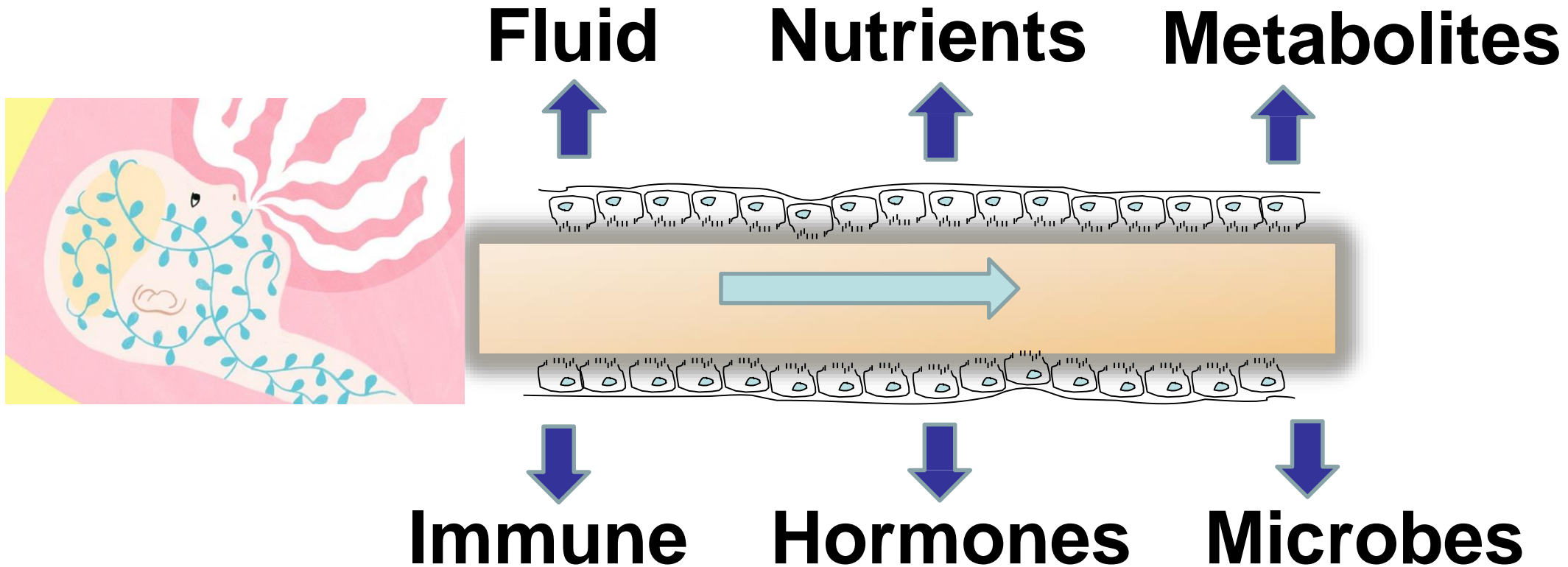
Group/Genus: Bifidobacterium

Species/Strains: *Bifidobacterium breve*, *Bifidobacterium lactis*, *Bifidobacterium longum*,
bifidobacterium, infantis..... *B. angulatum*; *B. animalis*; *B. asteroides*; *B. bifidum*; *B. boum*; *B. breve*;
B. catenulatum; *B. choerinum*; *B. coryneforme*; *B. cuniculi*; *B. dentium*; *B. gallicum*; *B. gallinarum*; *B. indicum*; *B.*
longum; *B. magnum*; *B. merycicum*; *B. minimum*; *B. pseudocatenulatum*; *B. pseudolongum*; *B. psychraerophilum*;
B. pullorum; *B. ruminantium*; *B. saeculare*; *B. scardovii*; *B. simiae*; *B. subtile*; *B. thermacidophilum*; *B.*
thermophilum; *B. urinalis*; *B. sp.*

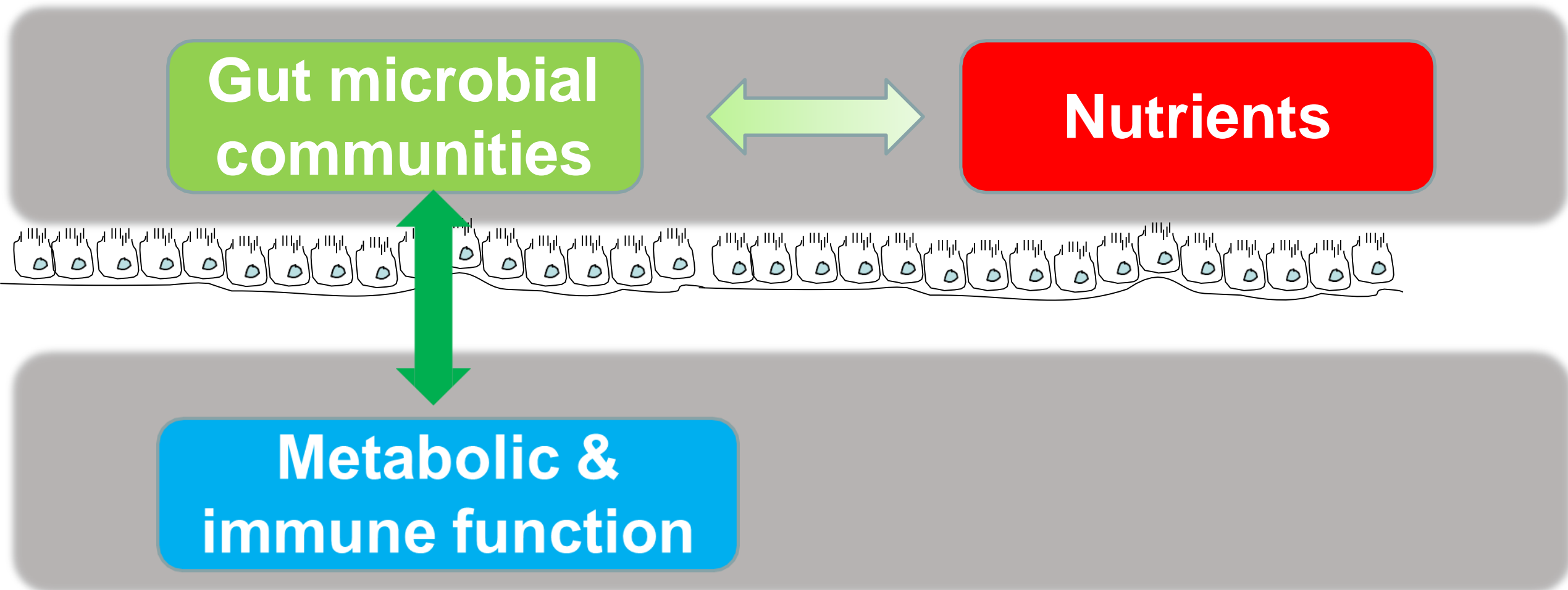




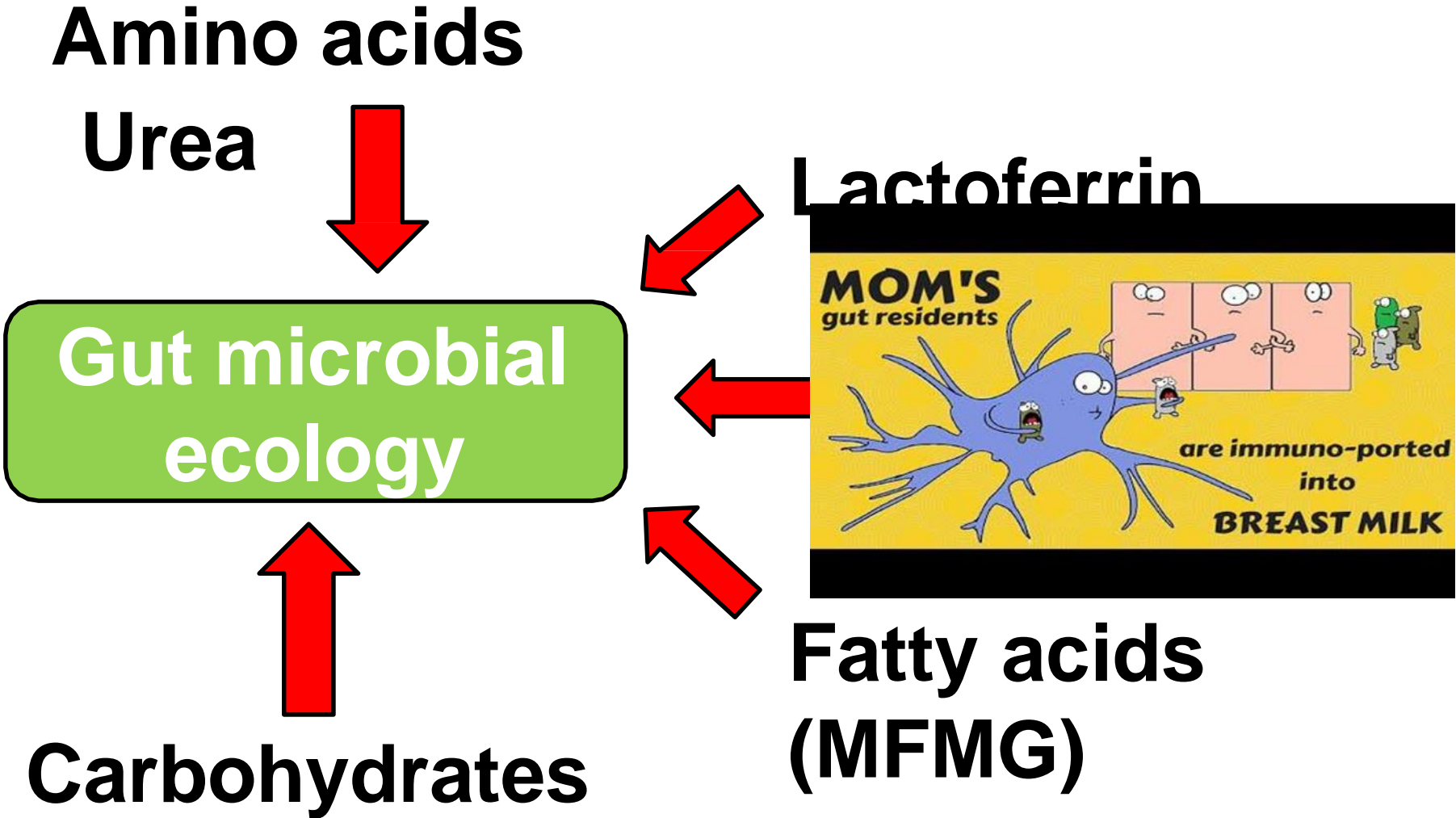
Breast milk: allows the mother to signal to the baby



What is going on in the gut lumen?

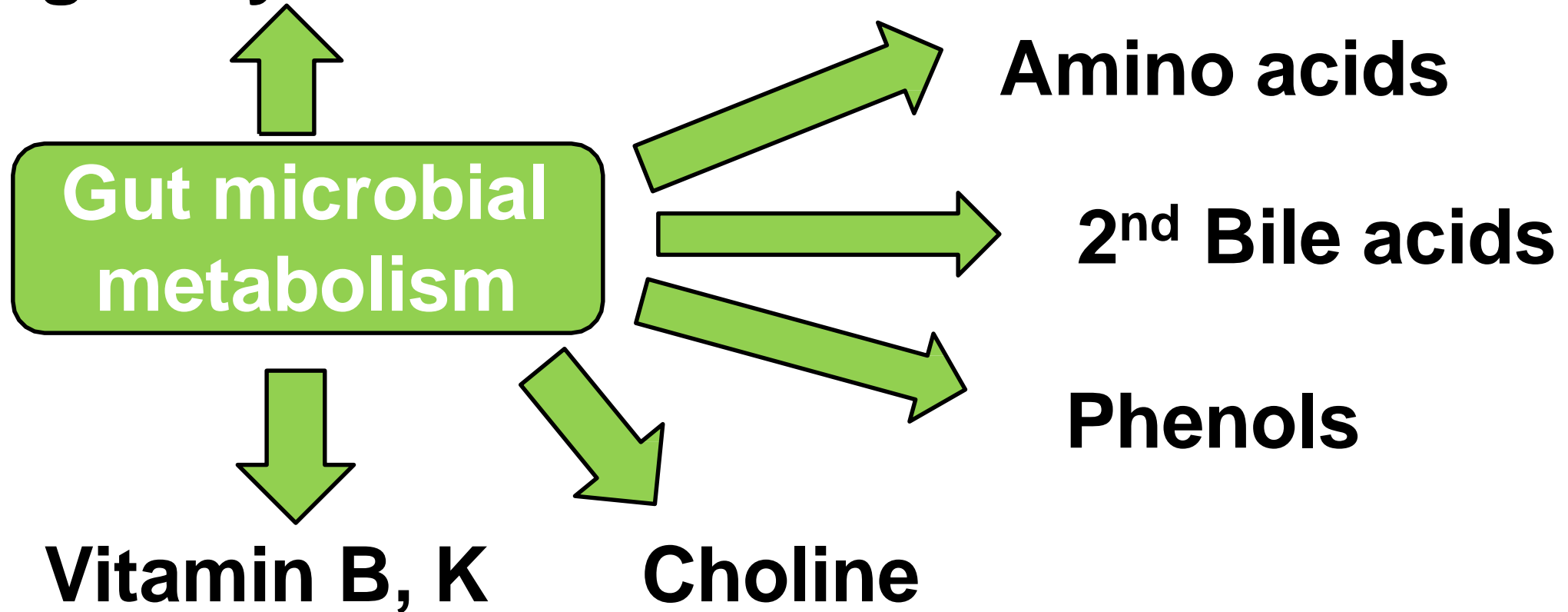


Key nutrients promote microbes



Microbes produce nutrients

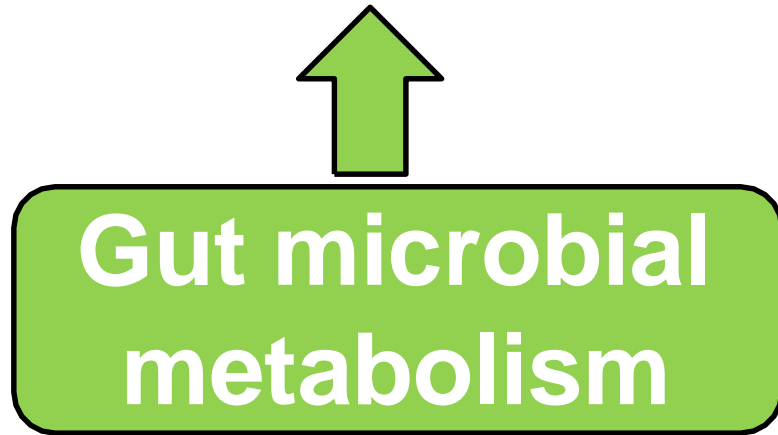
Short chain fatty acids
e.g. butyrate



Microbes produce much more than nutrients

Nutrients, peptides etc.

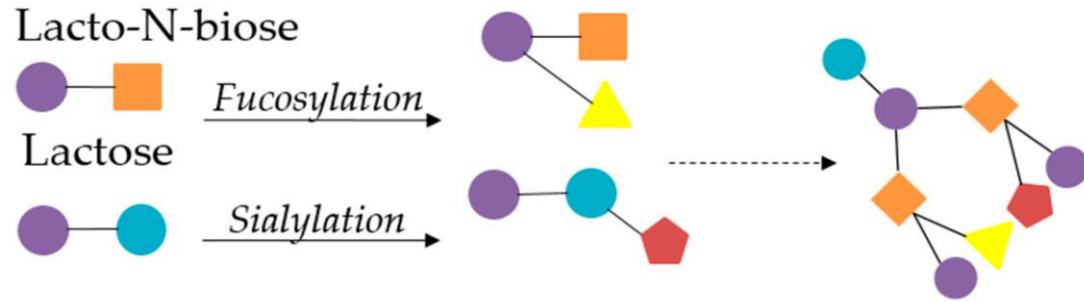
Signalling molecules



1000's of other metabolites: we don't know what they do

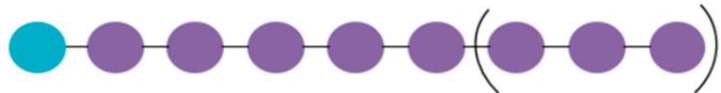
Anti- or Pro-inflammatory molecules

(a) Human Milk Oligosaccharides: β 1-3 & β 1-6 linkages

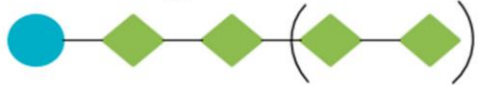


(b) Oligosaccharides in infant formula: β 1-2, β 1-4, β 1-6 linkages

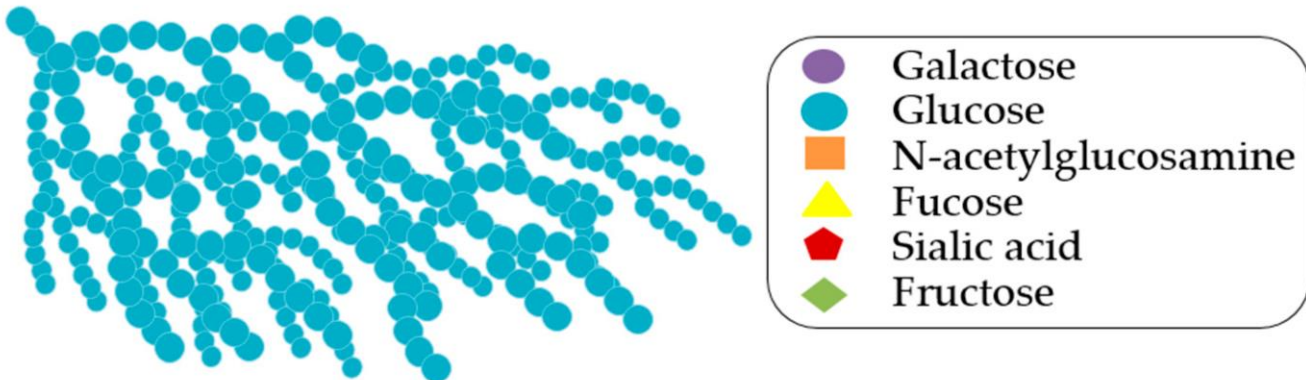
Galactooligosaccharide (lcGOS)



Fructooligosaccharide (scFOS)



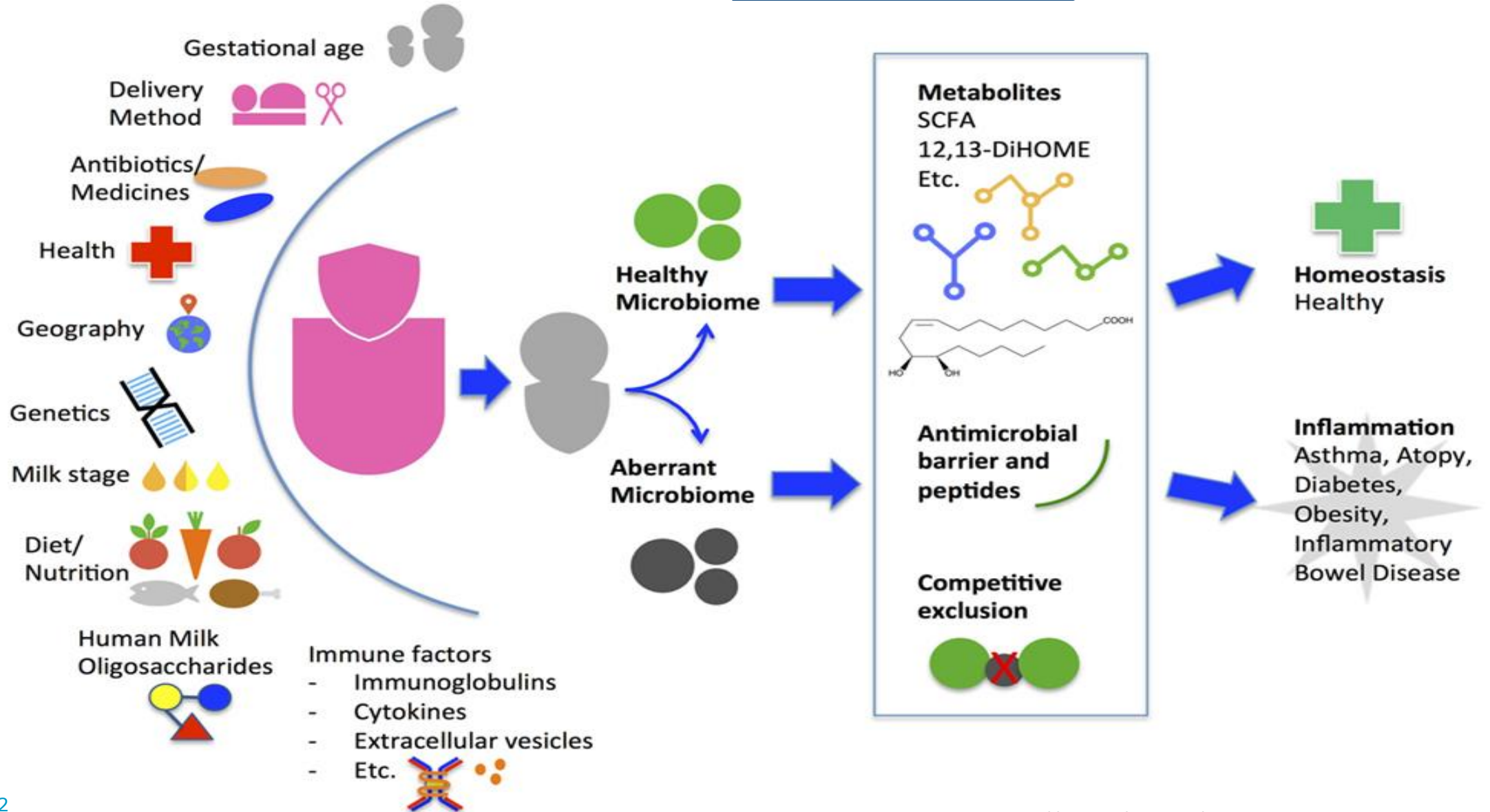
(c) Dietary fibres: α 1-6 linkages



Breast milk and Infant Formula

Only Bifidobacteria & Bacteroides able to comprehensively use HMOs as food source

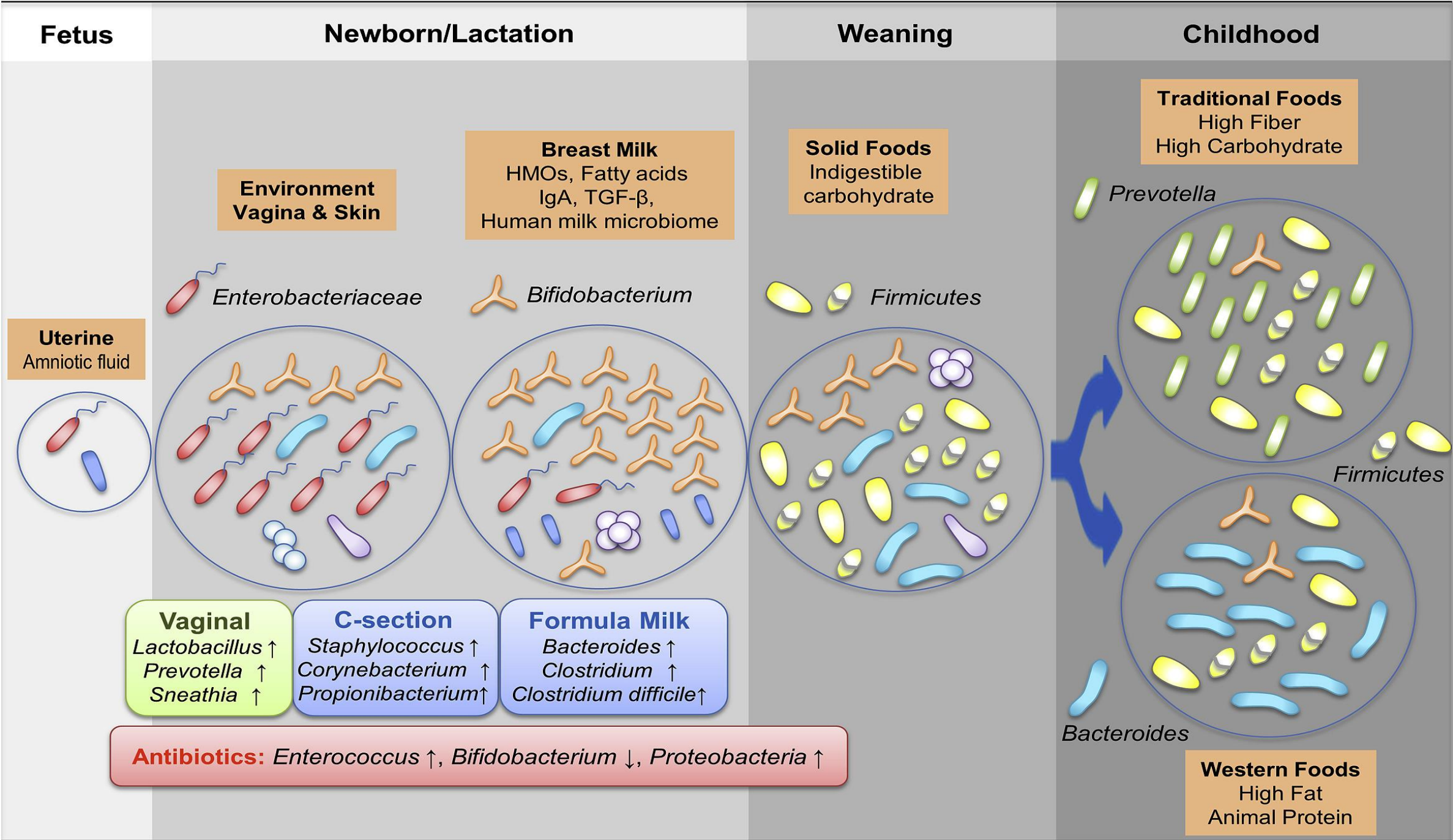
Summary

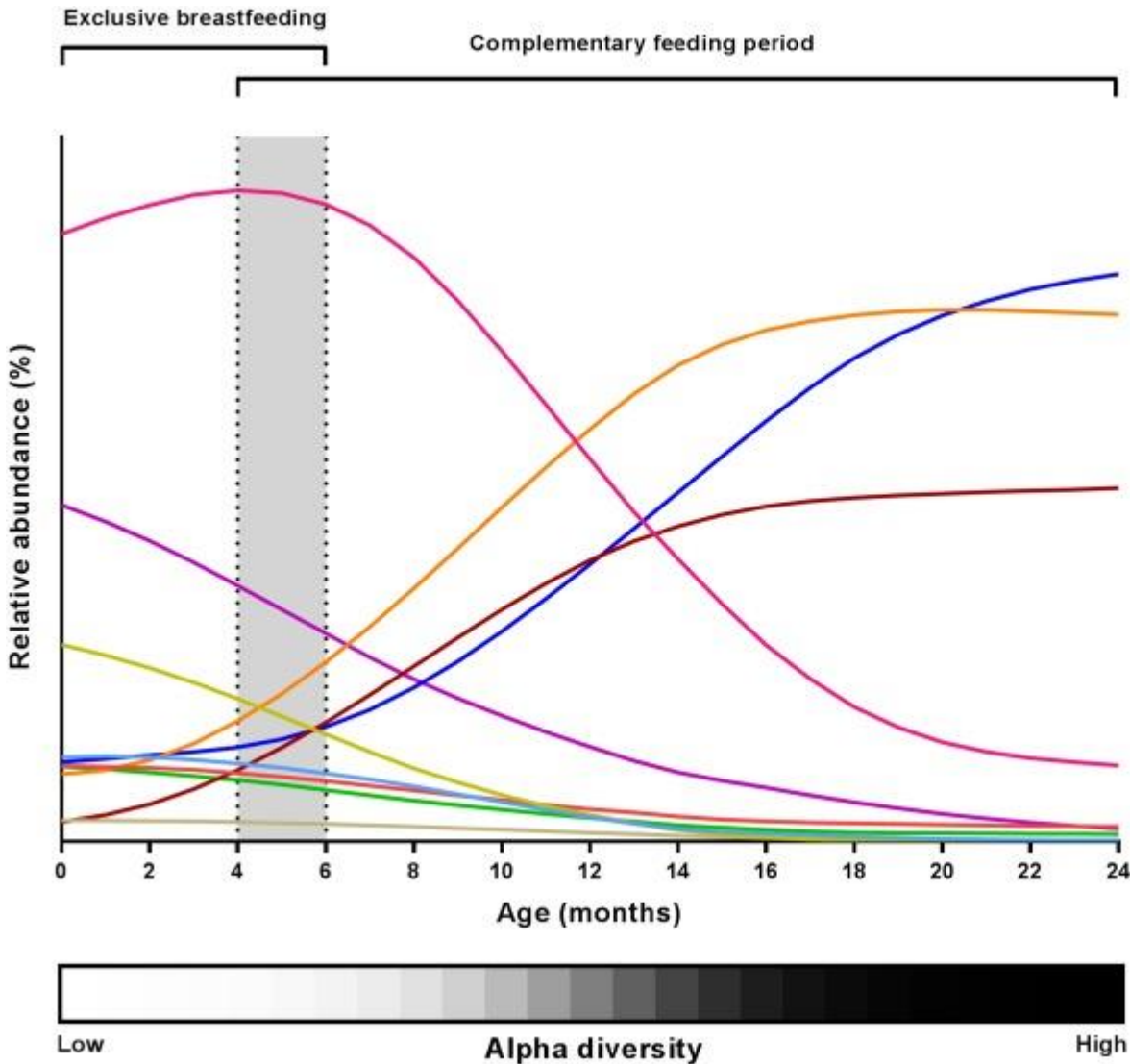


Complimentary Feeding

- Development of feeding skills
- Taste
- Nutrients
- **Gut maturation**
- **Immune maturation**





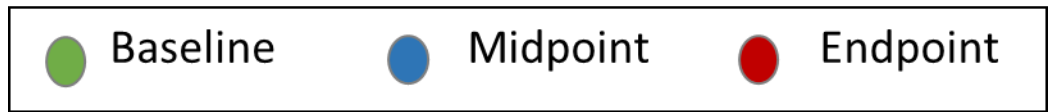
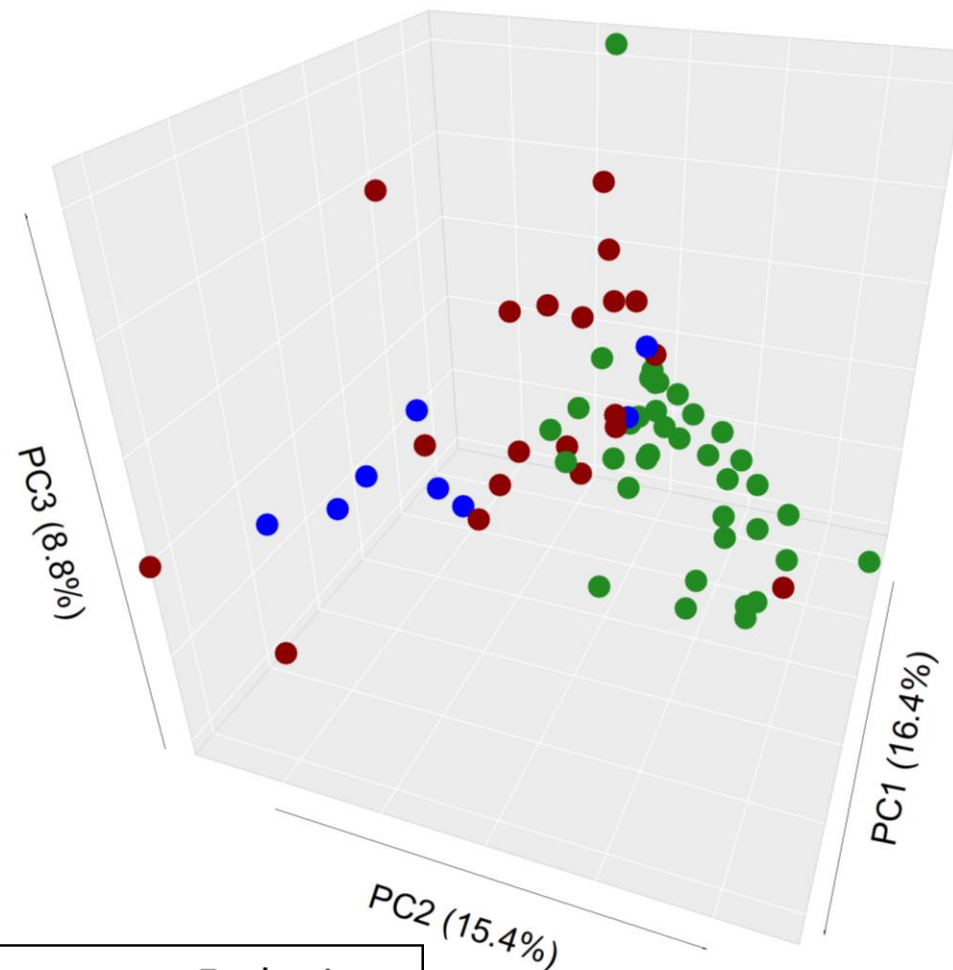
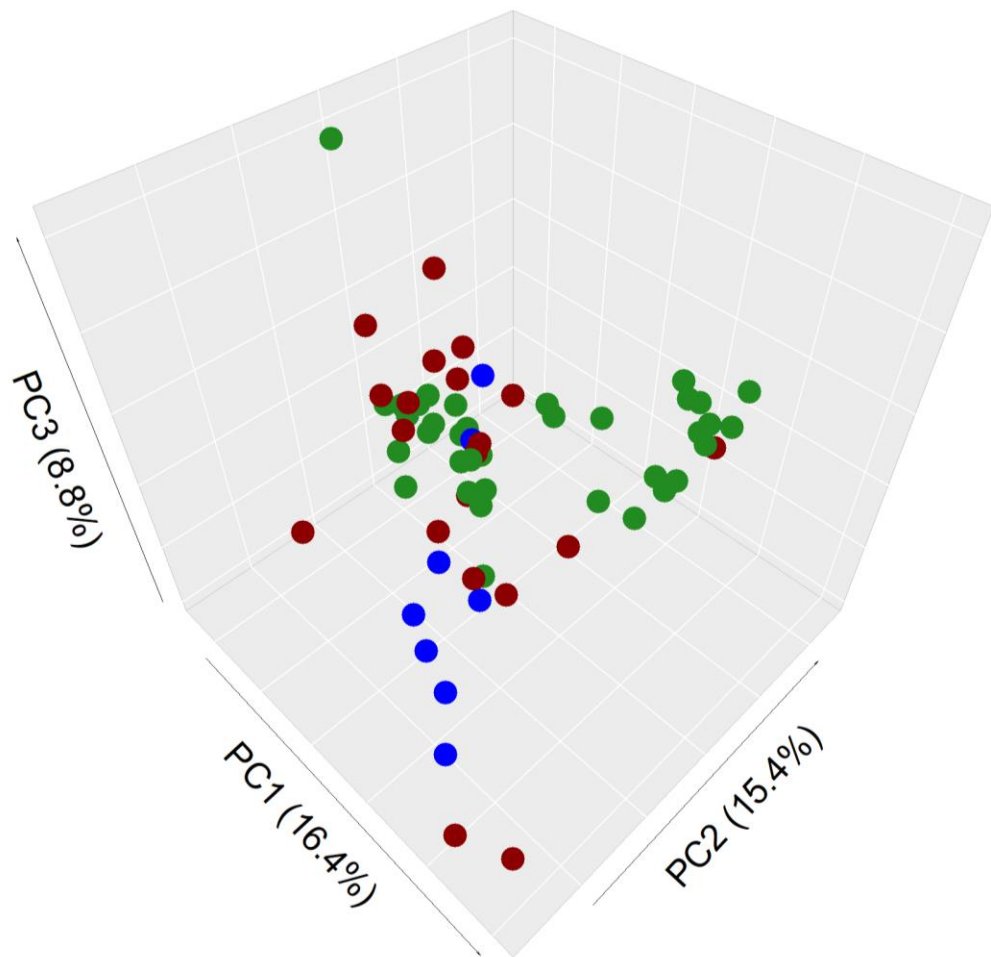


Changes in Diversity

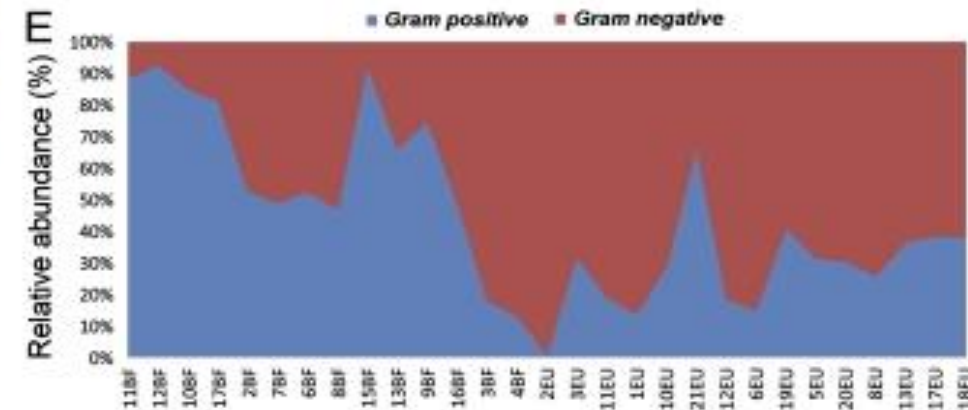
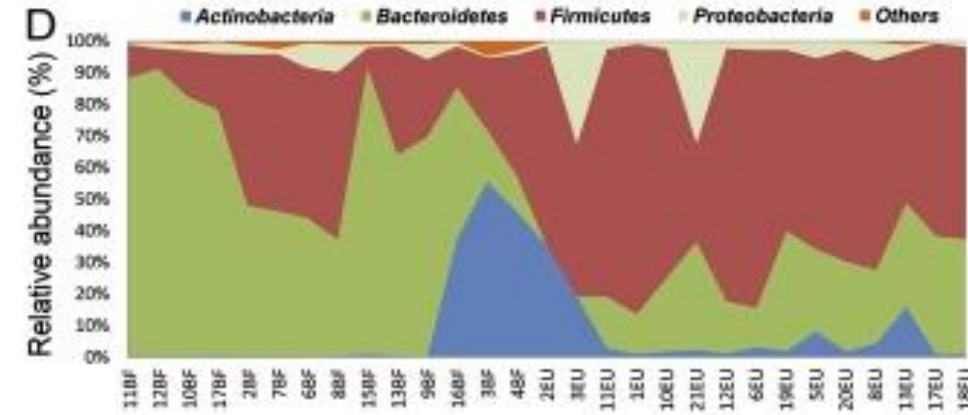
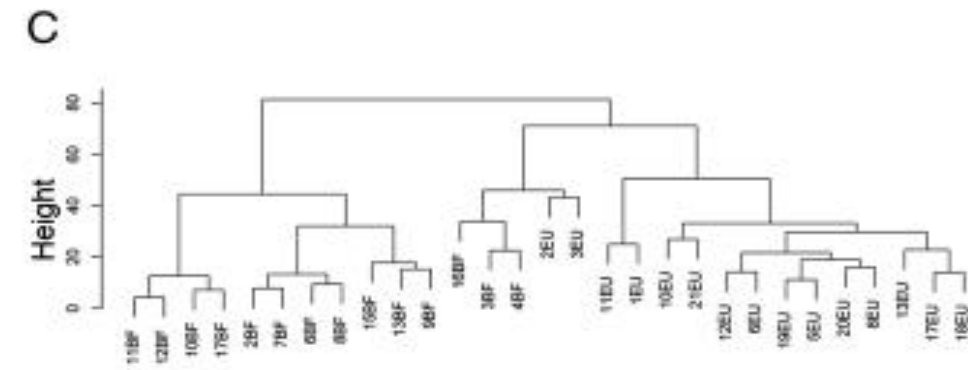
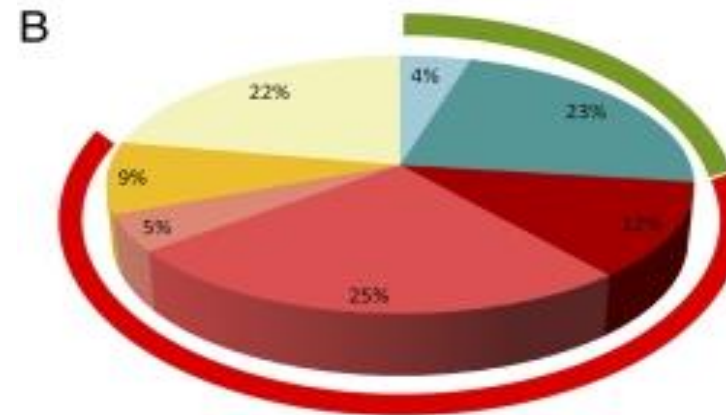
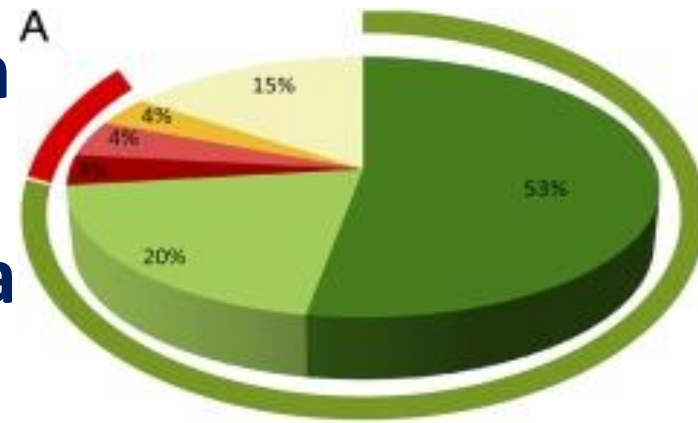
Faecal Microbiome PCA by Timepoint

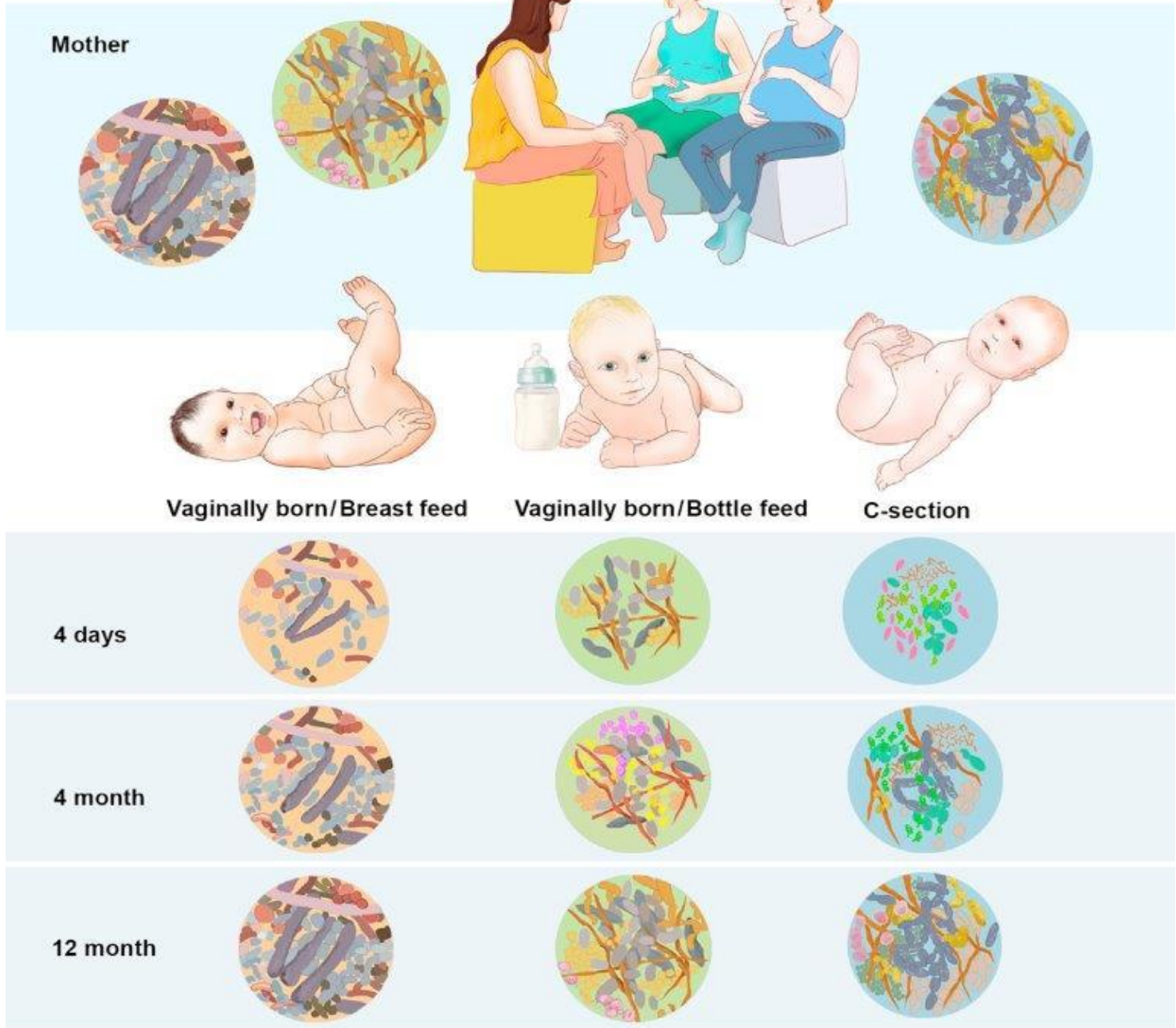


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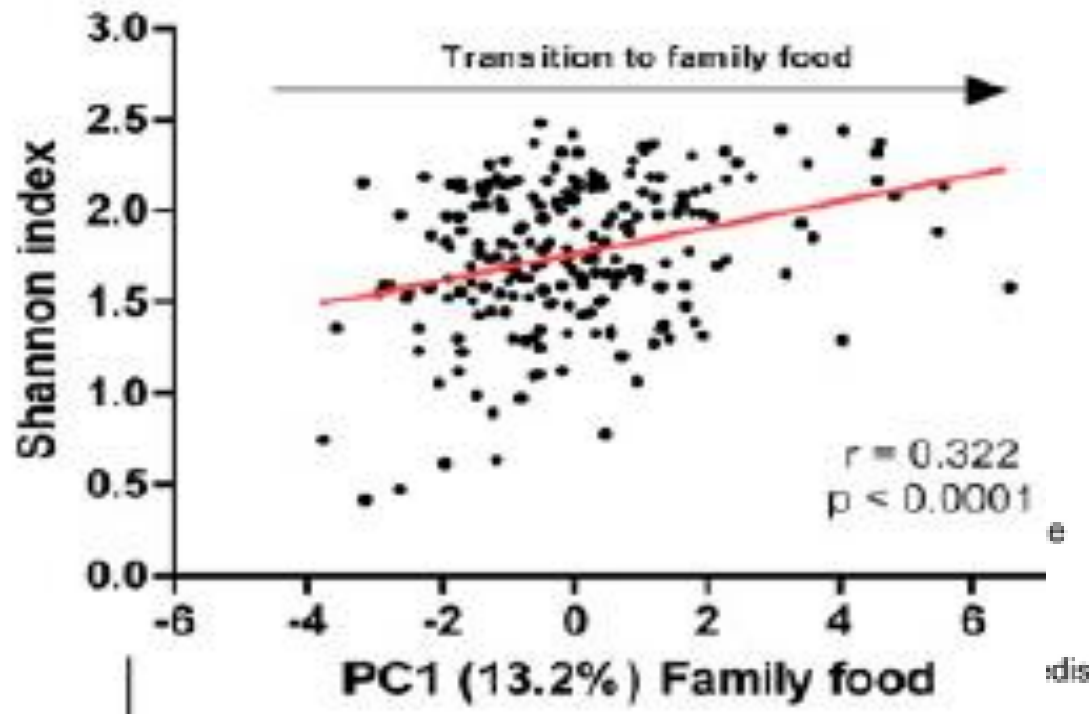
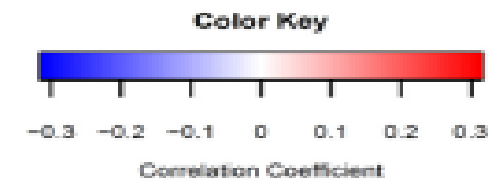
A comparative study in children from Europe and rural Africa



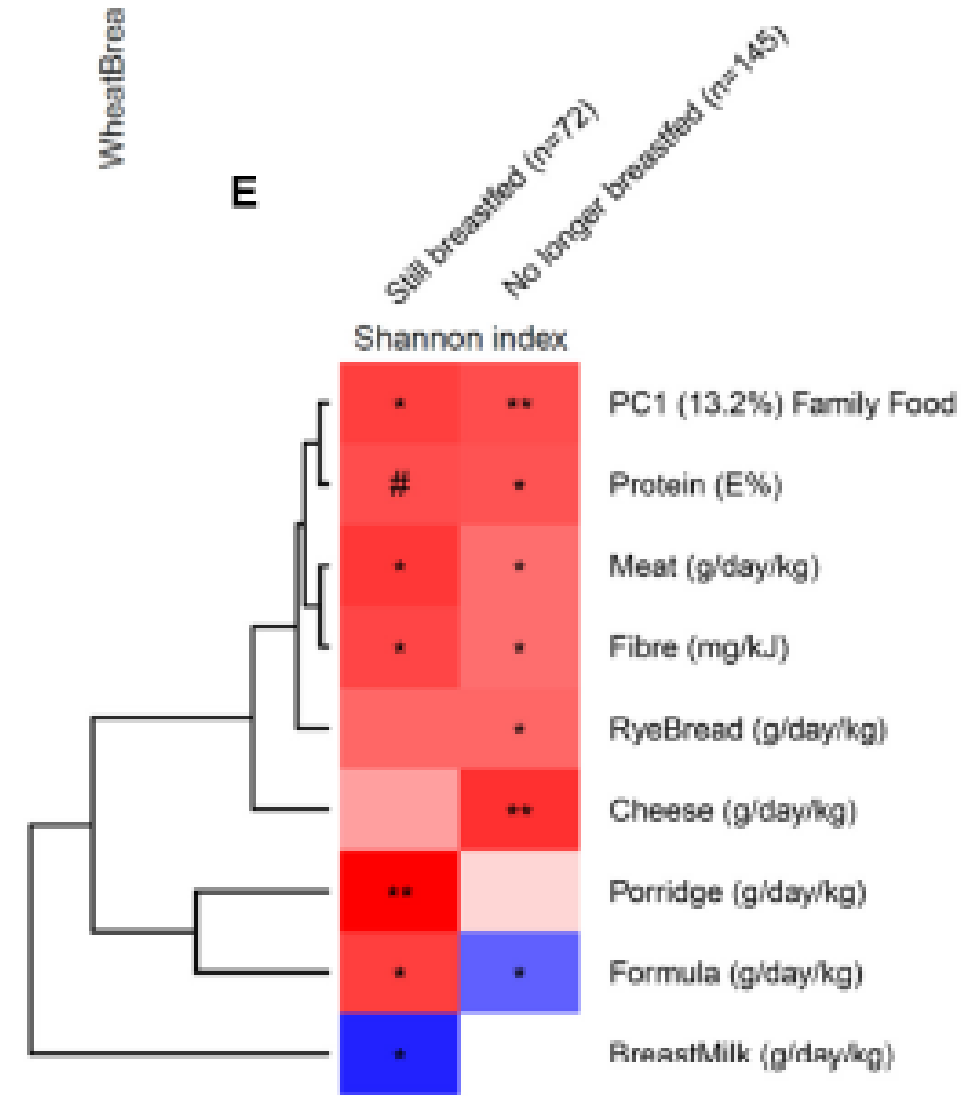


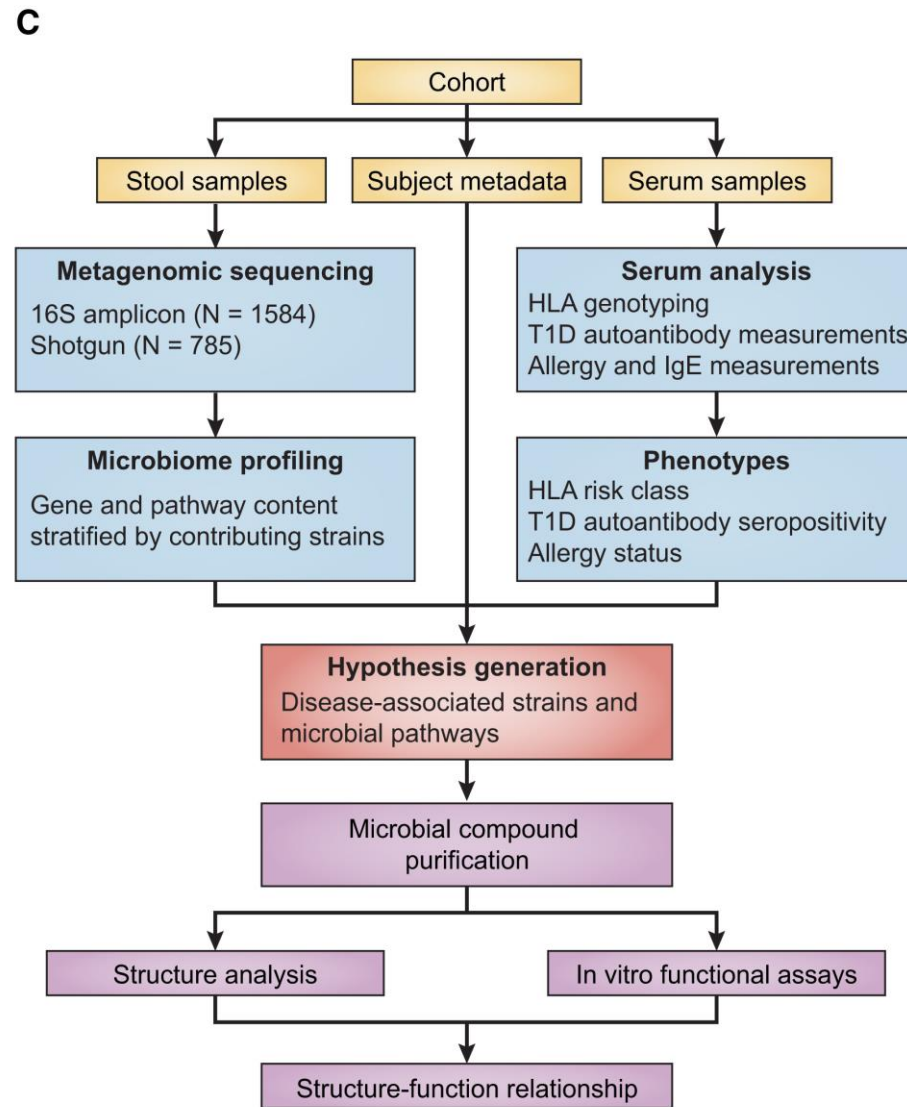
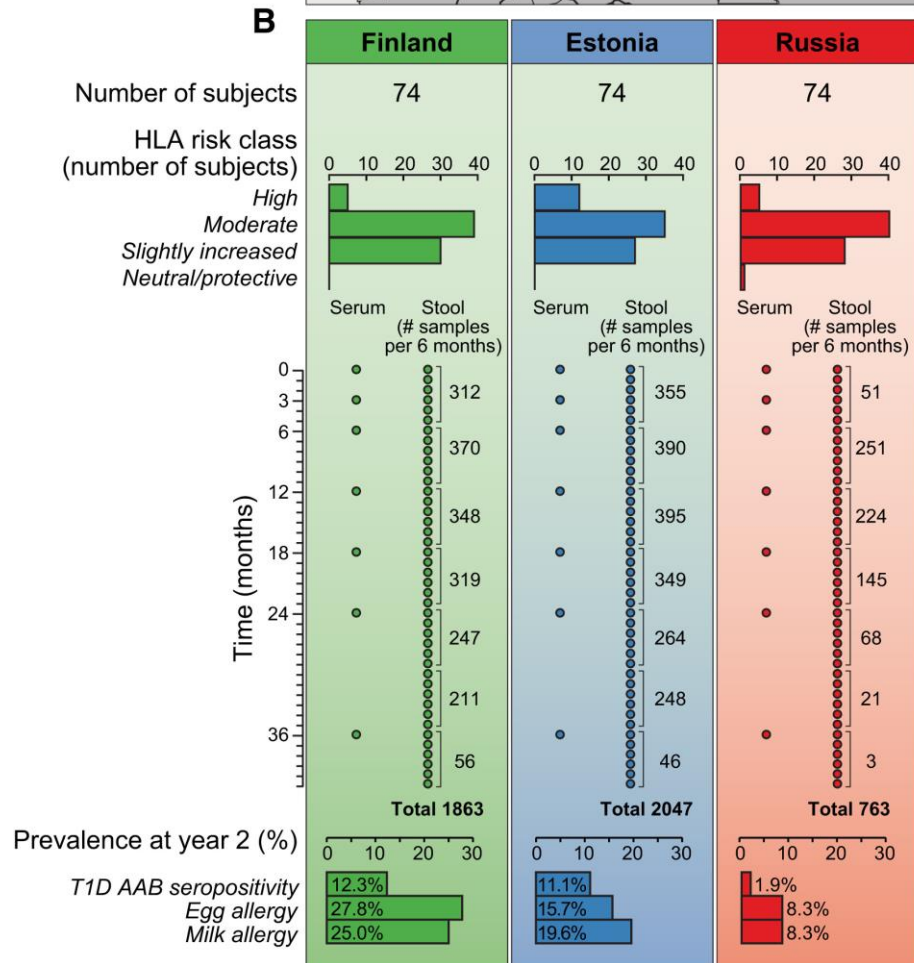
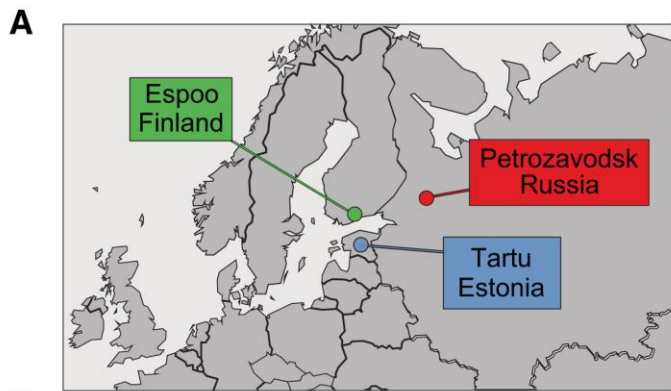
98, Mother-Infant

➤ Cessation of breast-feeding drives the maturation of the infant gut microbiome



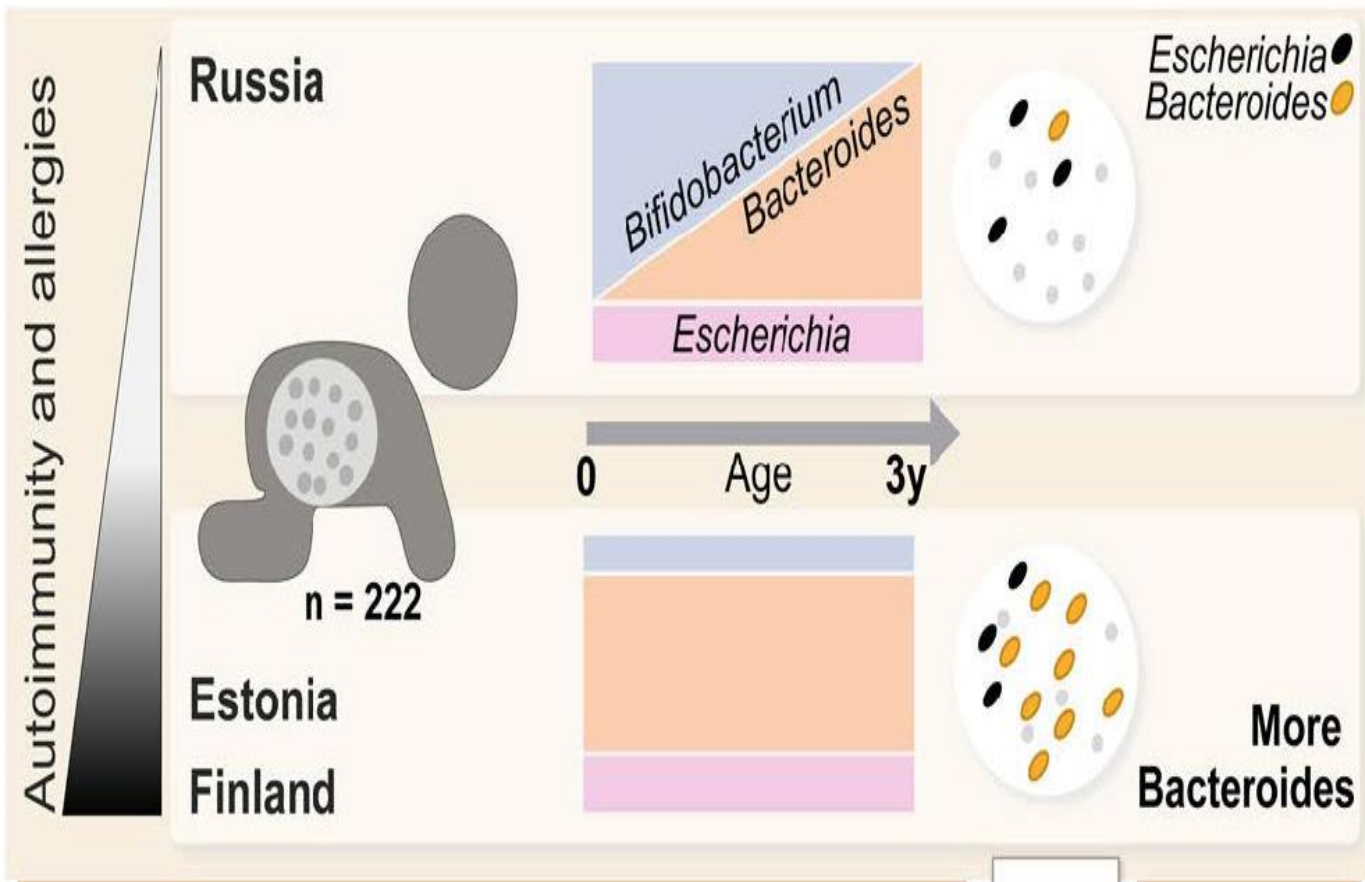
Danish Infants 9 months

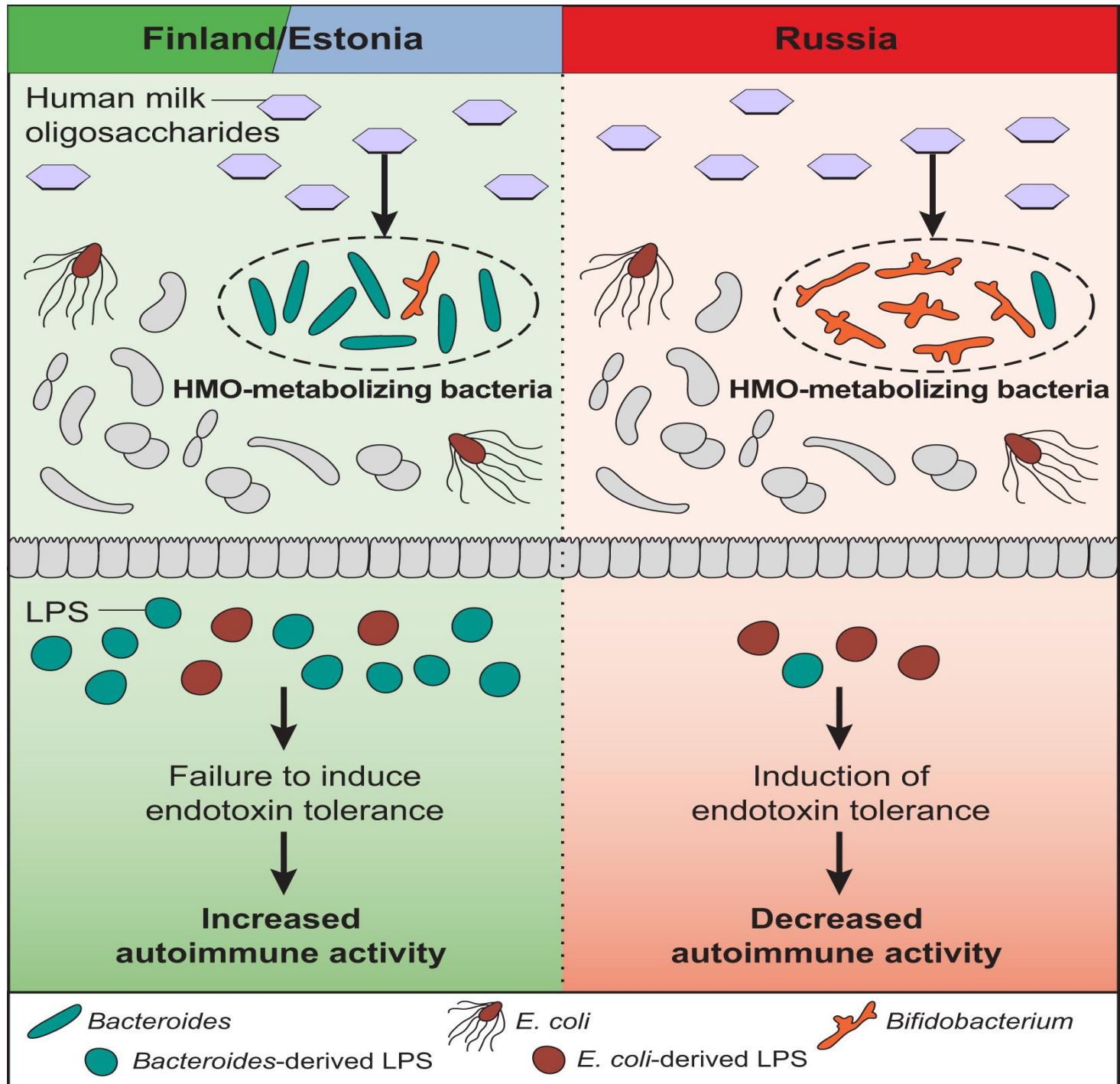




DIABIMMUNE Study

<https://pubs.broadinstitute.org/diabimmune>





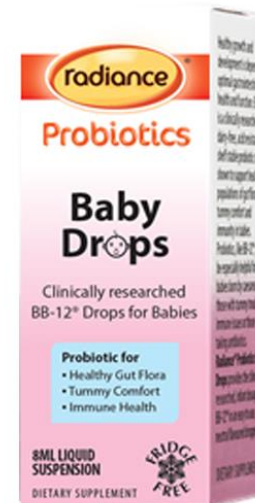
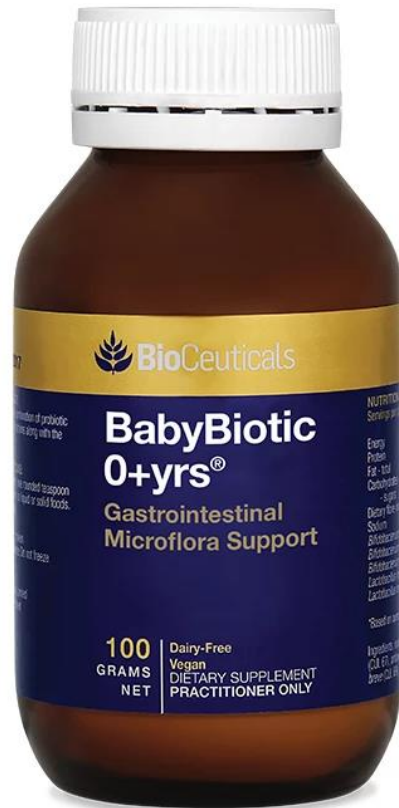
Complimentary Feeding - *Seeding through feeding*

- Breastfeeding while introducing solids
- Prebiotic foods – variety of fruit, vegetables, cereals, limit sugars, processed foods.
- Healthy weight gain



Probiotics

What strain/species? Does it colonise?



Probiotics

Because of the way probiotics are regulated, we can't always be sure that they:

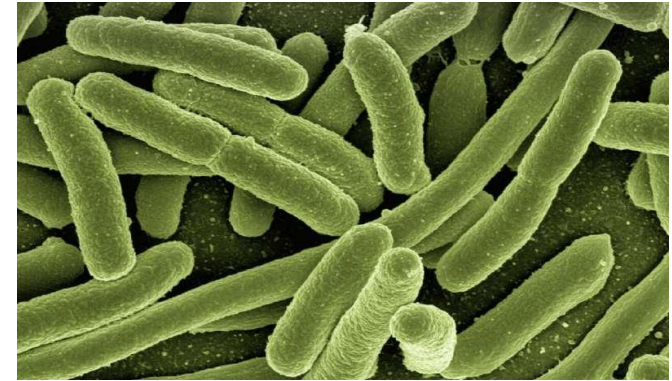
- actually contains the bacteria stated on the food label
- contain enough bacteria to have an effect
- they are able to survive long enough to reach your gut

When might they work?

Probiotics may prevent AAD via restoration of the gut microflora.

Unsupported claims

- Insufficient evidence that probiotics can help manage colic effectively or prevent infants crying.
- There's a lack of evidence that probiotics benefit the immune system.



Pediatrics 2010;126:1217–1231

There's no reason why you should need to "rebalance" your gut bacteria if you're already perfectly healthy
NICE Guidelines, 2016

EFSA says claims regarding immune system and digestive health lack sound scientific basis

Conclusion



- **Breast feeding is the best source of pre and pro biotics**
- **Continued breast feeding while introducing solids**
- **Use of prebiotic varieties of weaning foods**
- **Little evidence of benefit for use of probiotics**