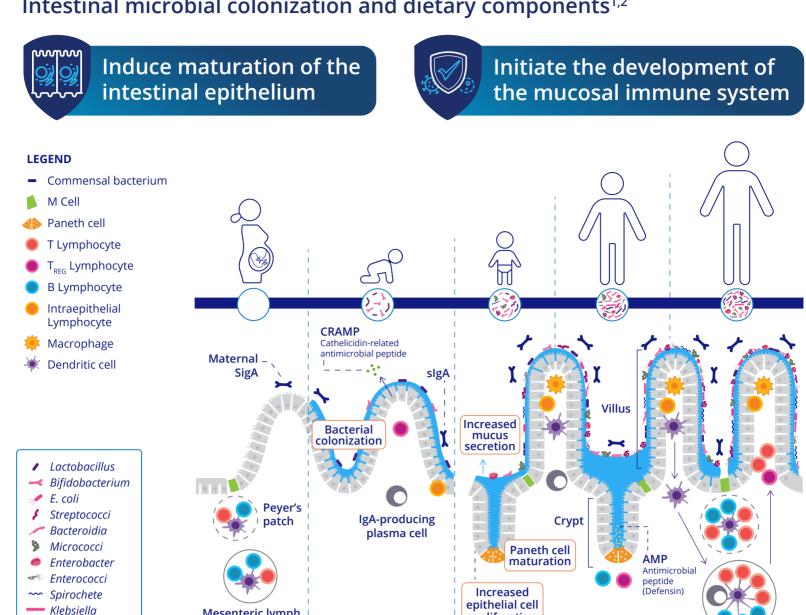
# The Triad of Diet, Microbiota and Immunity



### Changes in the intestinal immune system during development

Intestinal microbial colonization and dietary components<sup>1,2</sup>



#### Bidirectional communication between diet, gut microbiota, and immunity

Neonatal Intestine

В



Clostridia

Staphylococci

#### Commensal bacteria<sup>1</sup>

Mesenteric lymph

node

-Prenatal Intestine

**Birth** 

- ▶ Fermentation of dietary components to usable energy sources ▶ Regulate nutrient uptake
- Influence the development and function of mucosal immunity



proliferation

Weaning

### Mucosal immune system<sup>1</sup>

Child and adult Intestine

- Shapes the commensal composition and location
- Influences dietary energy absorption

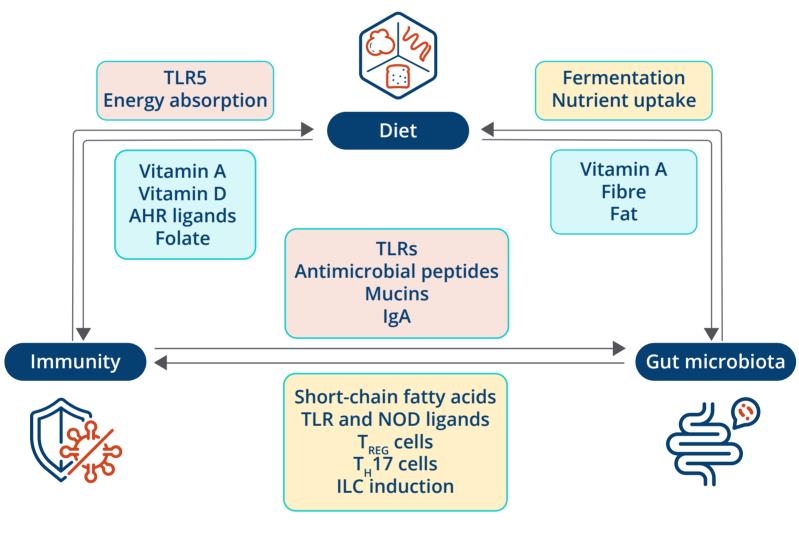


### Immune-microbial interactions<sup>1</sup>

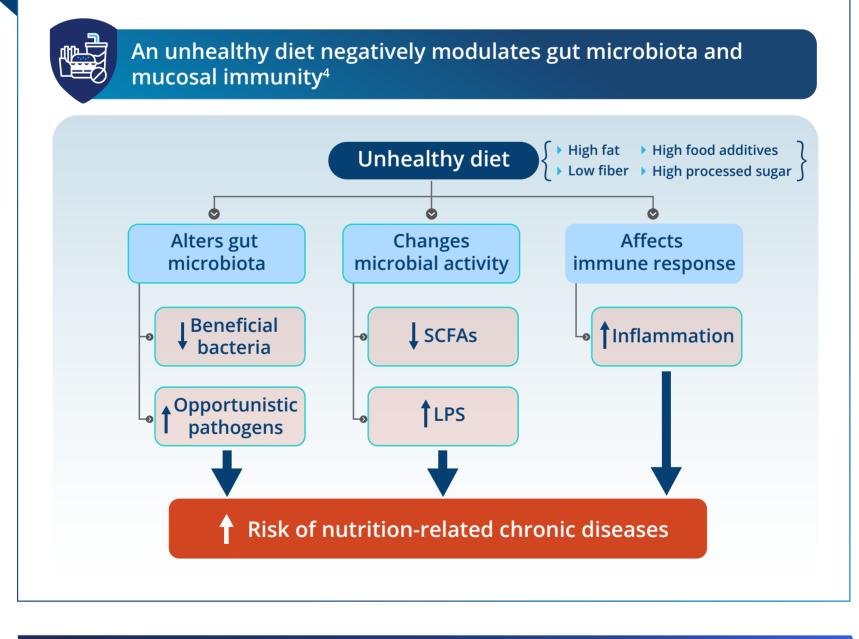
- Result in secretion of antimicrobial peptides, mucins, and IgA
- Maintain intestinal homeostasis
- Support barrier function



Immune cell-associated sensors use information about the local nutrients or metabolite milieu to regulate local immune responses.3



#### Impact of an unhealthy diet on gut microbiota and immune **function**



Malnutrition alters the gut microbiota and immunity<sup>3</sup>



## Defects in the immune

**Malnutrition is** 

associated with:

- Higher infection rate Alterations in gut microbiota



micronutrient deficiencies

Recurrent

infections:

- Lead to impaired intestinal mucosal barrier function



A cycle of susceptibility to infection & worsening nutritional status continues thereafter.



- Key takeaways
  - crucial in regulating intestinal homeostasis and barrier function. > Any imbalance in the triad of gut microbiota, nutrient metabolism, and immune function can lead to undernutrition in children.

> The interaction of the gut microbiota, diet, and immune system is

References