

HUMAN MILK OLIGOSACCHARIDES (HMOs)

Understanding the health benefits for newborns

Human milk is the sole recommended nutrition for infants under 6 months of age.

More than 160 HMOs have been described; they are critical components of human breast milk (5–15 g/L).

What are HMOs?

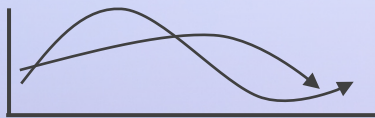
HMOs are **elongations** of the milk sugar **lactose** produced in the mammary gland.

They are divided into **categories** depending on the elongation they present:

- **Sialic acid** (acidic or neutral)
- **Fucose** units (Fucosylated or non-fucosylated)

Some manufactured HMOs are considered safe by the EFSA and FDA:

2'-FL | 3-FL | LDFT | LNT | 3'-SL | 6'-SL



The **profile of HMOs** in breast milk is **dynamic** in the months following birth. Most HMOs progressively decrease in concentration.



Human milk is richer in HMOs than farm animals' milk

HMOs support healthy development in 4 main ways



Establish a healthy gut microbiome

HMOs are not digested, but they are essential to feed beneficial bacteria, such as *Bifidobacterium* species



Protect from infectious illnesses

HMOs weaken harmful bacteria and increase **antibiotic sensitivity**. High levels of certain HMOs in breast milk reduce the risk of **diarrhea** and **respiratory tract infections**



Support development of immune competence

HMOs in breast milk are associated with a reduced risk of necrotizing enterocolitis (**NEC**)



Modulate cognitive development

Acidic HMOs are associated with **language development** and **high cognitive scores** in breastfed infants

Human milk is naturally rich in HMOs, but manufactured HMOs have a high potential of improving the health of formula-fed infants

Abbreviations: EFSA, European Food Safety Authority; FDA, US Food and Drug Administration.

Source: Sprenger, N, Tytgat, HLP, Binia, A, Austin, S, Singhal, A. Biology of human milk oligosaccharides: From basic science to clinical evidence. *J Hum Nutr Diet.* 2022; 35: 280–299. <https://doi.org/10.1111/jhn.12990>