

Introduction

Breast milk is the ideal diet for the newborn, not only for its nutritional composition but also for its bioactive components that promote healthy colonization of the intestine, prevent infections and support the maturation of the immune system. These bioactive factors include human milk oligosaccharides, a group of complex, indigestible carbohydrates that are very abundant in breast milk.

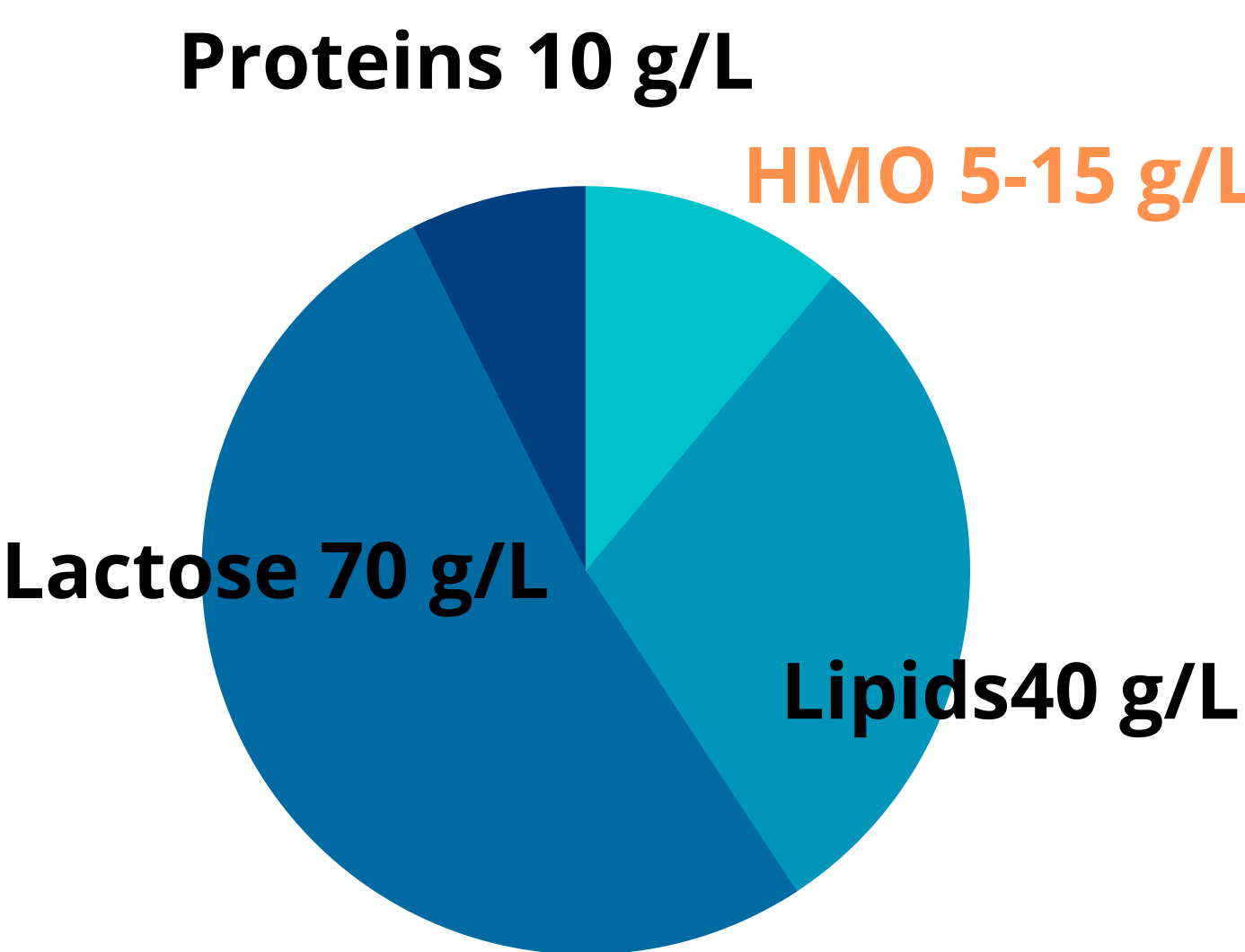


Figure 1. Human milk composition (Bode 2012)

Aim

- To know the HMO composition in human milk and their effects on the infant health.
- To study its production and addition to infant formula milk through biotechnological methods.

Results

HMO synthesis:

Fucosylation

Core structure

Sialylation

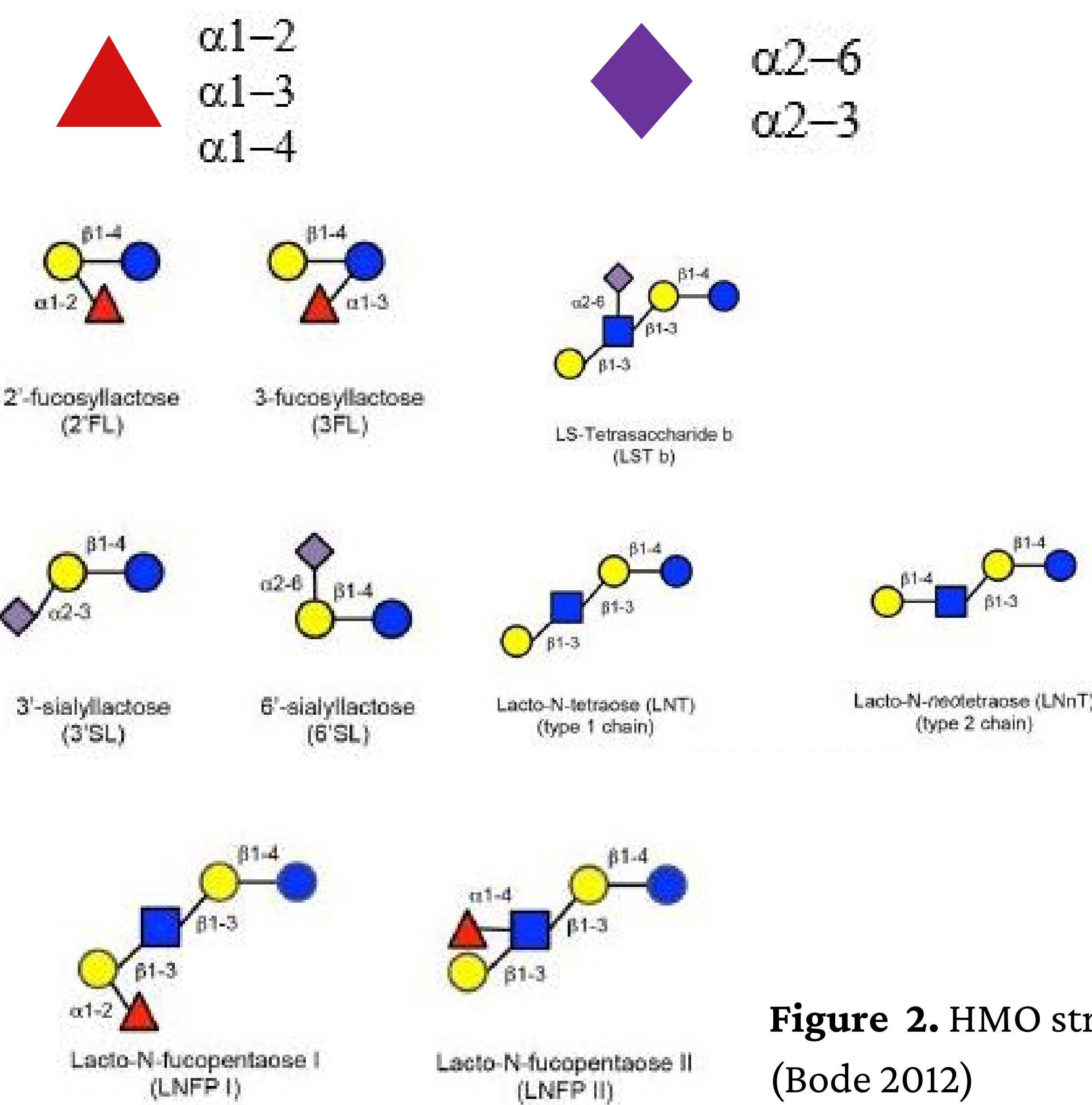
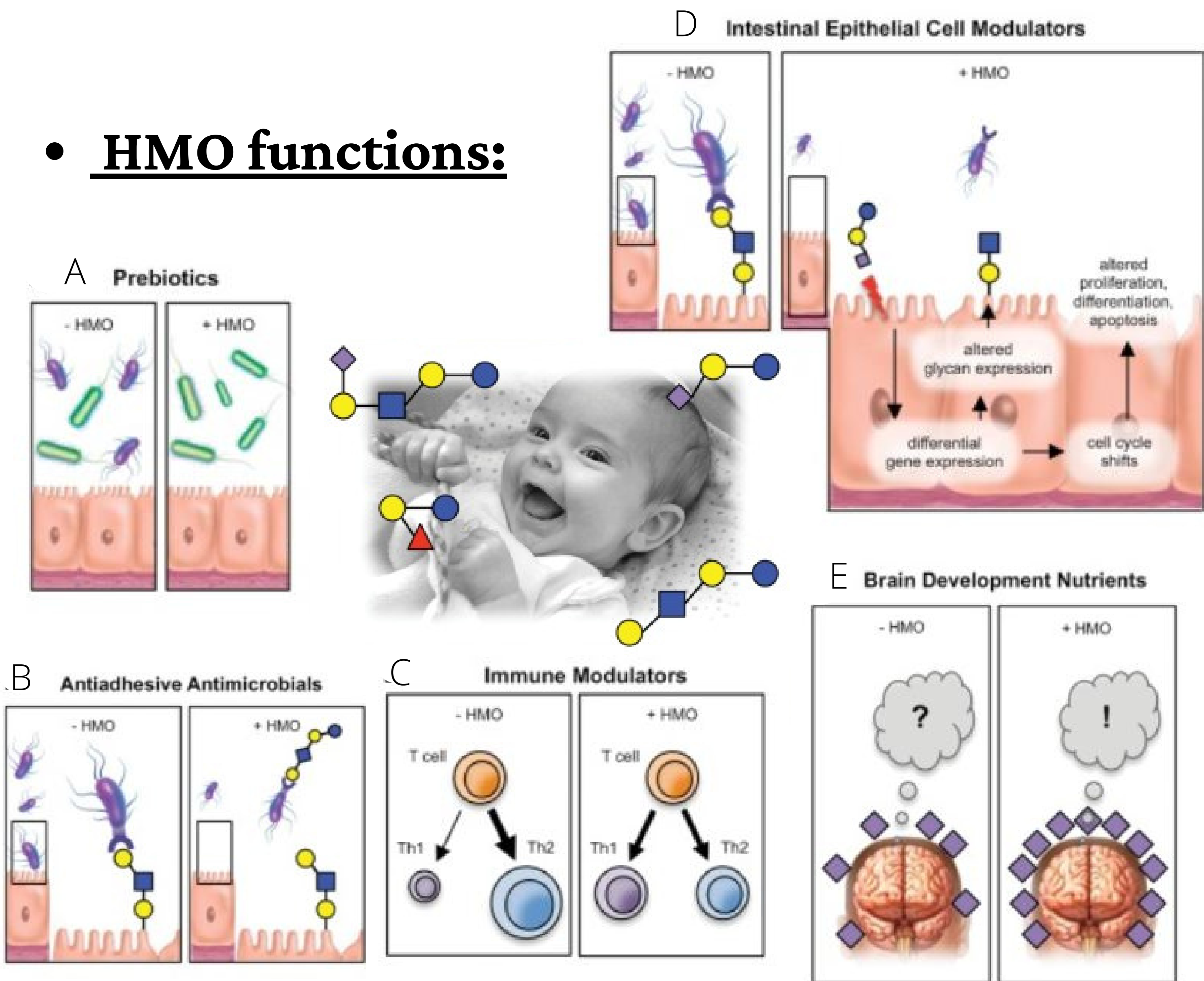


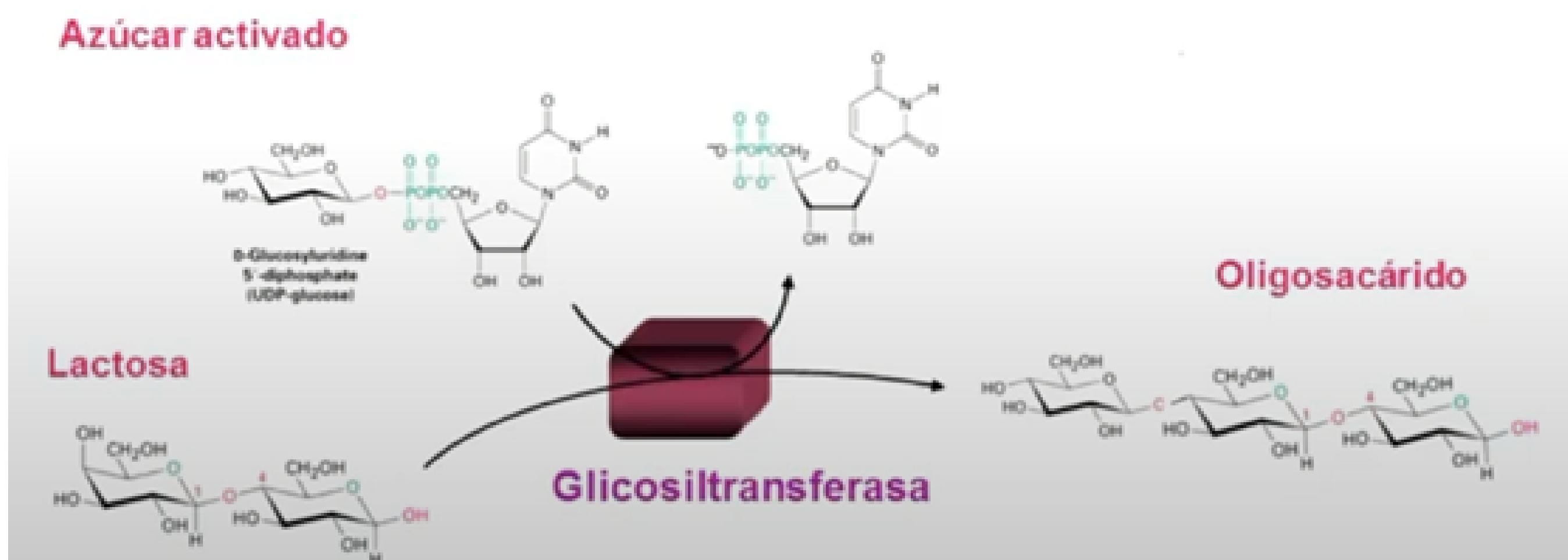
Figure 2. HMO structure (Bode 2012)

HMO functions:



Biotechnological strategies for its production:

- Enzymatic synthesis: Glycosyltransferases



- Enzymatic synthesis: Glycosidases

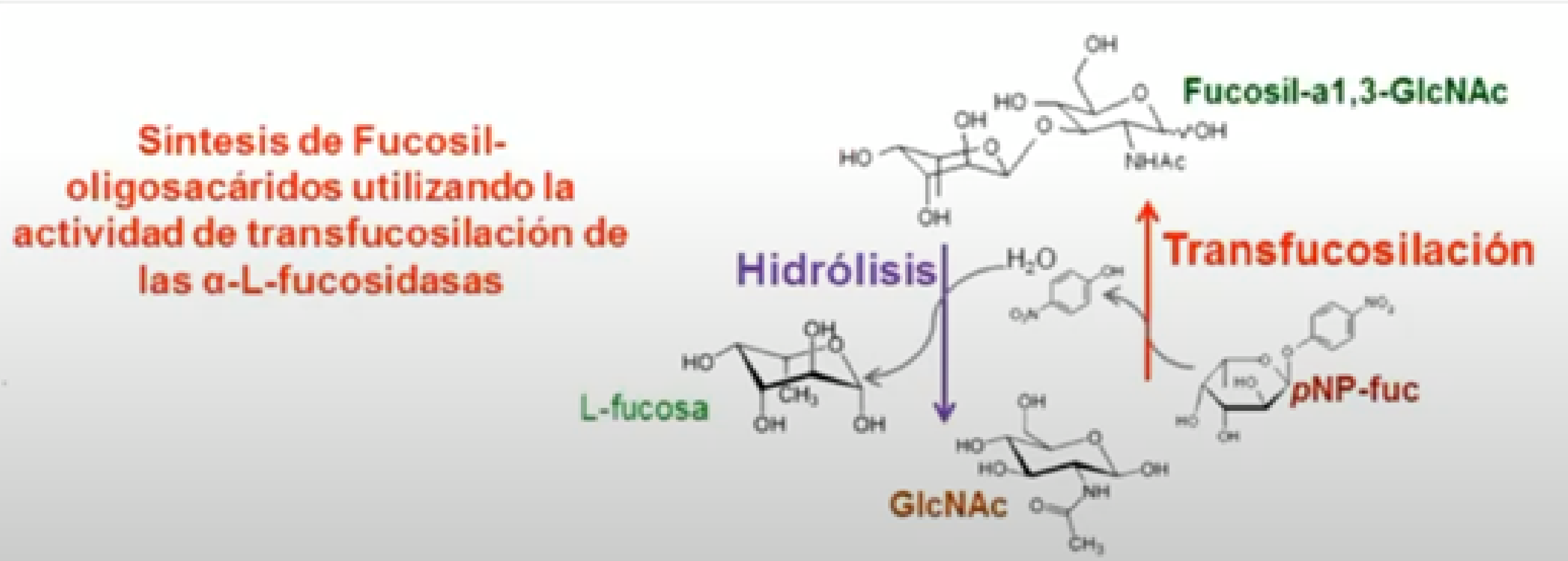


Figure 3 and 4. Synthetic HMO through glycosyltransferases and glycosidases (Yebrá 2017)

- Synthesis by metabolic engineering

Conclusions

- HMO types is higher in variability and concentration in human milk than in bovine milk.
- HMO produce benefits on the establishment of a healthy intestinal microbiota and a correct development of the infant's immune system.
- Infant formula is currently supplemented with synthetic HMO (2'FL and LNnT) but these does not supply all the effects of naturally occurring HMO.

[1]Bode L. (2012). Human milk oligosaccharides: every baby needs a sugar mama. Glycobiology, 22(9), 1147–1162. [2]Yebrá, M.J. (2017). Oligosacáridos de la leche humana. [Vídeo]. YouTube. Disponible en: <https://www.youtube.com/watch?v=9UCCghenuc8>