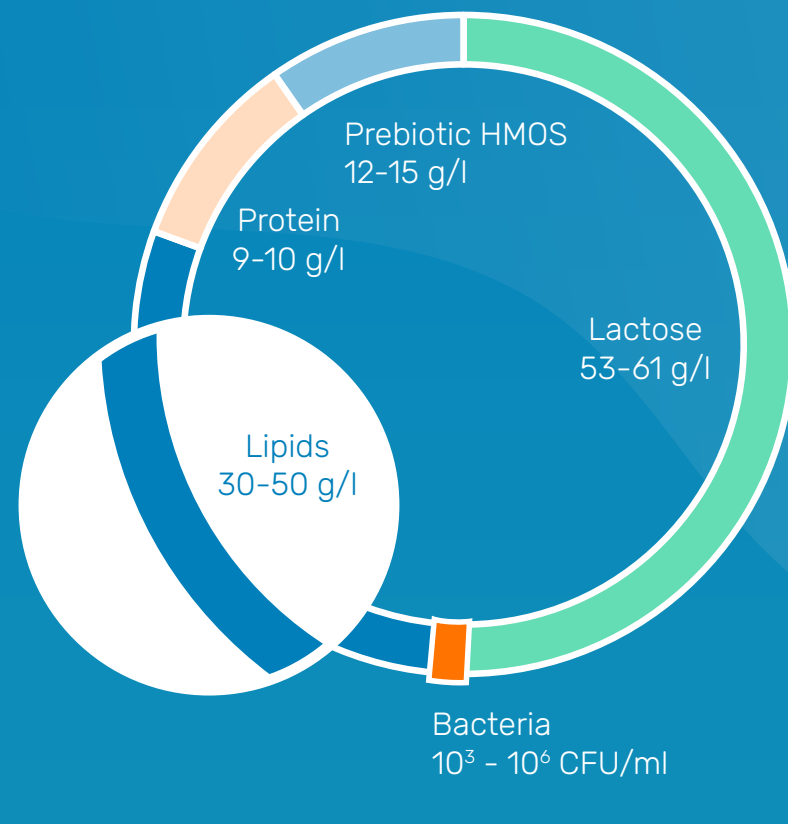


Lipids in breastmilk: what are lipids in breastmilk?



Lipids are the second **largest group of macronutrients in breastmilk** and include fatty acids (>97% of lipids), sterols, fat-soluble vitamins, mono-, di- and tri-glycerides, and phospholipids¹

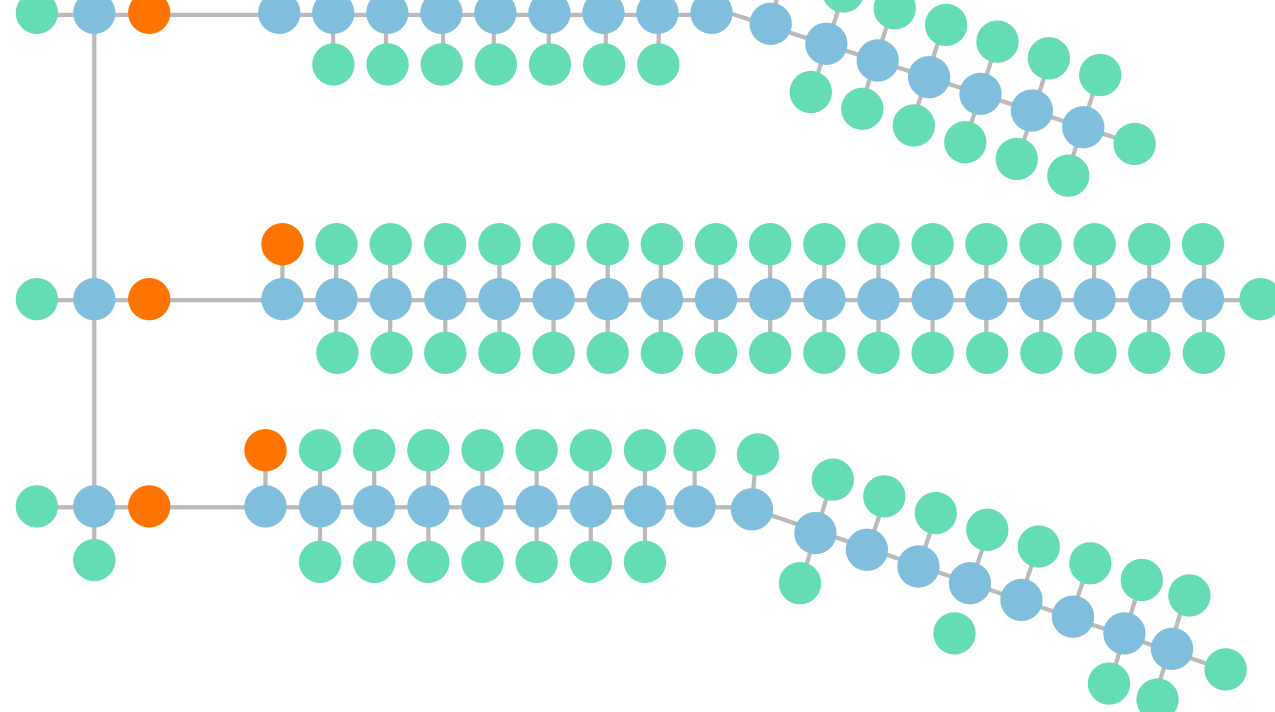
Triglyceride

represent the major form of breastmilk lipids²

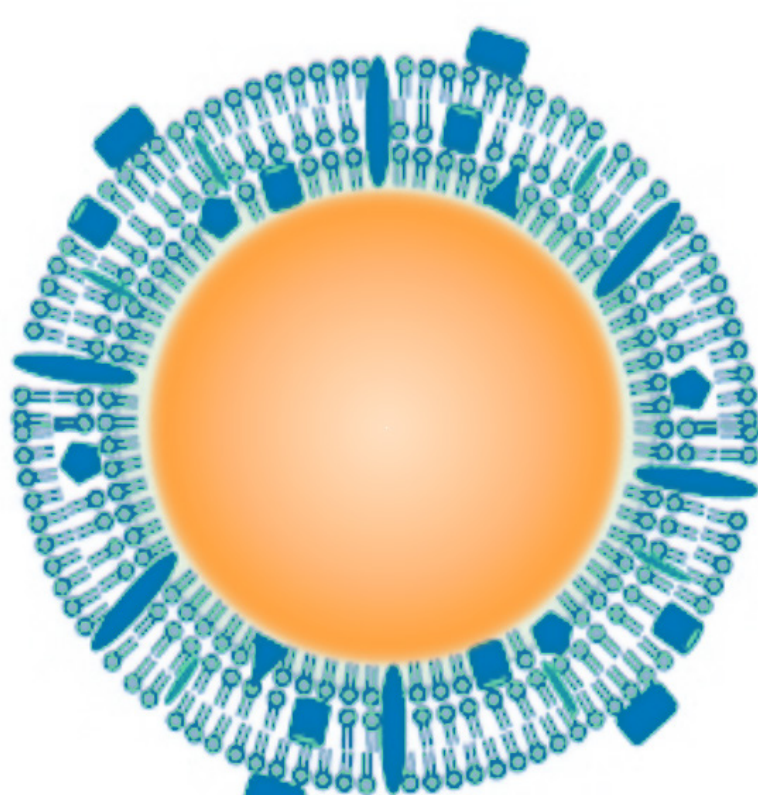
Triglycerides are composed of two building blocks:

Glycerol

Fatty acids



In breastmilk, these lipids are incorporated into **LARGE GLOBULES** (milk fat globules) surrounded by a complex triple-layer membrane (milk fat globule membrane)³



Why are lipids important in breastmilk?



ARA

DHA

Providing **essential fatty acids** (such as the poly-unsaturated fatty acids DHA* and ARA**) ^{1,2,4}

For **gastrointestinal and immune function** ^{1,2,4}



Providing **important fat-soluble vitamins**, such as vitamin A and D ^{1,2,4}

For **brain and cognitive development** ^{1,2,4}



Serve as an **energy source:** breastmilk lipids provide around 50% of total energy, necessary for healthy growth ^{1,2,4}

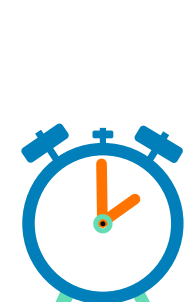


Lipids **impact the sensorial properties of breastmilk** (taste and mouthfeel)

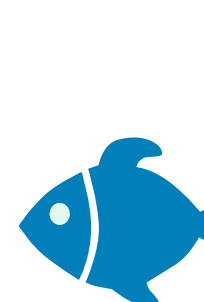
Do lipids vary in breastmilk?

Among the macronutrients, lipids show the most variable concentrations in breastmilk¹

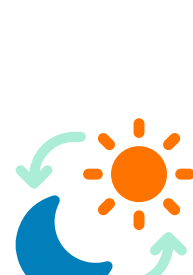
Studies have reported that LIPIDS in breastmilk vary:



Over the course of one feeding: hindmilk (the last milk of a feed) may contain up to **2 to 3 times** the lipid concentration as found in foremilk (the initial milk of a feed)⁵



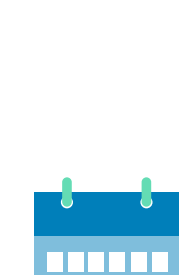
Following mother's diet: which influences the concentration of certain **fatty acids**. Eating fish leads to higher levels of breastmilk **DHA** concentrations^{1,5}



Over the course of a day: a circadian rhythm is observed during which the lipid concentration is **lower** in night and morning feedings, compared to afternoon and evening feedings⁶



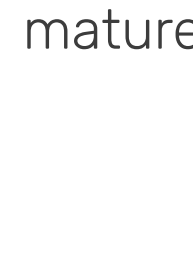
Depending on maternal BMI: total milk fat concentration has been found to **INCREASE** with maternal BMI¹¹



Over lactational stages: lipid concentration generally **increases** from colostrum till mature milk, yet long-chain polyunsaturated fatty acids decrease from colostrum to mature milk⁷



Over geographical regions: breastmilk fatty acid concentrations have been found to vary across geographical regions, likely caused by differences in dietary factors. In particular, **DHA** variances have been found between populations with different dietary habits^{1,10}



Between infant genders: some studies have suggested that the milk produced for sons contains more fat than the milk produced for daughters^{8,9}

* Docosahexaenoic acid
** Arachidonic acid
Images are adapted from: Newburg, DS. & Neubauer, SH. AP. 1995:273-349.

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