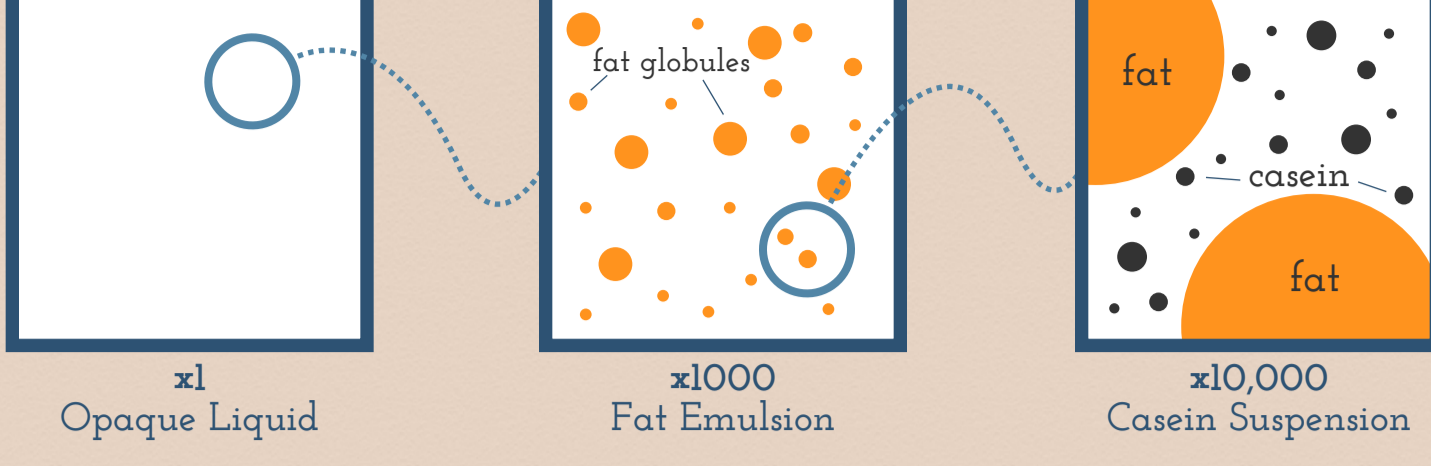


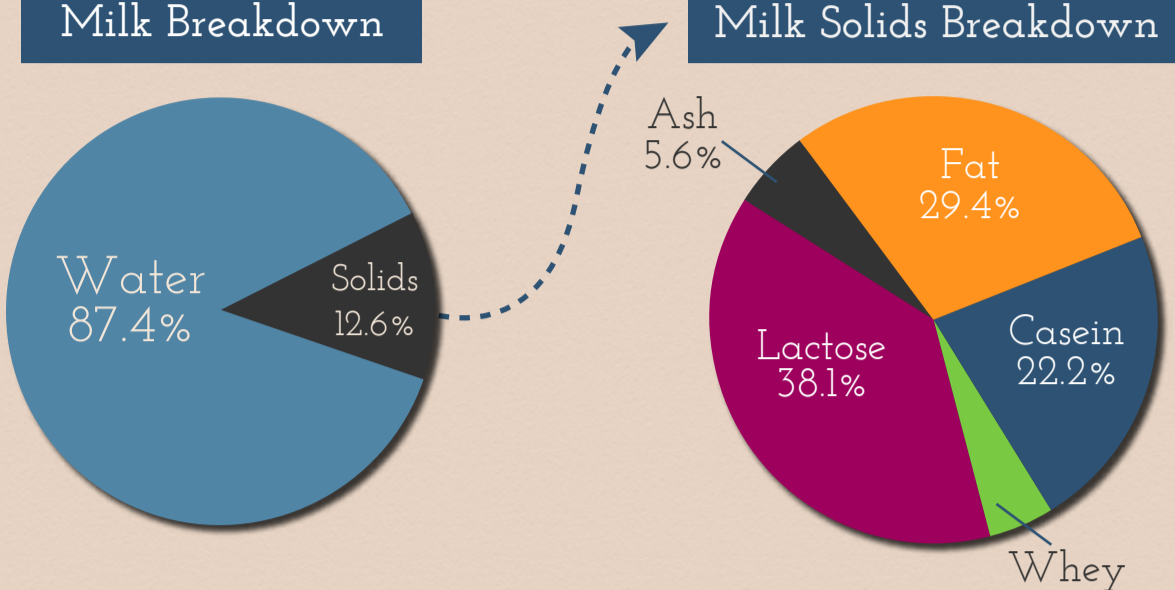
WHAT'S IN MILK?

Simply, milk is an emulsion with **fat particles (globules)** dispersed in an **aqueous (watery)** environment.

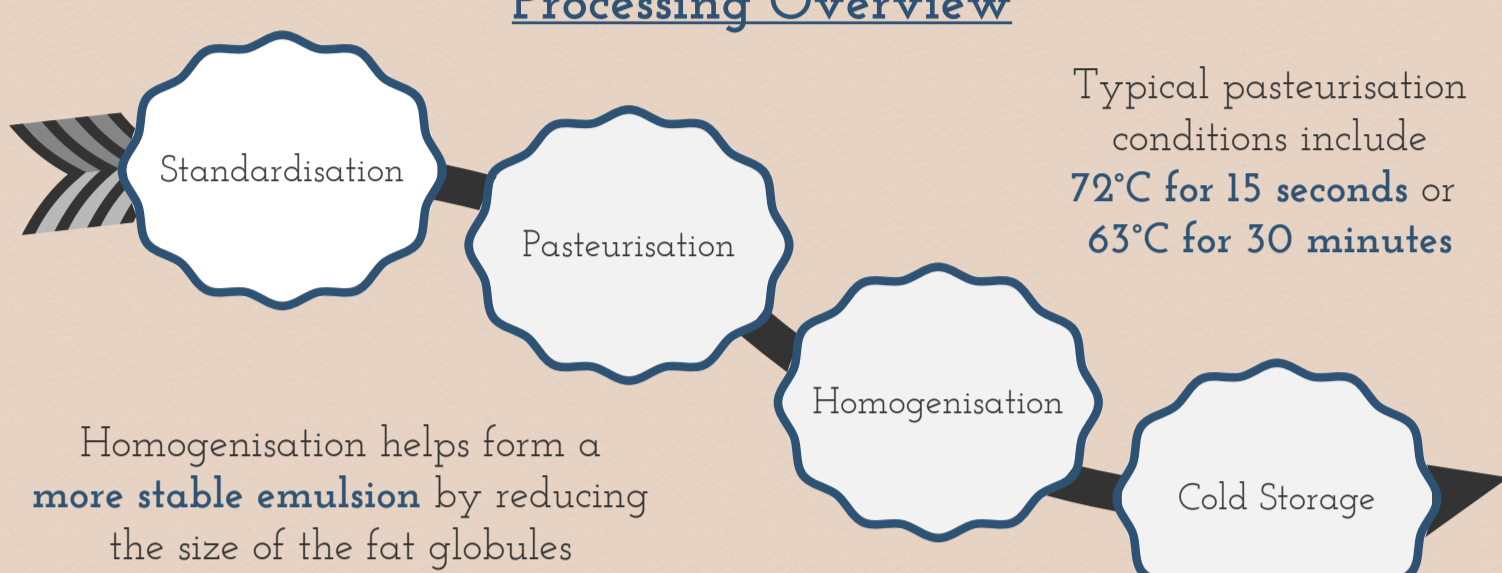


THE BASICS OF MILK

Milk is composed of water, sugar, fat, protein, and minerals

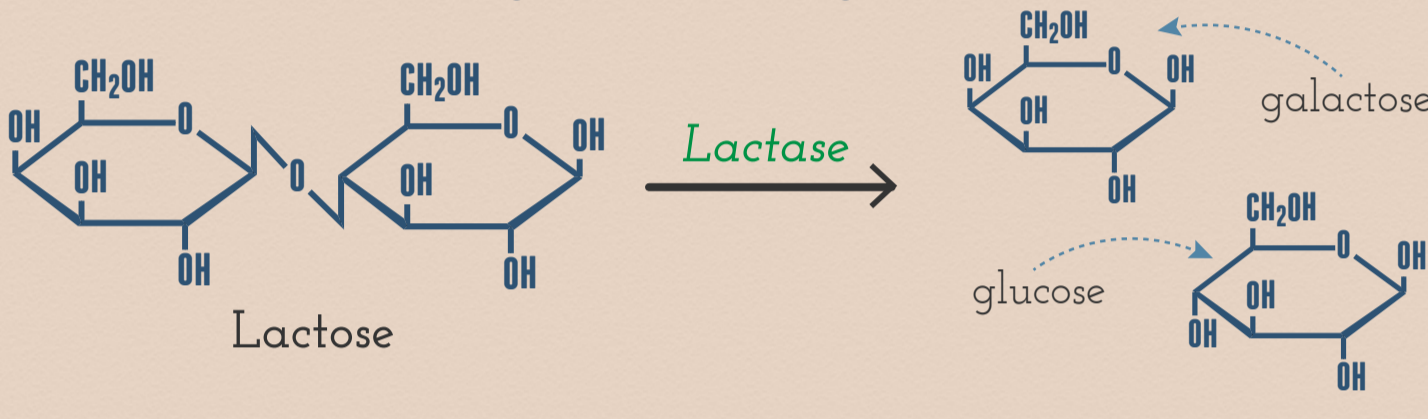


Processing Overview



SUGAR IN MILK (LACTOSE)

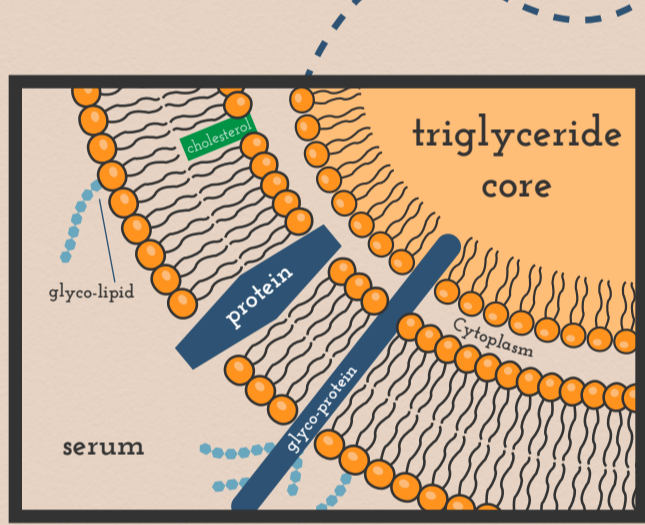
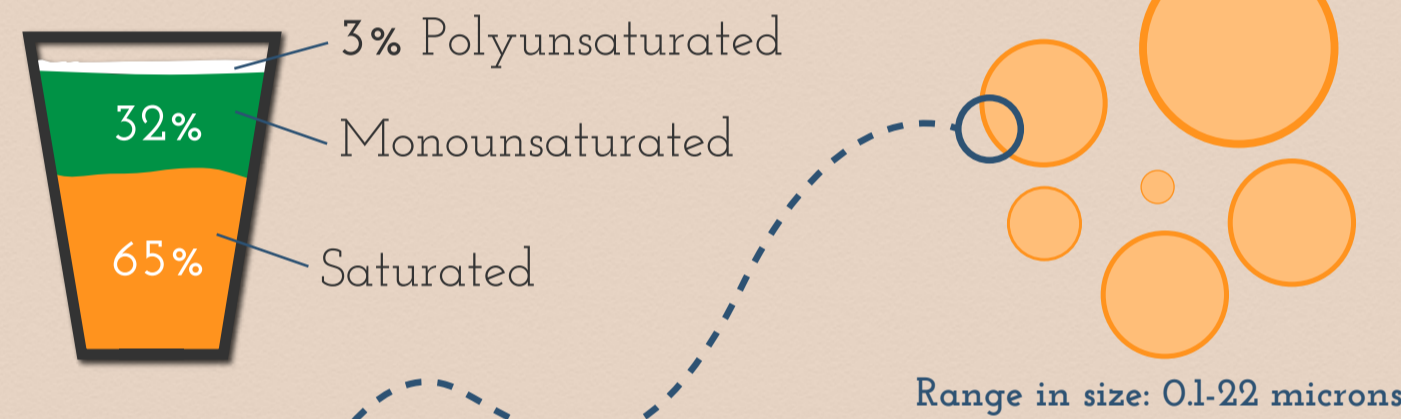
Lactose is the main sugar found in milk; it's a disaccharide of **galactose** and **glucose**



Those who are lactose intolerant lack the **lactase** enzyme and do not break down lactose. Instead, it is **fermented** by colonic bacteria

LIPID FRACTION OF MILK (MILK FAT)

Most of the fat in milk is **saturated**, and is found in **globular structures**



Milk fat globules are made up of a **phospholipid tri-layer**, in the form of a bilayer and monolayer. The membranes contain other **lipids**, **sugars**, **proteins**, etc.

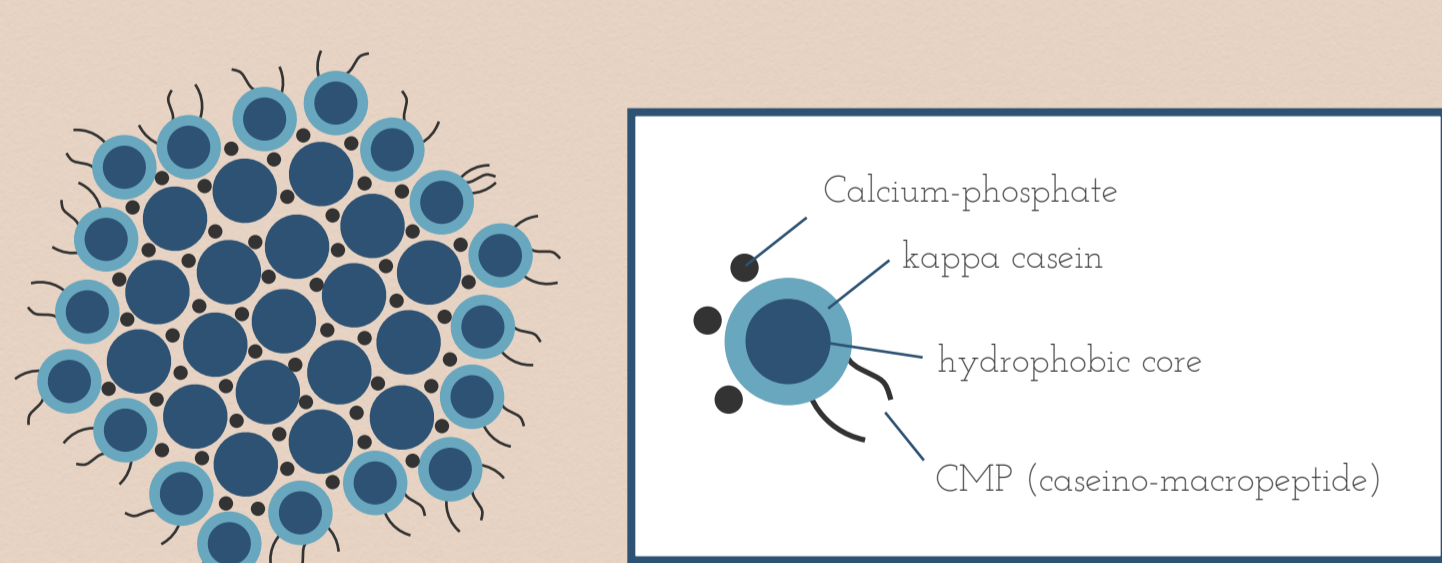
PROTEIN IN MILK (CASEIN & WHEY)

Milk contains two main types of proteins: **casein (80%)** and **whey (20%)**

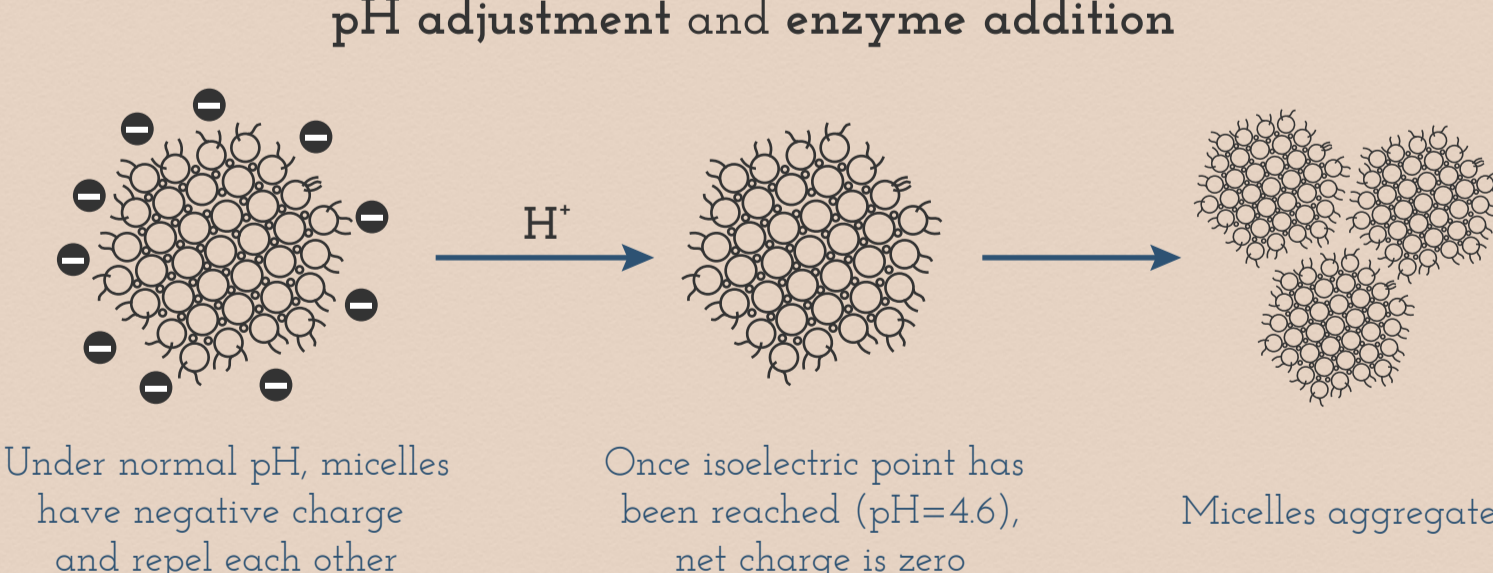
Casein

Casein micelle

Casein sub-micelle

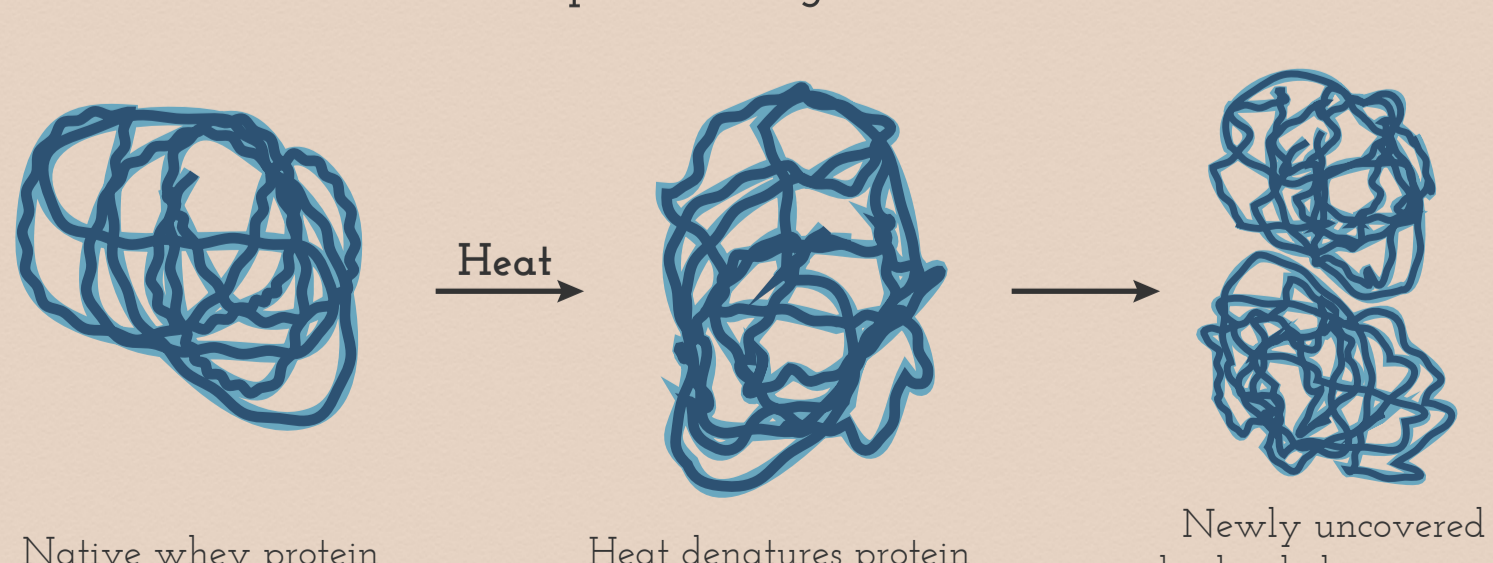


Casein proteins will aggregate under two main conditions: **pH adjustment** and **enzyme addition**



Whey

Whey proteins are globular proteins that denature when exposed to high heat.



Sources:

A.K. Smith and B.E. Campbell. Microstructure of Milk Components in Structure of Dairy Products. 2007. Blackwell Publishing Ltd.
 Fox, P.F. & McSweeney, P.L.H. Advanced Dairy Chemistry. 2003. Springer Science
 Kailasapathy, Kasipathy. Chemical Composition, Physical and Functional Properties of Milk and Milk Ingredients in Dairy Processing & Quality Assurance. 2008. John Wiley & Sons, Inc.