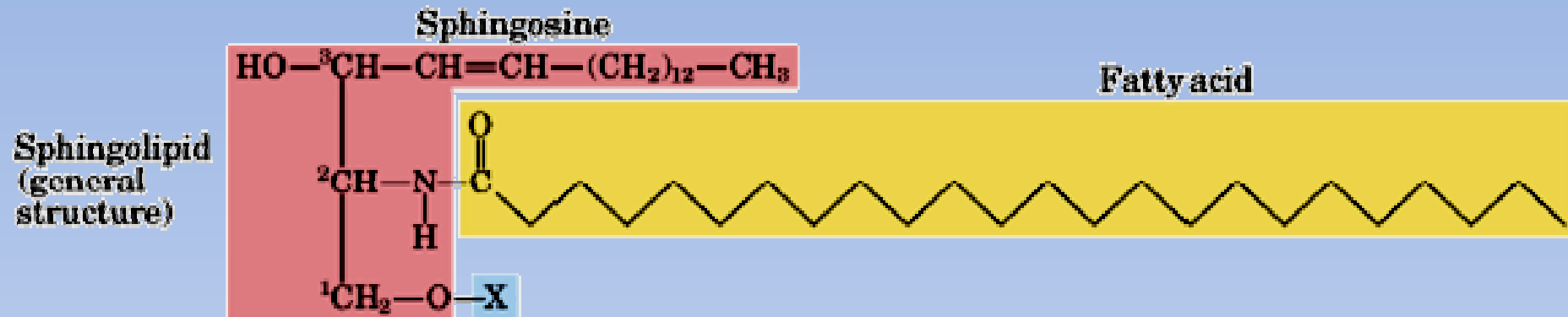


Sphingolipids

Dr. Howaida Nounou
College of science
Biochemistry Department

- Sphingolipids make up the second class of phospholipids.
- The most distinct difference between sphingolipids and glycerophospholipids is that the backbone of sphingolipids is **sphingosine alcohol instead of** glycerol.



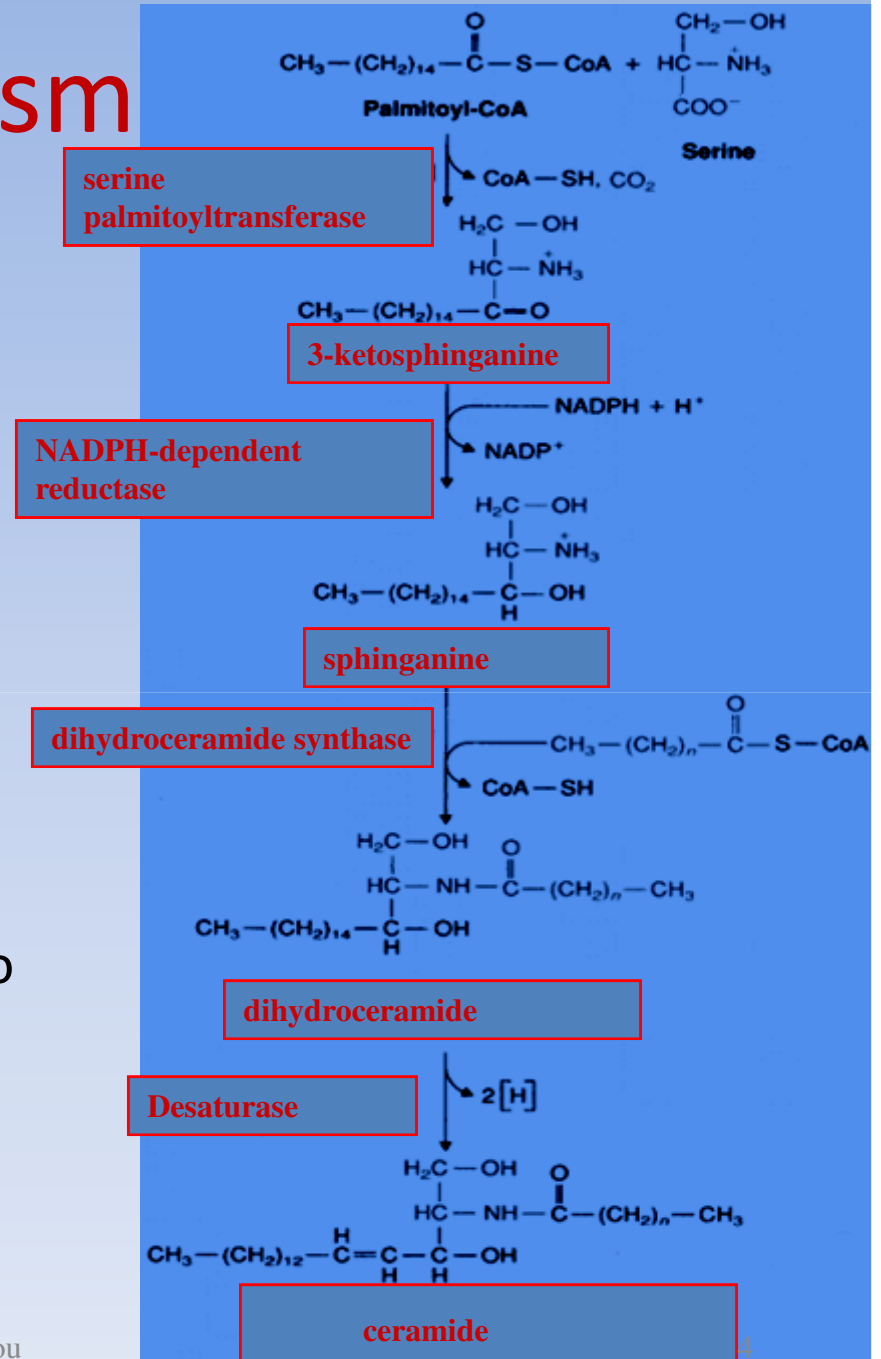
► Sphingolipids contain :

1. **sphingosine** (shown in pink), which is a long-chain amino alcohol:18- carbon amino alcohol with **C-C trans double bond**
2. A **fatty acid is joined to sphingosine** via an amide linkage rather than an ester linkage as seen in glycerol (**Ceramide**).
3. **Sphingomyelin** has a **phosphocholine as** head group (X).

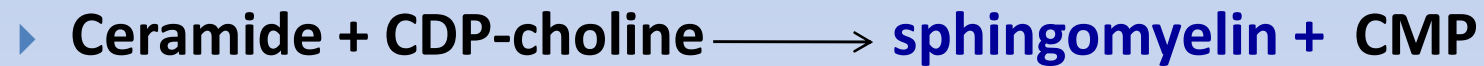
Sphingomyelins are common constituent of plasma membranes

Sphingolipid metabolism

- Starts with palmitoyl-CoA and serine forming **3-keto-sphinganine** by **serine palmitoyltransferase**
- Next, 3-keto-sphinganine is reduced to form **sphinganine**.
- Sphinganine is acylated by a **dihydroceramide synthase** to form **dihydroceramide** which is desaturated to form **ceramide**.



- ▶ Ceramide can be converted to **sphingomyelin** by the addition of a phosphorylcholine head group by **sphingomyelin synthase**.



○ **Glycosphingolipids:** ceramide with sugars.

* **Cerebroside:** Sugar is **glucose** or **galactose**.

* **Gangliosides:** ceramide with three or more sugars including **sialic acid**

▶ **Ceramide + UDP-galactose** \longrightarrow **galactocerebroside + UDP**