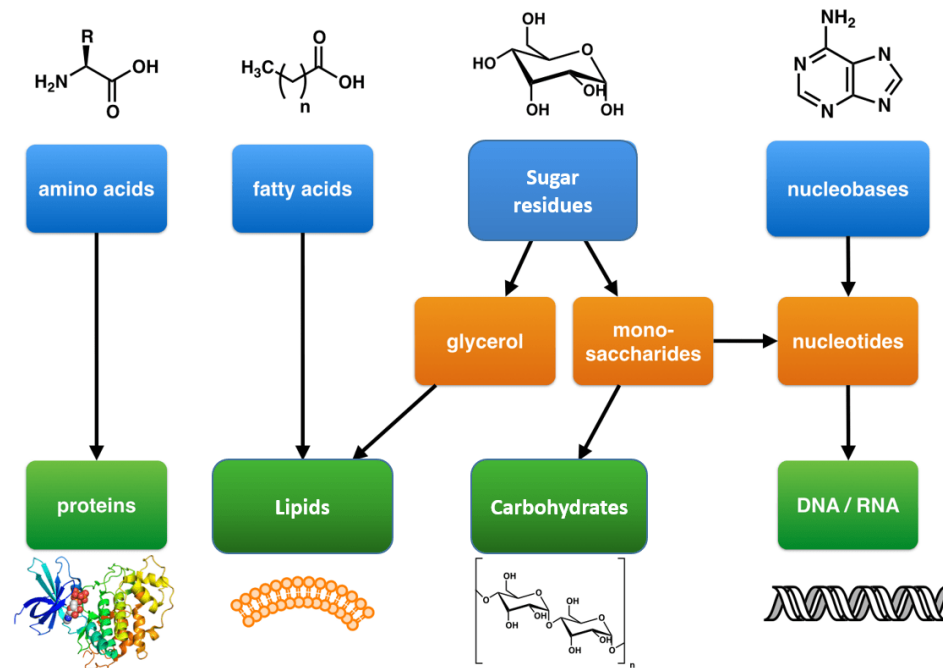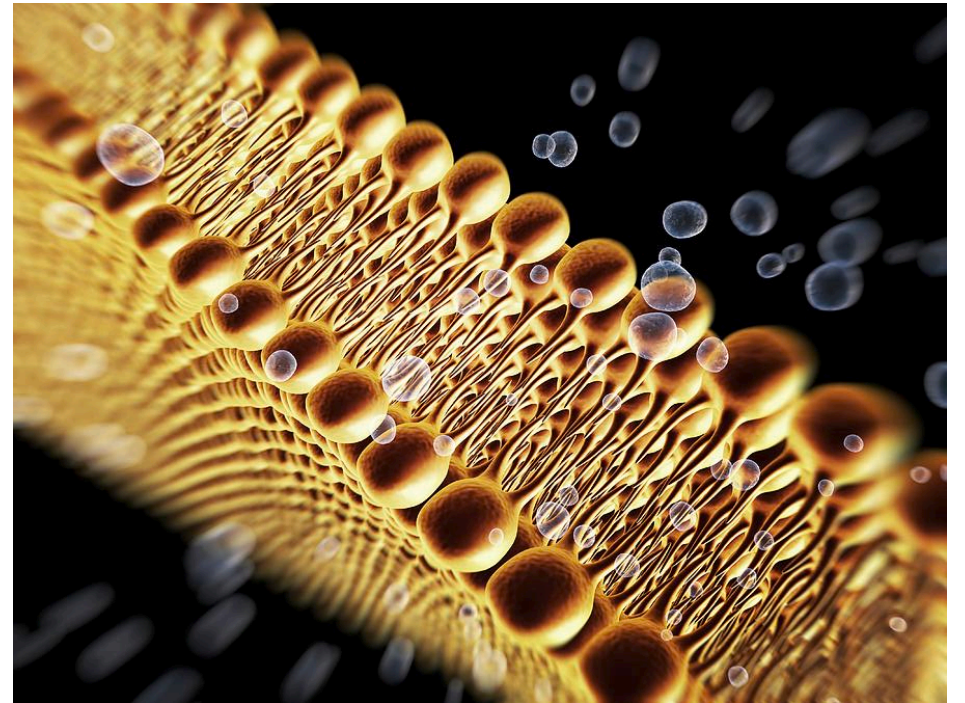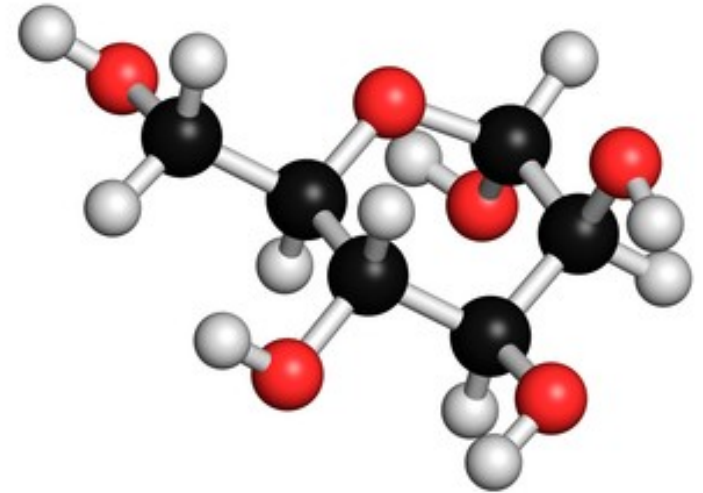# Lesson 1
Recognizing Macromolecules

Recognizing macromolecules

- Macro = big → Macromolecules = BIG molecules

- 4 major classes of macromolecules in cells:

  - Lipids

Recognizing macromolecules

- Macro = big → Macromolecules = BIG molecules
- 4 major classes of macromolecules in cells:
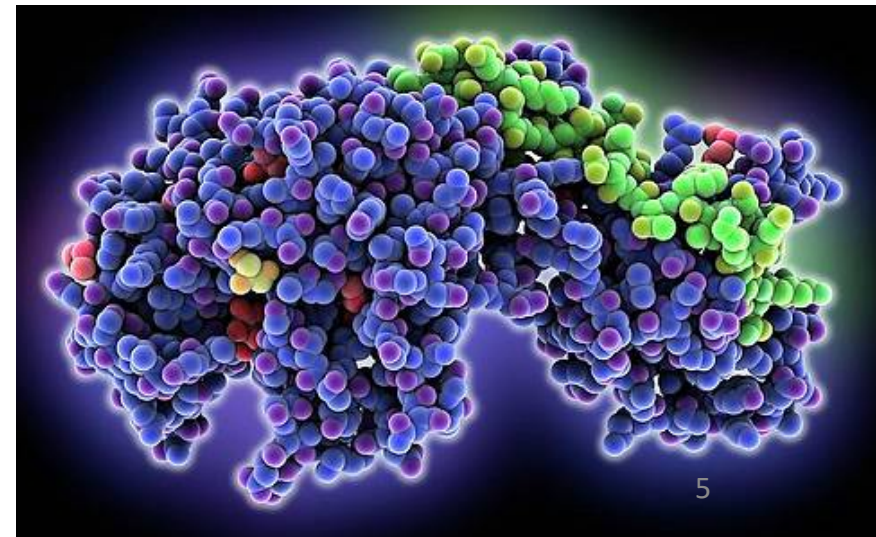
  - Lipids

- Carbohydrates

Recognizing macromolecules

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- 4 major classes of macromolecules in cells:

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  - Nucleic acids

Recognizing macromolecules

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- Proteins

Recognizing macromolecules

- Macro = big → Macromolecules = BIG molecules
- 4 major classes of macromolecules in cells:

  - Lipids

  - Carbohydrates

  - Nucleic acids

  - Proteins
- They are often polymers –> (monomer = M, polymer = M_n)

Lipids

- Membranes, signals, energy storage, protection
- Non-polar (hydrophobic) (**key attribute**)
- Or amphipathic (partly polar)
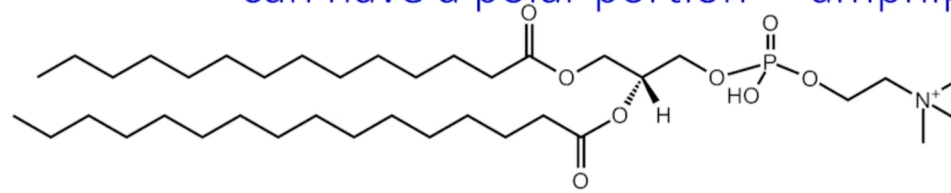- Long chain or small
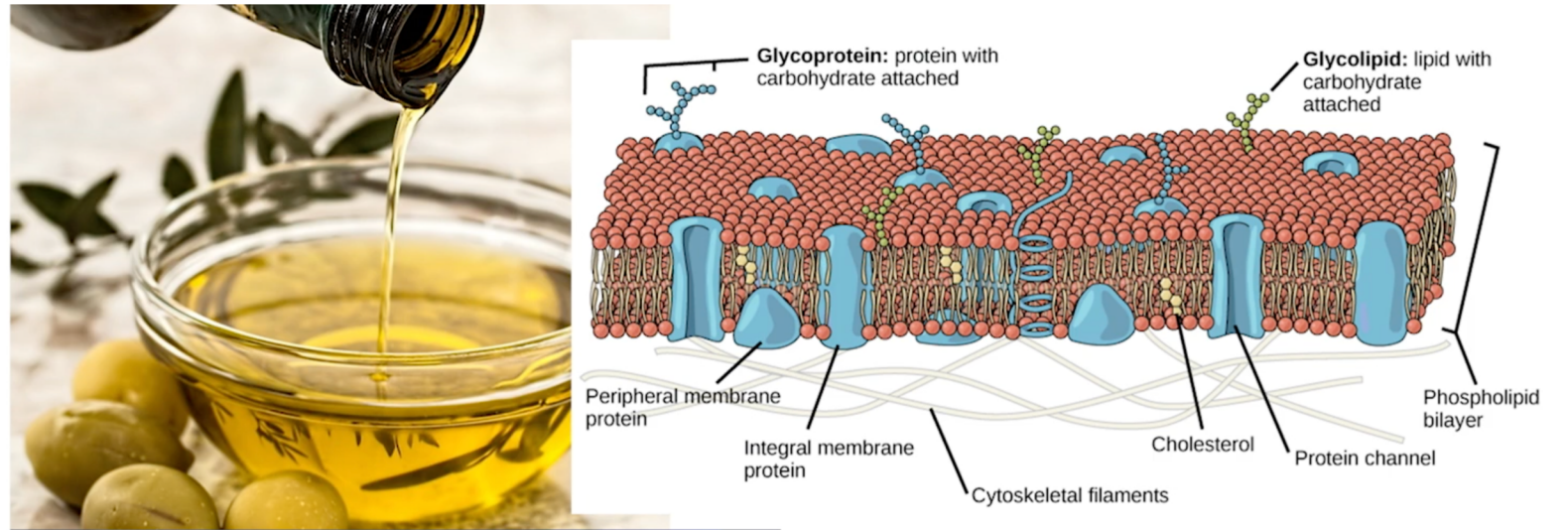
cell membranes

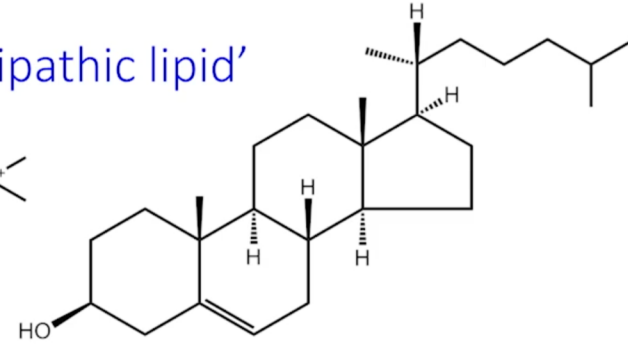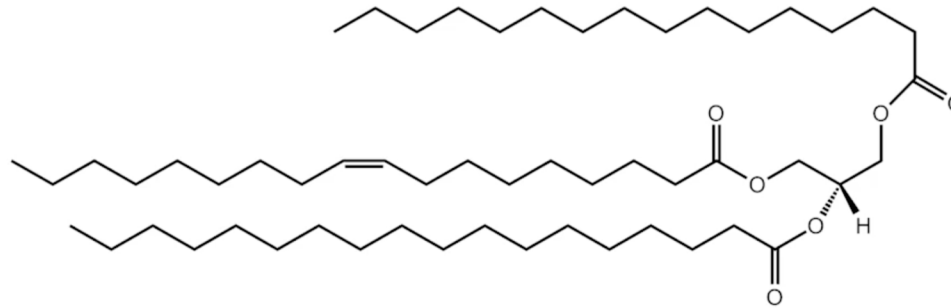*lipid functions*

insulation

signaling

Steroids

Lipids

Lipids

non-polar (hydrophobic)
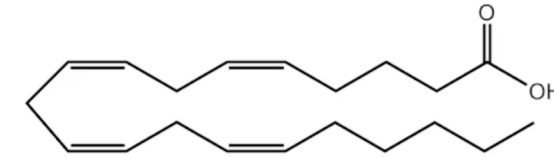can have a polar portion = 'amphipathic lipid'

1-myristoyl-2-palmitoyl-*sn*-glycerophosphocholine
(Glycerophospholipids)

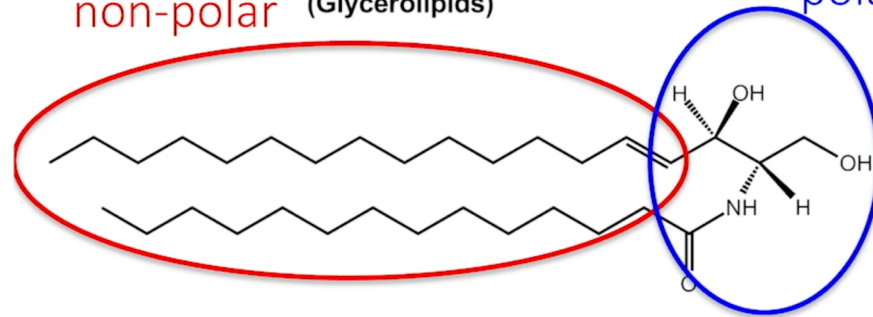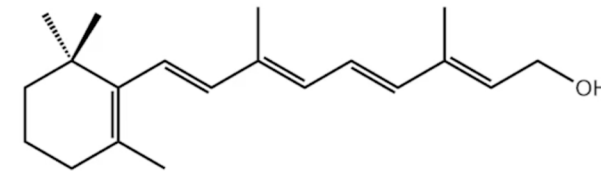Cholesterol (Sterol lipids)

1-oleoyl-2-stearoyl-3-palmitoyl-*sn*-glycerol
(Glycerolipids)

non-polar

polar

Arachidonic acid (Fatty acyls)

N-myristoyl-sphing-4-enine
(Sphingolipids)
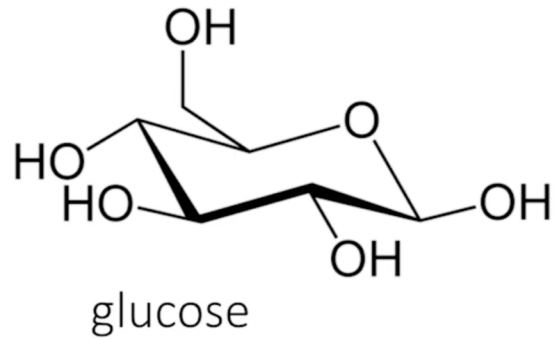
Retinol (Prenol lipids)

8

Carbohydrates
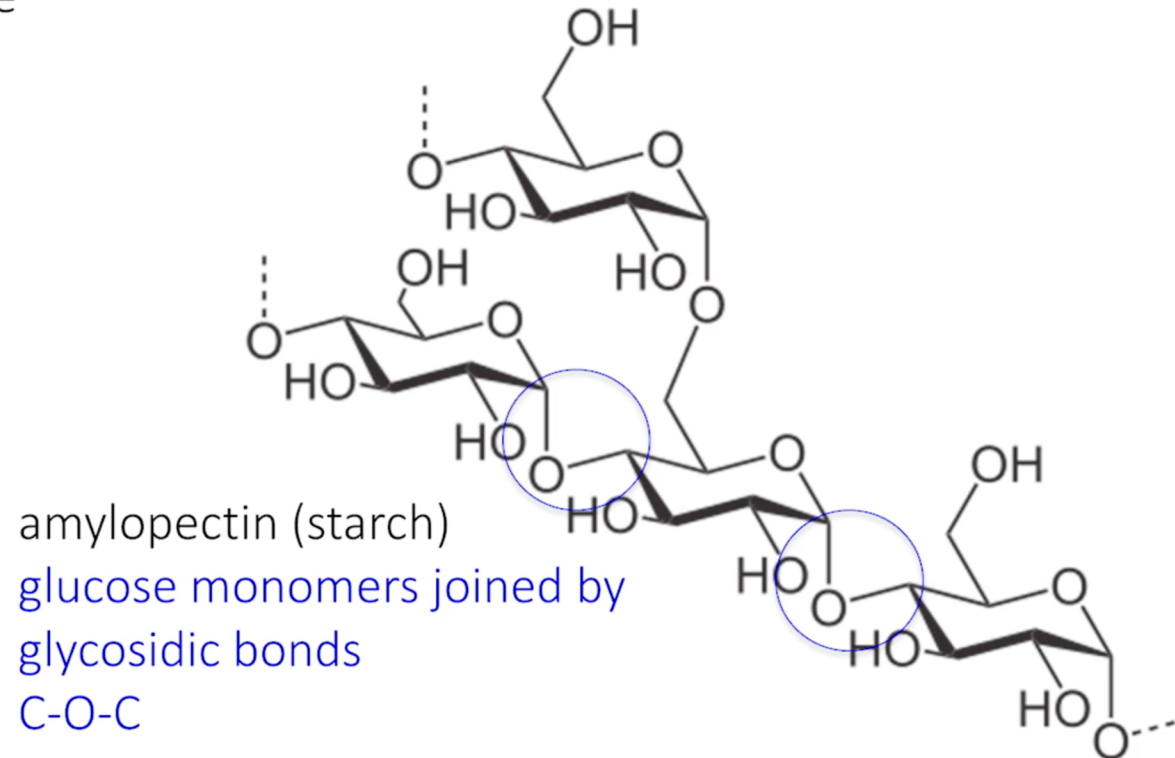
- Energy, information, structure
- Basic chemical formula CH_2O ($C_6H_{12}O_6$)
- Monomer M = monosaccharides (sugars)
- Polymers = polysaccharides (glycogen, starch, cellulose...)
- Ms joined by glycosidic bonds C-O-C

9

Carbohydrates

glucose

Carbohydrates

amylopectin (starch)
glucose monomers joined by
glycosidic bonds
C-O-C

Carbohydrates

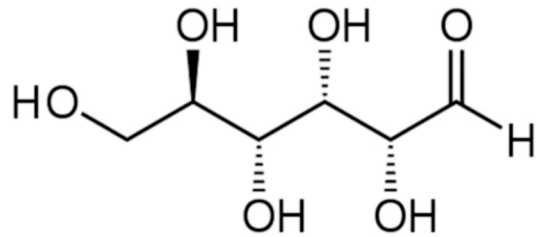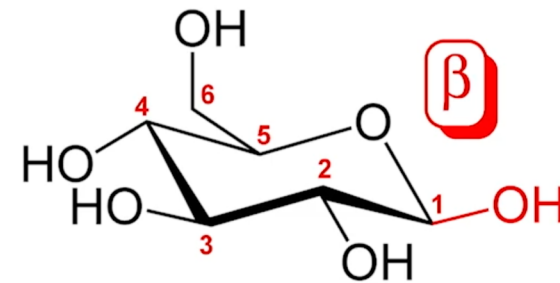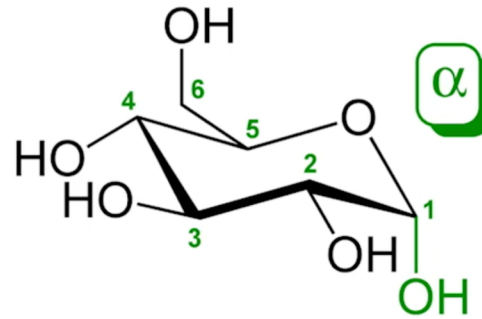## Glucose isomers

open chain

Each isomer can build di- or polysaccharides
β-cyclic form comprises ~99% of cellular glucose