

# Cell Membrane

*not just small nonpolar go through.*

A. Plasma membrane is **selectively permeable**

- Allows some substances to cross more easily than others

*lipids move (laterally) protein intermediaries that allow for the*

B. **Fluid Mosaic Model**

- **Fluid**: membrane held together by weak interactions
- **Mosaic**: phospholipids, proteins, carbs

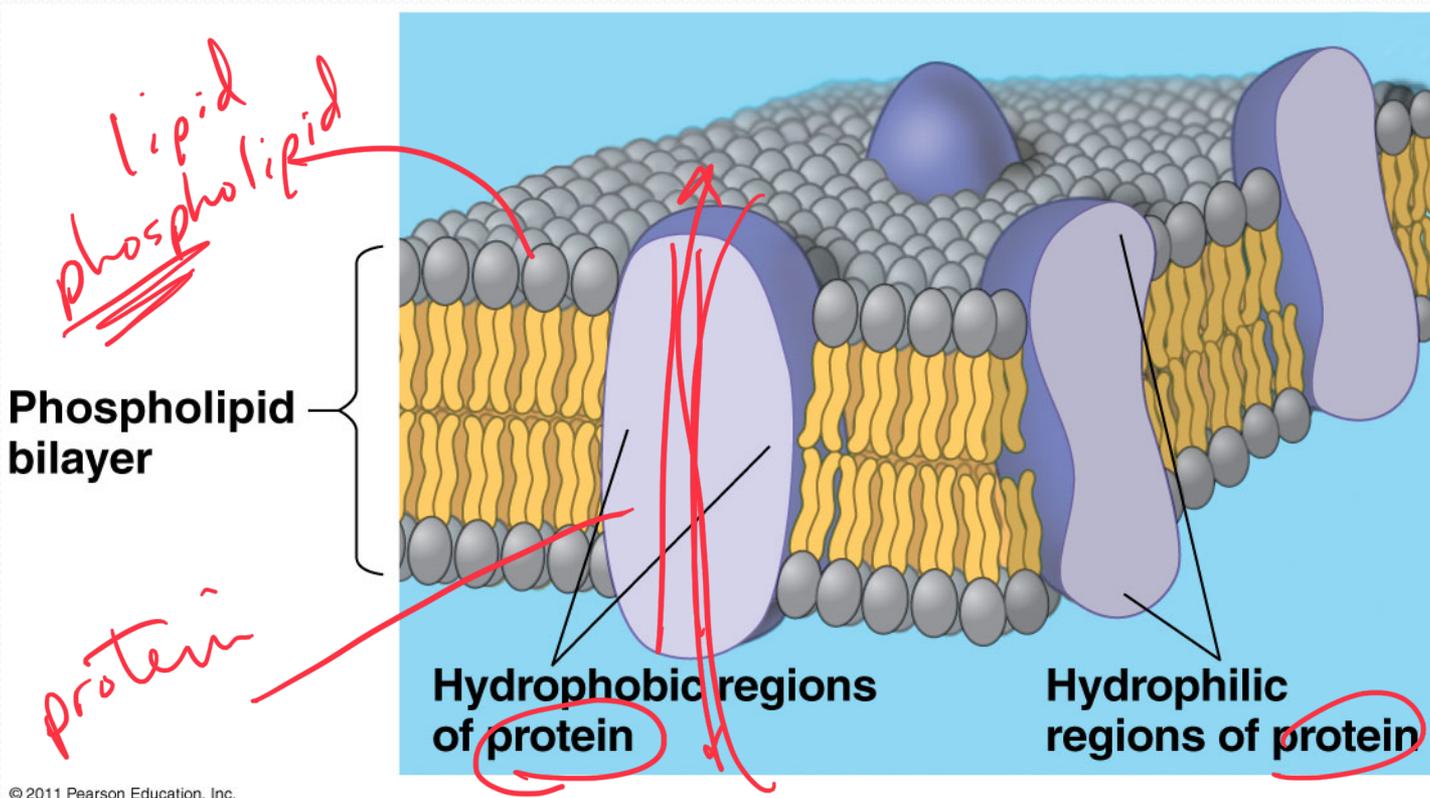
*passage of large/polar compounds*

*medley of different macromolecules*

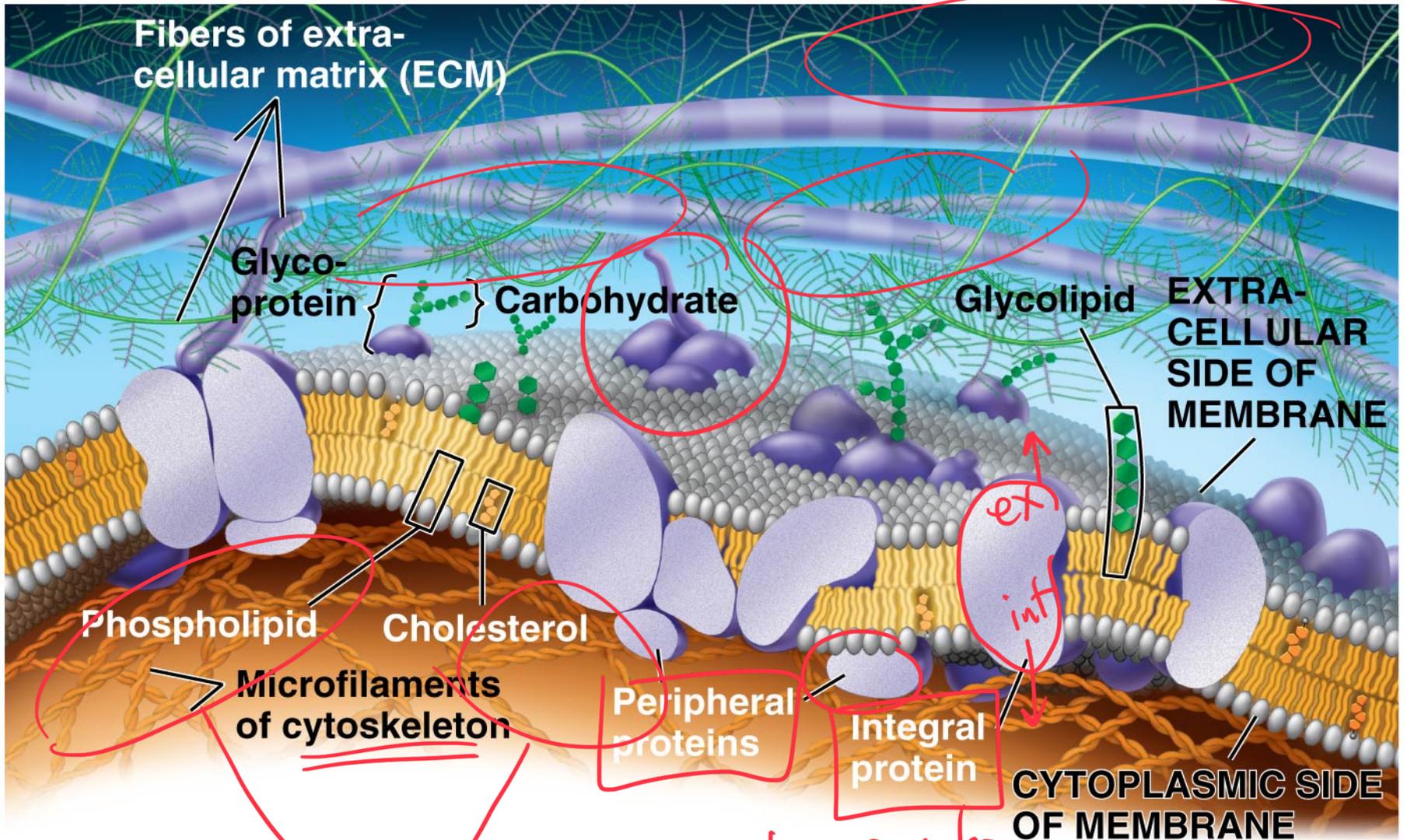
*> 50% of membrane is protein*



# Fluid Mosaic Model

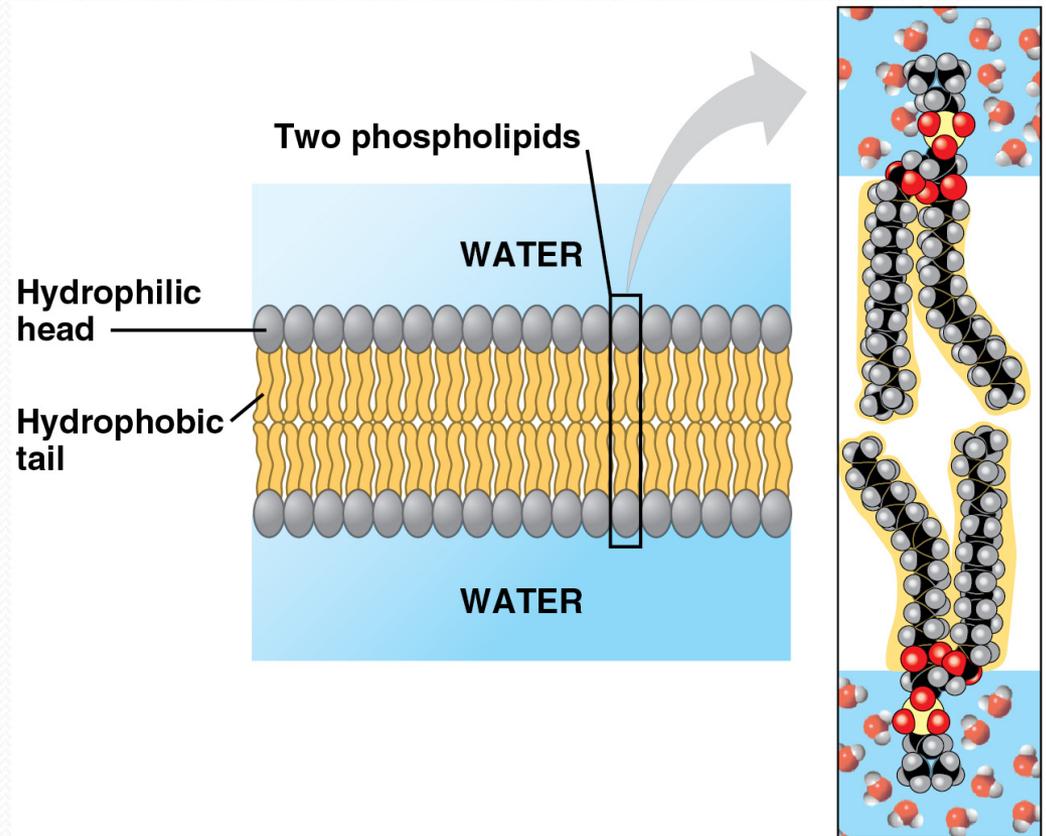


carbohydrates - always face outward



# Phospholipids

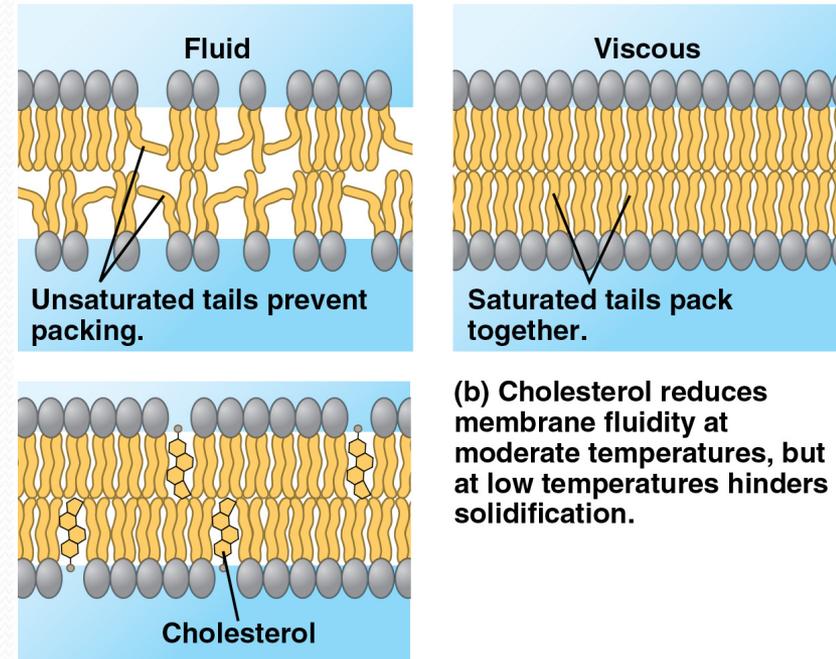
- Bilayer
- Amphipathic =  
*polar* hydrophilic head,  
*nonpolar* hydrophobic tail
- Hydrophobic barrier:  
keeps hydrophilic  
molecules out



# Membrane fluidity

- **Low temps:** phospholipids w/ unsaturated tails (kinks prevent close packing)
  - **Cholesterol** resists changes by:
    - limit fluidity at high temps
    - hinder close packing at low temps
- Temp/Fluidity buffer*
- Adaptations: bacteria in hot springs (unusual lipids); winter wheat (↑ unsaturated phospholipids)

(a) Unsaturated versus saturated hydrocarbon tails.



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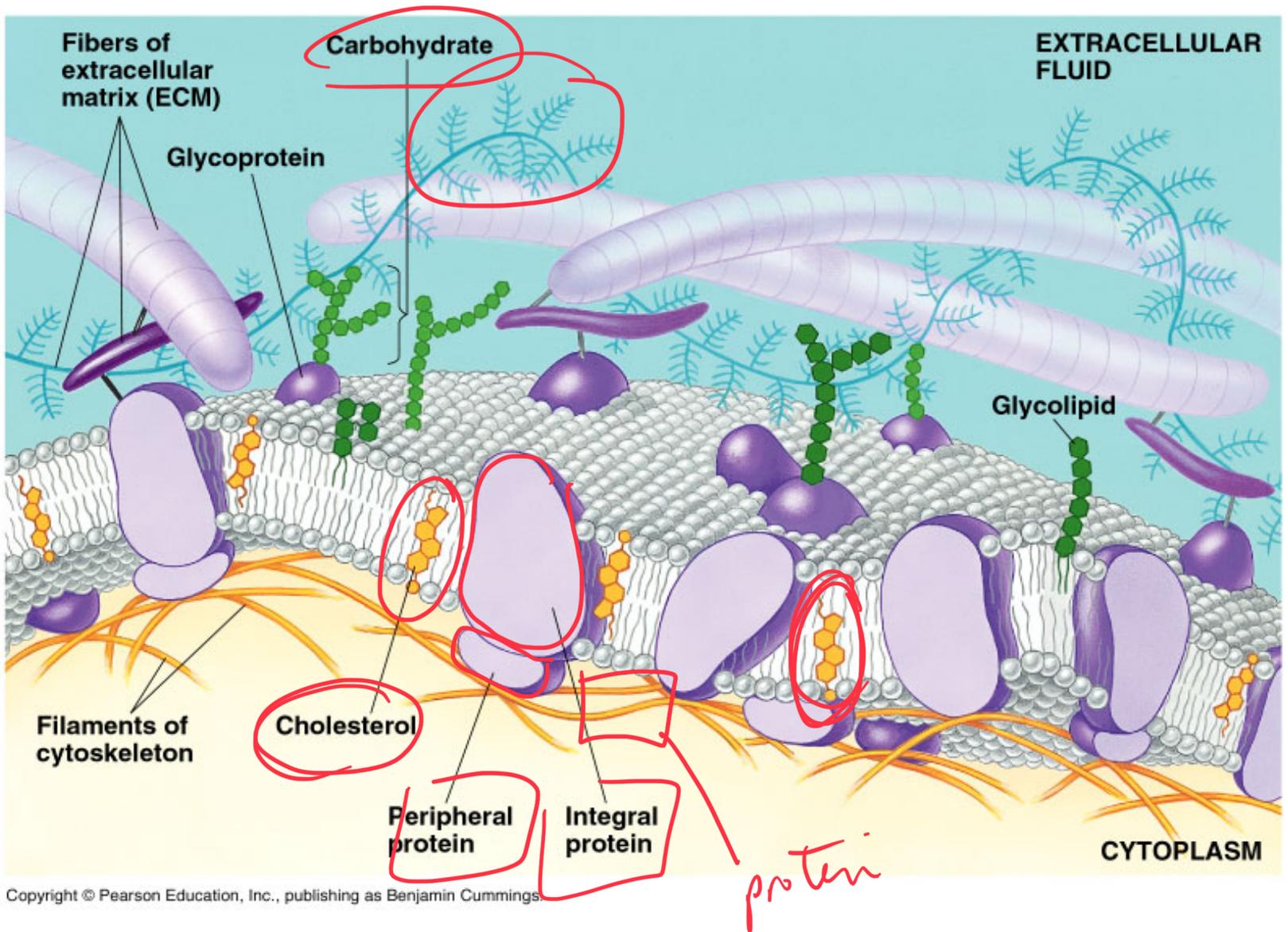
# Membrane Proteins

## Integral Proteins

- Embedded in membrane
- Determined by freeze fracture
- Transmembrane with hydrophilic heads/tails and hydrophobic middles

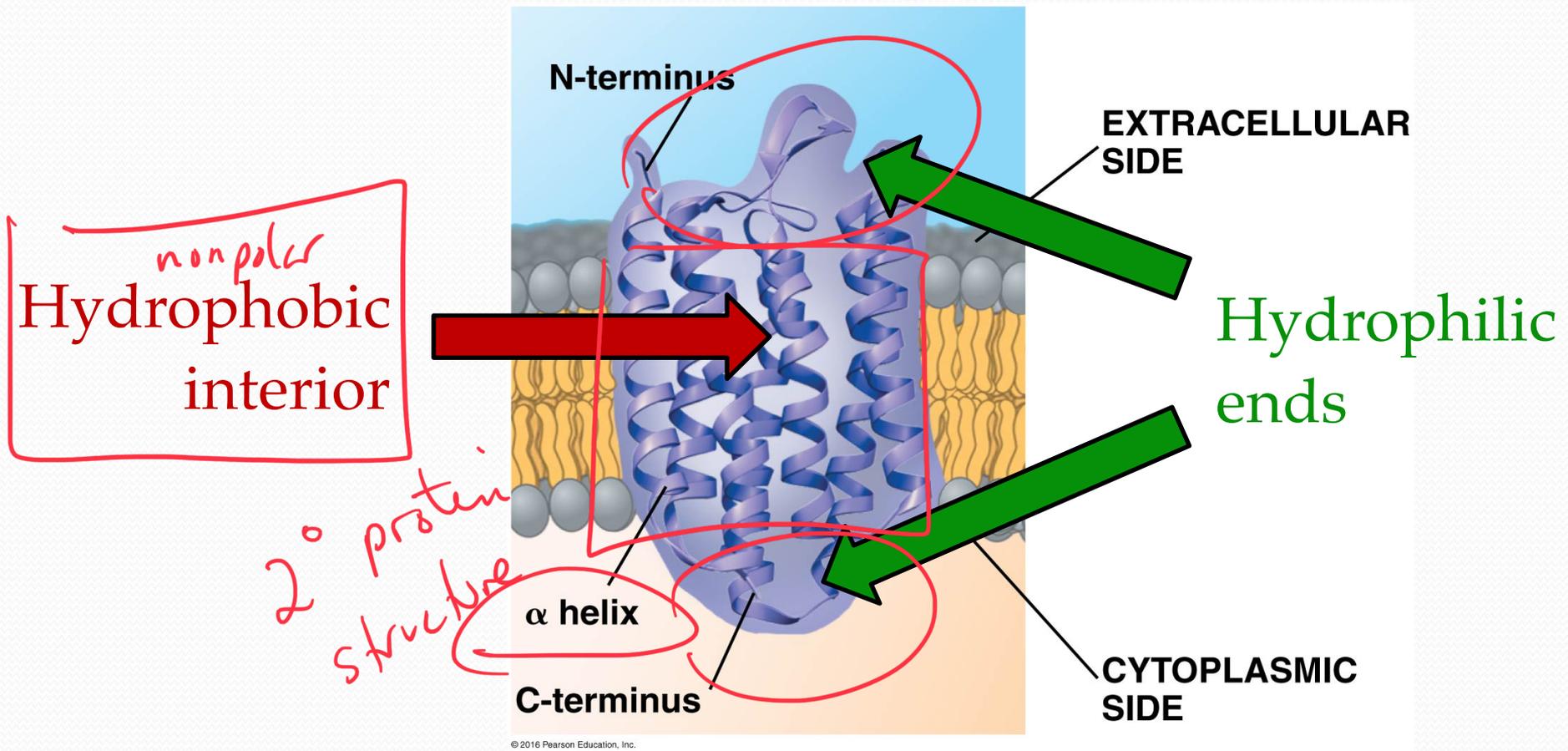
## Peripheral Proteins

- Extracellular or *intracellular* cytoplasmic sides of membrane
- NOT embedded
- Held in place by the cytoskeleton or ECM
- Provides stronger framework

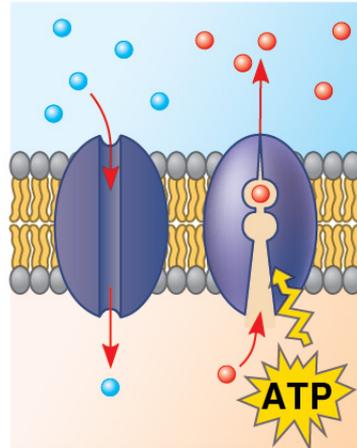


Integral & Peripheral proteins

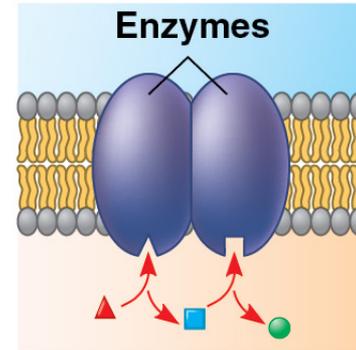
# Transmembrane protein structure



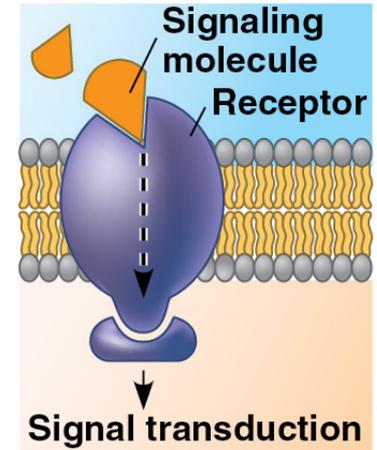
Some functions of membrane proteins



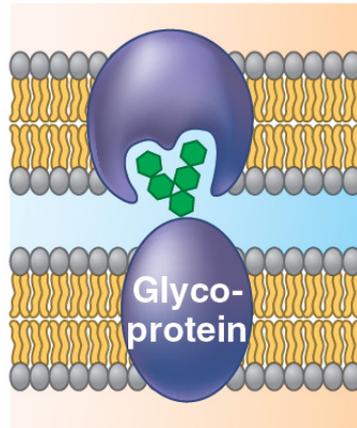
(a) Transport



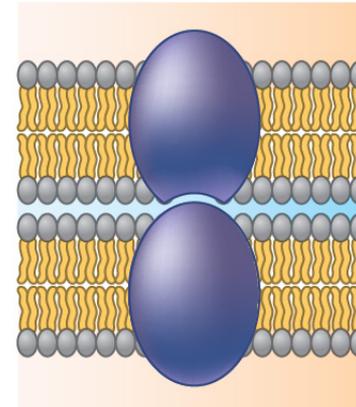
(b) Enzymatic activity



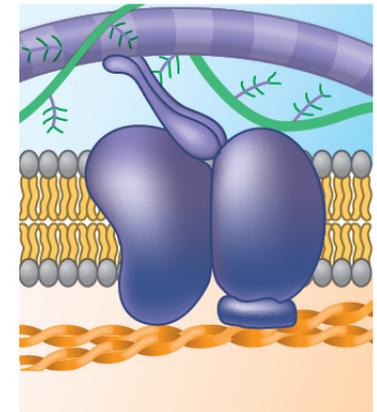
(c) Signal transduction



(d) Cell-cell recognition



(e) Intercellular joining

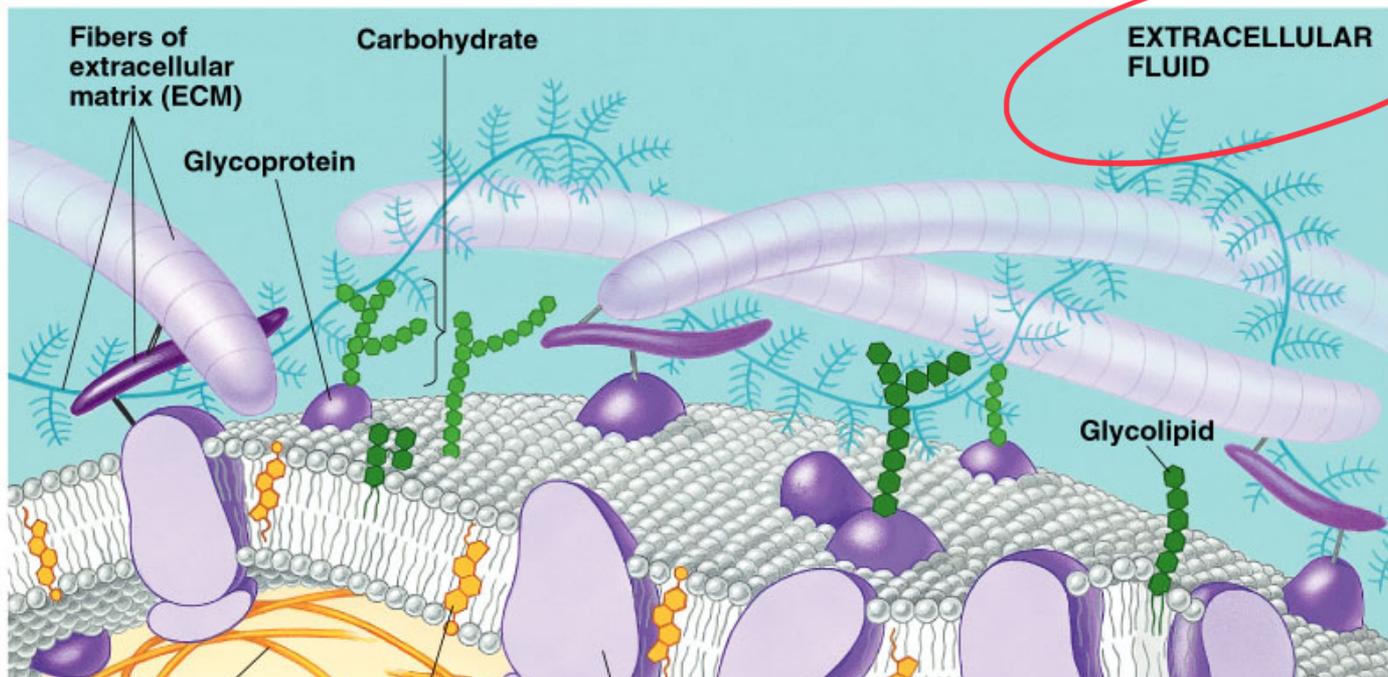


(f) Attachment to the cytoskeleton and extra-cellular matrix (ECM)

# Carbohydrates

- Function: cell-cell recognition; developing organisms
- Glycolipids, glycoproteins
- Eg. blood transfusions are type-specific

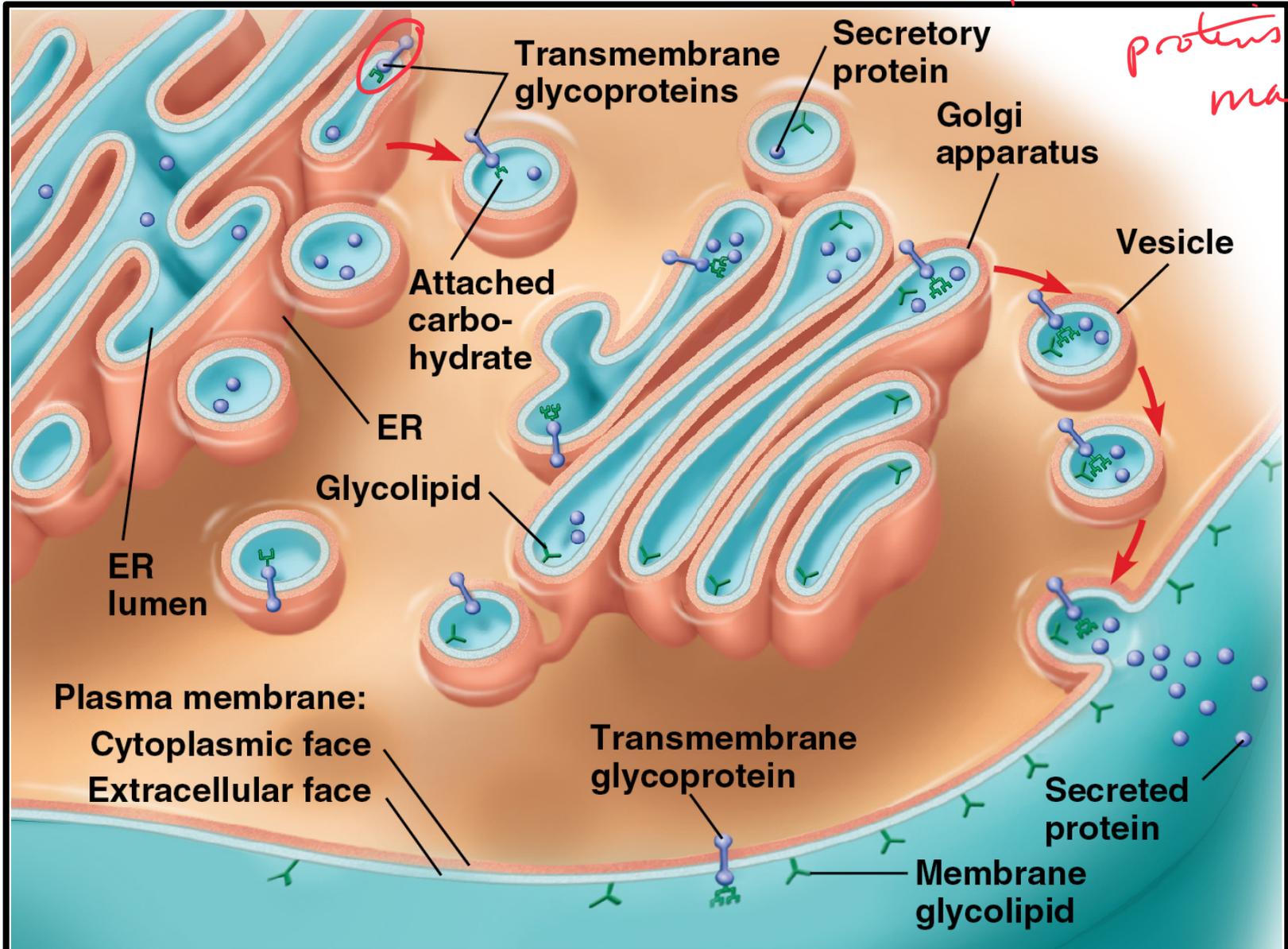
A B AB O



# Synthesis and sidedness of membranes

*Knows how transmembrane proteins are made!*

*proteins are made!*



# Selective Permeability

- Small nonpolar molecules cross easily: hydrocarbons, hydrophobic molecules, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>
- Polar uncharged molecules, including H<sub>2</sub>O – pass in small amounts *as long as you have the right protein*
- Hydrophobic core prevents passage of ions, large polar molecules – movement through embedded channel and transport proteins