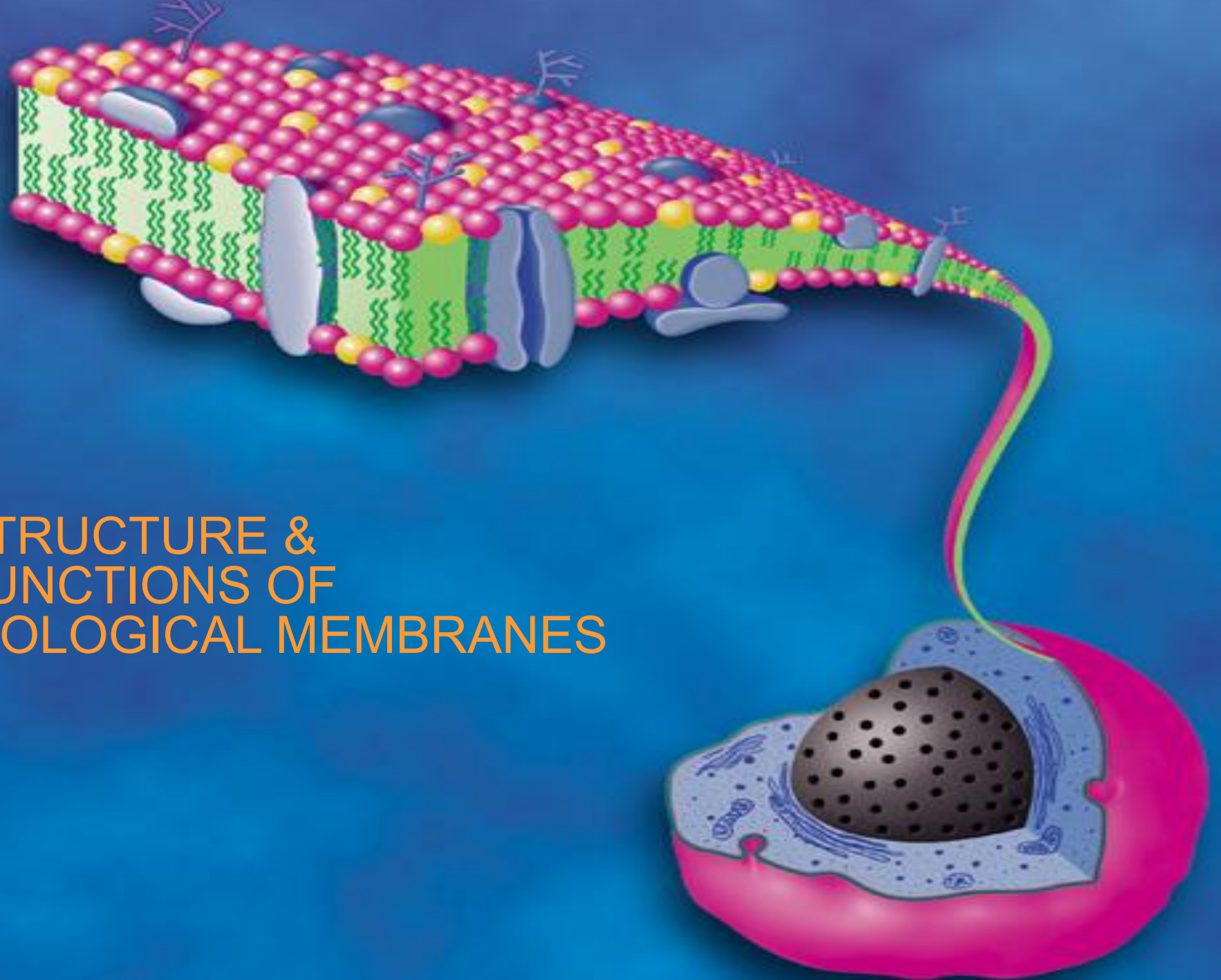
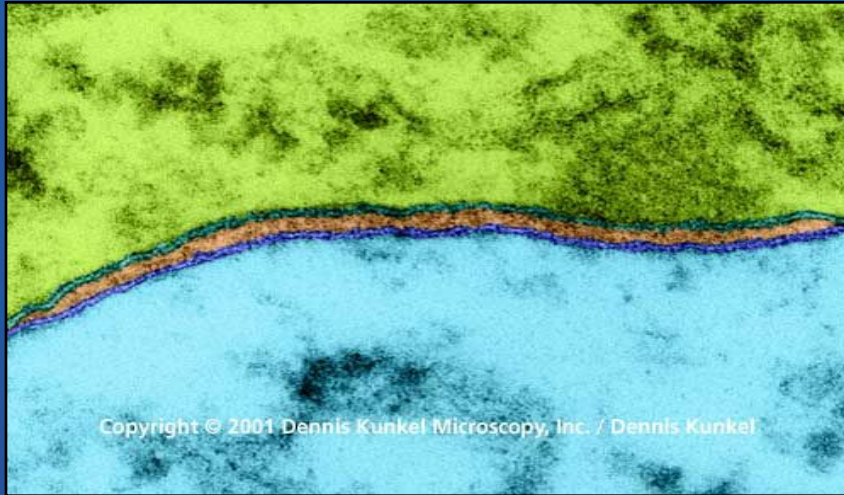


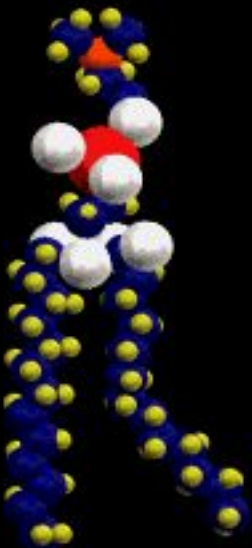


STRUCTURE & FUNCTIONS OF BIOLOGICAL MEMBRANES

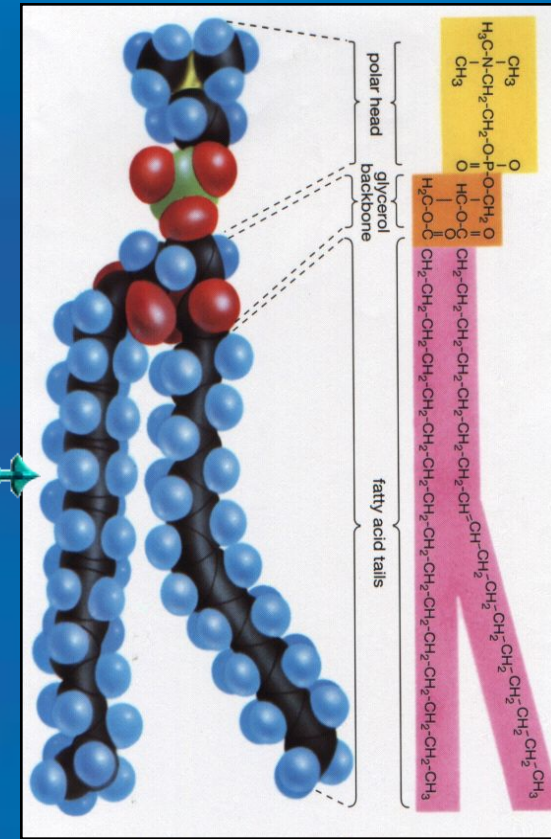
STUDY OF BIOLOGICAL MEMBRANES

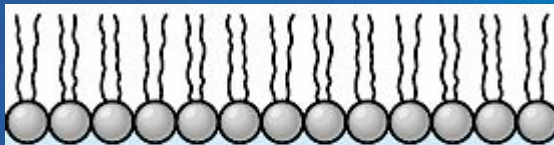


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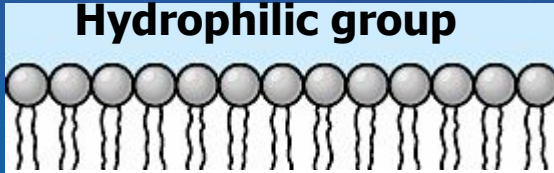


← PHOSPHOLIPID →

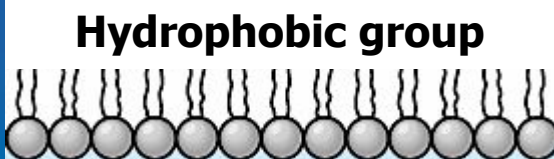




Lipid monolayer



Hydrophilic group

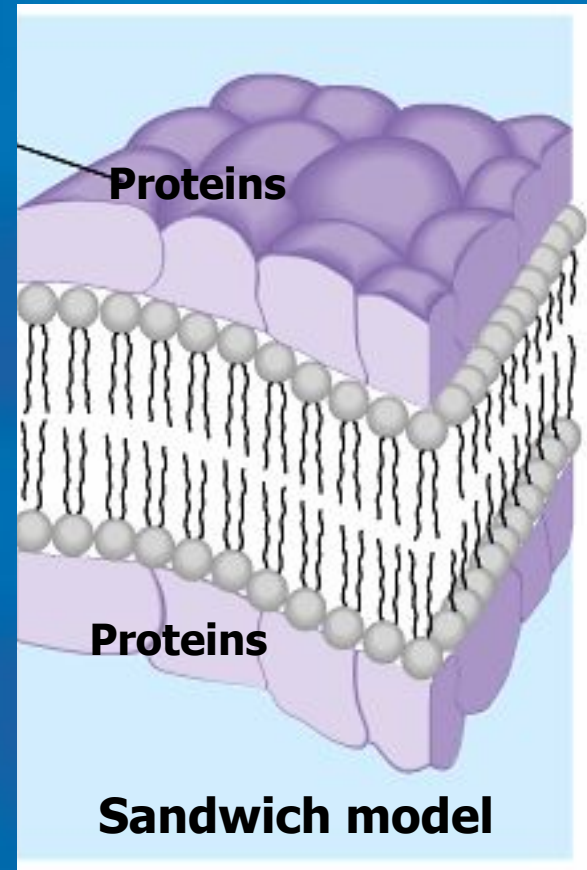


Hydrophobic group



Hydrophilic group

Lipid bilayer



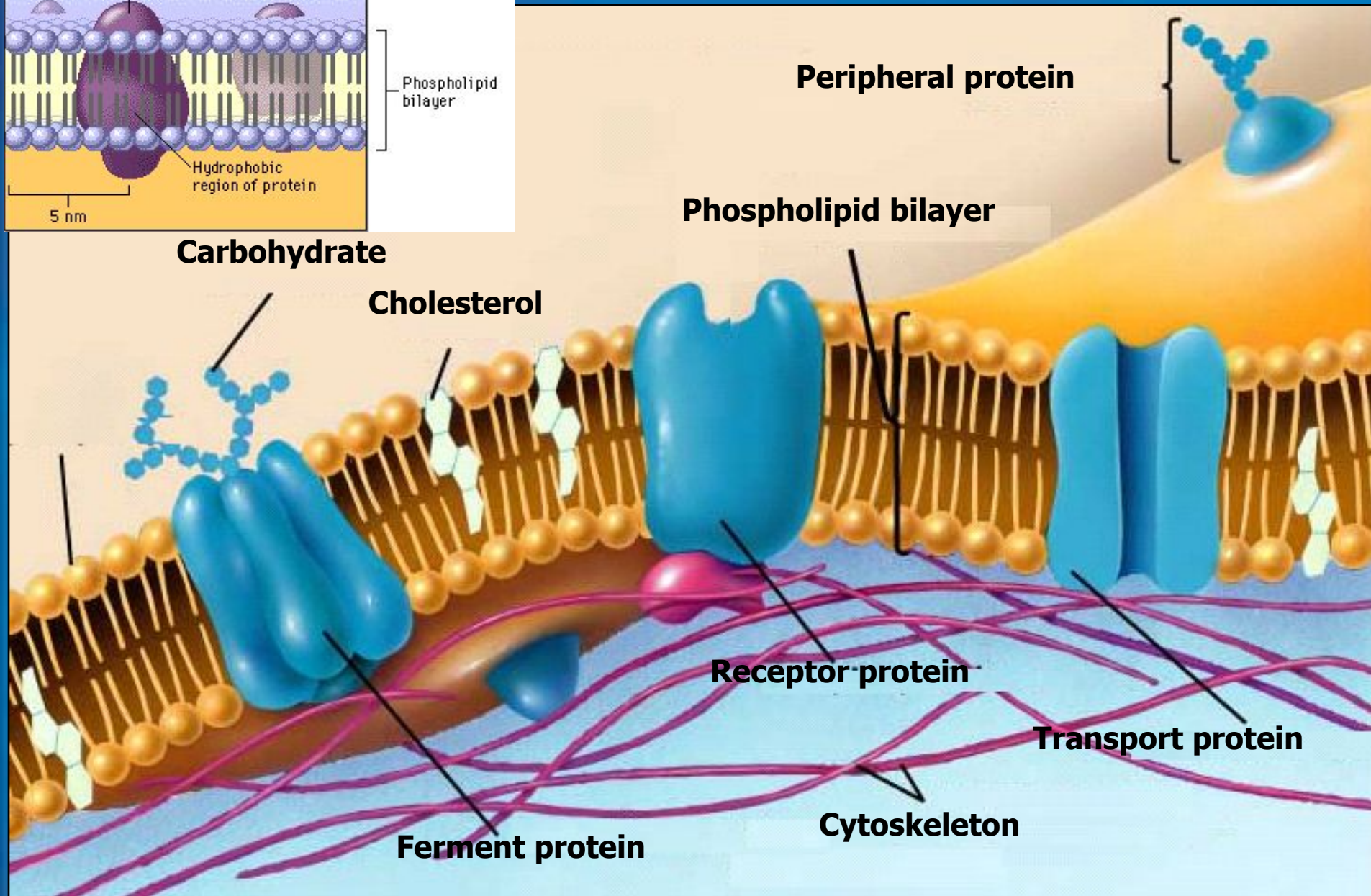
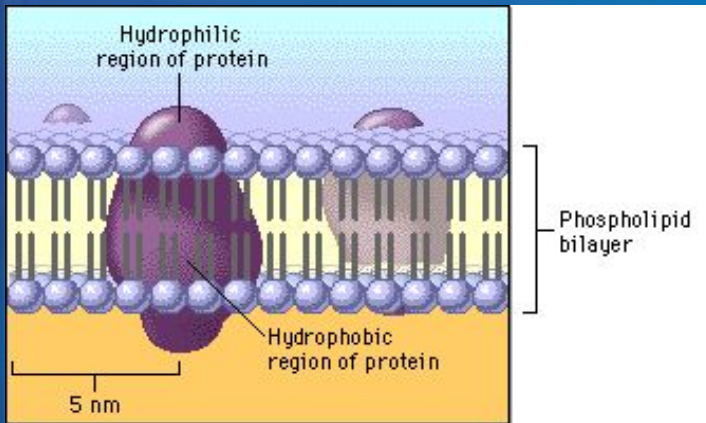
Proteins

Proteins

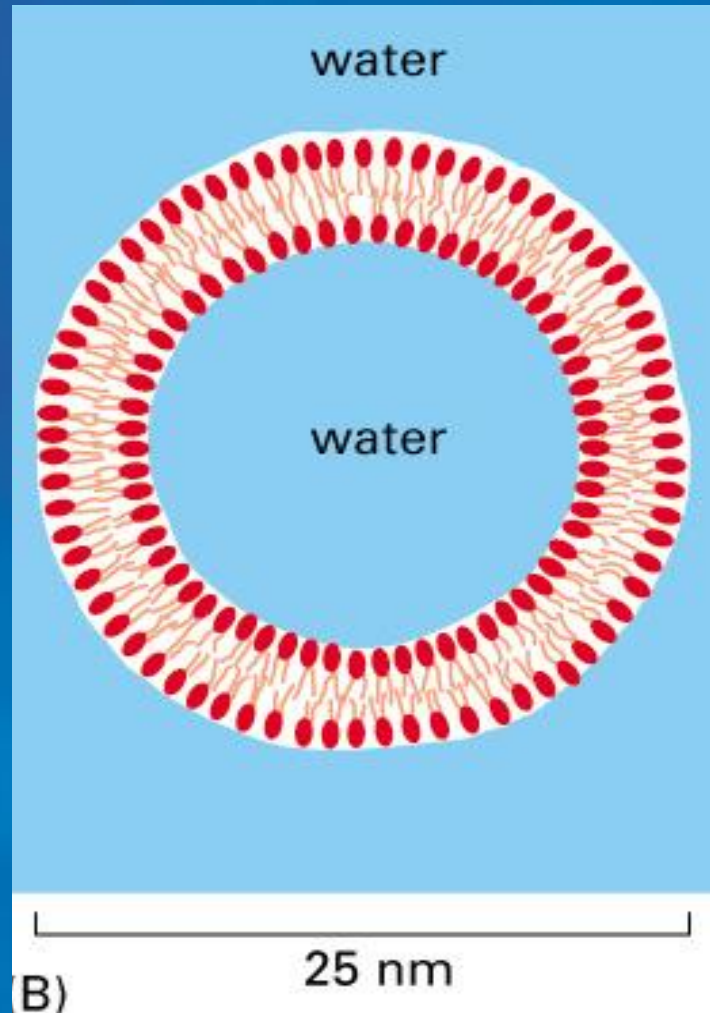
Sandwich model

LIQUID MOSAIC MODEL OF BIO MEMBRANE

Singer & Nikolson, 1972

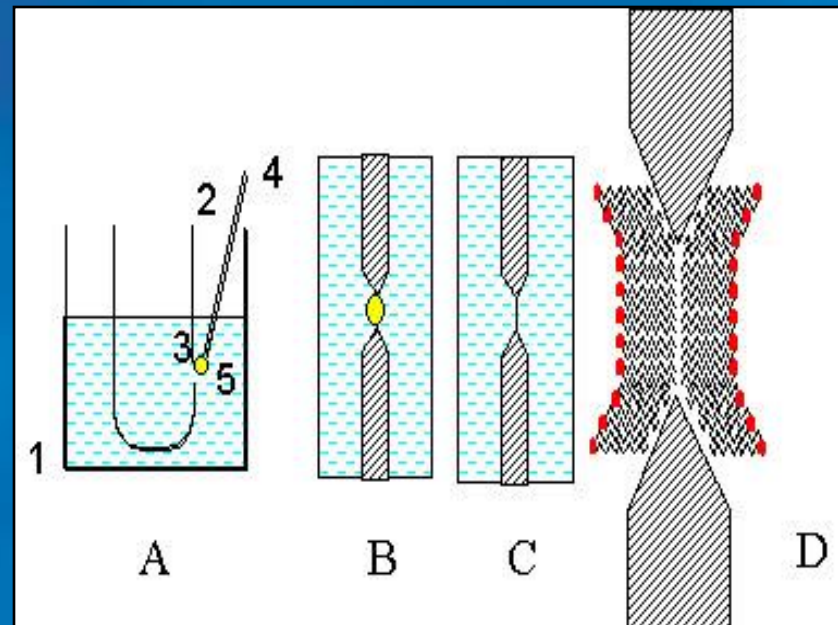
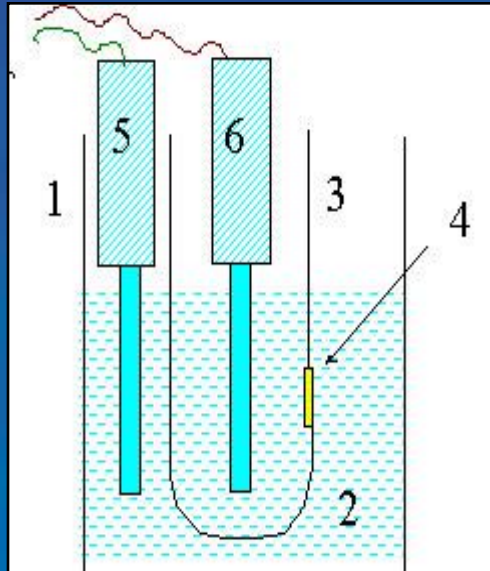


MODEL MEMBRANE. LIPOSOME



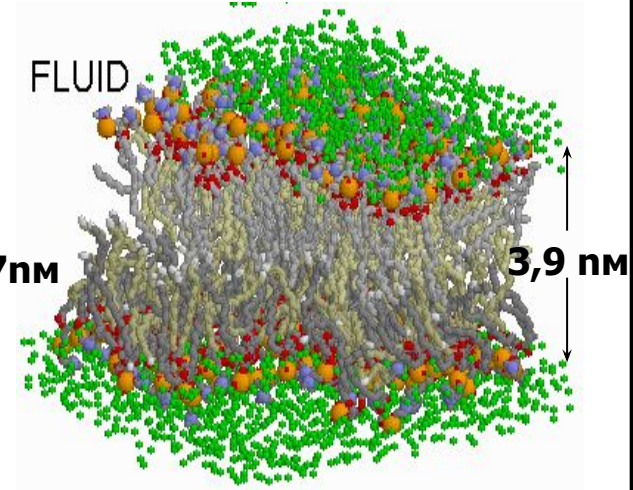
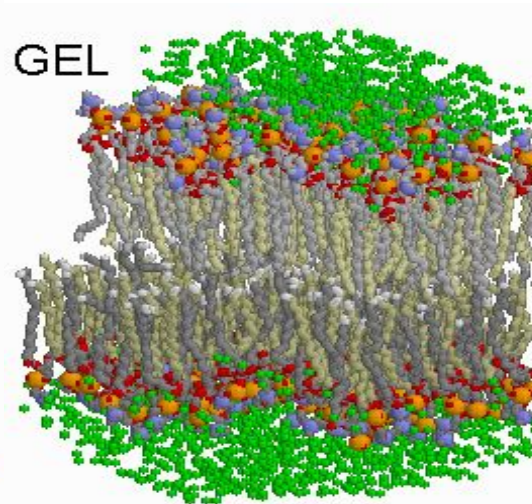
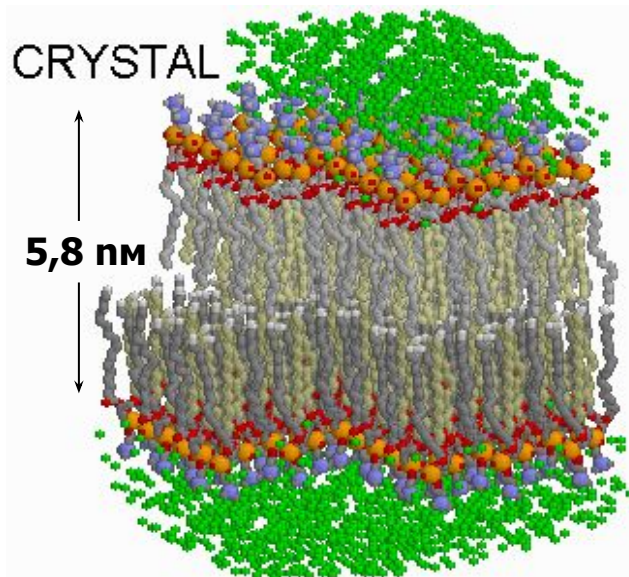
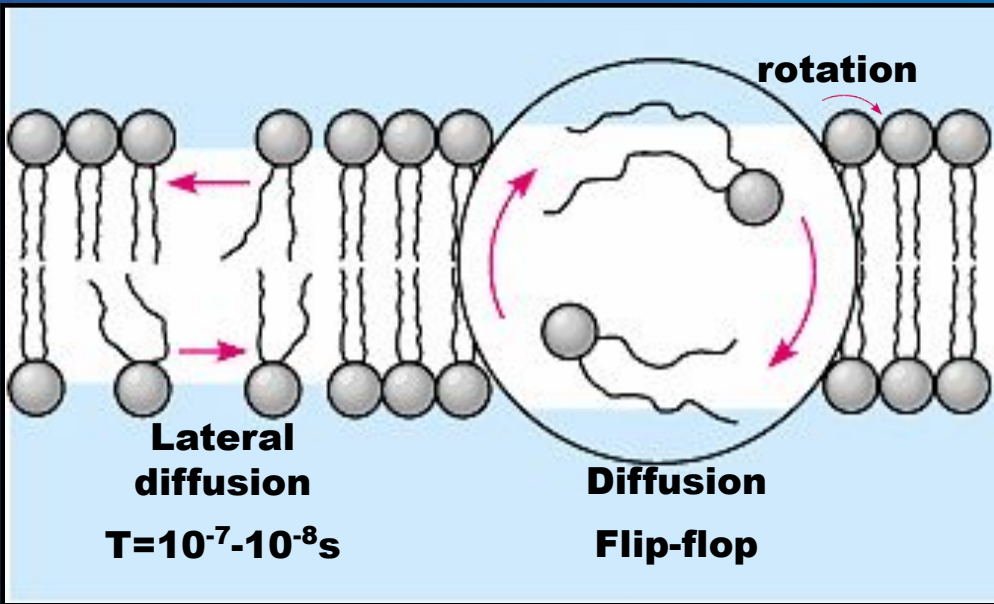
SELFCONSTRUCTION OF PHOSPHOLIPIDS

BIMOLECULAR LIPID MEMBRANES

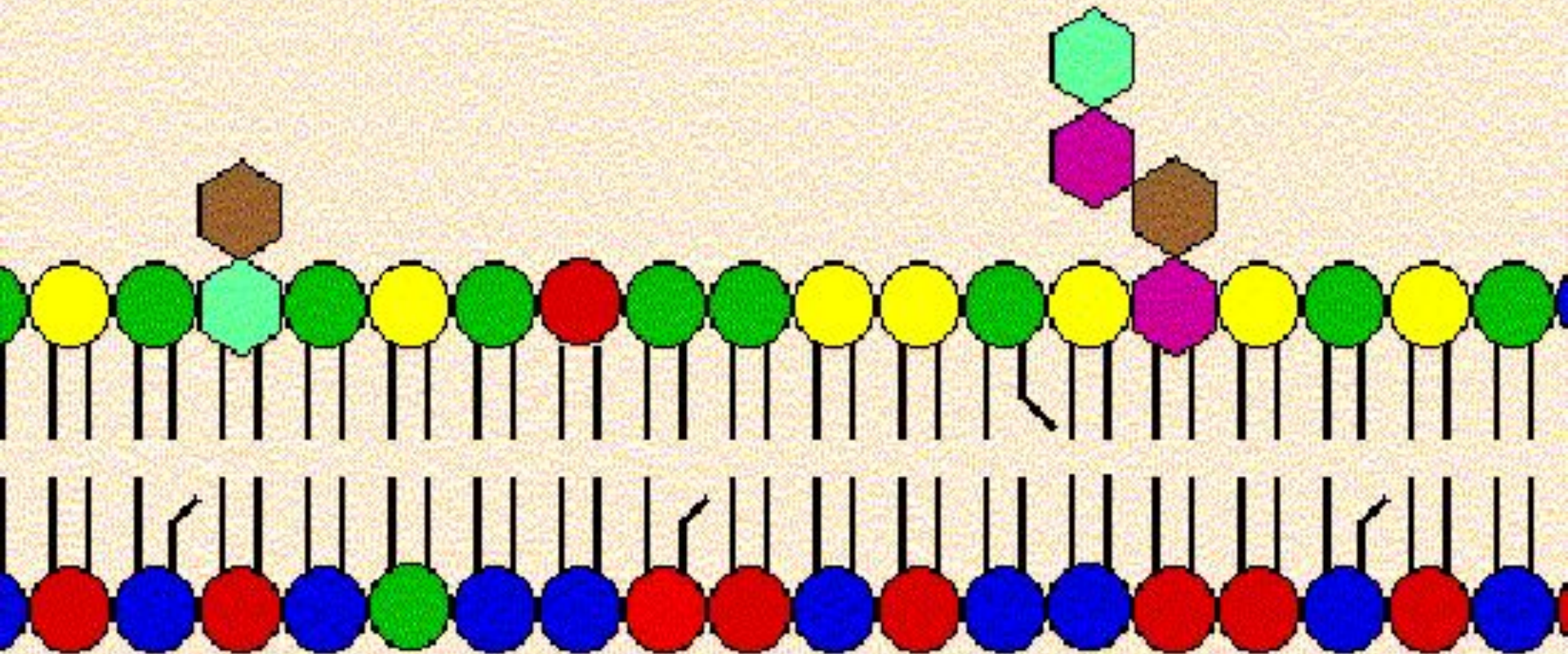


PHOSPHOLIPID MOLECULES MOTION

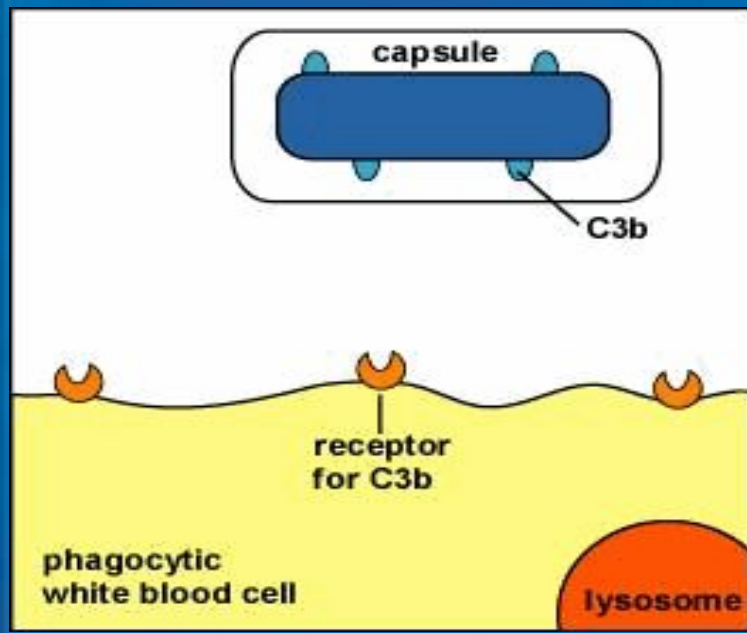
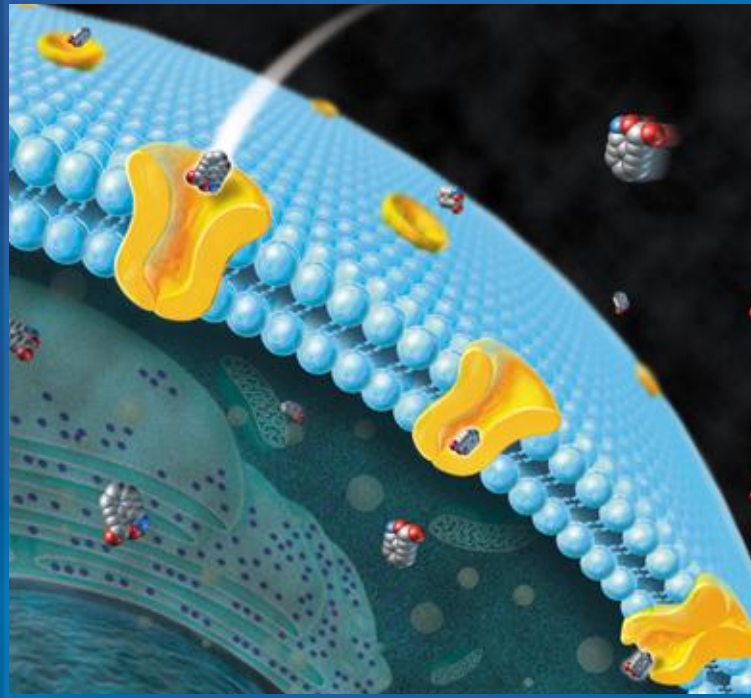
THERMAL EFFECT



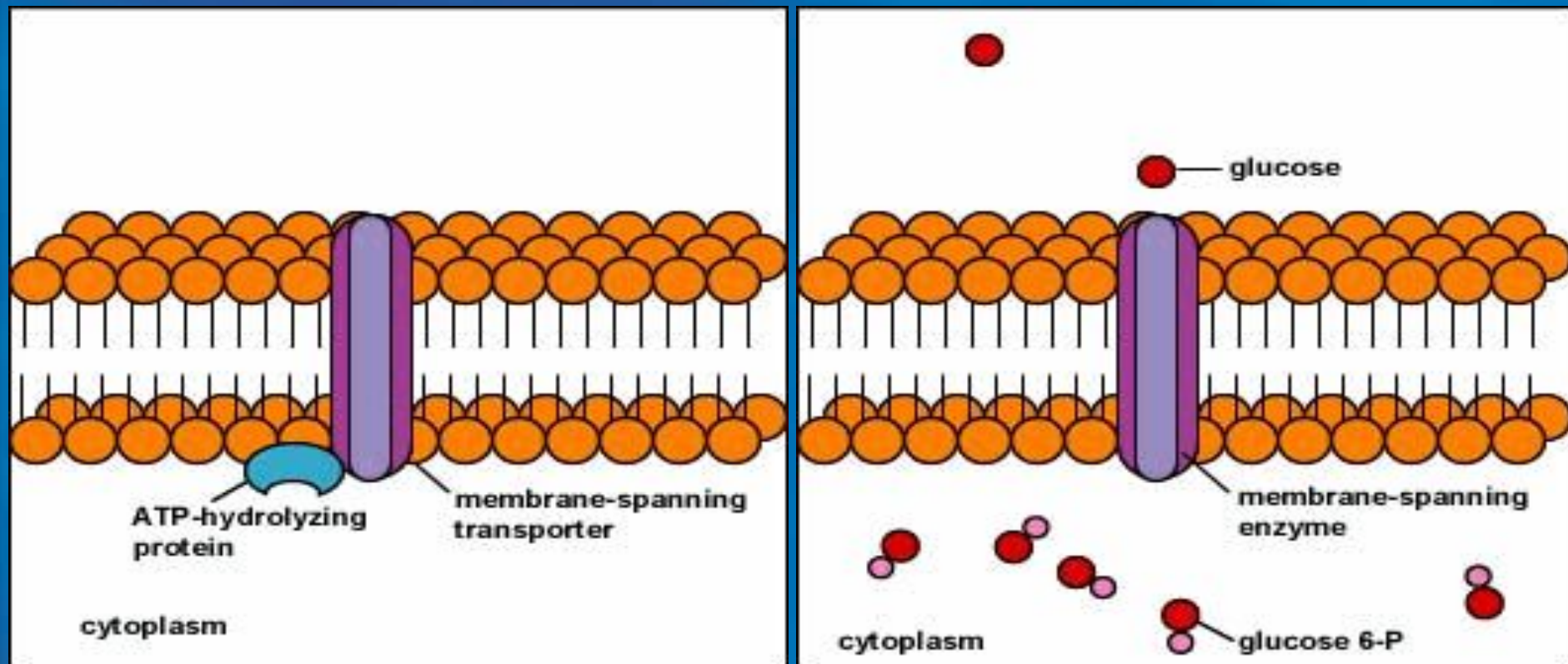
Flip-flop



BIOMEMBRANE FUNCTIONS



BIOMEMBRANE FUNCTIONS



BILIPID LAYER PENETRABILITY

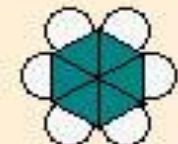
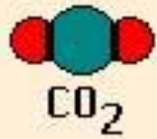
SMALL
MOLECULES

BIG
MPLECULES

IONS

GASES

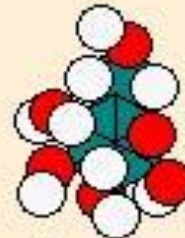
HYDROPHOBIC
MOLECULES



Benzene



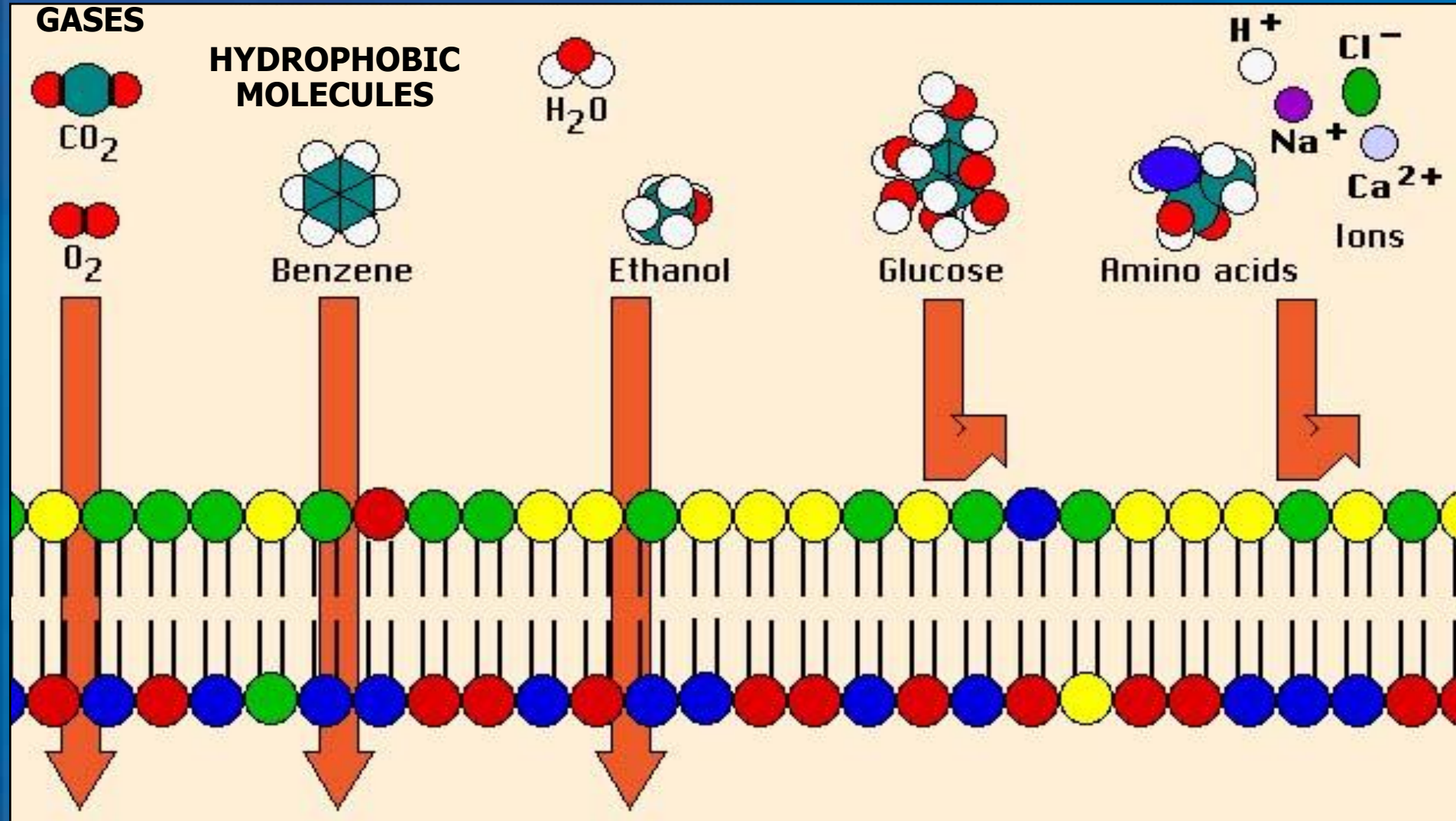
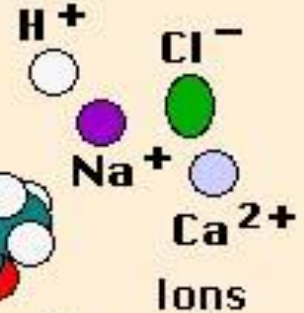
Ethanol



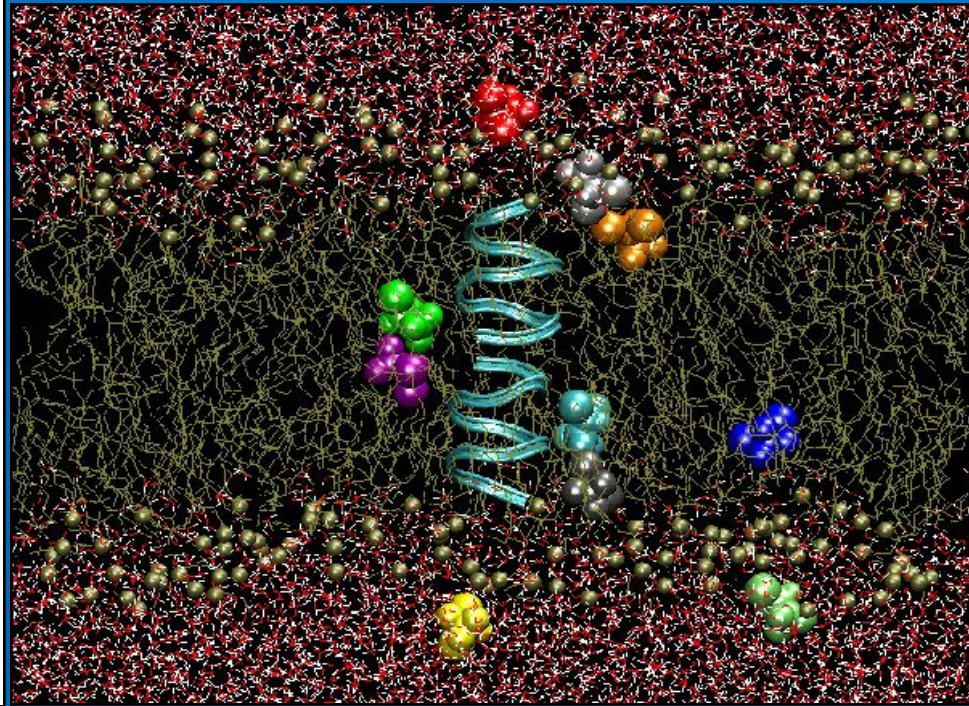
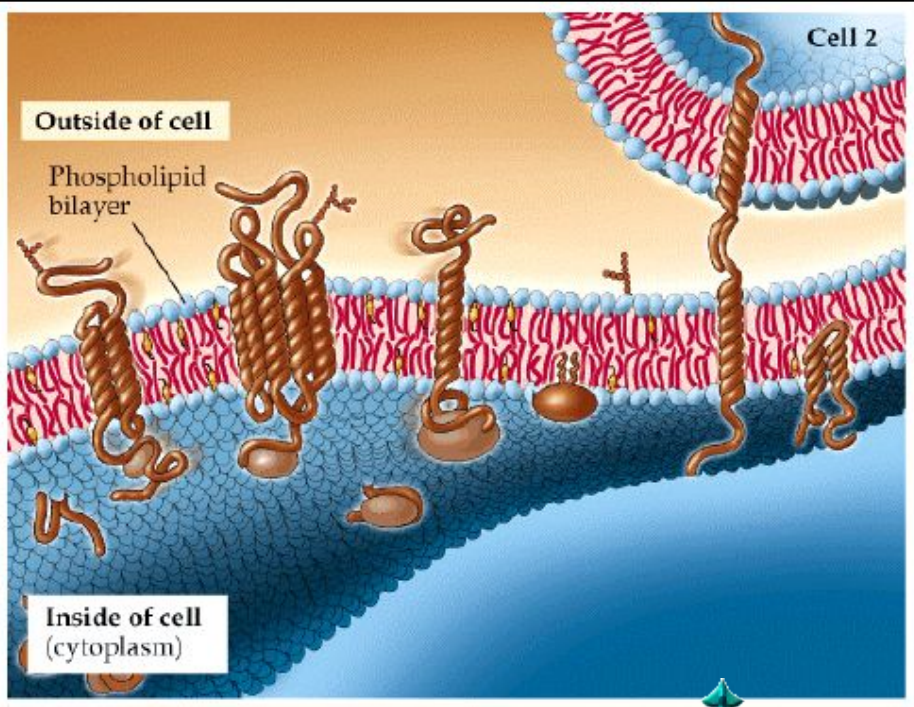
Glucose



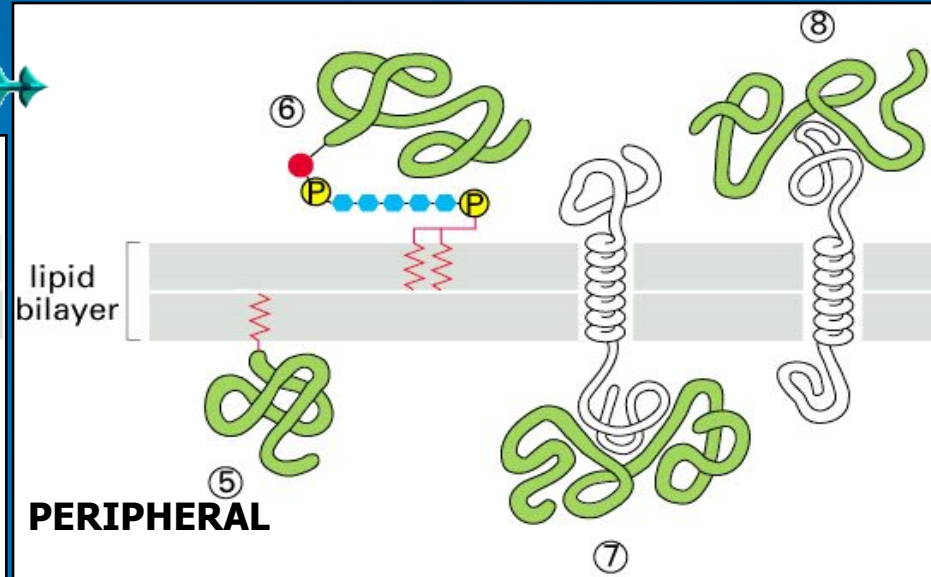
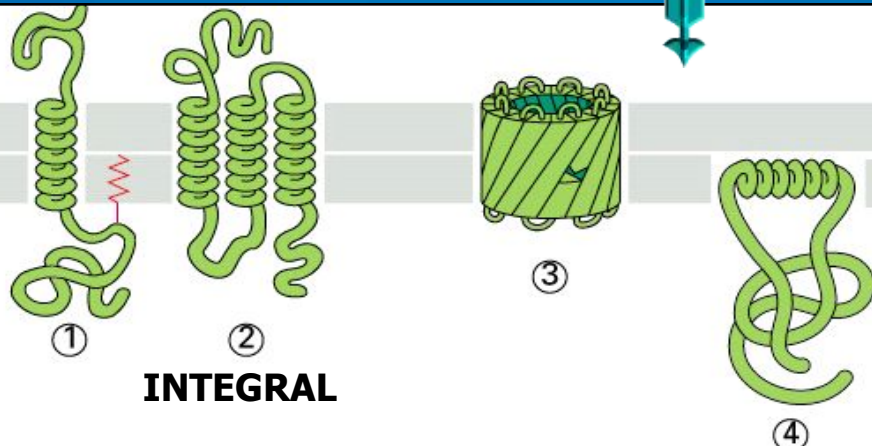
Amino acids



MEMBRANE PROTEINS

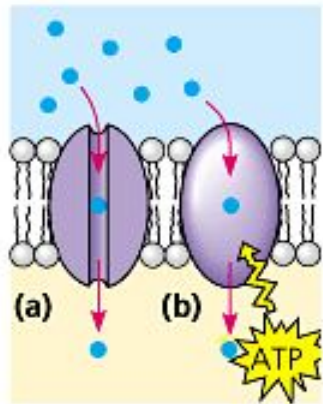


KINDS OF PROTEINS

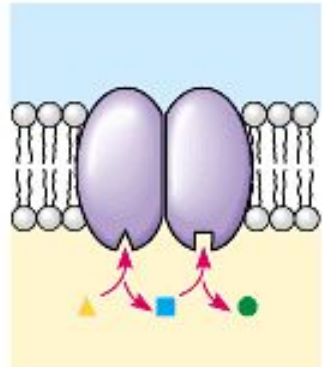


MEMBRANE PROTEINS

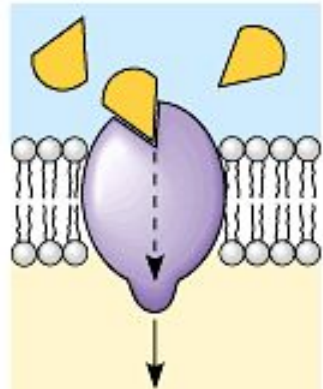
MEMBRANE PROTEINS FUNCTIONS



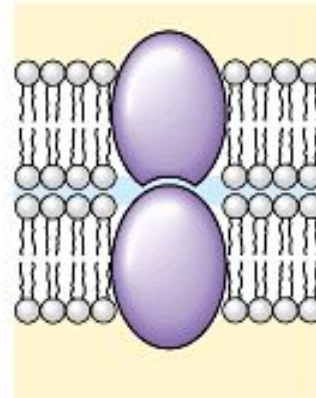
TRANSPORT
a) Passive transport;
b) Active transport



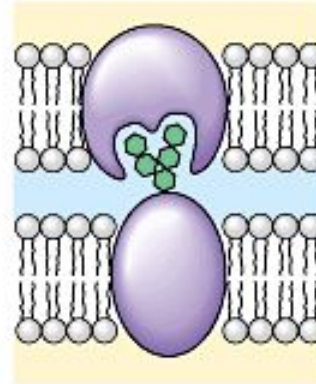
Enzymatic activity



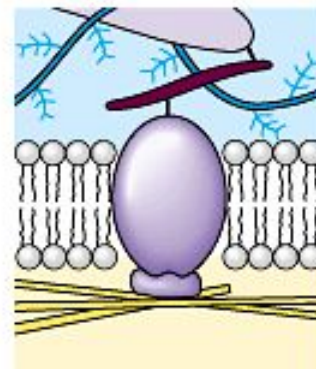
Signal transduction



Intercellular joining

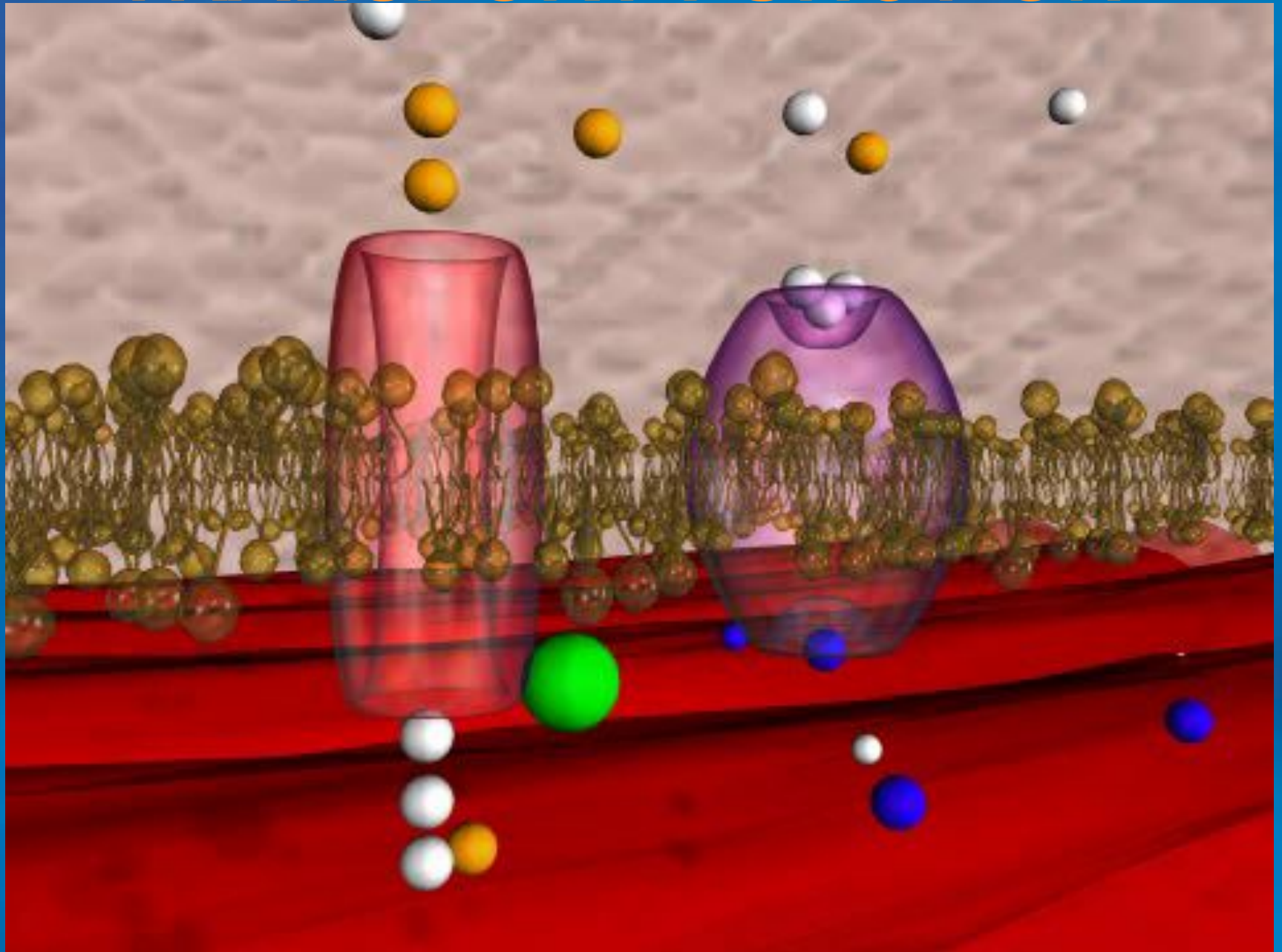


Cell-cell recognition

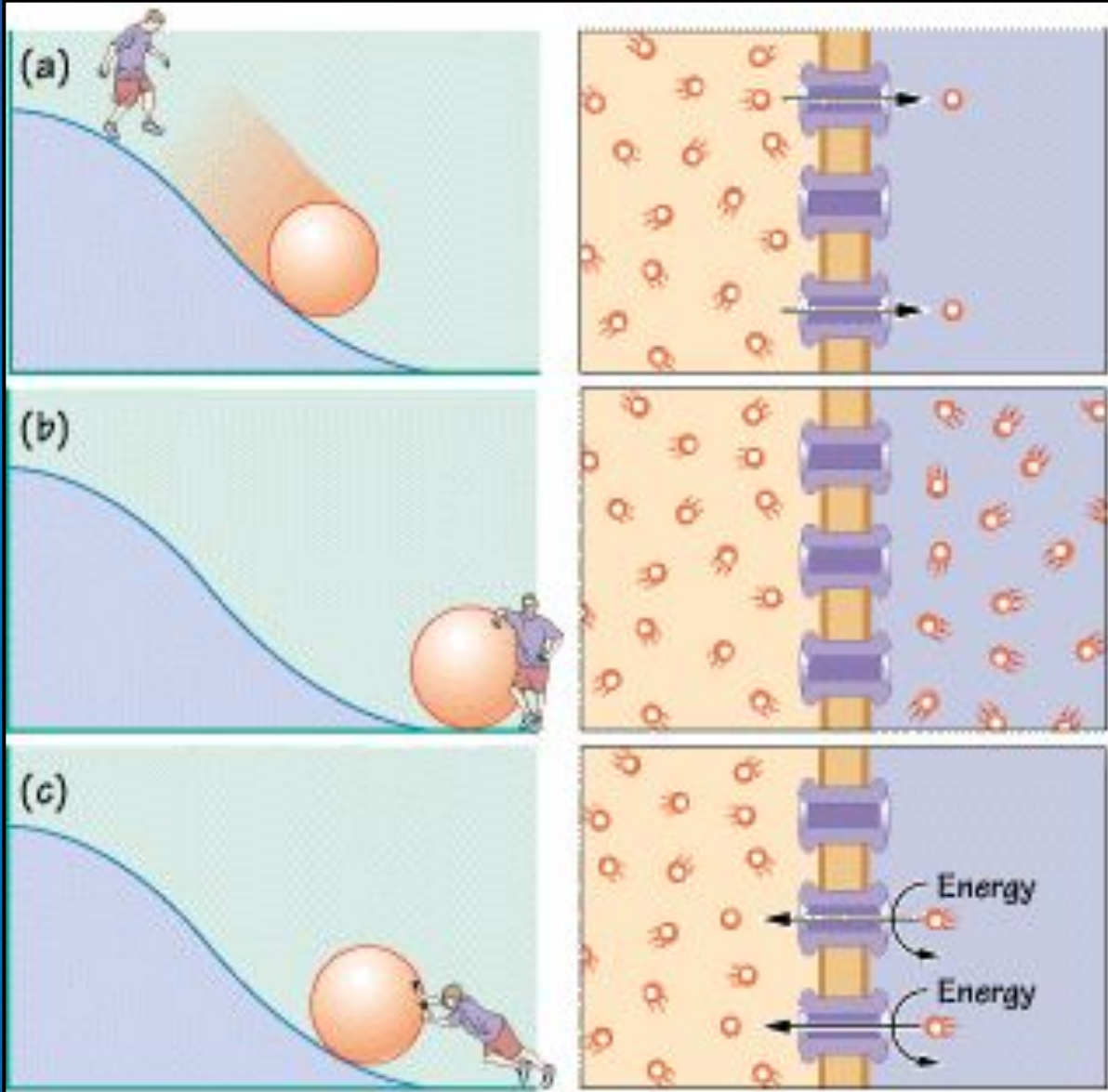


Attachment to the cytoskeleton and extracellular matrix (ECM)

TRANSPORT FUNCTION



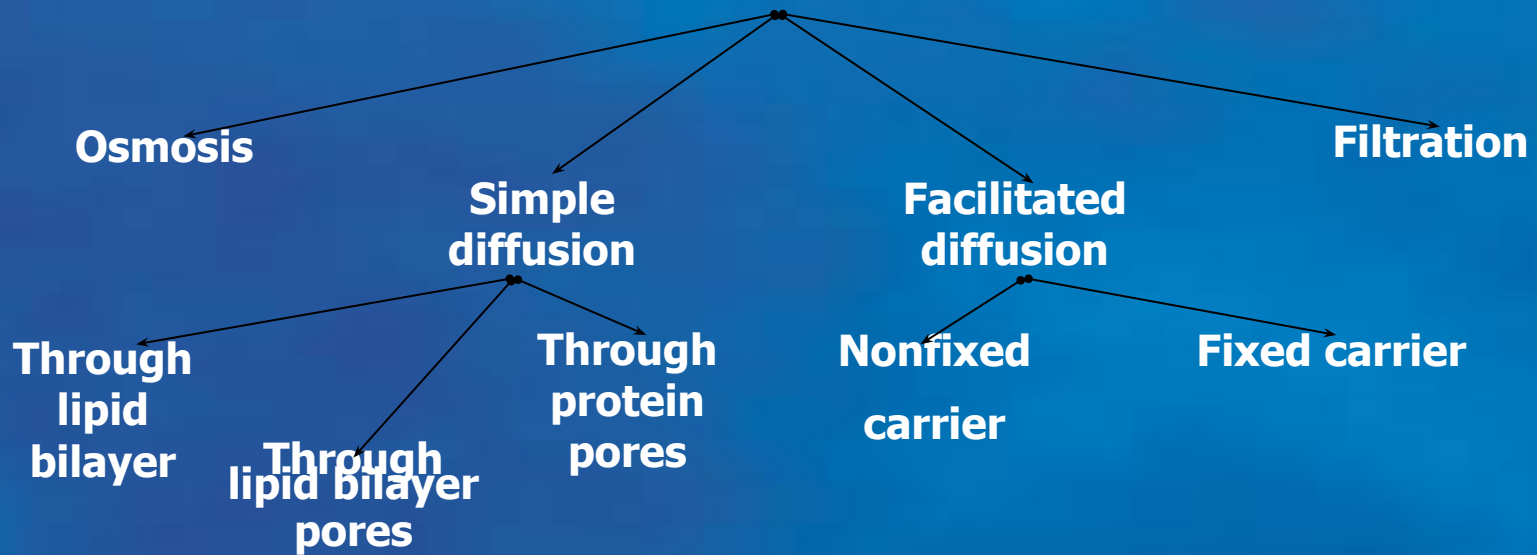
MEMBRANE TRANSPORT FUNCTION



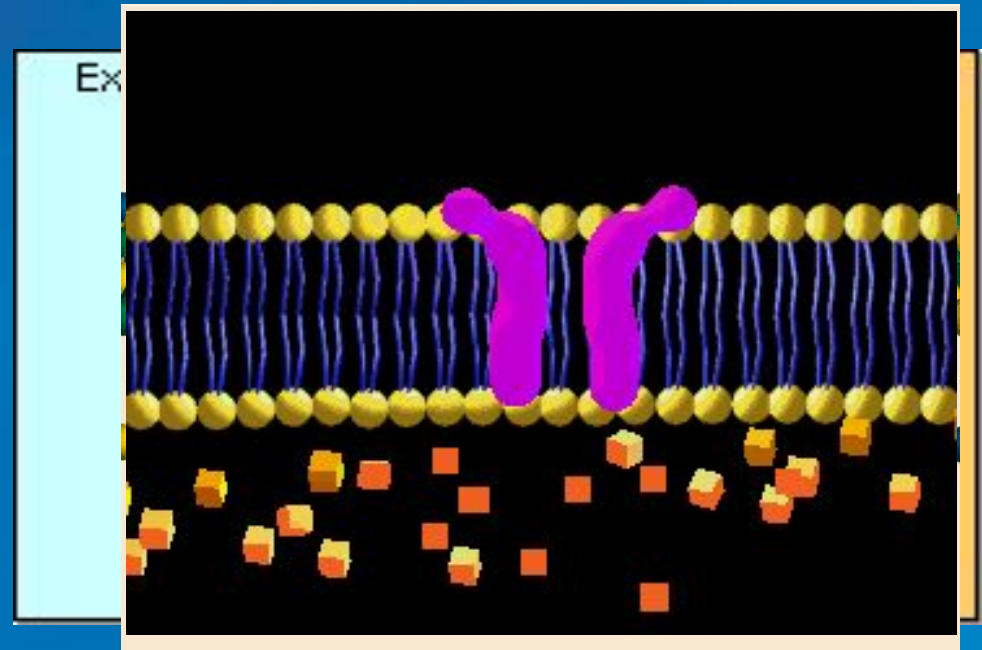
PASSIVE TRANSPORT

ACTIVE TRANSPORT

PASSIVE TRANSPORT



$$\frac{dm}{dt} = -D \frac{dc}{dx} S$$



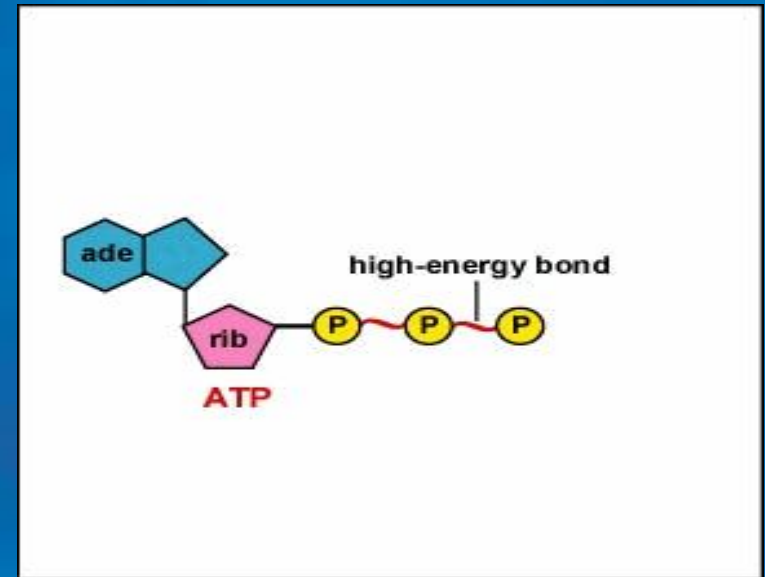
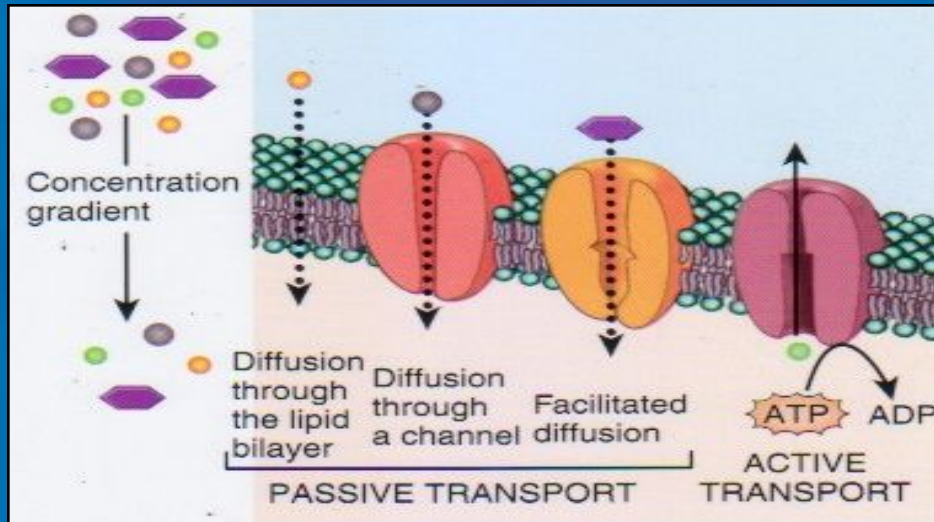
ACTIVE TRANSPORT

ION PUMPS

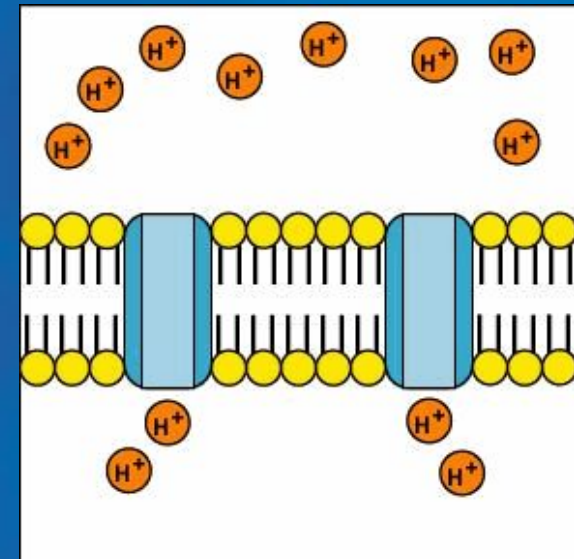
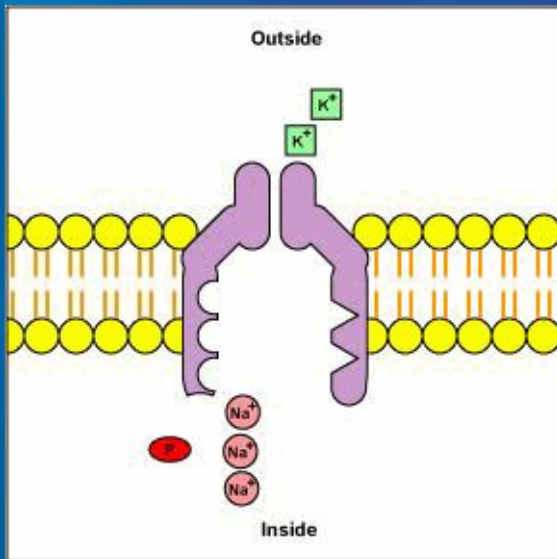
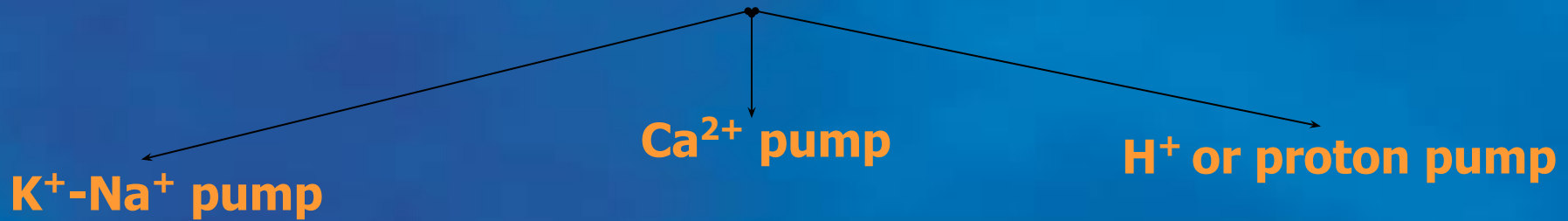
SECONDARY ION
TRANSPORT

ENDOCYTOSIS

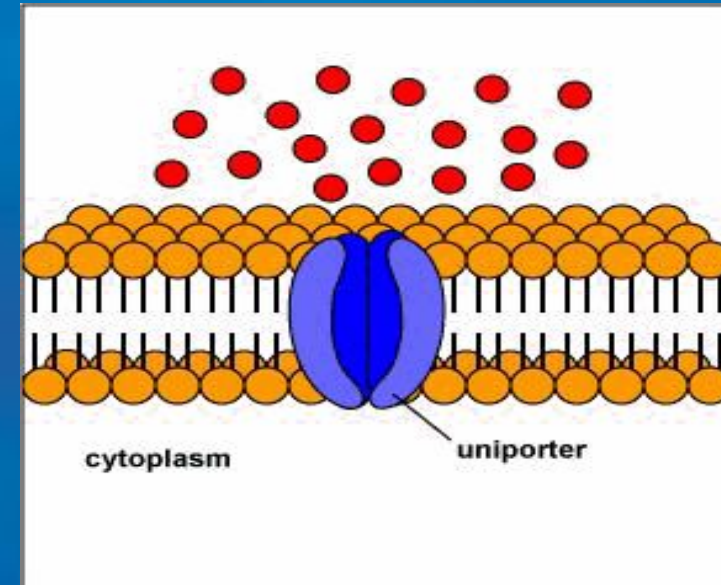
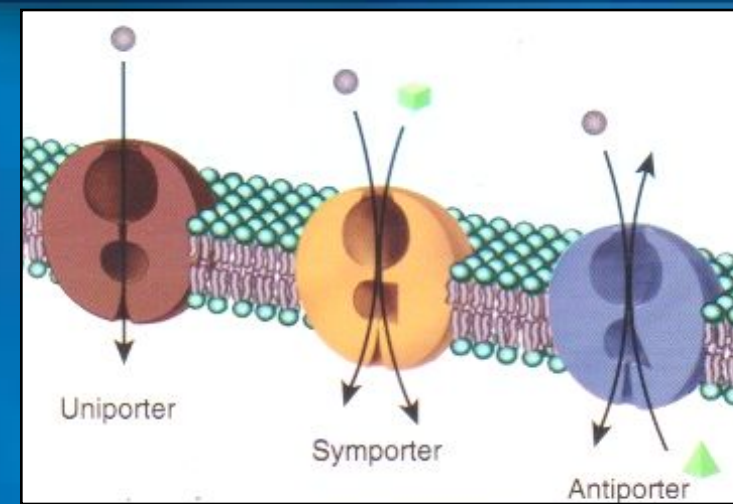
EXOCYTOSIS



ION PUMPS

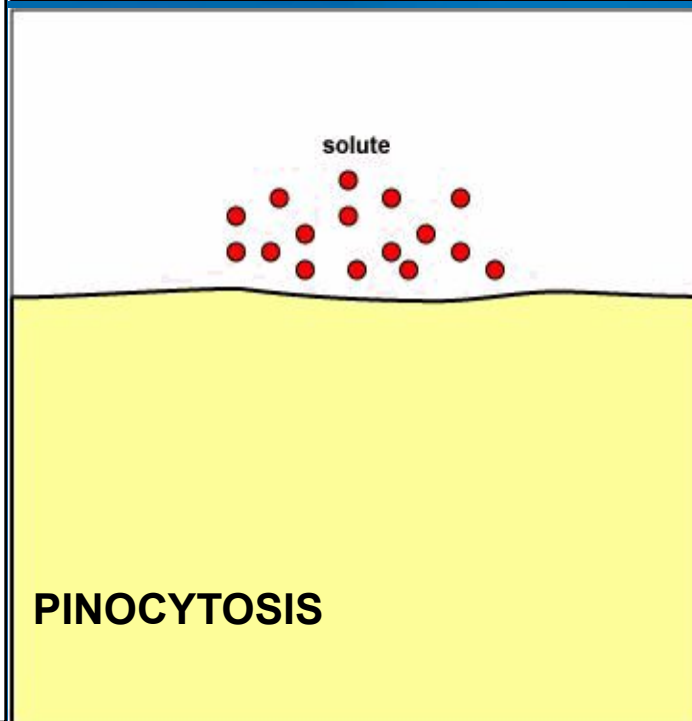
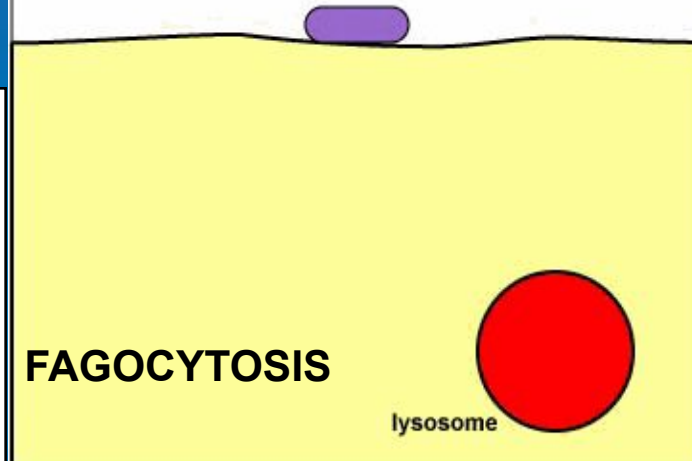
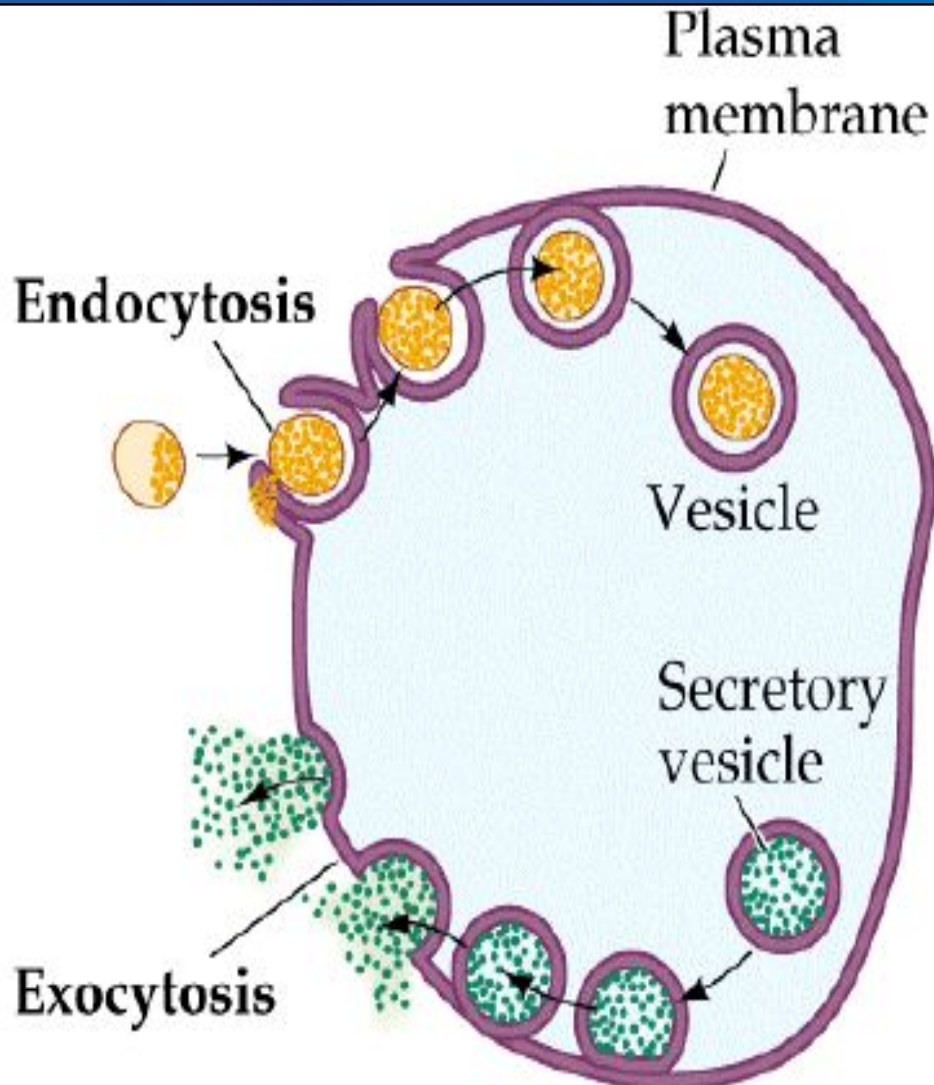


Secondary active transport



ENDO- & EXOCYTOSIS

ENDOCYTOSIS KINDS



ENDOCYTOSIS

TRANSPORT FUNCTION