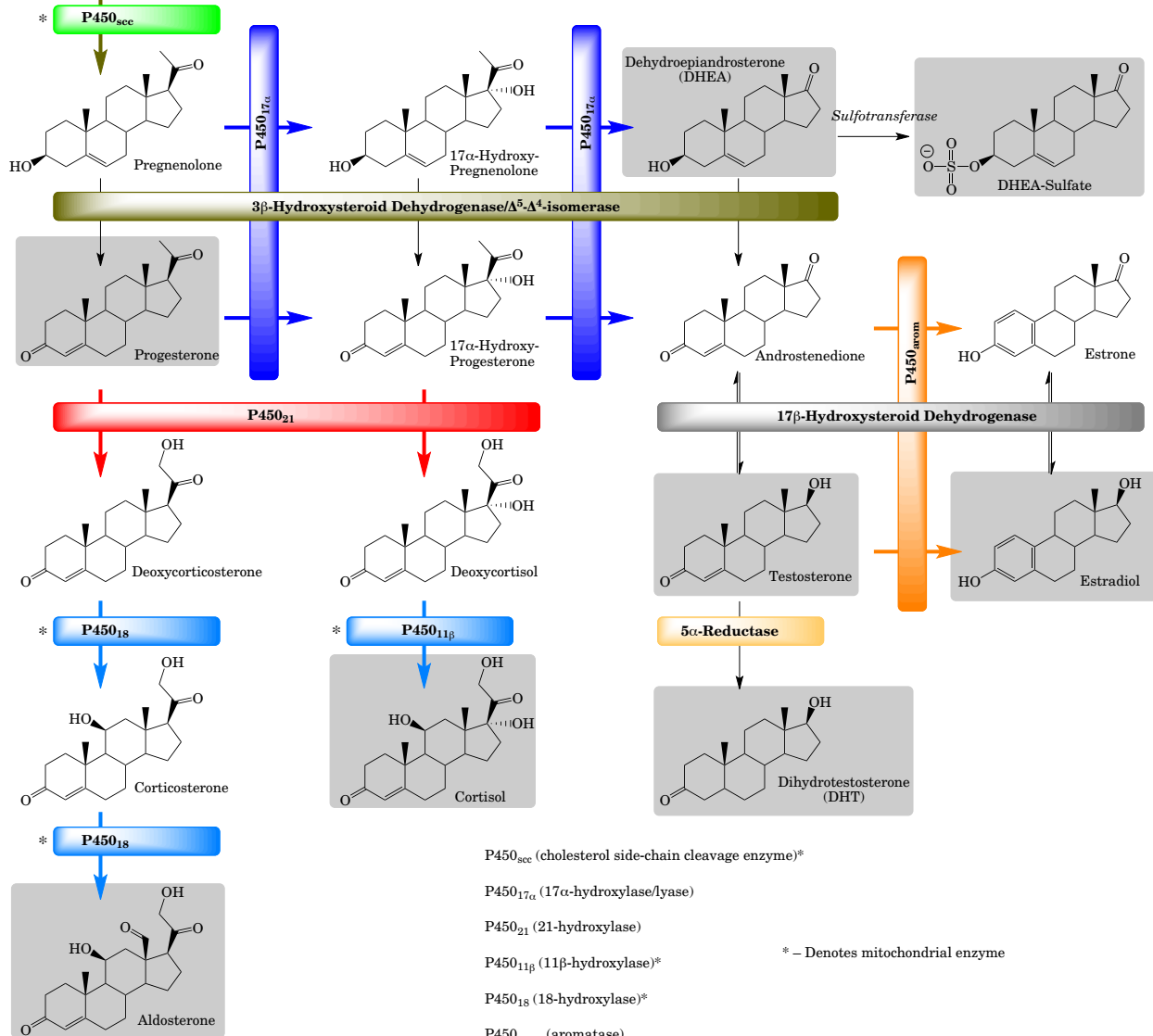
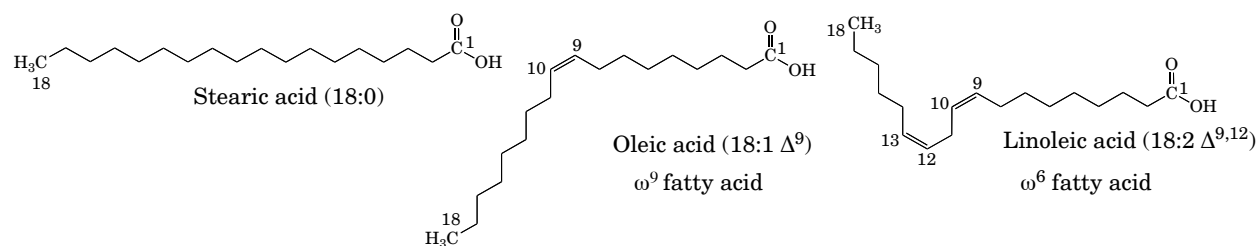
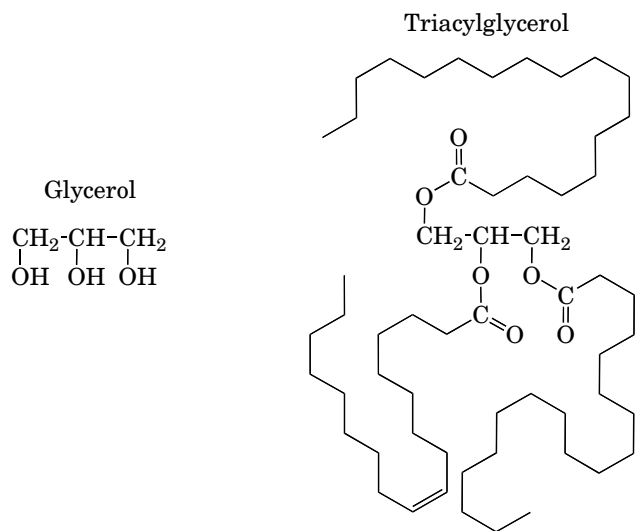


Steroid Biosynthetic Pathways

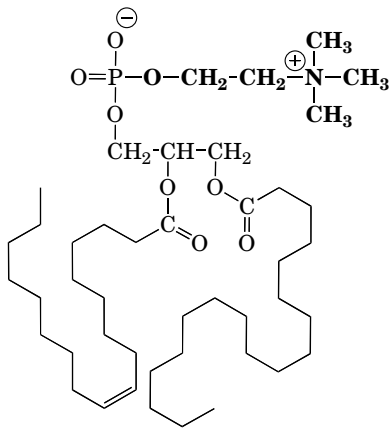




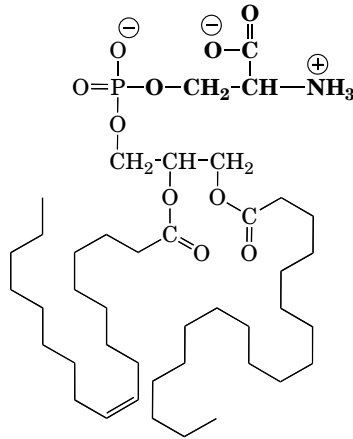
Number of Carbons	Name	Symbol	Structure	Melting Point (°C)
12	Lauric acid (dodecanoic acid)	12:0	$\text{CH}_3(\text{CH}_2)_{10}\text{COOH}$	44
14	Myristic acid	14:0	$\text{CH}_3(\text{CH}_2)_{12}\text{COOH}$	53
16	Palmitic acid	16:0	$\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$	63
18	Stearic acid	18:0	$\text{CH}_3(\text{CH}_2)_{16}\text{COOH}$	70
16	Palmitoleic acid	16:1 Δ^9	$\text{CH}_3(\text{CH}_2)_5\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$	-0.5
18	Oleic acid	18:1 Δ^9	$\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$	13
18	Linoleic acid	18:2 $\Delta^{9,12}$		-5
18	α -Linolenic acid	18:3 $\Delta^{9,12,15}$		-11
18	γ -Linolenic acid	18:3 $\Delta^{6,9,12}$		-11
20	Arachidonic acid	20:4 $\Delta^{5,8,11,14}$		-50



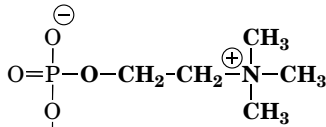
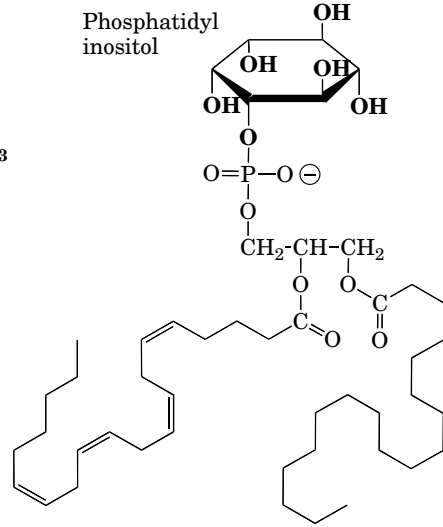
Phosphatidylcholine



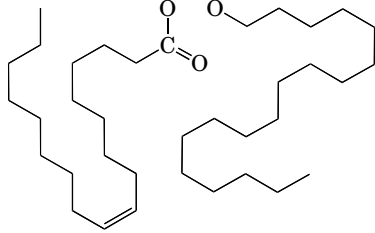
Phosphatidylserine



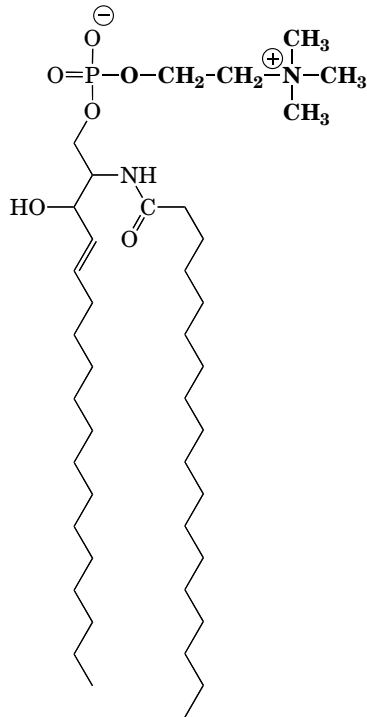
Phosphatidyl inositol



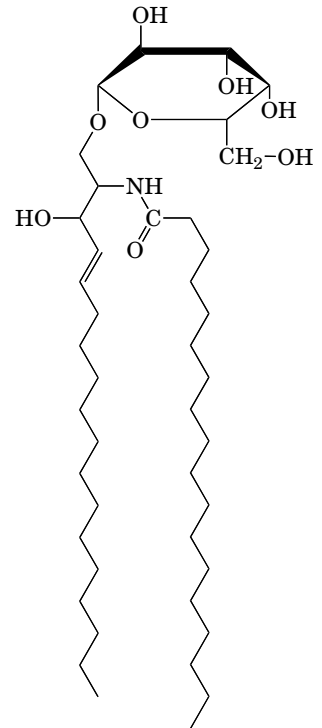
Ether phosphatidylcholine
(1-alkyl, 2-acyl phosphatidylcholine)



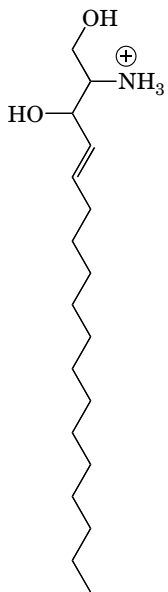
Sphingomyelin



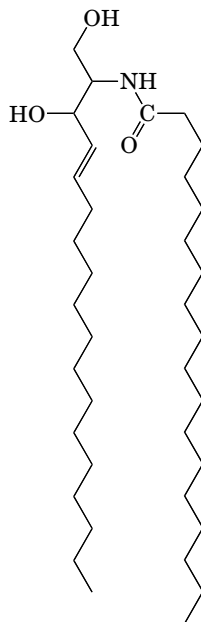
Cerebroside

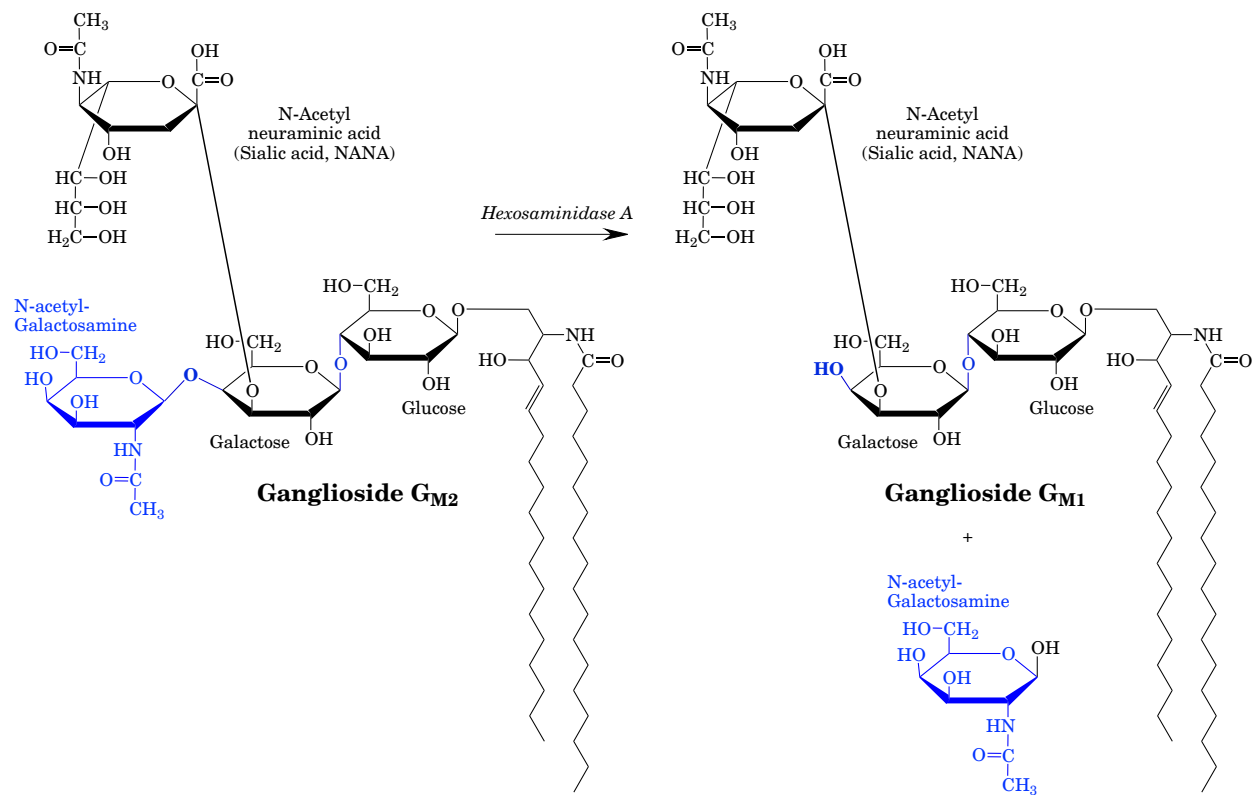


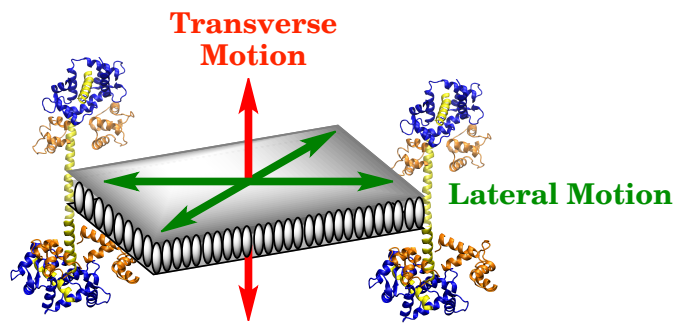
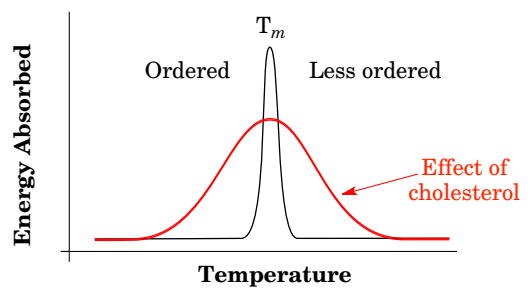
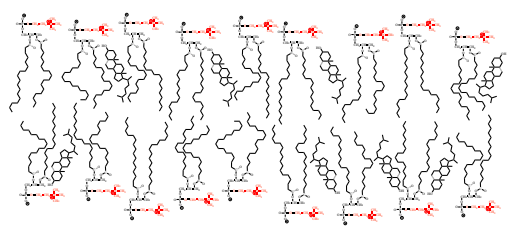
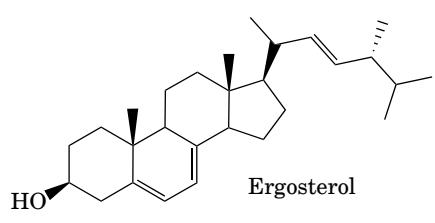
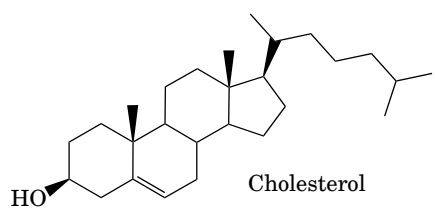
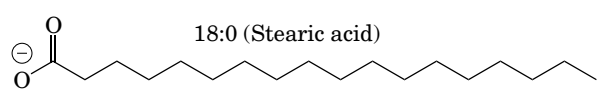
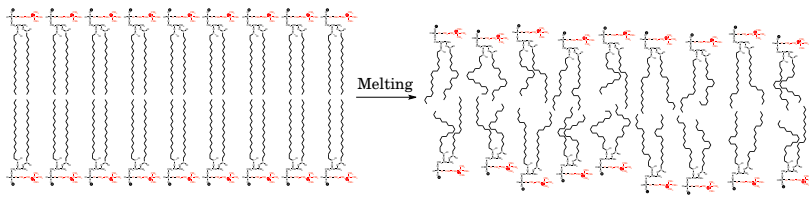
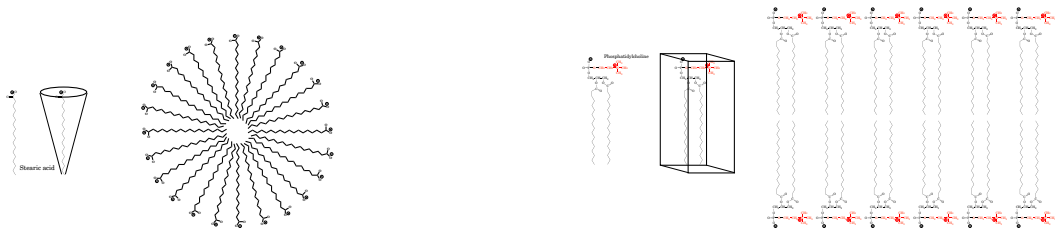
Sphingosine



Ceramide







Crossing Membranes – Thermodynamics

For **entering** a compartment:

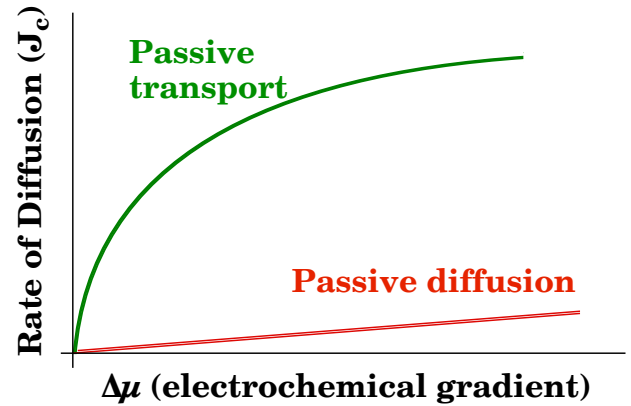
$$\Delta G = RT \ln \left(\frac{C_{in}}{C_{out}} \right) + Z\mathcal{F}\Delta\Psi$$

$$\mathcal{F} = 96485 \frac{\text{joules}}{\text{Volt} \cdot \text{mol}}$$

Crossing Membranes – Kinetics

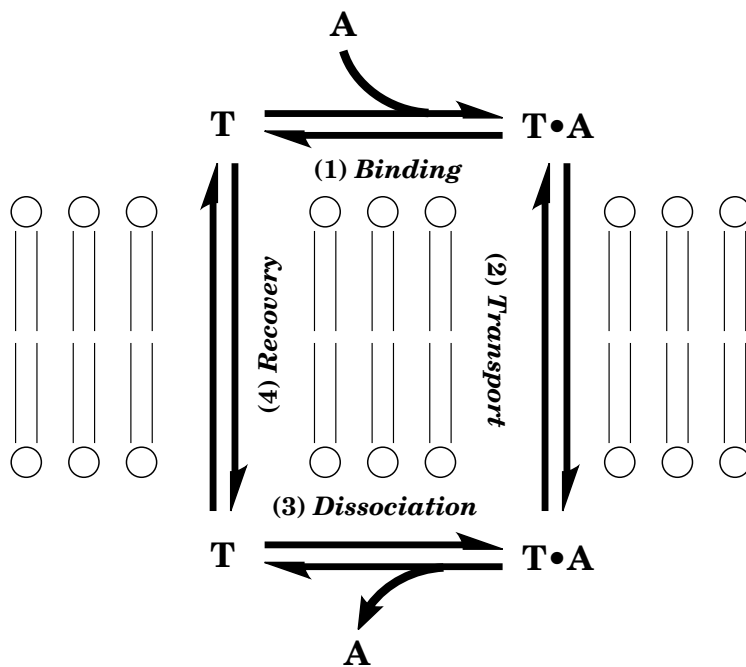
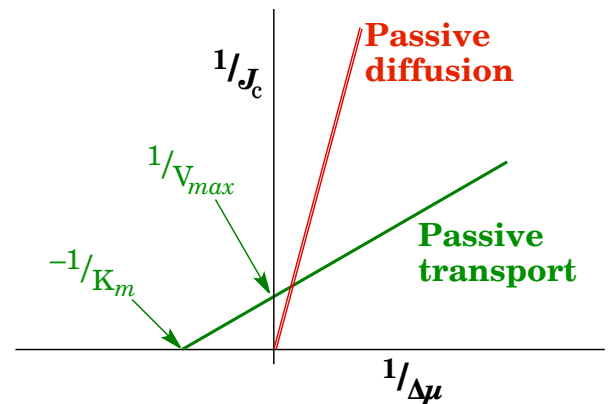
Passive Diffusion

$$J_c = - \left(\frac{KD}{x} \right) \Delta\mu$$

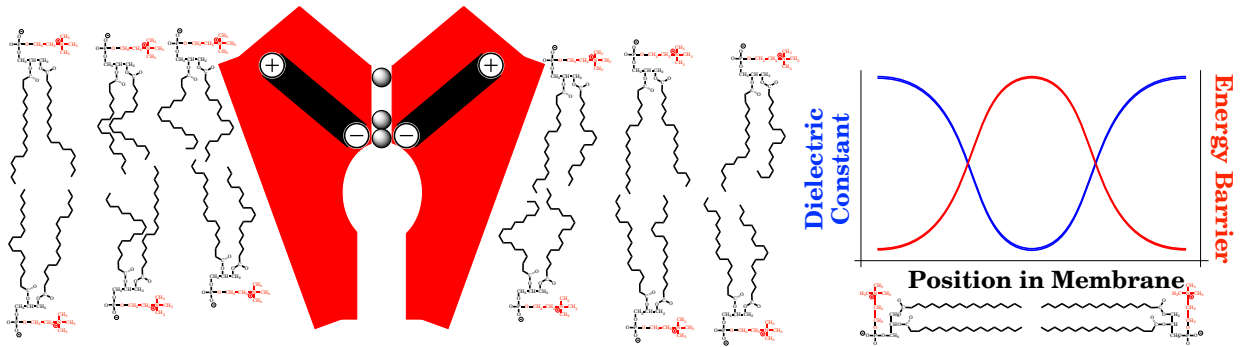
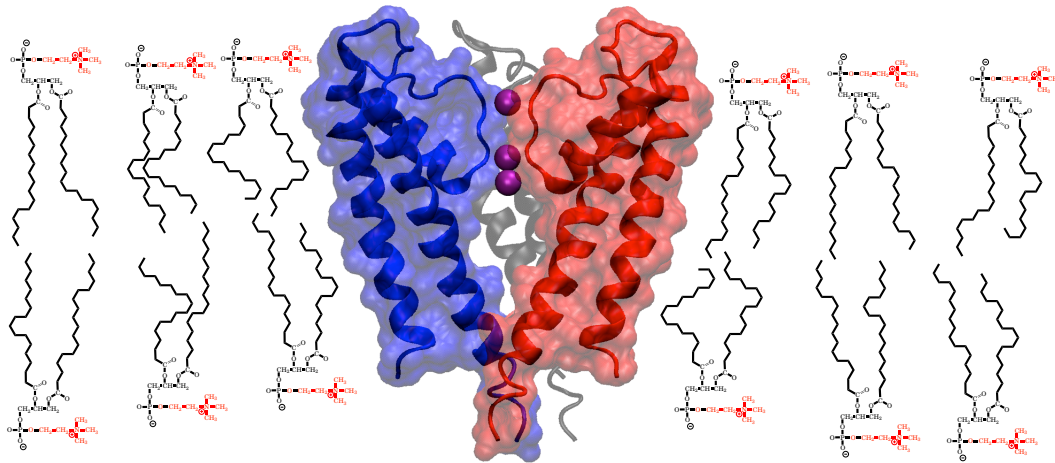


Transporters

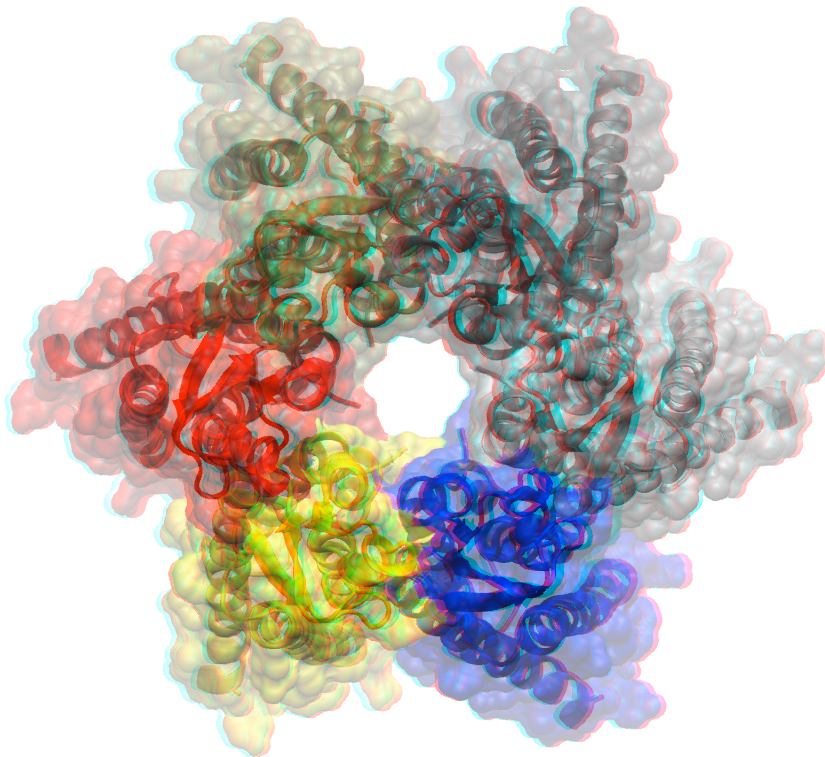
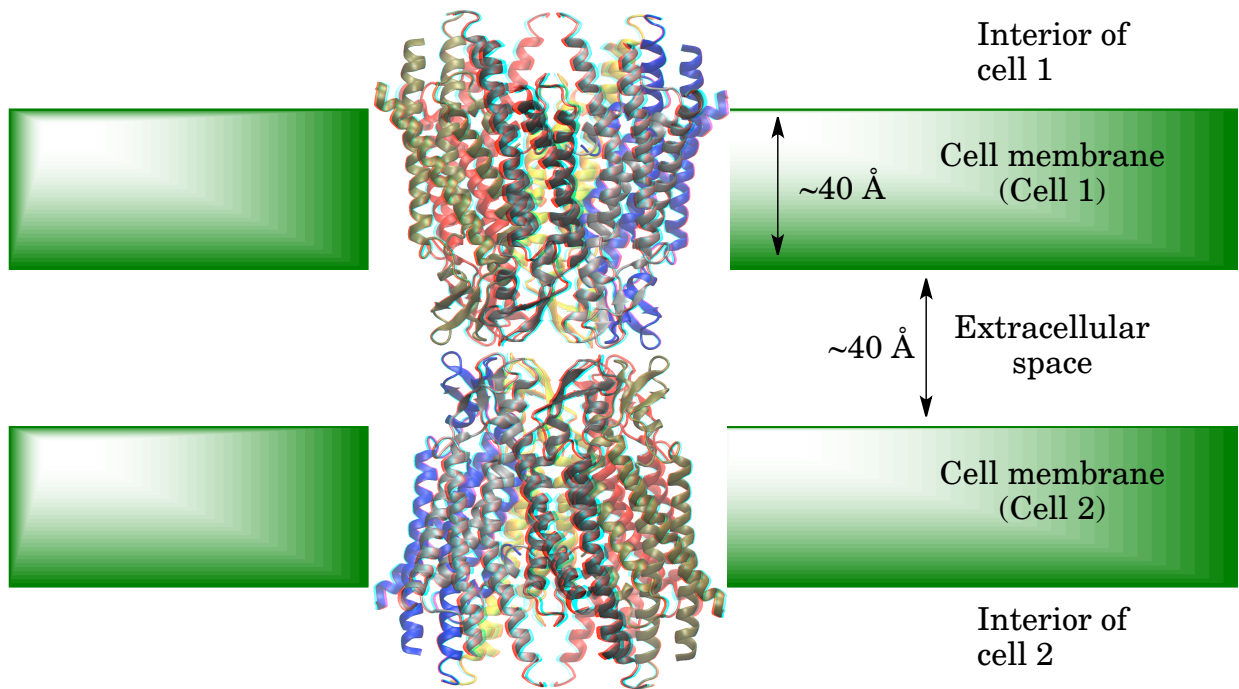
$$J_c = \frac{J_{max} \Delta\mu}{K_m + \Delta\mu}$$



Channels



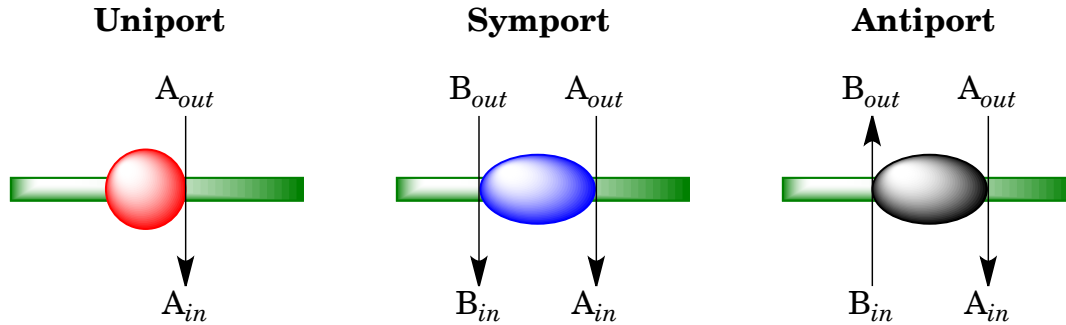
Gap Junctions



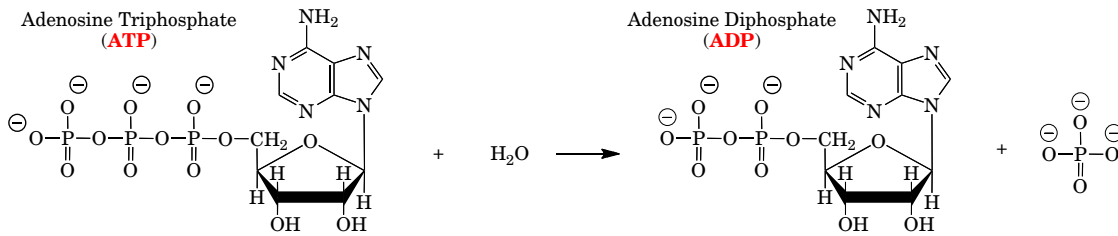
Homo sapiens connexin-26 gap junction hexamer (pdb ID 2ZW3)

Pumps

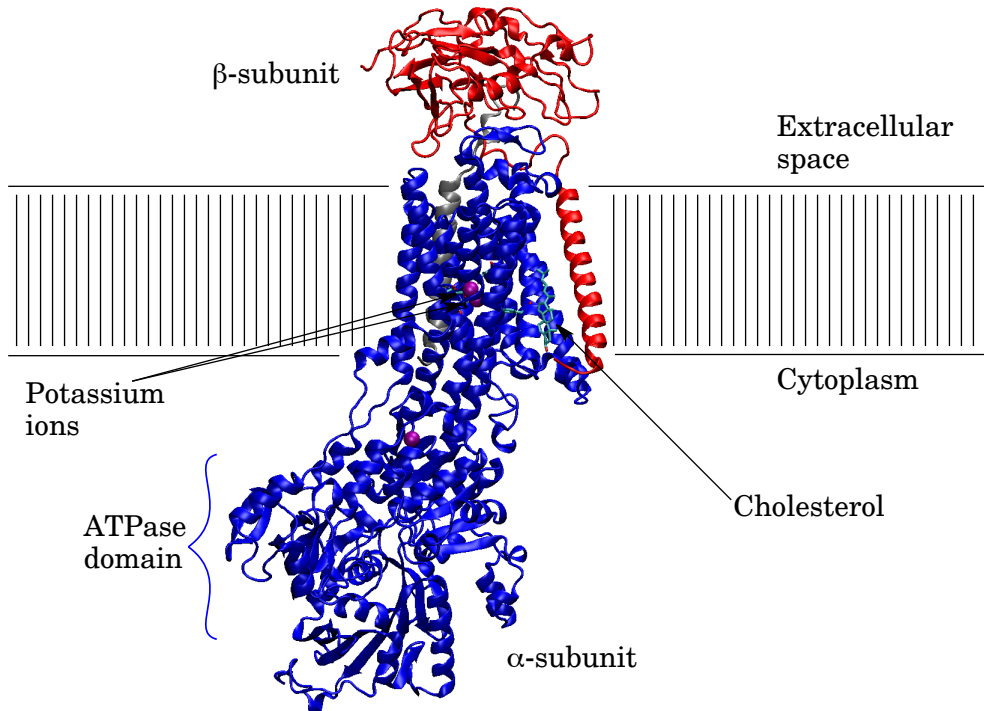
$$\Delta G = RT \ln\left(\frac{C_{in}}{C_{out}}\right) + ZF\Delta\Psi + \Delta G_c$$



A. Chemical energy-dependent a. ATPases



Na-K-ATPase



b. Electron transport proteins

B. Electrochemical gradient dependent

C. Light-dependent

