TRANSPORT ACROSS MEMBRANES

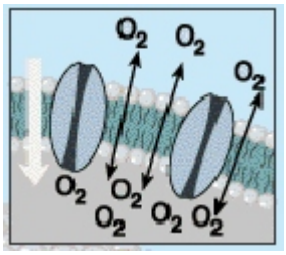
10/18/91,rvsd 10/21/92, 10/18/93, 10/14/94, 10/13/95, 16 Oct 00, 15 Oct 01, 20 Oct 03, 20 Oct 04, 17 Oct 05, 22Oct08, 19Oct09, 20Oct10, 19Oct11
BKH: 201-231, 5th: , 6th: 191-203, 7th:

Accumulation of solutes in cell is usually against concentration gradient,

Types of transport:	**Cellular**	uptake of glucose
(p 195)	**Intracellular**	in/out of organelles
	transcellular	GI track uptake of nutrients

PASSIVE TRANSPORT occurs *in the direction of electrochemical gradient* (memb potential + conc):

DIFFUSION Movement of a solute from an area of high concentration to low.
Rate of simple diffusion affected by property of solute: O_2, CO_2, H_2O move easily
Classes of diffusion: http://www.youtube.com/watch?v=JShwXBWGMyY

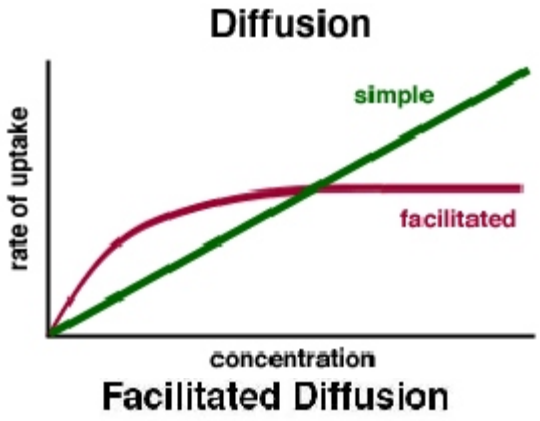


Bangham made **liposomes** with K^+ or Na^+ trapped, stable for days, conclude:
ions do not cross membrane barrier without help.

factors affecting *rate of diffusion* (see table 8-1, p 199)

major	**Ionization:**	ionic species **do not pass** well
less	**Polarity:**	the less polar, the faster diffusion (add non-polar groups increases rate)
smallest	**Size:**	smaller than glucose OK, if <, needs help

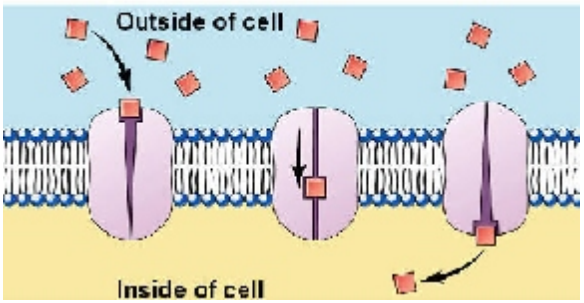
GRAPH: (Fig 8-6, p 202)
***simple diffusion* displays no saturation, facilitated does (hyperbolic).**
Comparing CO_2 (linear) and glucose (saturation curve) entry into cell.



Why the difference?
What does the hyperbolic curve remind one of?
Enzyme saturation curve.

FACILITATED DIFFUSION
(requires a carrier protein for large molecules)

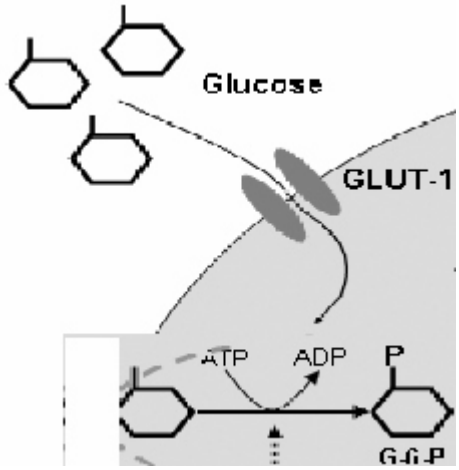
FACILITATED TRANSPORT (as for glucose),



Facilitated Transport	is required for most polar and ionic species, display substrate saturation
Carrier proteins	are integral membrane proteins, permeases, or transport proteins.

Carrier proteins act like enzymes, binding, release, can be saturated, have a V_{max}

Mechanism? not flip-flop, probably **hydrophilic channel**
(See glucose facilitated transport: p 204)



non directional: facilitates both ways.

EX: glucose PO_4ylated immediately, makes reverse diffusion impossible (page 205)

coupled passive transport: ATP diffusion out of mitochondrion coupled with ADP inward

ACTIVE TRANSPORT: Requires energy (couple to energy yielding reaction)