Skills to Develop

• define flux (J) of solute (A) across a membrane;
• write mathematical relationship that show how flux J depends on the concentration gradient of solute across the membrane \((\frac{dA}{dx})\) and also on the difference of solute concentration across the membrane \((\Delta A)\) for passive diffusion;
• differentiate between passive diffusion, facilitated diffusion mediated by a receptor transporter, and active transport
• write chemical equations which show the physical steps in the process of passive and facilitated diffusion
• derive a mathematical equation and graphs which shows the dependencies of flux J as a function of Aout and AR for facilitated diffusion assuming rapid equilibrium binding of;
• differentiate between carrier proteins, permeases or transport proteins on one hand and channels on the other;

This chapter will discuss diffusion processes. First, diffusion equations will be derived for cases not involving a binding receptor. The equation will show the rate of diffusion of a solute across a membrane from a region of high concentration to a region of low concentration \((\Delta \mu < 0)\) is a linear function of \((\Delta L)\) across the membrane. Next we will derive equations for receptor-mediated diffusion across a membrane - facilitated diffusion. We will deal with the situation when the solute must be transported up a concentration gradient (which requires ATP as an exogenous source of energy), a process called active transport.

• Topic hierarchy

Contributors

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