

**Active Transport      vs.      Passive Transport**

both processes move things in & out of cells  
both processes occur in living things

**requires E** to move subst  
moves **against concent**  
**gradient**

moves from **low-->high**  
moves against natural flow  
must be able to make E  
to move substances  
can **ONLY** occur w/in  
living systems  
examples: endocytosis,  
exocytosis,  
protein pumps

**no E** required to move subst  
moves **down concentration**  
**gradient**

moves from **high-->low conc**  
moves with the natural flow  
passage is due to inherent E  
present w/in substances (e-)  
can occur in living, nonliving, &  
artificial systems  
ex: diffusion, osmosis, facilitated  
diffusion

## Passive Transport

already discussed 2 examples: **diffusion & osmosis**

**facilitated diffusion:** molecules move down concentration gradient w/help of transport proteins in cell membrane

helps diffusion proceed faster

transport proteins can form channel to help ferry substance across membrane

examples of **Active Transport:**

**Exocytosis:** moves things out of cells by putting substance into vesicle  
the vesicle moves to cell membrane, fuses with cell membrane, is released to outside of cell

these items are moved by bulk transport because they are too large to get in and out of the cell by diffusion, require E to move, and are against concentration gradient

examples are proteins, hormones, polysaccharides

**Endocytosis:** moves things inside cells  
again, these substances are too large to move in by diffusion, requires E, and goes against concentration gradient  
substance comes to cell membrane, membr pinches inward around substance, closes around it forming vesicle, then vesicle moves inside cell

both of these require E due to movement of cell membrane

**Protein pumps:** proteins embedded in cell membrane actively move ions either inside or outside of cell  
ex.  $\text{Na}^+$  and  $\text{K}^+$  pump in nerve cells