Ch. 5 Cont.: Phospholipids II

- Selectivity of ion channels:
  - A sodium ion is smaller than a potassium ion
  - hydrated ions have different shell sizes
  - when ions are in solution they are hydrated; so there's a shell around any given ion in a solution (hydration shell)
  - ions must become dehydrated to pass through an ion channel (get rid of hydration shell)
  - carbonyl groups: parts of the amino acids that stick into the selectivity pore
  - spacing of potassium & sodium carbonyl groups differ
  - carbonyl groups replace (dehydrate) the water around ions (water around ions are the hydration shell around ions)
    - it is probably dehydration energy (ability to strip off the water from these ions) that's the primary determinant of ion selectivity in the pore region of ion channels
  - what determines where carbonyl groups go is DNA (protein must fold up in correct orientation)
    - this allows the carbonyl groups to be perfectly spaced
- Water is moved through osmosis
  - there are no water pumps, or water transporters
    - all water movement across our cells is an indirect process (our cells have no direct way of controlling water movement across their membranes)
  - there are water channels (aquaporins), but these aren't passive
  - osmosis: water simply follows salt
  - animals balance water & electrolytes in tandem to maintain an environment conducive to cellular function
  - so salt is moved & water will follow it via osmosis
  - diffusion: the movement of any molecule down its concentration gradient (form areas of higher concentration to areas of lower concentration- in this case, across a selectively permeable membrane)
  - osmosis: water moves from areas of higher water concentration to areas of lower water concentration
  - water can cross the membrane on its own (just not as effective)
    - must cross 2 cell membranes (must go into the cell & outside the other side of the cell to leave)
- Water Movement Process
  - Sodium Potassium pump creates an electrochemical gradient
    - creates an electrochemical gradient by having an imbalance of sodium ions & potassium ions (3 sodium ions moves, & 2 potassium ions move)
    - this creates an uneven distribution of charge