D3, 30 JANUARY 2008

ECOL 437 LAB/DISCUSSION GROUP

hyponatremia ("water intoxication")

1. serum osmolality decreases
2. cells try to maintain gradients by:
   i. Na+ leaves cell
   ii. Water diffuses into cell
3. fluid in lungs, swelling of brain tissue, coma, death…

Equilibrium Potential

Nernst Equation (in V):

$$E_x = \frac{0.058}{z} \log \frac{[X]_{out}}{[X]_{in}}$$

Goldman Equation (in V) :

$$V_m = .058 \log \frac{P_K[K+]_{out} + P_{Na}[Na+]_{out} + P_{Cl}[Cl-]_{in}}{P_K[K+]_{in} + P_{Na}[Na+]_{in} + P_{Cl}[Cl-]_{out}}$$

Equilibrium Potential

- Calculate for a given type of ion using the simplified Nernst Equation:

$$E_x = \frac{0.058}{z} \log \frac{[X]_{out}}{[X]_{in}}$$

$$E_{Na} = \frac{0.058}{z} \log \frac{[Na^+]_{out}}{[Na^+]_{in}}$$

$$E_{Na} = \frac{0.058}{1} \log \frac{120\ mM}{10\ mM} = .063\ V = 63\ mV$$

remember Equilibrium potential (E_x in mV)
when [X] gradient = electrical gradient