Molecular Biology Through Discovery

Problem Set 2: Strategies of Life

SL.1. Which of the following are hydrophobic? Hydrophilic? Amphipathic?

A. vinegar
B. skin
C. tooth paste
D. sugar
E. wax
F. rabid dogs

SL.2. In general, hydrophilic molecules have a difficult time passing cell membranes unless the cell makes accommodations for them. Presuming there are no such accommodations, which of the following molecules would not easily get into a cell?

A. sodium
B. sugar
C. ethanol
D. amino acids

SL.3. Consider that at an air-water interface, amphipathic molecules expose their hydrophobic surface to air. Draw a picture of what a soap bubble might look like at the molecular level, using a long-sticked popsicle to represent a molecule of soap.

SL.4. Some potent antiseptics are amphipathic molecules consisting of a long chain alkane on one end and a positively charged ammonium group on the other. How do you suppose they fit into a membrane? (Draw a picture)

SL.5. Phospholipase A2 is an enzyme commonly found in snake venom that acts by cutting off one of the two fatty acids on phospholipids. Draw a picture that shows how extensive action of the enzyme might affect the structure of a cell membrane.