

Introduction to Bioinformatics

Problem Set: Strategies of Life

1. Which of the following are hydrophobic? Hydrophilic? Amphipathic?
 - A. vinegar
 - B. skin
 - C. tooth paste
 - D. sugar
 - E. wax
 - F. rabid dogs

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? In each case, draw a cartoon of how water might interact with the atom or molecule.
 - A. sodium
 - B. sugar
 - C. ethanol
 - D. amino acids

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.

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)