

Problem Set - Membranes & Membrane Proteins

1. Consider the experiment conducted by Gorter and Grendel in 1925. Describe the experimental procedure, and what experimental variables could affect the interpretation of their results.
2. A 200 mL solution of n-Decyl- β -D-Maltopyranoside is prepared in a standard 250 mL beaker at a concentration of 10 mM in 150 mM NaCl, 20 mM MOPS, at pH 7.0.
 - (a) Calculate the concentration of free detergent monomers in solution.
 - (b) What is the fraction of detergent molecules in the monolayer?
 - (c) What is the fraction of detergent molecules in the micelle form?
3. Find the common names for the following fatty acids chains:
 - a. C4:0
 - b. C6:0
 - c. C8:0
 - d. C10:0
 - e. C12:0
 - f. C14:0
 - g. C16:0
 - h. C18:0
 - i. C20:0
 - j. C22:0
3. Draw a graph that shows the change in bilayer thickness as a function of increasing tail length from C12:0 to C22:0.
4. Explain why PE has a higher T_m than PC lipids?
5. Explain why the free energies for amino acid partitioning are larger for the Radzicka scale compared to the Hessa scale.
6. Calculate the resting membrane potential for a cardiac myocyte (look up the appropriate ionic concentrations).
7. Explain how the selectivity filter of the potassium channel achieves selectivity for K^+ over Na^+ .
8. Describe three factors that affect transport kinetics in an ion efflux measurement.
9. Describe a method for measuring transport activity for non-electrogenic transport.
10. Describe the DOs and DON'Ts of secondary active transport