Unit 1: The Dynamic Cell

Lecture 2

1. Draw and label a cell membrane. Include all components.

2. a. Describe the membrane composition for each of the following membranes:

<table>
<thead>
<tr>
<th>Membrane</th>
<th>Proteins</th>
<th>Carbohydrates</th>
<th>Lipid structure</th>
<th>Cholesterol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid at a moderate temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid at a low temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not fluid at a moderate temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not fluid at a low temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. How does a membrane with
   i. Low membrane fluidity affect the 6 functions of membrane proteins?

  ________________________________________________________________
   ________________________________________________________________

   ii. High membrane fluidity affect 6 the functions of membrane proteins?

   ________________________________________________________________
   ________________________________________________________________

Lecture 3

1. Draw the process of the Na+/K+ pump, including ratio of ions, direction of ion movement, and how ATP helps to drive it.
2. Umbilical cord blood stem cells are placed in solutions with different concentrations of solute and the results are shown in the figure below. Given these data, in what solute concentrations is the cell hypertonic to the solution? Explain your choice in terms of membrane transport concepts.

![Graph showing % Change in Stem Cell Volume vs Solute Concentration (mM)](image)

A) 140 mM  
B) 100 and 120 mM  
C) Solutions below 120 mM  
D) 200 mM and below  
E) Solutions above 140 mM

Lecture 4

1. Draw:  
   a. A diagram of how Dynein acts to “bend” the cilium or flagellum
   b. A diagram of how Myosin aids in muscle contraction

2. A cell has a defect at the minus-ends of its microtubules so that they do not anchor well to the MTOC. How do you think this cell will be affected by this defect?