

You have grown a culture of *Danio rerio* gill cells and discovery that they are heavily contaminated with a mould, a type of fungus. Which one of the following procedures is most likely to eliminate the mould without killing the fish cells?

- a. Treating the culture with a drug that damages DNA.
- b. Treating the culture with a detergent that destroys cell membranes.
- c. Treating the culture with a drug that impairs oxidative metabolism.
- d. Treating the culture with a drug that inhibits ergosterol synthesis.
- e. None of a, b, c or d will eliminate the mould without killing the fish cells

GTP...

- a. Consists of the nucleoside guanosine with three phosphate groups linked to the 5' carbon of the sugar.
- b. Is a ribose sugar covalently coupled via its 1' carbon to the nitrogenous base guanosine and its 5' carbon to three phosphate groups.
- c. Is a high energy pyrimidine nucleotide capable of transferring energy through the loss of a phosphate group to power cellular reactions.
- d. All of a, b, and c are true of GTP.
- e. None of a, b or c is true of GTP.

To investigate the nature of a membrane protein, you treat an isolated membrane with the enzyme phospholipase C and then probe the membrane with a fluorescent marker for the protein of interest. No fluorescence is detected. By contrast, membranes probed with the fluorescent marker after changes in solution pH or ionic strength show a strong fluorescent signal. Which one of the following conclusions is consistent with your observations?

- a. The protein of interest is anchored to the inner (cytosolic) leaflet of the lipid bilayer via a covalent interaction with a membrane fatty acid; it will be oriented towards the cytosolic environment.
- b. The protein of interest behaves like a peripheral protein. It is probably associated with the inner (cytosolic) leaflet of the lipid bilayer.
- c. The protein of interest is an integral protein.
- d. The protein of interest is linked to the membrane by a glycosylphosphatidylinositol (GPI) anchor. It is likely to be oriented towards the extracellular environment.

Which one of the following adjustments would not be used by a rainbow trout to maintain the same level of membrane fluidity following transfer from water of 5°C to water of 20°C?

- a. Increase the length of the hydrocarbon tails in its membrane phosphoglycerides.
- b. Increase expression of desaturase enzymes.
- c. Increase the cholesterol:phosphoglyceride ratio.
- d. Increase the proportion of phosphatidylcholine relative to phosphatidylethanolamine.
- e. All of a, b, c and d would be employed by a rainbow trout transferred from 5°C to 20°C.

Following transfer to an unknown solution, a human red blood cell rapidly swells and ultimately breaks. The unknown solution...

- a. Was isotonic with the red blood cell.
- b. Contained a higher solute concentration than the cytoplasm of the red blood cell.
- c. Was hypertonic relative to the red blood cell.
- d. Contained a lower solute concentration than the cytoplasm of the red blood cell.
- e. None of the above adequately describes the solution.

You are investigating the mechanism through which a solute (we'll call it X), exits a plant cell across the plasma membrane. You observe that the transport of X exhibits saturation kinetics, depends on the presence of both H⁺ ions and ATP, and occurs even when a high concentration of X is present in the extracellular solution. The transport of X most likely occurs by:

- a. Simple diffusion
- b. Primary active transport
- c. Secondary active transport
- d. Facilitated diffusion

Bonus: For a bonus mark that, in the spirit of socialism will be applied to the entire class if even one person is successful, which of the following “fishy” roadside attractions have been featured on the “Announcements” slides at the start of each lecture?

- A. Chuck the Channel Cat, from Selkirk, Manitoba**
- B. Restigouche Sam, the world's largest Atlantic salmon, from Campbellton, NB**
- C. The speckled trout of Westport, Ontario**
- D. The giant muskie of Gananoque, Ontario**
- E. Waldo the Great, from Upsala, Ontario**
- F. The World's Largest Sturgeon, from Dominion City, Manitoba**
- G. Port Stanley's Perch (from Ontario)**
- H. Husky the Muskie, from Kenora, Ontario**
- I. The Kamloops Trout (BC)**

- a. B, C, E, F, G and H
- b. A, B, C, D, G and I
- c. A, B, C, E, H, and I

- d. C, D, E, G, H and I
- e. A, C, D, F, G and H