

A Level Biology A
H420/02 Biological Diversity

Question Set 19

1 Lipids are an important group of biological molecules.

(a) Lipoproteins are roughly-spherical structures that transport lipids in the blood.

Fig. 21 shows a simplified drawing of a section from the widest part of a lipoprotein.

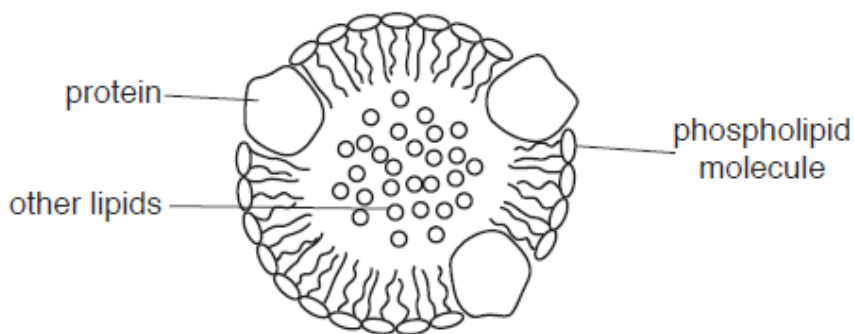


Fig. 21

(i) Calculate the number of phospholipid molecules in the outer surface of the lipoprotein shown in Fig. 21.

Assume that the pattern of proteins and phospholipids shown in Fig. 21 is continued across the whole surface of the lipoprotein.

Use the formula: Surface area of sphere = $4\pi r^2$

$$2\pi r = 21 \quad r = 3.34$$
$$4\pi \times 3.34^2 = 140.37$$

number of phospholipid molecules =140.....

[2]

(ii) Lipoproteins with fewer phospholipids and more protein in the outer layer are known as high density lipoproteins.

Lipoproteins with a larger number of phospholipids but less protein are known as low density lipoproteins.

Use this information to explain why lipids can increase the buoyancy of aquatic animals.

Lipid are insoluble in water and have low density (lower than protein) thus lipids float on water. As a result lipids can aid the buoyancy.

[1]

(b) Complete the passage by choosing the most appropriate word from the list.

~~bife~~ ~~carbon~~ ~~hydrogen~~ ~~insoluble~~
nitrogen oxygen permeability production solid
soluble ~~stability~~ ~~storage~~ vitamins

Lipids have many roles in living organisms. Some are used for energy
.....storage..... in adipose cells. Unsaturated fatty acids contain at least
one double bond between twocarbon..... atoms and so contain
fewerhydrogen..... atoms. All lipids areinsoluble..... in water
so need to be transported in the blood by lipoproteins. Cholesterol
molecules increase thestability..... of membranes, and cholesterol is
also used to synthesise steroid hormones andbile..... .

[6]

(c) Triglycerides are a type of lipid molecule that can be broken down during hydrolysis reactions.

Using the structure of triglyceride molecules as an example, explain what is meant by hydrolysis.

Hydrolysis is the process of breakdown due to reaction with water. Hydrolysis breaks the 3 ester bonds in triglyceride using water and splits the triglyceride into 1 glycerol and 3 fatty acids (lysis)

[2]

Total Marks for Question Set 19: 11

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