

IB Diploma

BIOLOGY

SL P1
2017 — 2024

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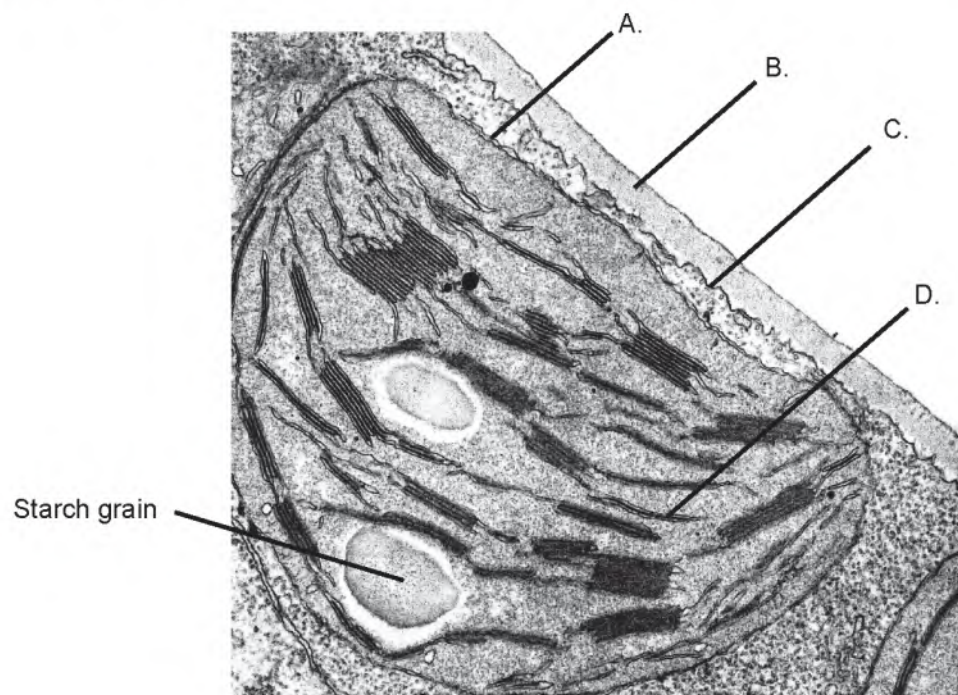
1 - (BIOLO/11_SL_Summer_2017_Q1) - *Cell Biology*

Which structure found in eukaryotes has a single membrane?

- A. Nucleus
- B. Lysosome
- C. Chloroplast
- D. Mitochondrion

2 - (BIOLO/11_SL_Summer_2017_Q2) - *Cell Biology*

The following electron micrograph shows part of a palisade mesophyll cell. Which of the labelled structures controls the exchange of substances to and from the cell?



[Source: adapted from Eldon Newcomb, <http://botit.botany.wisc.edu/about.html>]

3 - (BIOLO/11_SL_Summer_2017_Q3) - *Cell Biology*

Which organism has DNA located in three organelles?

- A. A sponge
- B. A fern
- C. A flatworm
- D. A bacterium

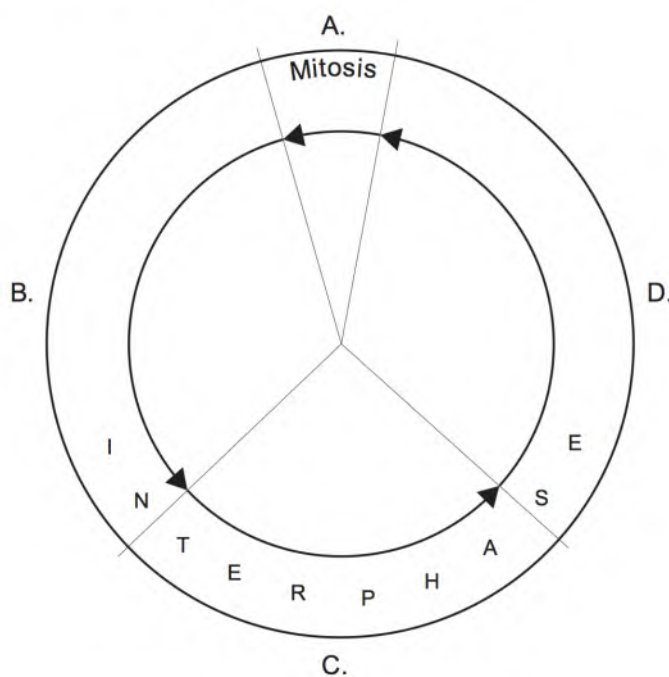
4 - (BIOLO/11_SL_Summer_2017_Q4) - *Cell Biology*

Which organelle is involved in generating vesicles destined for the cell membrane?

- A. Golgi apparatus
- B. Smooth endoplasmic reticulum
- C. Rough endoplasmic reticulum
- D. Lysosome

5 - (BIOLO/11_SL_Summer_2017_Q5) - *Cell Biology*

When during the cell cycle does DNA replication take place?



[Source: © International Baccalaureate Organization 2017]

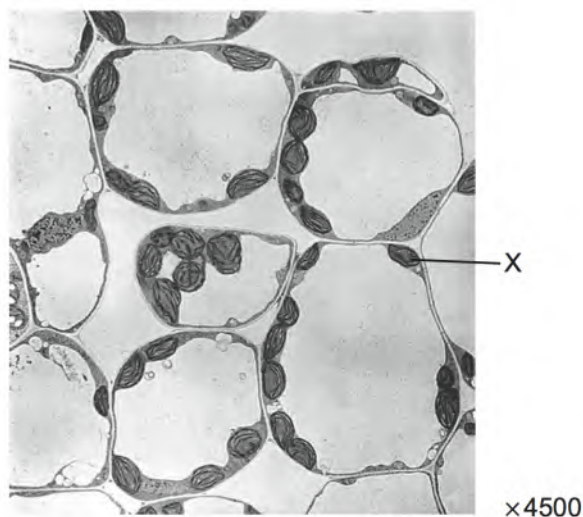
6 - (BIOLO/12_SL_Summer_2017_Q1) - Cell Biology

The giant alga *Acetabularia* has a feature that suggests it is an exception to the cell theory. What feature is this?

- A. It lacks a nucleus.
- B. It lacks a cell wall.
- C. It has only one mitochondrion.
- D. It lacks subdivision into separate cells.

7 - (BIOLO/12_SL_Summer_2017_Q2) - Cell Biology

The image shows an electron micrograph of mesophyll cells.



[Source: BIOPHOTO ASSOCIATES/SCIENCE PHOTO LIBRARY]

What is the name of the structure labelled X?

- A. Cytoplasm
- B. Mitochondrion
- C. Nucleus
- D. Chloroplast

8 - (BIOLO/12_SL_Summer_2017_Q3) - *Cell Biology*

What is a role of cholesterol in animal cells?

- A. It increases body fat.
- B. It controls membrane fluidity.
- C. It lines the inner wall of capillaries.
- D. It is a constituent of bile.

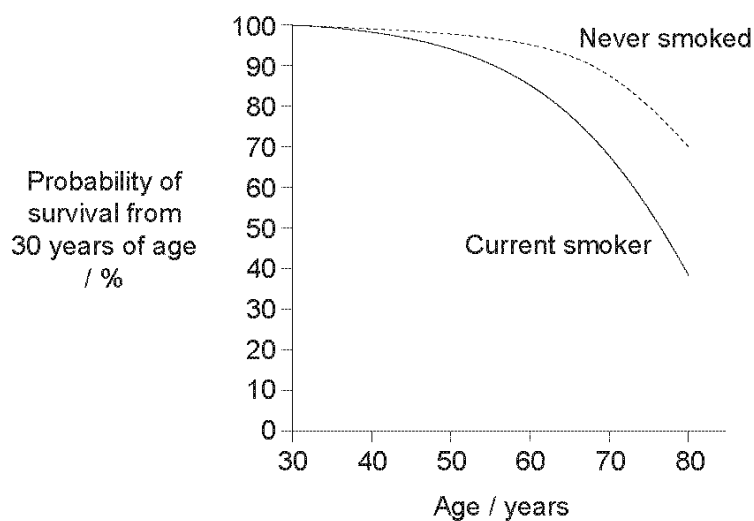
9 - (BIOLO/12_SL_Summer_2017_Q4) - *Cell Biology*

What is evidence for the endosymbiotic theory?

- A. RNA can catalyse metabolic reactions.
- B. Meteorites contain organic molecules.
- C. Amino acids can be synthesized from inorganic compounds.
- D. Mitochondria possess their own DNA.

10 - (BIOLO/12_SL_Summer_2017_Q5) - Cell Biology

The graph shows the survival probabilities for current smokers and for those who never smoked among women 30 to 80 years of age.



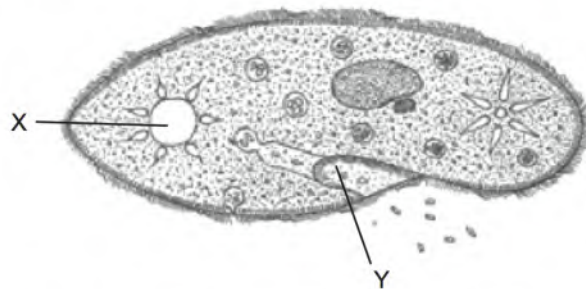
[Source: adapted from J Prabhat *et al.* (2013) *The New England Journal of Medicine*, 368 (4), page 347. Copyright ©2013 Massachusetts Medical Society. Reprinted with permission]

What can be deduced from this graph?

- A. There is a correlation between smoking and cancer.
- B. Smoking reduces life expectancy.
- C. Smoking causes cancer.
- D. 70% of smokers survive to 80 years old.

11 - (BIOLO/10_SL_Winter_2017_Q1) - Cell Biology

The image of a *Paramecium* refers to question 1 and question 2.



[Source: Adapted from www.biology-resources.com. Copyright 2004-2017 D G Mackean & Ian Mackean. All rights reserved.]

Which function is accomplished by structures X and Y in the *Paramecium*?

	X	Y
A.	excretion	digestion
B.	homeostasis	feeding
C.	movement	food storage
D.	respiration	DNA replication

12 - (BIOLO/10_SL_Winter_2017_Q2) - Cell Biology

What evidence from the image of *Paramecium* indicates whether the organism is a prokaryote or a eukaryote?

- A. Compartments in the cell indicate that it is a eukaryote.
- B. No nucleus indicates that the cell is a prokaryote.
- C. Lack of a cell wall indicates that the cell is a eukaryote.
- D. It is a unicellular organism, so it must be a prokaryote.

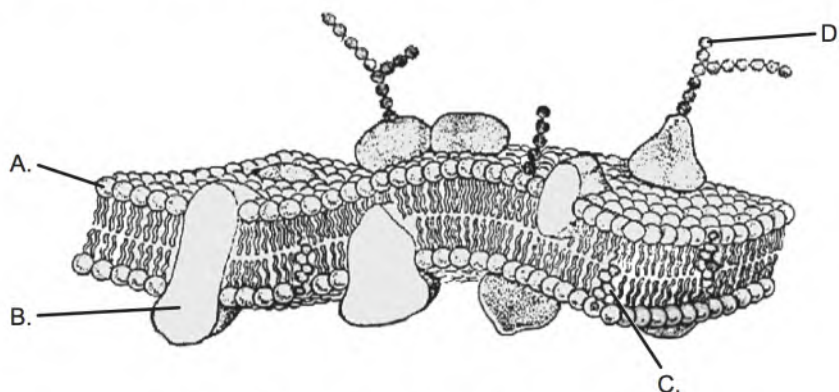
13 - (BIOLO/10_SL_Winter_2017_Q3) - Cell Biology

The salt concentration inside an animal cell is 1.8%. The salt concentration in the surrounding medium becomes 5%. What will be the likely response?

- A. The cell will gain water from the medium.
- B. The cell will lose salt to the medium.
- C. The cell will remain unchanged.
- D. The cell will shrink from loss of water.

14 - (BIOLO/10_SL_Winter_2017_Q4) - Cell Biology

The diagram of a membrane refers to question 4 and question 5.



[Source: © International Baccalaureate Organization 2017]

In the diagram, which structure is an intrinsic or integral protein?

15 - (BIOLO/11_SL_Summer_2018_Q1) - Cell Biology

What feature of both striated muscle and aseptate fungal hyphae is different from typical cell structure?

- A. They have multiple nuclei within a structural unit.
- B. They have a cell wall that is not made of cellulose.
- C. They have plasmids.
- D. They have an absence of cholesterol in the plasma membrane.

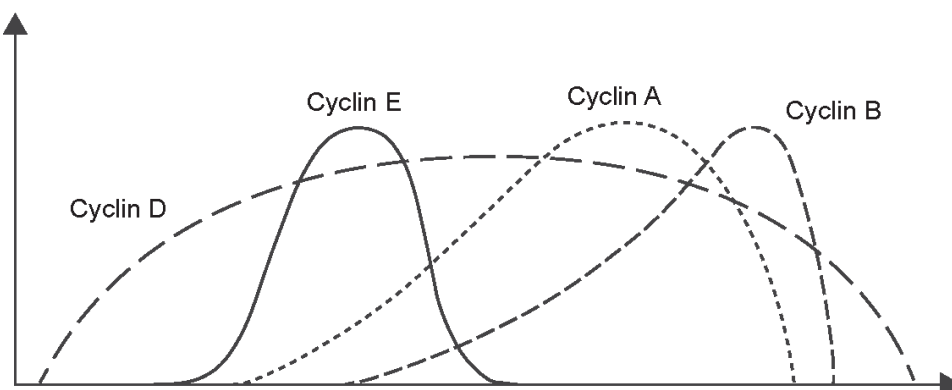
16 - (BIOLO/11_SL_Summer_2018_Q4) - Cell Biology

Which organelle provides evidence that eukaryotic cells originated when large prokaryotes engulfed small free-living prokaryotes?

- A. Chloroplast
- B. Nucleoid
- C. 80S ribosome
- D. Vacuole

17 - (BIOLO/11_SL_Summer_2018_Q5) - *Cell Biology*

The concentrations of cyclins rise and fall in cells at certain times.



[Source: https://en.wikipedia.org/wiki/Cyclin#/media/File:Cyclin_Expression.svg]

What times are these?

- A. Day and night
- B. Seasons of the year
- C. Stages of mitosis and interphase
- D. Developmental stages in the life cycle

18 - (BIOLO/11_SL_Summer_2018_Q7) - *Cell Biology*

Researchers have developed a skin patch which can detect and measure very small concentrations of ions, sugars, amino acids, proteins and hormones which remain when sweat evaporates. What allows the presence of these substances in sweat?

- A. Cohesion
- B. Hydrophobic interactions
- C. Solvent properties
- D. Thermal properties

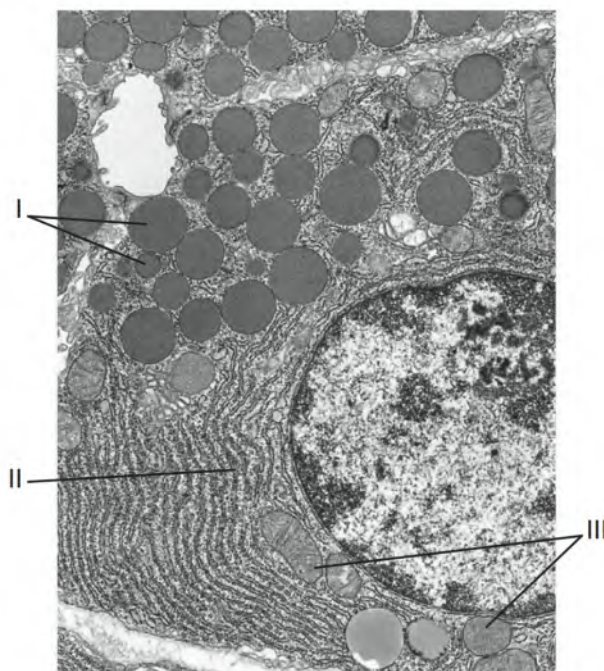
19 - (BIOLO/12_SL_Summer_2018_Q1) - *Cell Biology*

When compared to other body cells, which characteristic of stem cells is the most important for therapeutic uses?

- A. Less differentiation
- B. Less excretion
- C. Lower rate of reproduction
- D. Lower rate of metabolism

20 - (BIOLO/12_SL_Summer_2018_Q2) - Cell Biology

The image shows an electron micrograph of a cell.



[Source: *Junqueira's Basic Histology*, 15th edition, by Anthony L. Mescher, McGraw-Hill publisher.]

Which organelles correspond to the labels in the electron micrograph of this cell?

	I	II	III
A.	secretory vesicles	Golgi apparatus	mitochondria
B.	mitochondria	Golgi apparatus	secretory vesicles
C.	secretory vesicles	rough endoplasmic reticulum	mitochondria
D.	mitochondria	rough endoplasmic reticulum	secretory vesicles

21 - (BIOLO/12_SL_Summer_2018_Q3) - Cell Biology

Which molecule regulates the fluidity of cell membranes?

- A. Phospholipid
- B. Cholesterol
- C. Glycoprotein
- D. Peripheral protein

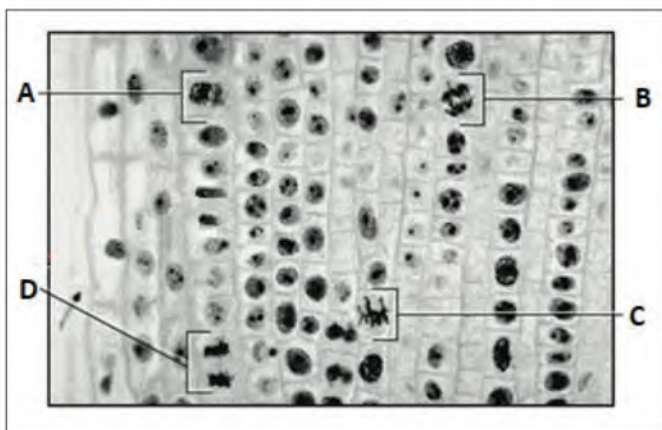
22 - (BIOLO/12_SL_Summer_2018_Q4) - *Cell Biology*

Pasteur carried out a series of experiments that provided strong evidence against a widely supported theory. What was this theory?

- A. Endosymbiosis
- B. Spontaneous generation
- C. Conservative replication of DNA
- D. Evolution

23 - (BIOLO/12_SL_Summer_2018_Q5) - *Cell Biology*

The image shows cells in the different stages of mitosis. Which cell is in telophase?



[Source: © The Trustees of Indiana University]

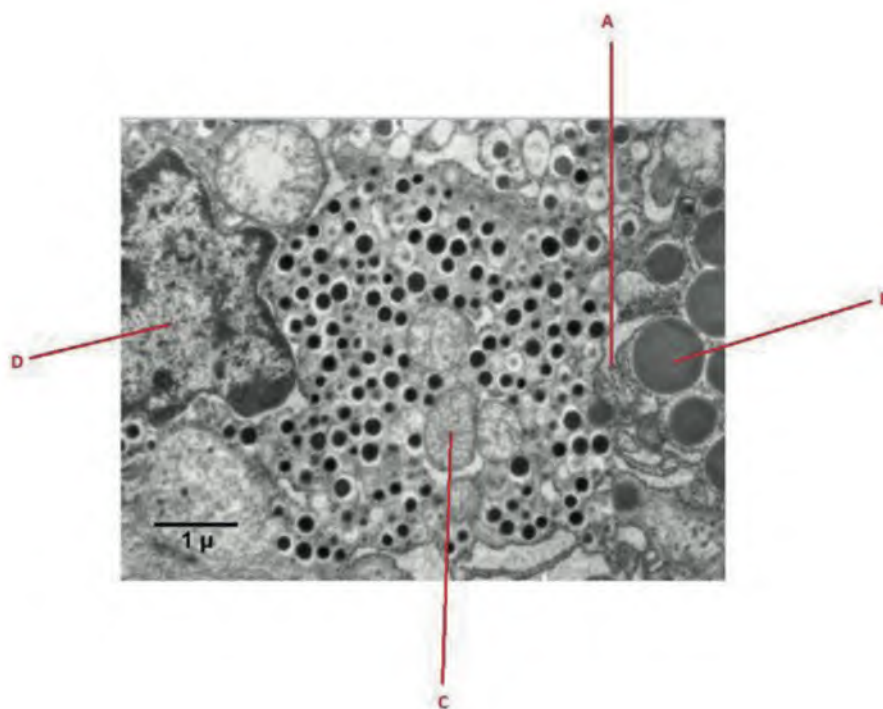
24 - (BIOLO/10_SL_Winter_2018_Q1) - *Cell Biology*

If cells of a multicellular organism have the same genes, how can there be many different cell types in a body?

- A. Some genes but not others are expressed in each cell type.
- B. Cells lose some genes as development occurs.
- C. Genes do not determine the structure of a cell.
- D. Cells must practice division of labour in order to survive.

25 - (BIOLO/10_SL_Winter_2018_Q2) - *Cell Biology*

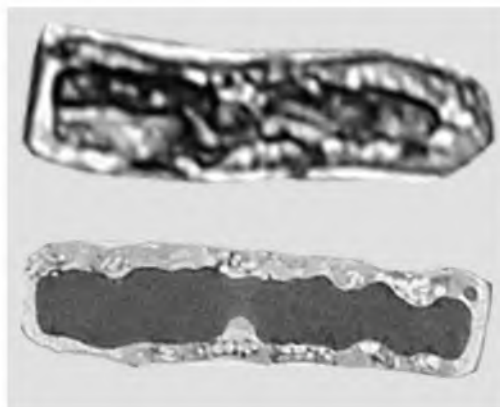
The electron micrograph shows part of a cell. Which organelle is the site of aerobic respiration?



[Source: adapted from C. Shugrue and F. Gorelick, Yale University-adult mouse Islet cell (adjacent acinar cell with zymogen granules on right side of the panel)]

26 - (BIOLO/10_SL_Winter_2018_Q3) - Cell Biology

The images are microscopic views of two similar cells.



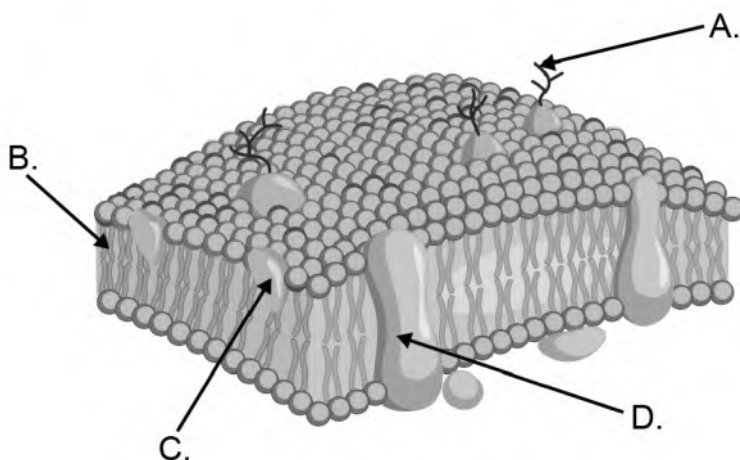
[Source: Images adapted from https://www.researchgate.net/figure/Microscopic-response-of-Vitis-vinifera-cv-Aleatico-to-ozone-treatment-observed-by-light_fig9_281393249. Licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>]

What is a reason for the differences between the two micrographs?

- A. The lower image has a higher magnification.
- B. The lower image has greater resolution.
- C. A nucleus can only be seen in the upper image.
- D. The upper image is an electron micrograph.

27 - (BIOLO/10_SL_Winter_2018_Q4) - Cell Biology

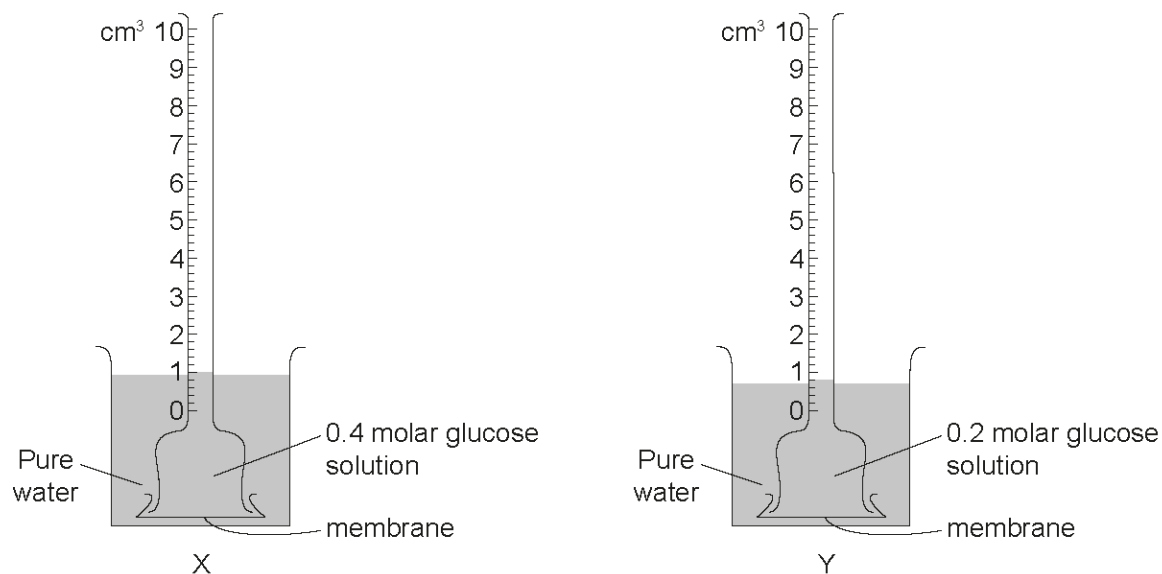
What part of the plasma membrane is fluid, allowing the movement of proteins in accordance with the fluid mosaic model?



[Source: Vecton/Vector images/Shutterstock]

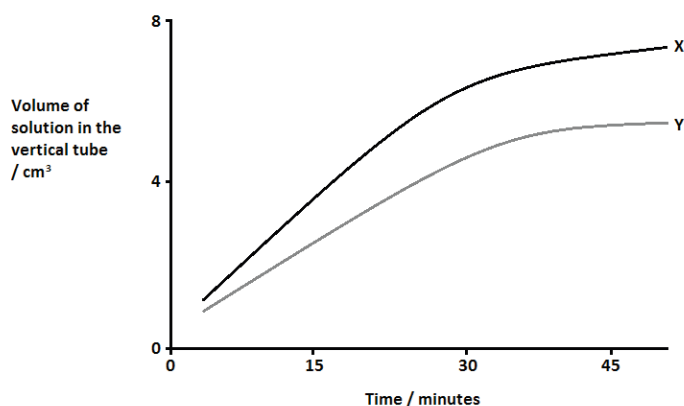
28 - (BIOLO/10_SL_Winter_2018_Q5) - Cell Biology

Apparatus was set up as shown to collect data.



[Source: © International Baccalaureate Organization 2018]

The graph shows the results after 47 minutes of data collection.



[Source: © International Baccalaureate Organization 2018]

What causes the rates to differ?

- I. Different concentration gradients at the start
- II. Diffusion of sugar is initially greater in Y than in X
- III. The systems are reaching equilibrium over time

- A. I only
- B. II only
- C. I and III only
- D. II and III only

29 - (BIOLO/10_SL_Winter_2018_Q6) - *Cell Biology*

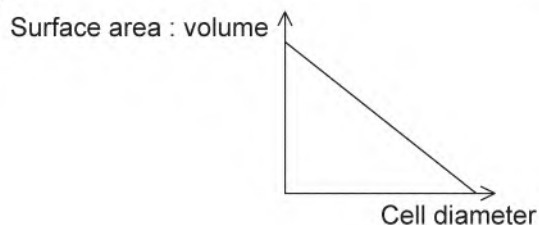
How does mitosis produce two genetically identical nuclei?

- A. By separation of homologous chromosomes
- B. By separation of sister chromatids
- C. By division of the cytoplasm into two equal cells
- D. By division of the nuclear membrane into two equal parts

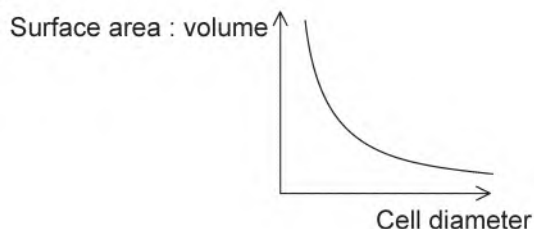
30 - (BIOLO/11_SL_Summer_2019_Q1) - *Cell Biology*

Which graph represents the change in cell surface area to volume ratio with increasing cell diameter?

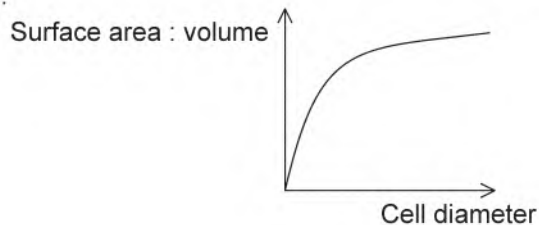
A.



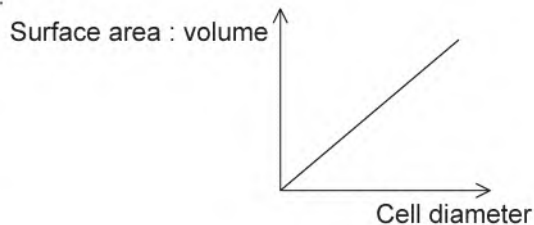
B.



C.



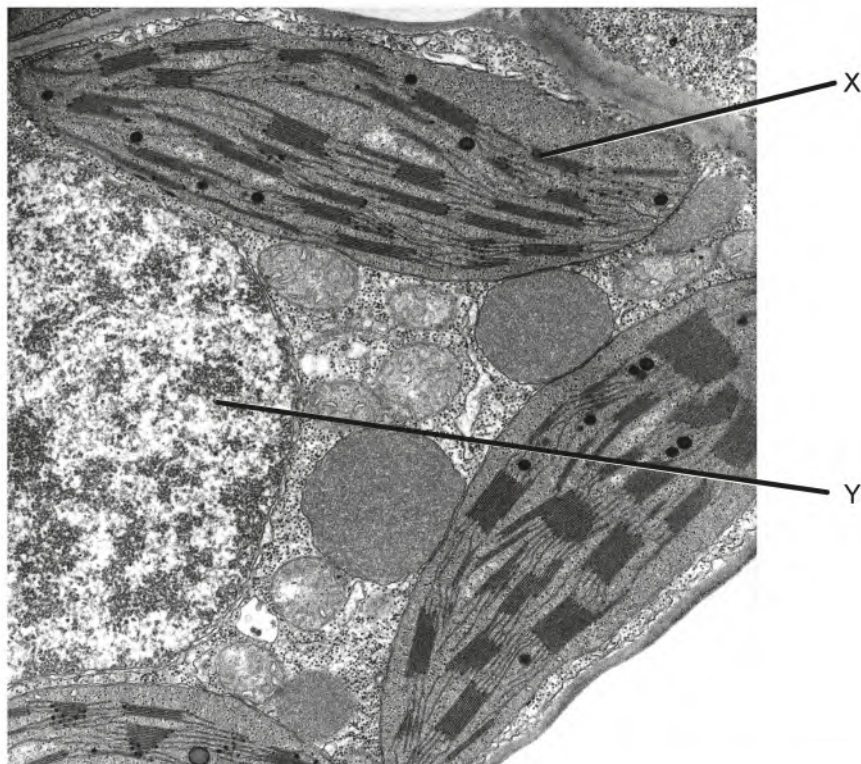
D.



[Source: © International Baccalaureate Organization 2019]

31 - (BIOLO/11_SL_Summer_2019_Q2) - Cell Biology

The image shows an electron micrograph of part of a cell.



[Source: Dr. Eldon Newcomb – Emeritis Professor at The University of Wisconsin – Madison.]

Which features do the two structures labelled X and Y have in common?

- A. They are surrounded by a double membrane.
- B. They contain 70S ribosomes.
- C. They contain naked DNA.
- D. They are only found in leaf cells.

ANSWERS

1 - (BIOLO/11_SL_Summer_2017_Q1) - *Cell Biology*

B

2 - (BIOLO/11_SL_Summer_2017_Q2) - *Cell Biology*

C

3 - (BIOLO/11_SL_Summer_2017_Q3) - *Cell Biology*

B

4 - (BIOLO/11_SL_Summer_2017_Q4) - *Cell Biology*

A

5 - (BIOLO/11_SL_Summer_2017_Q5) - *Cell Biology*

C

6 - (BIOLO/12_SL_Summer_2017_Q1) - *Cell Biology*

D

7 - (BIOLO/12_SL_Summer_2017_Q2) - *Cell Biology*

D

8 - (BIOLO/12_SL_Summer_2017_Q3) - *Cell Biology*

B

9 - (BIOLO/12_SL_Summer_2017_Q4) - *Cell Biology*

D

10 - (BIOLO/12_SL_Summer_2017_Q5) - *Cell Biology*

B

IB DIPLOMA	BIOLOGY - SL - P1	CH1 - CELL BIOLOGY
11 - (BIOLO/10_SL_Winter_2017_Q1) - <i>Cell Biology</i>		B
12 - (BIOLO/10_SL_Winter_2017_Q2) - <i>Cell Biology</i>		A
13 - (BIOLO/10_SL_Winter_2017_Q3) - <i>Cell Biology</i>		D
14 - (BIOLO/10_SL_Winter_2017_Q4) - <i>Cell Biology</i>		B
15 - (BIOLO/11_SL_Summer_2018_Q1) - <i>Cell Biology</i>		A
16 - (BIOLO/11_SL_Summer_2018_Q4) - <i>Cell Biology</i>		A
17 - (BIOLO/11_SL_Summer_2018_Q5) - <i>Cell Biology</i>		C
18 - (BIOLO/11_SL_Summer_2018_Q7) - <i>Cell Biology</i>		C
19 - (BIOLO/12_SL_Summer_2018_Q1) - <i>Cell Biology</i>		A

20 - (BIOLO/12_SL_Summer_2018_Q2) - *Cell Biology*

C

21 - (BIOLO/12_SL_Summer_2018_Q3) - *Cell Biology*

B

22 - (BIOLO/12_SL_Summer_2018_Q4) - *Cell Biology*

B

23 - (BIOLO/12_SL_Summer_2018_Q5) - *Cell Biology*

D

24 - (BIOLO/10_SL_Winter_2018_Q1) - *Cell Biology*

A

25 - (BIOLO/10_SL_Winter_2018_Q2) - *Cell Biology*

C

26 - (BIOLO/10_SL_Winter_2018_Q3) - *Cell Biology*

B

27 - (BIOLO/10_SL_Winter_2018_Q4) - *Cell Biology*

B

28 - (BIOLO/10_SL_Winter_2018_Q5) - *Cell Biology*

C

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