

Cell Structure

Question Paper 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Cell Structure
Sub Topic	
Booklet	Multiple Choice
Paper Type	Question Paper 2

Time Allowed : 64 minutes

Score : / 53

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Which combination is found in a prokaryotic cell?

	endoplasmic reticulum	DNA	RNA	nucleus
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✓	✓

key
 ✓ present
 ✗ absent

2 Which part of the cell is often continuous with the rough endoplasmic reticulum?

- A cell surface membrane
- B Golgi apparatus
- C mitochondrion
- D nuclear envelope

3 Which structures are found in both chloroplasts and mitochondria?

- 1 70S ribosomes
- 2 80S ribosomes
- 3 circular DNA

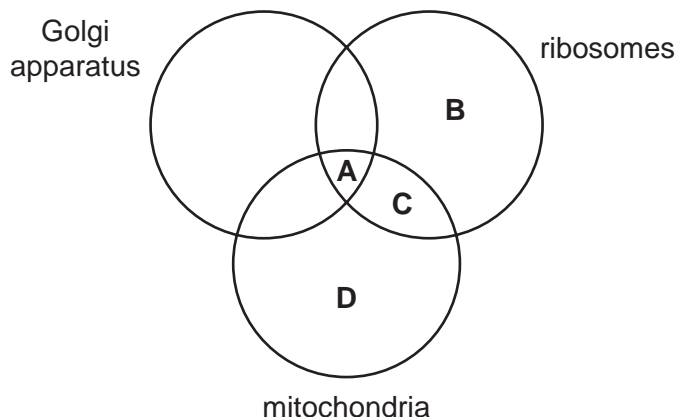
- A** 1 and 3 **B** 2 and 3 **C** 1 only **D** 3 only

4 Tay-Sachs disease occurs when cells are unable to produce an enzyme, leading to a build up of certain lipids in cells.

Which cell structure would **not** function correctly, resulting in the disease?

- A Golgi apparatus
- B lysosome
- C mitochondrion
- D smooth endoplasmic reticulum

5 Which structures are present in a cell of *Plasmodium*?



6 The statements are all descriptions of cell structures.

- 1 surrounded by a single membrane and enclosing a large fluid-filled space
- 2 surrounded by a single membrane and enclosing inactivated enzymes
- 3 formed by two membranes enclosing a matrix, the inner membrane is folded
- 4 formed by a membrane that has flattened sacs and tubular structures inter-connected throughout the cell
- 5 formed of nucleic acid and protein attached to membranes or free in the cytoplasm

Which row shows the typical cell in which these cell structures are found?

	plant cell	animal cell
A	1, 2, 3 and 4	1, 2, 3 and 5
B	1, 3, 4 and 5	2, 3, 4 and 5
C	2, 4 and 5	1, 4 and 5
D	3, 4 and 5 only	2, 3 and 5 only

7 Which structures are found in **both** typical eukaryotic cells **and** typical prokaryotic cells?

- 1 70S ribosomes
- 2 80S ribosomes
- 3 circular DNA

A 1, 2 and 3, **B** 1 and 3 only **C** 1 only **D** 2 only

8 Which sequence shows some of the stages in the production and secretion of an enzyme?

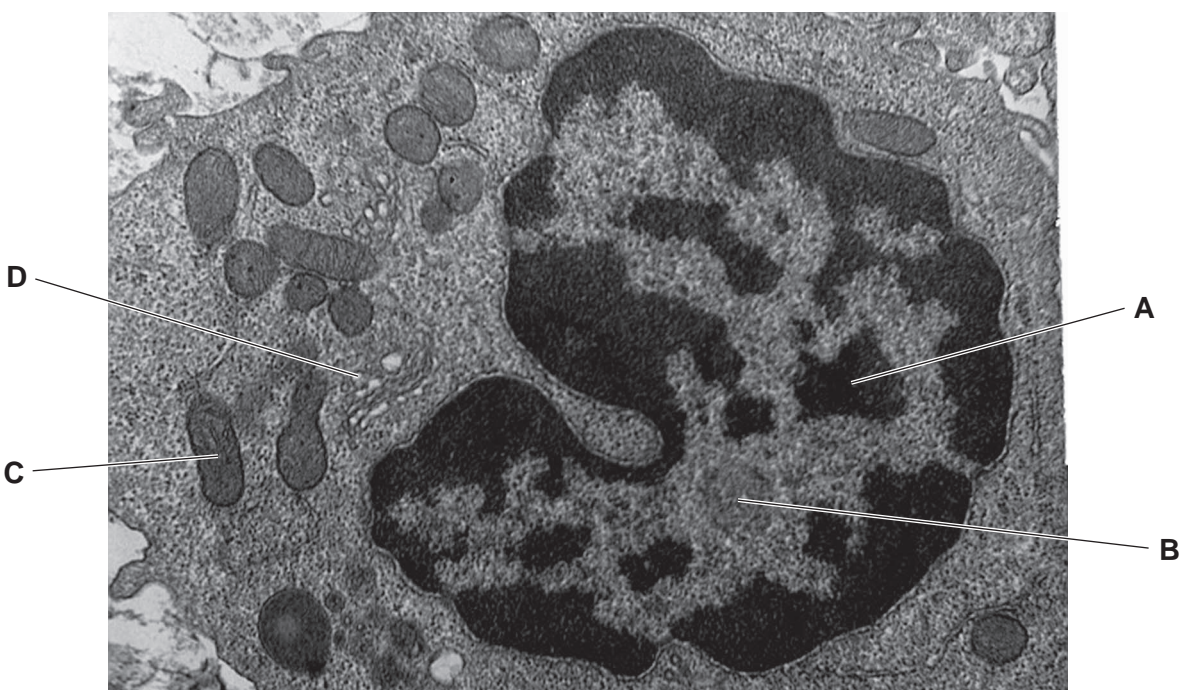
- A Golgi apparatus → ribosome → rough endoplasmic reticulum → mRNA
- B mRNA → smooth endoplasmic reticulum → Golgi apparatus → vesicle
- C ribosome → rough endoplasmic reticulum → vesicle → Golgi apparatus
- D smooth endoplasmic reticulum → mRNA → vesicle → ribosome

9 Density gradient centrifuges are used to separate cell structures by their relative density. Larger cell structures have greater density and sink further down the centrifuge tube.

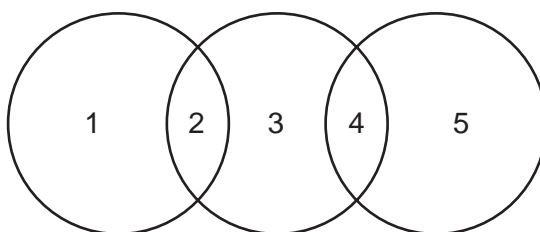
What is the correct order of the cell structures, starting from the top of the centrifuge tube?

- A chloroplasts → nuclei → mitochondria → ribosomes
- B nuclei → chloroplasts → mitochondria → ribosomes
- C ribosomes → chloroplasts → mitochondria → nuclei
- D ribosomes → mitochondria → chloroplasts → nuclei

10 Which cell structure shown in the electronmicrograph is the site of protein modification and packaging?



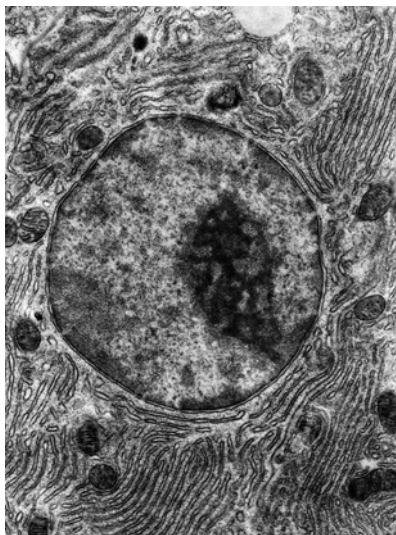
- 11 The diagram shows some similarities between typical prokaryotes, chloroplasts and mitochondria.



Which is correct?

	1	2	3	4	5
A	chloroplasts	circular DNA and 70S ribosomes	mitochondria	circular DNA and 70S ribosomes	prokaryotes
B	chloroplasts	circular DNA and 80S ribosomes	prokaryotes	circular DNA and 80S ribosomes	mitochondria
C	mitochondria	linear DNA and 70S ribosomes	chloroplasts	linear DNA and 70S ribosomes	prokaryotes
D	mitochondria	linear DNA and 80S ribosomes	prokaryotes	linear DNA and 80S ribosomes	chloroplasts

12 The electronmicrograph shows part of an animal cell.



What will be synthesised in large quantities in this cell?

- 1 ATP
- 2 glucose
- 3 RNA

A 1 only **B** 2 only **C** 1 and 3 only **D** 1, 2 and 3

13 Which statements about a typical eukaryotic cell are correct?

- 1 It is smaller than $2\ \mu\text{m}$.
- 2 It has a nucleolus.
- 3 It has linear DNA.
- 4 It only has small (70S) ribosomes.

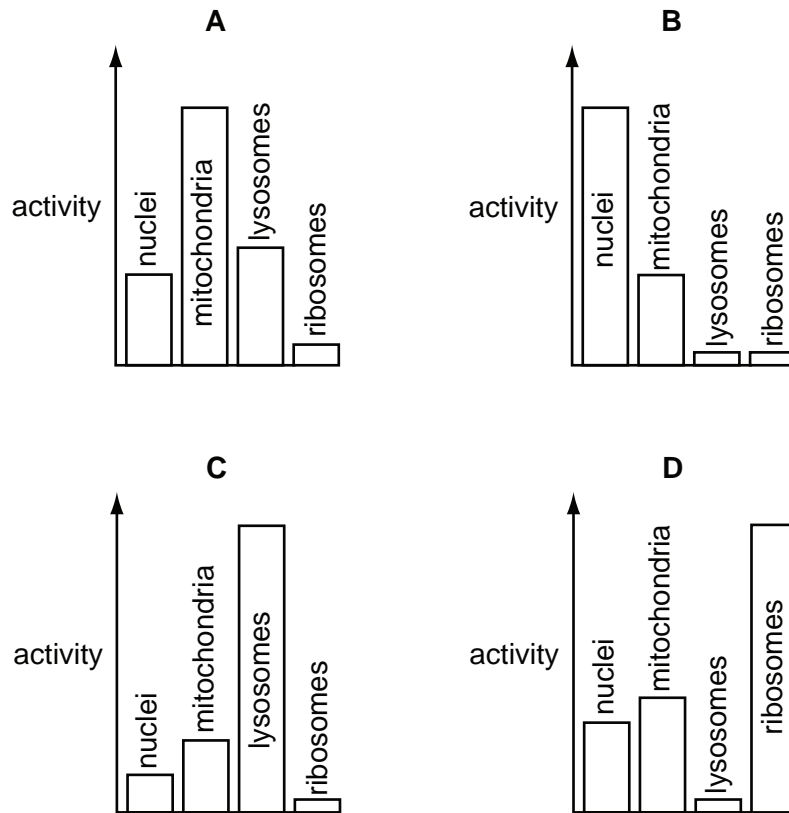
A 1 and 2 only **B** 1 and 4 only **C** 2 and 3 only **D** 3 and 4 only

14 Which animal cells would have the most Golgi apparatus?

- A** ciliated epithelial cells
- B** goblet cells
- C** red blood cells
- D** smooth muscle cells

- 15 A piece of mammalian tissue was homogenised and centrifuged. The biochemical activity of four subcellular fractions was investigated.

Which diagram indicates the fraction with maximum synthesis of messenger RNA?



- 16 Which row shows features of a typical eukaryotic cell?

	cell size	nucleus	DNA	ribosome size
A	< 2µm	absent	linear	large 80S
B	< 2µm	present	circular	small 70S
C	> 2µm	present	circular	small 70S
D	> 2µm	present	linear	large 80S

- 17 Many single-celled animals, living in fresh water, possess vacuoles which contract regularly, expelling excess water.

Why do the cells of plants living in fresh water **not** require such vacuoles?

- A** Plant cells have a higher concentration of dissolved solutes than animal cells.
- B** Plant cell walls are impermeable to water.
- C** Plant cell walls limit cell size.
- D** Water movement into plants is controlled by their roots.

18 For which process is the large surface area of the cristae in the mitochondria important?

- A energy radiation
- B enzyme reaction
- C gaseous exchange
- D protein synthesis

19 What explains why cells with no nucleoli die?

- A They do not have centrioles and cannot divide.
- B They do not have mitochondria and cannot release energy.
- C They do not have mRNA and cannot transcribe DNA.
- D They do not have ribosomes and cannot synthesise protein.

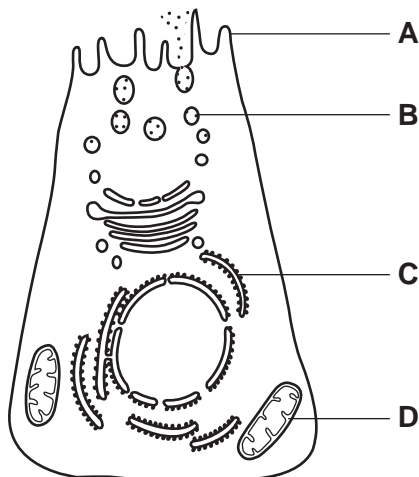
20 Which statements about a typical prokaryotic cell are correct?

- 1 It is smaller than $2\ \mu\text{m}$.
- 2 It has a nucleus.
- 3 Its has circular DNA.
- 4 It has small (70S) ribosomes.

- A 1 and 2 only B 1 and 3 only C 1, 3 and 4 only D 2, 3 and 4 only

21 The diagram is a drawing from an electron micrograph of a cell.

Which structure indicates that this is a secretory cell?



22 Which of the following are found in both eukaryotic and prokaryotic cells?

- 1 cellulose
- 2 deoxyribose
- 3 lipids
- 4 ribose

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

23 Which row correctly identifies all the locations of ribosomes in a eukaryotic cell?

	free in cytoplasm	in mitochondria	attached to ER	attached to nuclear envelope	in nucleus
A	✓	✓	✓	✓	✓
B	✓	x	✓	x	x
C	x	✓	x	✓	✓
D	x	x	✓	✓	x

key
 ✓ = present
 x = absent

24 What are the characteristics of a prokaryotic cell?

	endoplasmic reticulum	genetic material
A	absent	DNA
B	absent	RNA
C	present	DNA
D	present	RNA

25 The following are all features of eukaryotic cells.

- 1 chloroplast
- 2 Golgi apparatus
- 3 lysosome
- 4 mitochondrion
- 5 nucleus

Which of these has a single membrane?

- A 1 and 2
- B 2 and 3
- C 3 and 4
- D 4 and 5

26 Which feature is found in **both** prokaryotic and plant cells?

- A cell wall
- B DNA bound to protein
- C endoplasmic reticulum
- D Golgi apparatus

27 What leaves the nucleus through the pores in the nuclear envelope?

- 1 DNA
 - 2 mRNA
 - 3 ribosomes
- A 1 only
 - B 2 only
 - C 1 and 2
 - D 2 and 3

28 Which cell components contain ribosomes?

- 1 chloroplast
- 2 mitochondrion
- 3 nucleus
- 4 cytoplasm

- A** 1, 2 and 3
- B** 1, 2 and 4
- C** 1 and 2 only
- D** 3 and 4 only

29 Where would cristae be found in a cell?

- 1 endoplasmic reticulum
- 2 Golgi apparatus
- 3 mitochondrion

- A** 1 and 2
- B** 1 and 3
- C** 2 and 3
- D** 3 only

30 Which cell components are present in **all** prokaryotic cells?

	cell surface membrane	cell wall	endoplasmic reticulum	flagellum
A	✓	✓	x	✓
B	✓	x	✓	x
C	✓	✓	x	x
D	x	✓	✓	✓

key
 ✓ = present
 x = not present

31 In general, eukaryotic cells undergo division much slower than prokaryotic cells.

What is the reason for this?

- A** Eukaryotes break down the nuclear membrane during mitosis.
- B** Eukaryotes have many more mitochondria than prokaryotes.
- C** Prokaryotes do not contain any centrioles.
- D** Prokaryotic cells are a lot smaller than eukaryotic cells.

32 Which is correct about the organelles listed in the table?

		carries out transcription	contains enzymes	contains ribosomes
1	lysosomes	no	yes	no
2	mitochondria	yes	no	yes
3	rough endoplasmic reticulum	yes	yes	yes
4	vacuoles	no	yes	no

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

33 The graticule and stage micrometer are used to measure cells.

Which is the correct reason why the graticule calibrated?

- A** The graticule can be used to make measurements.
- B** The graticule is magnified by the objective lens.
- C** The graticule magnifies the specimen.
- D** The graticule makes comparisons.

34 What are the characteristics of a prokaryotic cell?

	DNA structure	endoplasmic reticulum	plasmids	ribosomal size
A	circular	absent	present	small
B	circular	present	absent	large
C	linear	absent	present	small
D	linear	present	absent	large

35 Which cell organelle does **not** contain nucleic acid?

- A chloroplast
- B Golgi apparatus
- C lysosome
- D ribosome

36 Cells consist of a number of different components.

Which row shows the components present (✓) in both a prokaryotic and eukaryotic cell?

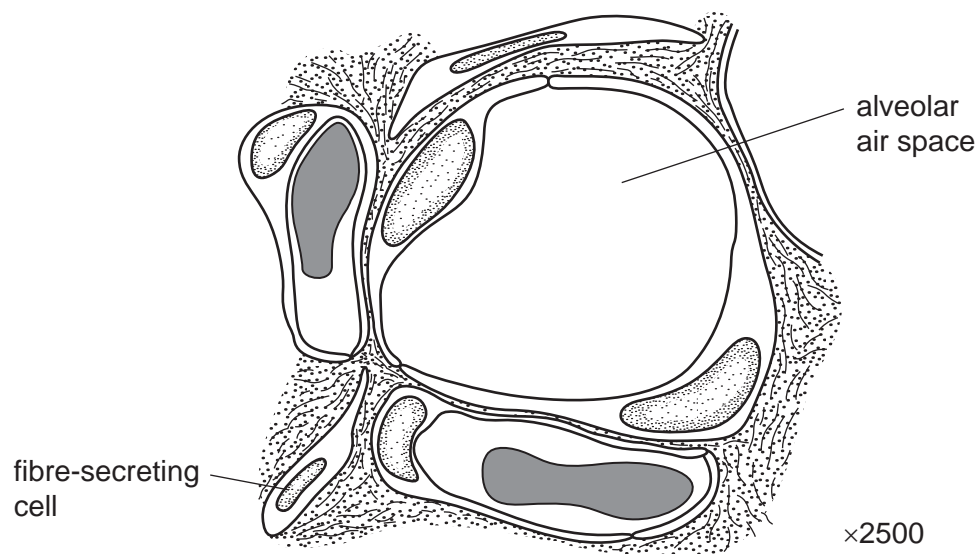
	lysosomes	Golgi apparatus	ribosomes	cell surface membrane
A		✓		✓
B	✓	✓		
C			✓	✓
D	✓		✓	

37 What is a function of the smooth endoplasmic reticulum?

- A protein synthesis
- B protein transport
- C steroid synthesis
- D steroid transport

- 38 Which is a feature of all prokaryotic cells?
- A absence of cell surface membrane
 - B division by mitosis
 - C presence of cellulose cell wall
 - D presence of ribosomes
- 39 From which cell organelle are nucleic acids absent?
- A chloroplast
 - B Golgi apparatus
 - C mitochondrion
 - D ribosome

- 40 The diagram is a drawing made from an electron micrograph showing a cross-section of an alveolus and two adjacent capillaries.



What is the shortest distance travelled by an oxygen molecule diffusing from the alveolar air space into one of the red blood cells?

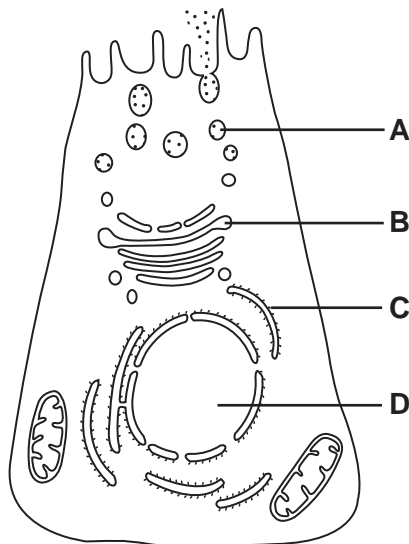
- A $1.0\ \mu\text{m}$
- B $3.0\ \mu\text{m}$
- C $10.0\ \mu\text{m}$
- D $30.0\ \mu\text{m}$

41 Which combination is found in a prokaryotic cell?

	endoplasmic reticulum	DNA	RNA	nucleus	
A	✓	✓	x	x	key ✓ = present x = absent
B	✓	x	x	✓	
C	x	✓	✓	x	
D	x	x	✓	✓	

42 The diagram is taken from an electron micrograph of a cell which secretes digestive enzymes.

Where are these enzymes made?



- 43 A specimen is viewed under a microscope using green light with a wavelength of 510 nm.

If the same specimen is viewed under the same conditions, but using red light with a wavelength of 650 nm instead, what effect will this have on the magnification and on the resolution of the microscope?

	magnification	resolution
A	decreased	decreased
B	increased	increased
C	remains the same	increased
D	remains the same	decreased

- 44 A student is asked to study two photographs, taken at the same magnification, of a palisade mesophyll cell, one using a high quality light microscope and the other using an electron microscope.

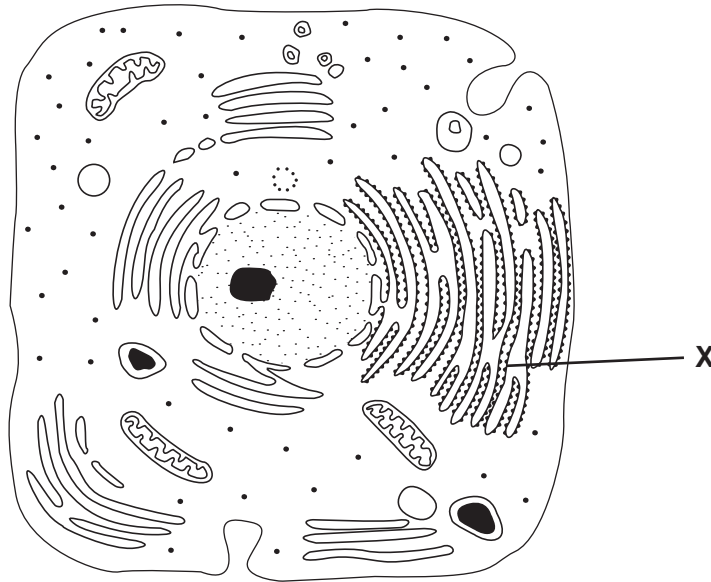
The student observed

- 1 the cisternae of the Golgi apparatus
- 2 the grana in the chloroplasts
- 3 the two membranes of the nuclear envelope
- 4 the vacuole enclosed by a tonoplast

Which features can be seen because of the higher resolution of the electron microscope?

- A** 1, 2 and 3
B 1, 2 and 4
C 1, 3 and 4
D 2, 3 and 4

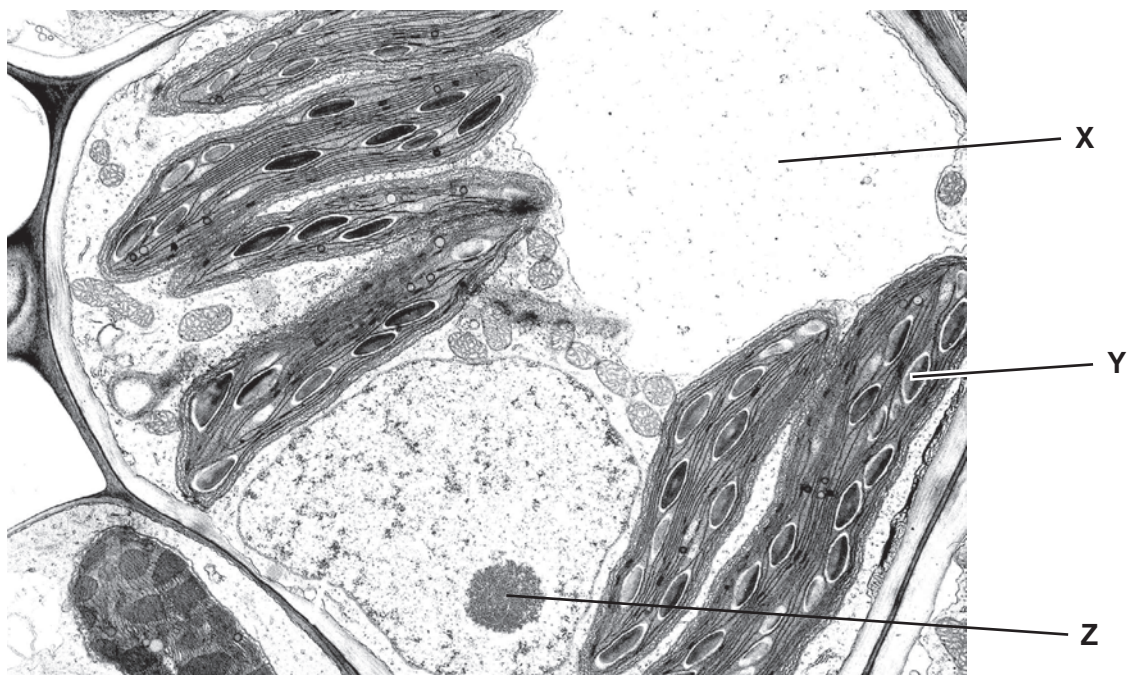
45 The diagram shows an electron micrograph of a typical animal cell.



What is the function of the membrane system labelled **X**?

- A carbohydrate metabolism
- B lipid synthesis
- C protein synthesis
- D protein synthesis and transport

46 The diagram shows an electron micrograph of a plant cell.



What do structures **X**, **Y** and **Z** contain?

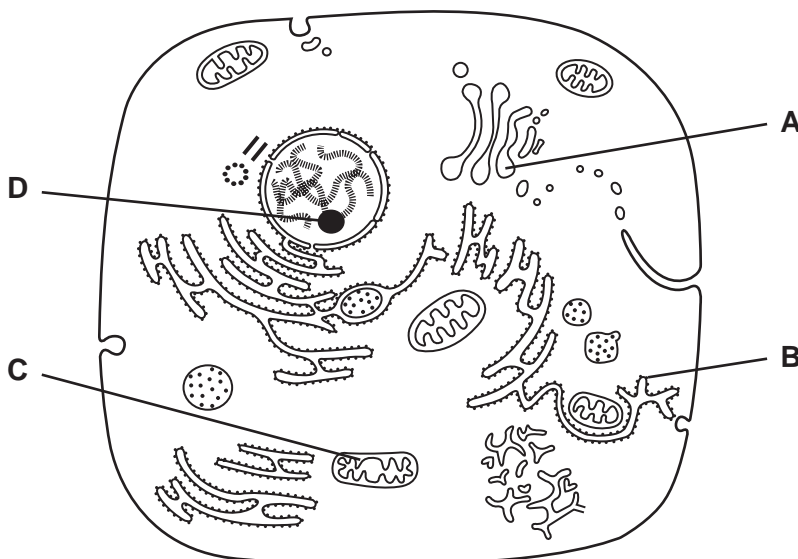
	X	Y	Z
A	air	chlorophyll	protein
B	mineral ions	starch	DNA and RNA
C	water	mineral ions	starch
D	starch	DNA and RNA	mineral ions

47 Which organelles are found in the cells of both eukaryotes and prokaryotes?

- A** chloroplasts
- B** Golgi apparatus
- C** mitochondria
- D** ribosomes

48 The diagram shows the ultrastructure of a eukaryotic cell.

Which organelle does **not** contain nucleic acid?



49 Which cell structure can be seen only with an electron microscope?

- A cell surface membrane
- B cell wall
- C chromosome
- D nucleolus

50 Which components are present in prokaryotic cells?

- A chloroplasts, DNA, nuclear envelope
- B chromosomes, mitochondria, nuclear envelope
- C cytoplasm, DNA, mitochondria
- D cytoplasm, DNA, ribosomes

- 51** Which feature is a characteristic of prokaryotic organisms?
- A** a cell wall
 - B** circular DNA
 - C** mitochondria
 - D** rough endoplasmic reticulum
- 52** From which cell organelle are nucleic acids absent?
- A** chloroplast
 - B** Golgi body
 - C** mitochondrion
 - D** ribosome
- 53** For which process is the large surface area of the cristae in the mitochondria important?
- A** energy radiation
 - B** enzyme reactions
 - C** gaseous exchange
 - D** protein synthesis