1. Cell Structure

1.2 Cells as the basic units of living organisms

Paper 1

Question Paper

1 Which range of cell diameters is typical for prokaryotic cells?

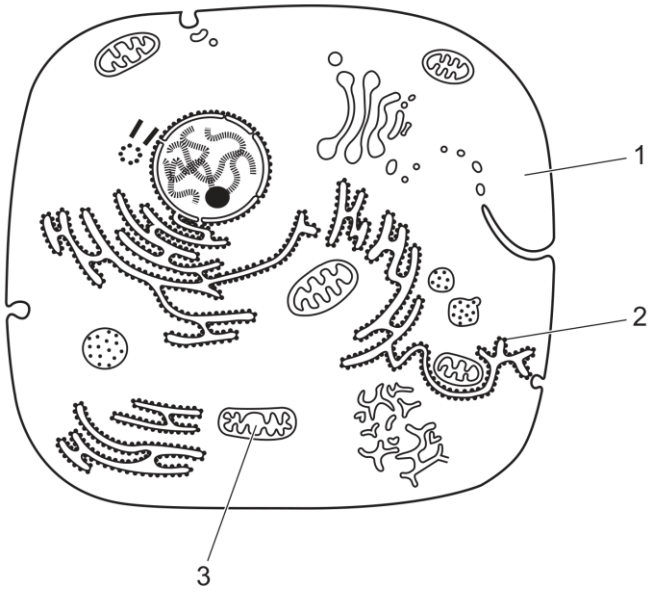
A 1 nm to 5×10^2 nm

B 1×10^3 nm to 5 μm

C 1×10^1 μm to 5×10^2 μm

D 1×10^2 μm to 5×10^3 μm

2 The diagram shows a typical animal cell.



Where would nucleic acids be found?

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

3 Which structure is found in a typical bacterial cell?

A intron

B telomere

C template strand

D capsid

4 What is the correct order of locations in the cell for the production of an extracellular enzyme?

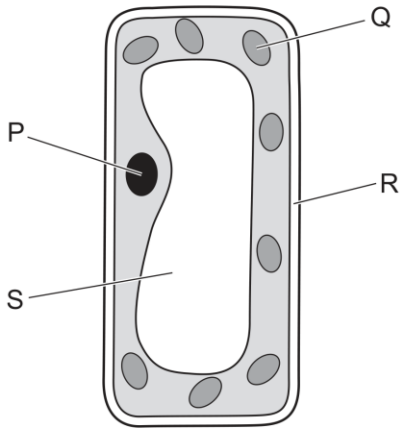
A nucleus → ribosome → rough endoplasmic reticulum → Golgi body

B ribosome → nucleus → Golgi body → rough endoplasmic reticulum

C ribosome → rough endoplasmic reticulum → nucleus → Golgi body

D rough endoplasmic reticulum → nucleus → Golgi body → ribosome

5 The diagram shows a plant cell with some labelled structures.



Which labelled structures are bound by a double membrane?

A P and Q **B** P and S **C** R and Q **D** R and S

6 Which size of ribosome is found in mitochondria **and** typical prokaryotic cells?

A 50S **B** 60S **C** 70S **D** 80S

7 Which row about typical prokaryotic cells **and** typical animal cells is correct?

	lysosomes present for the break down of old organelles	ATP is produced by the cell
A	✓	✗
B	✓	✓
C	✗	✓
D	✗	✗

key

✓ = correct for typical prokaryotic cells **and** typical animal cells

✗ = **not** correct for both cells but correct for **either** typical prokaryotic cells **or** typical animal cells

8 Which row is correct for the structures present in typical plant cells **and** typical animal cells?

	cell structure	plant cell	animal cell
A	plasmodesmata	present	present
B	Golgi body	present	not present
C	centriole	not present	present
D	tonoplast	not present	not present

9 Which statement explains why lymphocytes with **no** nucleoli die?

A The cells do **not** have centrioles and cannot divide.

B The cells do **not** have mitochondria and cannot release energy.

C The cells do **not** have mRNA and cannot transcribe DNA.

D The cells do **not** have ribosomes and cannot synthesise protein.

10 Density gradient centrifugation is 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 → nuclei → mitochondria

D ribosomes → mitochondria → chloroplasts → nuclei

11 Which cell structures contain nucleic acids?

1 chloroplasts

2 Golgi bodies

3 lysosomes

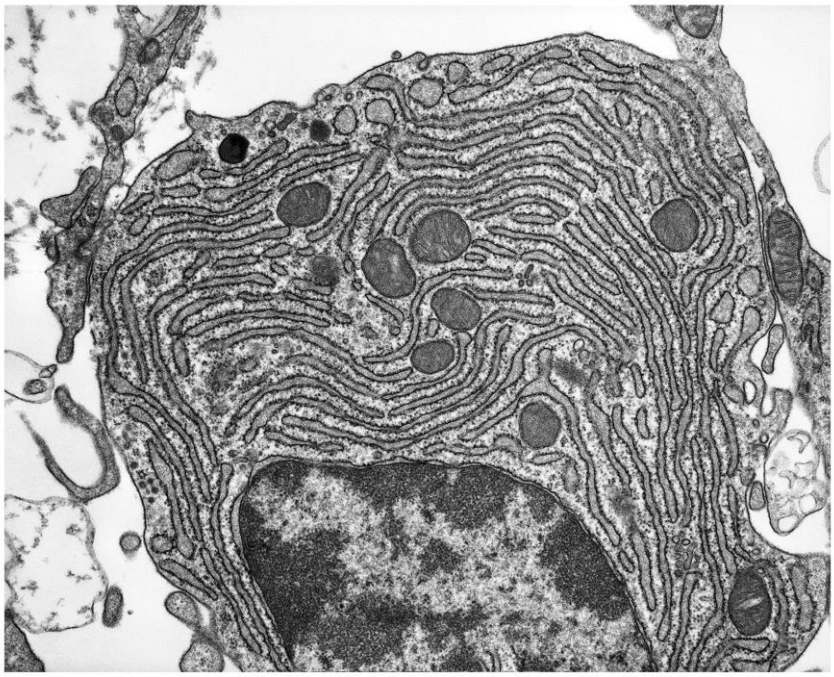
4 ribosomes

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

12 How many types of structures with a double membrane that are found in animal cells are also found in plant cells?

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

13 A cell is shown in the micrograph.



Which statement explains how it is possible to identify the type of microscope used to produce the micrograph?

A The nucleus is visible, so an electron microscope was used.

B The endoplasmic reticulum is **not** visible, so a light microscope was used.

C Chloroplasts are visible, so a light microscope was used.

D Ribosomes are visible, so an electron microscope was used.

14 Which statement supports the fact that mature plant cells contain organelles that carry out the same role as lysosomes?

A A range of hydrolytic enzymes can be found within mature plant vacuoles.

B Glycogen, found within vesicles, can be hydrolysed to glucose molecules.

C Double membrane-bound vesicles are formed from plant Golgi bodies.

D Vesicles, formed from the cell surface membrane, contain enzymes.

15 Which cell structures may contain cisternae?

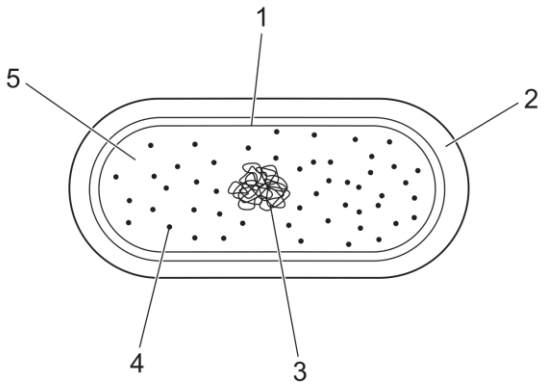
	chloroplast	endoplasmic reticulum	Golgi body	mitochondrion
A	✓	✓	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

key

✓ = may contain cisternae

✗ = does **not** contain cisternae

16 The diagram shows some cell structures of one type of cell.



Which labelled cell structures are present in typical eukaryotic cells **and** typical bacterial cells?

A 1, 2, 3 and 4

B 1, 3, 4 and 5

C 1, 2 and 3 only

D 3, 4 and 5 only

17 Peptidoglycan is stained purple by the chemical crystal violet.

Which cells would stain purple in the presence of crystal violet?

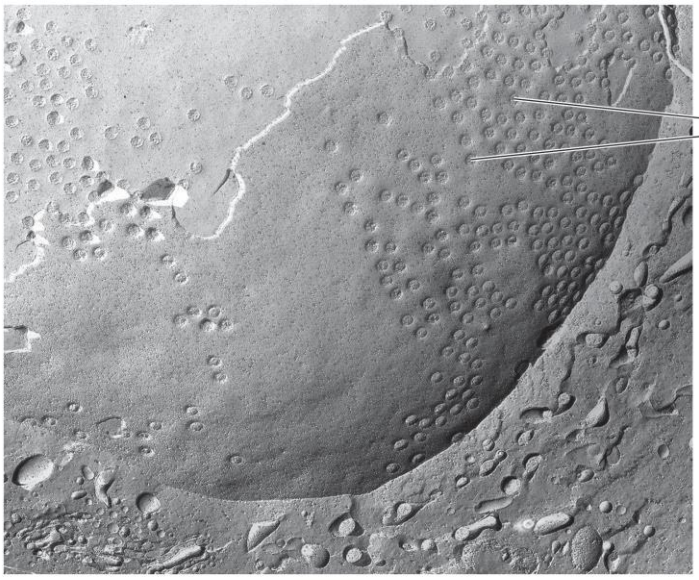
A palisade mesophyll cells

B *Vibrio cholerae* cells

C *Plasmodium falciparum* cells

D endothelial cells

18 The electron micrograph shows onion root cells prepared using a freeze-fracture technique. The cells were quickly frozen and then physically broken apart. Freeze fracture breaks apart cells along weak areas, such as membranes and the surfaces of organelles.



×20 000

Which statement best explains the appearance of the electron micrograph?

A The cells were broken apart at the endoplasmic reticulum; structure X is a ribosome.

B The cells were broken apart at the nuclear envelope; structure X is a nuclear pore.

C The cells were broken apart at the nuclear envelope; structure X is a ribosome.

D The cells were broken apart at the tonoplast; structure X is a plasmodesma.

19 Which cell structures can form vesicles?

	cell surface membrane	endoplasmic reticulum	Golgi body
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = can form vesicles

✗ = cannot form vesicles

20 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 synthesis of polypeptides

2 synthesis of lipids

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by letter.

V membranes which surround an enclosed inner cavity

W non-membrane-bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane-bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	W	V	Z
B	W	Z	Y
C	Z	W	Z
D	Z	V	W

21 Which cells contain a tonoplast?

	root hair	companion	sieve tube element	endodermis
A	✓	✓	✓	✓
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✓	✓	✗	✓

key

✓ = contain tonoplast

✗ = do not contain tonoplast

22 Which organelles found in animal or plant cells are surrounded by double membranes?

A chloroplasts, mitochondria, vacuoles

B chloroplasts, mitochondria, nuclei

C chloroplasts, nuclei, vacuoles

D mitochondria, nuclei, vacuoles

23 Some scientists think that mitochondria evolved from bacteria that entered the cytoplasm of a different cell and were able to survive there.

Which structural features of mitochondria support this hypothesis?

	folded internal membrane	circular DNA	70S ribosomes
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = supports

✗ = does not support

24 What is present in all viruses, all prokaryotes **and** all eukaryotes?

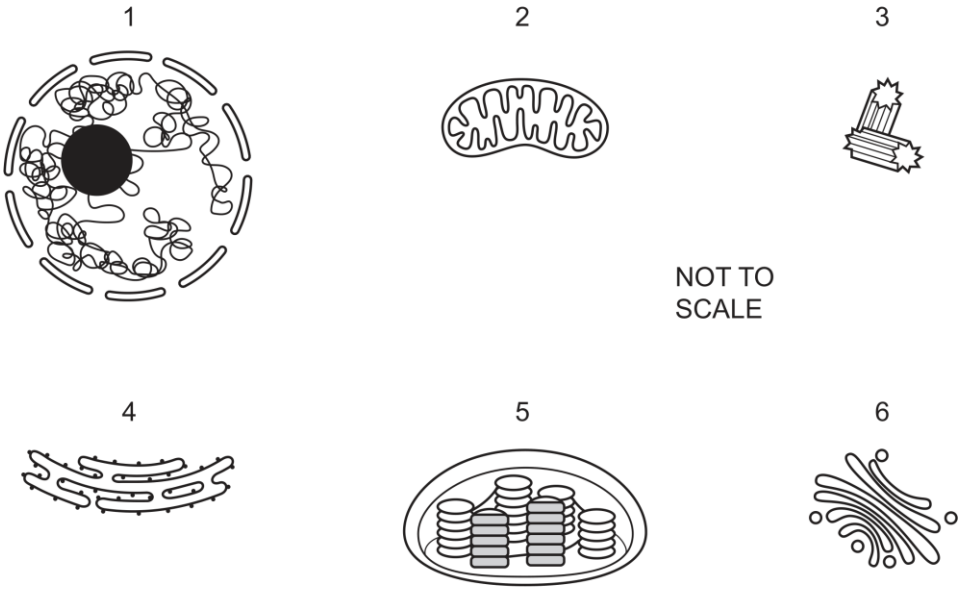
A ribose

B deoxyribose

C cytosine

D thymine

25 Six organelles found in eukaryotic cells are shown.



Which organelles are involved in the synthesis and secretion of a glycoprotein?

A 1, 2, 3 and 4 **B** 1, 2, 4 and 6 **C** 2, 3 and 5 **D** 3, 4, 5 and 6

26 Which cell structures can have mRNA inside them?

1 chloroplast

2 mitochondrion

3 nucleus

4 rough endoplasmic reticulum

A 1, 2, 3 and 4

B 1, 2 and 3 only

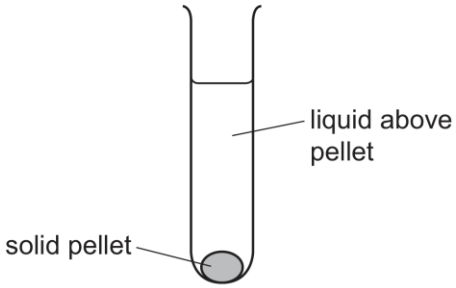
C 2, 3 and 4 only

D 3 and 4 only

27 A scientist carried out an experiment to separate the organelles in an animal cell by mass.

The scientist mixed the cells with a buffer solution which had the same water potential as the cells. The cells were broken open with a blender to release the organelles.

The extracted mixture was filtered and then spun in a centrifuge at a high speed to separate the heaviest type of organelle. These sank to the bottom, forming solid pellet 1.



The liquid above pellet 1 was poured into a clean centrifuge tube and spun in the centrifuge at a higher speed to separate the next heaviest type of organelle. These organelles sank to the bottom, forming solid pellet 2.

This procedure was repeated twice more to obtain pellet 3 and pellet 4, each containing a single type of organelle.

What is the main function of the type of organelle extracted in pellet 2?

A digestion of old organelles

B production of ATP

C production of mRNA

D synthesis of protein

28 Which structures are found in palisade mesophyll cells **and** photosynthetic prokaryotes?

1 cell surface membrane
2 cellulose wall
3 ribosomes
4 chloroplasts

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

29 Which polymers are present in all viruses **and** all prokaryotes?

1 polynucleotides
2 polypeptides
3 polysaccharides

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

30 Tay-Sachs disease results in a build-up of lipids in cells.

Which cell structure does **not** function correctly in this disease?

A Golgi body
B lysosome
C mitochondrion
D smooth endoplasmic reticulum

31 Which animal cells would have the most extensive Golgi bodies?

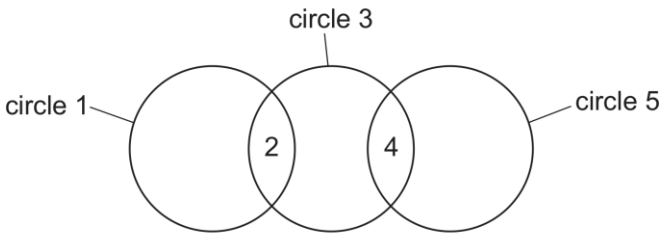
A ciliated epithelial cells

B goblet cells

C red blood cells

D smooth muscle cells

32 The diagram shows three circles, 1, 3 and 5, and the shared structures, 2 and 4.



Which row correctly identifies the three circles and some of the structures that are shared between them?

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

33 Which row about the genetic material in animal cells and prokaryotic cells is correct?

	animal cells contain linear DNA	prokaryotic genetic material is surrounded by a double membrane	prokaryotic genetic material is double-stranded DNA
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✗	✓

key

✓ = correct

✗ = not correct

34 What is present in **all** viruses?

A uracil

B ribose

C thymine

D guanine

35 What is correct about the synthesis and release of the glycoprotein mucin in goblet cells?

1 The protein is produced on ribosomes and a carbohydrate chain is added in the Golgi body.

2 The glycoproteins are packed into vesicles in the Golgi body forming lysosomes.

3 Secretory vesicles containing the glycoprotein move from the Golgi body and fuse with the cell surface membrane.

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

36 What are functions of microtubules?

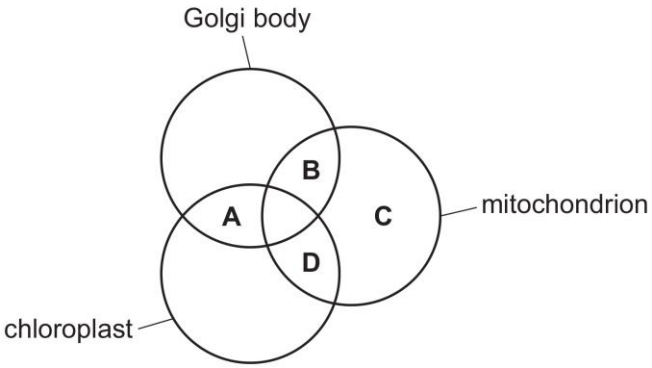
1 allowing movement of cilia in a bronchus

2 attachment to centromeres during metaphase

3 moving secretory vesicles around a cell

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

37 Which organelles contain nucleic acids?



38 Some features of cells are listed.

1 cell wall

2 cell surface membrane

3 ribosomes

Which features can be found in plant cells **and** in prokaryotic cells?

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

39 Which bonds are present in **all** viruses?

1 phosphodiester

2 peptide

3 covalent

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

40 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 mRNA passes through to the ribosome

2 produces the mitotic spindle during cell division

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by letter.

V membranes which surround an enclosed inner cavity

W non-membrane-bound, spherical structures

X a double membrane interspersed with pores

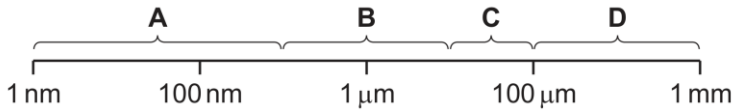
Y non-membrane-bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	V	W	Y
B	V	Y	Z
C	X	W	Y
D	X	Y	Z

41 Which size range would include most prokaryotic cells?



42 What is present in a typical prokaryotic cell **and** a typical eukaryotic cell?

A 70S ribosomes

B centrioles

C circular DNA in the cytoplasm

D starch granules

43 Which statement about viruses is correct?

A They all have a capsid made of protein.

B They all contain RNA.

C They all have an outer envelope made of phospholipids.

D They all contain 80S ribosomes.

44 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 produces the mitotic spindle during cell division

2 synthesis of polypeptides

3 synthesis of lipids

The appearances were listed by letter.

V membranes which surround an enclosed inner cavity

W non-membrane-bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane-bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered functions with the appearance of the cell structure?

	1	2	3
A	W	X	Z
B	W	Z	V
C	Y	W	V
D	Y	Z	W

45 What is found in chloroplasts **and** mitochondria?

A 70S ribosomes only

B 70S ribosomes and circular DNA

C 80S ribosomes and circular DNA

D circular DNA only

46 Which feature is correct for all known viruses?

A capsid made of lipid and protein

B DNA core

C outer envelope of phospholipid

D non-cellular structure

47 Which row matches each organelle with its function?

	microtubules	rough endoplasmic reticulum	Golgi body	centrioles
A	make cilia and spindle	separates some processes from cytoplasm	makes lysosomes	assemble the spindle during nuclear division
B	move vesicles within the cell	assembles amino acids to make proteins	contains enzymes for destroying worn out parts of the cell	move chromosomes apart during anaphase
C	move chromatids apart during anaphase	modifies proteins which may be released from cell	makes glycoproteins	move cilia
D	form part of the cytoskeleton	makes triglycerides and phospholipids	modifies proteins by adding carbohydrates	move individual cells

48 Where are 80S ribosomes found?

1 chloroplasts

2 cytoplasm of eukaryotes

3 mitochondria

4 cytoplasm of prokaryotes

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

49 Which feature, when present in an organism, enables it to be identified as a prokaryote?

A cytoplasmic DNA

B cell wall

C nucleus

D ribosomes

50 What is the function of the nucleolus?

A the formation and breakdown of the nuclear envelope

B the formation of rough endoplasmic reticulum

C the synthesis of ribosomal proteins

D the synthesis of rRNA

51 Where are cisternae found in a cell?

1 endoplasmic reticulum

2 Golgi body

3 mitochondria

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

52 Which row matches the functions to the cell structures?

	vacuole	nucleolus	ribosomes	lysosomes
A	stores water, sugar and pigment	manufactures messenger RNA	protein synthesis	involved in cell recognition
B	exports proteins	manufactures ribosomal RNA	lipid synthesis	involved in cell recognition
C	stores water, sugar and pigment	manufactures ribosomal RNA	protein synthesis	contains enzymes
D	exports proteins	manufactures messenger RNA	lipid synthesis	contains enzymes

53 Which structures are found in prokaryotes **and** eukaryotes?

A cell membrane and nucleus

B cell membrane and ribosomes

C nucleus and mitochondria

D mitochondria and ribosomes

54 Which molecules are present in all viruses?

1 thymine
2 adenine
3 cytosine

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

55 The electron micrograph shows a structure found in the cytoplasm of an animal cell.



What is this cell structure?

A centriole
B lysosome
C ribosome
D vesicle

56 Which cell structures contain nucleic acid?

1 Golgi body
2 lysosome
3 mitochondria
4 ribosomes

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

57 Which statements about mitochondria, chloroplasts or prokaryotes are correct?

1 Mitochondria and chloroplasts have a fully permeable inner membrane and a partially permeable outer membrane.

2 Prokaryotes and chloroplasts have 70S ribosomes that are the sites for translation and polypeptide synthesis.

3 Prokaryotes and mitochondria have an outer membrane and an inner, folded membrane where ATP synthesis occurs.

4 Prokaryotes and mitochondria have circular DNA where genes coding for information are located.

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

58 The very large (1000 nm) *Pandora* viruses found in Chile and Australia are considered to be viruses because they cannot replicate their own genome and cannot make proteins.

They also share essential structural features with other viruses.

What are the essential structural features of viruses?

1 non-cellular

2 protein coat

3 both DNA and RNA

4 either DNA or RNA

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

59 Which row describes the membranes surrounding each cell structure?

	chloroplast	mitochondrion	nucleus
A	single	single	double
B	double	single	single
C	single	double	single
D	double	double	double

60 Which sequence shows the correct order of some of the stages in the production and secretion of an enzyme?

A Golgi body → ribosome → rough endoplasmic reticulum → mRNA

B mRNA → smooth endoplasmic reticulum → Golgi body → vesicle

C ribosome → rough endoplasmic reticulum → vesicle → Golgi body

D smooth endoplasmic reticulum → mRNA → vesicle → ribosome

61 Different antibiotics function in different ways. Ideally, the antibiotic kills the bacteria, but does not harm the infected human.

One type of antibiotic, tetracycline, can affect the way in which human mitochondria function.

What explains the effect of tetracycline on human mitochondria?

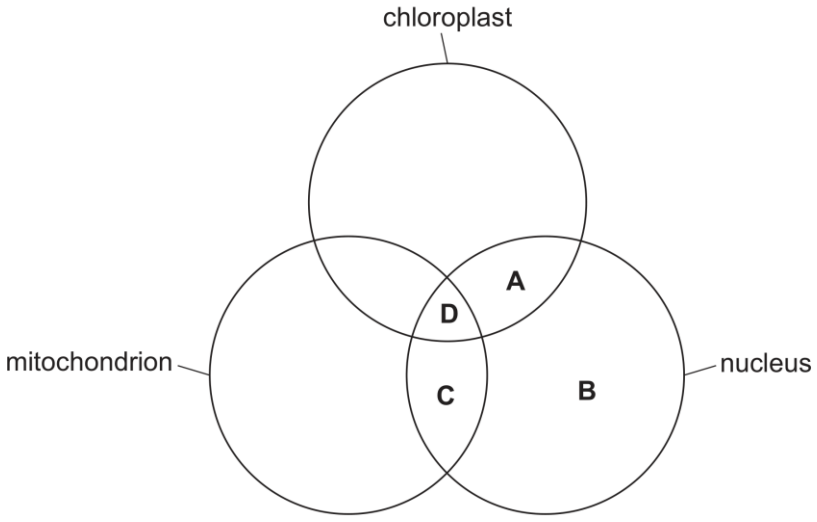
1 The antibiotic prevents the synthesis of peptidoglycan cell walls.

2 The antibiotic prevents synthesis of linear DNA.

3 The antibiotic prevents translation by binding to 70S ribosomes.

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

62 In which cell structures does DNA transcription occur?



63 Which rows could correctly identify the nucleic acids present in two different virus particles in a sample of air?

	DNA	RNA
1	✓	✓
2	✓	✗
3	✗	✓
4	✗	✗

key

✓ = nucleic acid present

✗ = nucleic acid not present

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

64 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 mRNA passes through to the ribosome

2 organises microtubules to produce the spindle during cell division

3 synthesis of polypeptides

The appearances were listed by letter.

V membranes which surround an enclosed inner cavity

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X a double membrane interspersed with pores

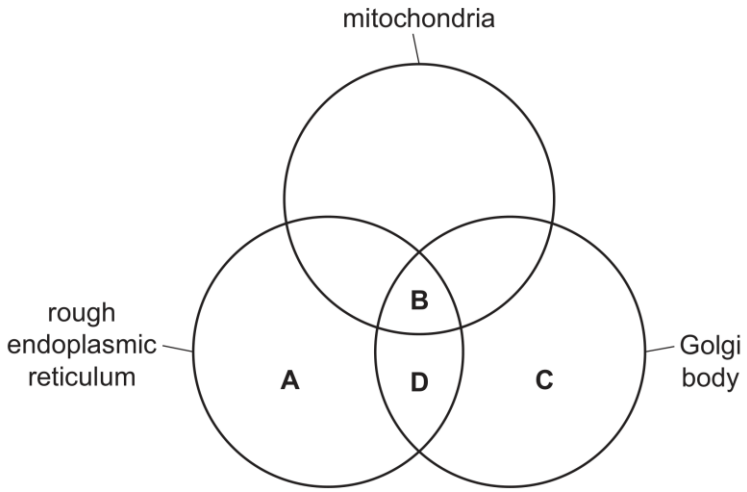
Y non-membrane bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	V	W	X
B	V	Y	Z
C	X	W	Z
D	X	Y	W

65 Which cell structures are required for the formation of lysosomes and the hydrolytic enzymes that they contain?



66 Which cell structures contain rRNA?

1 chloroplast

2 mitochondrion

3 nucleus

4 smooth endoplasmic reticulum

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 3 and 4 only

67 The single-celled organism *Thiomargarita namibiensis* measures 700 μm in diameter and is enclosed in a cell wall. The genetic material of *T. namibiensis* is located free in the cytoplasm where it occurs as thousands of copies of circular DNA. Most of the cell is taken up by a large vacuole, which stores essential chemicals for metabolism.

Which statement is correct?

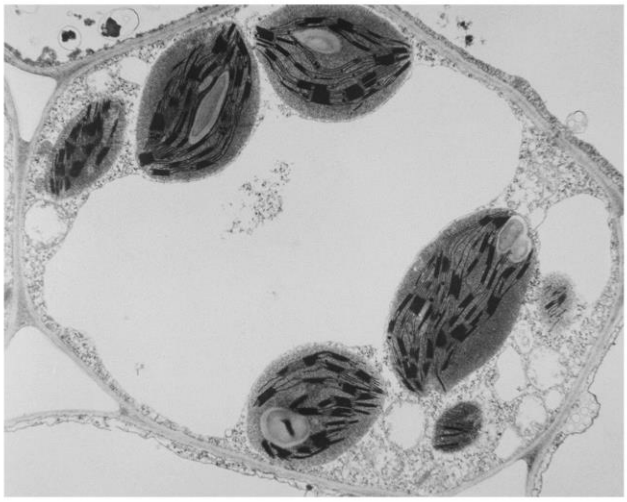
A It must be a eukaryote because a diameter of 700 μm is too large for a prokaryote.

B It must be a plant because it contains a vacuole.

C It must be a plant because it is enclosed in a cell wall.

D It must be a prokaryote because its DNA is circular and located in the cytoplasm.

68 The photomicrograph shows the ultrastructure of part of a cell.



Which statement about the type of cell shown in the photomicrograph is correct?

A It is a plant cell because it has both chloroplasts and a nucleus.

B It is a plant cell because it has chloroplasts.

C It is an animal cell because it has a cell membrane.

D It is an animal cell because it has mitochondria.

69 Which structures are found in typical eukaryotic cells?

1 70S ribosomes

2 80S ribosomes

3 linear DNA (chromosomes)

4 circular DNA

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1 and 4 only

D 2 and 3 only

70 The table shows a comparison between two features of a typical eukaryotic cell and a typical prokaryotic cell.

Which row shows the correct comparison between these cells?

	presence of centromeres		presence of telomeres	
	eukaryotic cell	prokaryotic cell	eukaryotic cell	prokaryotic cell
A	✓	✓	✗	✗
B	✓	✗	✓	✗
C	✗	✓	✗	✓
D	✗	✗	✓	✓

key

✓ = present

✗ = not present

71 Which row correctly shows a feature of a cell structure?

	site of protein synthesis	makes lysosomes
A	smooth endoplasmic reticulum	rough endoplasmic reticulum
B	ribosomes	Golgi body
C	rough endoplasmic reticulum	ribosomes
D	Golgi body	smooth endoplasmic reticulum

72 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by a number.

1 organises microtubules to produce the spindle during cell division

2 synthesis of polypeptides

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by a letter.

V membranes which surround an enclosed inner cavity

W non-membrane bound, spherical structures

X a double membrane with many pores

Y non-membrane bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	W	X	Y
B	W	Z	W
C	Y	W	Z
D	Y	Z	Z

73 The features of some cells and cell structures that make ATP are listed.

1 has outer boundary membrane and folded inner membrane

2 has peptidoglycan cell wall outside an outer boundary membrane

3 has a double boundary membrane and stacks of inner membranes

Which row identifies these components?

	1	2	3
A	bacterium	chloroplast	mitochondrion
B	chloroplast	bacterium	mitochondrion
C	chloroplast	mitochondrion	bacterium
D	mitochondrion	bacterium	chloroplast

74 Mitochondria are thought to have evolved from prokaryotic cells that were ingested by an ancestral cell.

Which feature have these prokaryotes lost during their evolution into mitochondria?

A cell wall

B circular chromosome

C internal membranes

D ribosomes

75 Which row shows the correct order of size of these cell structures?

1 width of a mitochondrion

2 width of a ribosome

3 width of a cell surface membrane

4 width of a chloroplast

	largest		→	smallest
A	1	4	2	3
B	1	4	3	2
C	4	1	2	3
D	4	2	1	3

76 Insulin is a hormone synthesised from two polypeptide chains inside cells of the pancreas.

Which row shows the cell structures that are used in producing insulin and releasing it from the cells?

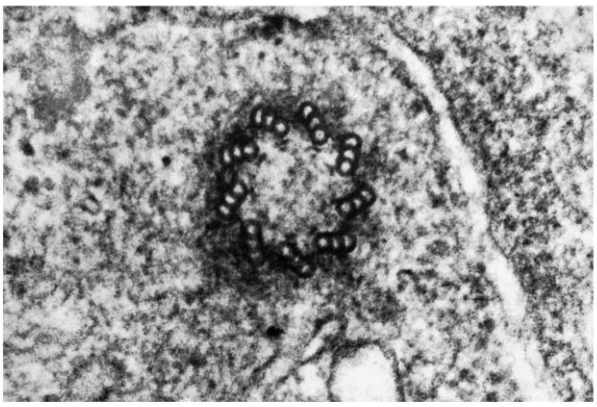
	Golgi body	lysosome	rough endoplasmic reticulum
A	✓	✓	✗
B	✓	✓	✓
C	✓	✗	✓
D	✗	✓	✓

key

✓ = used

✗ = not used

77 The electron micrograph shows a cell structure in a eukaryotic cell.



Which statements about this cell structure are correct?

1 ATP is synthesised in this cell structure.

2 The cell structure is made of protein molecules.

3 The cell structure replicates during interphase of the cell cycle.

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

78 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 synthesis of polypeptides

2 synthesis of lipids

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by letter.

V membranes which surround an enclosed inner cavity

W non-membrane-bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane-bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	W	V	Z
B	W	Z	Y
C	Z	W	Z
D	Z	V	W

79 The DNA of typical prokaryotes is naked and circular.

Which statement describes how the DNA of eukaryotes differs from the DNA of typical prokaryotes?

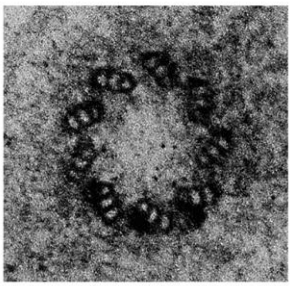
A Only DNA of eukaryotes has a nuclear envelope around it and is a double helix.

B Only DNA of eukaryotes has a nuclear envelope around it and is circular.

C Only DNA of eukaryotes has proteins attached to it and is a double helix.

D Only DNA of eukaryotes has proteins attached to it and is linear.

80 The electron micrograph shows a structure found in the cytoplasm of an animal cell.



Which biological molecules are found in this structure?

1 nucleic acid

2 protein

3 phospholipid

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

81 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by number.

1 mRNA passes through to the ribosome

2 synthesis of lipids

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by letter.

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W non-membrane-bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane-bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered function with the appearance of the cell structure?

	1	2	3
A	V	W	Z
B	V	Z	Y
C	X	V	W
D	X	V	Z

82 Which are found in typical prokaryotic cells **and** in typical plant cells?

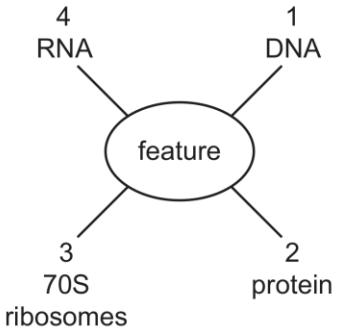
1 cell wall

2 circular DNA

3 cytoplasm

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

83 The diagram shows some features that occur in organisms.



Which features can be present in viruses?

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

84 Which features of cilia and root hairs are correct?

	increase cell surface area	cannot be resolved with the light microscope	contain vacuoles	more than one present on a cell
A	cilia	cilia	root hairs	root hairs
B	cilia	root hairs	cilia	cilia
C	root hairs	cilia	root hairs	cilia
D	root hairs	root hairs	cilia	root hairs

85 Which are functions of microtubules?

1 allowing movement of cilia in a bronchus

2 attachment of centromeres during metaphase

3 moving secretory vesicles around a cell

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

86 Some cell structures are listed.

1 mitochondria

2 nucleus

3 chloroplasts

4 ribosomes

What is the correct order of these cell structures when listed from largest to smallest?

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

87 Which cell structures have ribosomal RNA (rRNA)?

1 chloroplast

2 mitochondrion

3 nucleus

4 rough endoplasmic reticulum

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 2, 3 and 4 only

88 A cell structure in the macrophage destroys bacteria. Some bacteria stop this cell structure from functioning.

Which cell structure in the macrophage is stopped from functioning by the bacteria?

A Golgi body

B lysosome

C ribosome

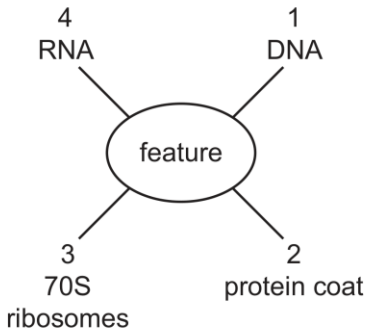
D vesicle

89 Two different types of cell, P and Q, were broken up using ultrasound and their contents analysed. Both types of cell contained small circular DNA. The circular DNA from P all carried the same base sequence, but those from Q were of two types, with different base sequences.

What may be concluded about the identity of cell types P and Q?

	P	Q
A	heart muscle fibres	root cortical cells
B	lymphocytes	mature red blood cells contaminated by bacteria
C	mature red blood cells	phloem sieve tube element
D	root cortical cells	leaf mesophyll cells

90 Which features shown in the diagram can be present in viruses?



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

91 Which cell structure contains cytoplasm?

A chloroplasts

B mitochondria

C plasmodesmata

D smooth endoplasmic reticulum

92 Some cell structures are listed in a particular order.

1 nucleus

2 ribosome

3 Golgi body

4 vesicle

What determines the order in which these cell structures are listed?

A sequence used in synthesis of a lipid

B sequence used in synthesis of an antibody

C size from largest to smallest

D size from smallest to largest

93 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by a number.

1 mRNA passes through to the ribosome

2 synthesis of polypeptides

3 packaging of hydrolytic enzymes that will remain in the cell

The appearances were listed by a letter.

V membranes which surround an enclosed inner cavity

W non-membrane bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered functions with the appearance of the cell structure?

	1	2	3
A	V	X	Y
B	V	Z	Z
C	X	W	Z
D	X	Z	W

94 The antibiotic chloramphenicol inhibits protein synthesis in mitochondria and in some prokaryotes. Chloramphenicol does **not** inhibit protein synthesis in the cytoplasm of eukaryotic cells.

What would be the effect on the cells of a person being treated with chloramphenicol?

	rate of ATP production	transcription of nuclear DNA
A	decreases	decreases
B	decreases	no effect
C	increases	decreases
D	no effect	no effect

95 Which structures are found in animal cells and in plant cells?

1 centriole

2 lysosome

3 nucleolus

4 vacuole

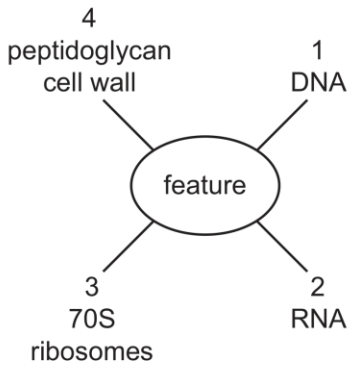
A 1 and 3 only

B 2 and 4 only

C 2, 3 and 4 only

D 1, 2, 3 and 4

96 Which features shown in the diagram can be present in eukaryotes?



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

97 Four students were asked to match the function with the appearance of some cell structures in an animal cell.

The functions were listed by a number.

1 organises microtubules to produce the spindle during cell division

2 synthesis of polypeptides

3 synthesis of lipids

The appearances were listed by a letter.

V membranes which surround an enclosed inner cavity

W non-membrane bound, spherical structures

X a double membrane interspersed with pores

Y non-membrane bound, cylindrical structures

Z membrane-bound sacs, arranged as a flattened stack

Which student correctly matched the numbered functions with the appearance of the cell structure?

	1	2	3
A	W	X	Z
B	W	Z	V
C	Y	W	V
D	Y	Z	W

98 Which types of RNA are present in prokaryotic cells and in eukaryotic cells?

	mRNA	rRNA	tRNA
A	✓	✓	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✓	✗

key

✓ = present

✗ = not present

99 Different antibiotics function in different ways. It is important that the antibiotic kills the bacteria, but does not harm the infected human.

The antibiotic tetracycline has been found to affect the way in which human mitochondria function.

Which statements could explain why human mitochondria function is affected by tetracycline?

A The antibiotic prevents the synthesis of peptidoglycan cell walls.

B The antibiotic prevents synthesis of linear DNA.

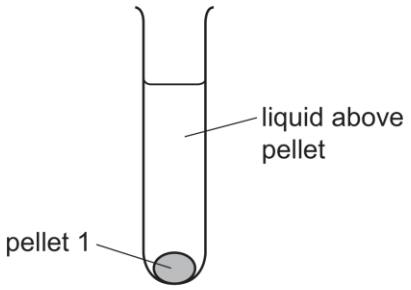
C The antibiotic prevents translation of circular DNA.

D The antibiotic prevents translation by binding to 70S ribosomes.

100 A scientist carried out an experiment to separate cell structures in animal cells.

The cells were broken open to release the cell structures.

This extract was filtered into a centrifuge tube and then spun in a centrifuge. The heaviest cell structure sank to the bottom forming pellet 1, as shown in the diagram.



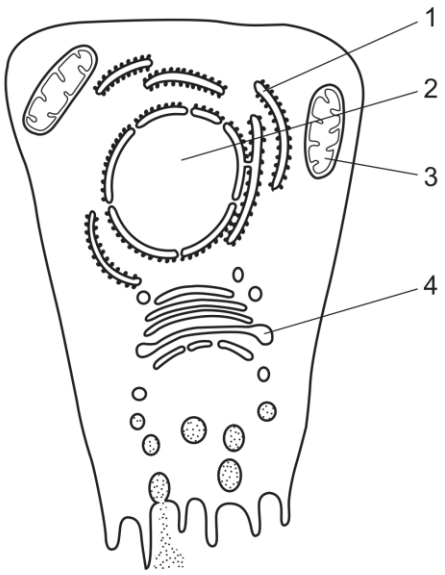
The liquid above pellet 1 was poured into a clean centrifuge tube and spun in the centrifuge at a higher speed to separate the next heaviest cell structure. This cell structure sank to the bottom, forming pellet 2.

This procedure was repeated twice more to obtain pellet 3 and pellet 4, each containing a single type of cell structure.

Which row shows the order in which the cell structures were collected?

	pellet 1	pellet 2	pellet 3	pellet 4
A	nucleus	lysosomes	mitochondria	ribosomes
B	nucleus	mitochondria	lysosomes	ribosomes
C	ribosomes	lysosomes	mitochondria	nucleus
D	ribosomes	mitochondria	lysosomes	nucleus

101 Radioactively-labelled nucleotides are introduced into a cell.



In which cell structures will the radioactivity first become concentrated?

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

102 Some features of cells are listed.

1 cell wall

2 cell surface membrane

3 ribosomes

Which features can be found in plant cells and in prokaryotic cells?

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

103 Which type of cell contains the highest proportion of cell structures bound by a single membrane?

A ciliated epithelial cell

B goblet cell

C red blood cell

D smooth muscle cell

104 The table shows a variety of structures which may be found in cells.

Which row shows structures that could be found in the root cells of a plant?

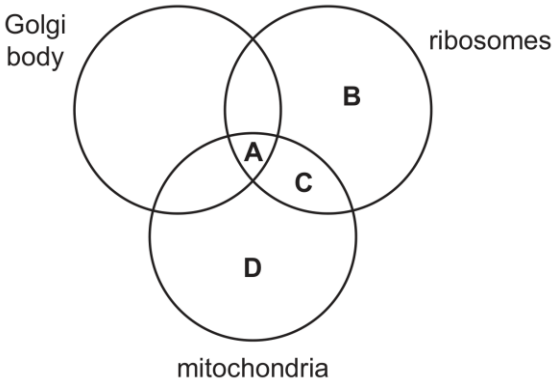
	plasmodesmata	glycogen granules	Golgi body	mitochondria
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✓
D	✗	✗	✓	✓

key

✓ = present

✗ = absent

105 Which of these cell structures are present in *Plasmodium*?



106 A student made notes describing photomicrographs of four cells.

cell 1 Grey cytoplasm at edge of cell contains many black lines and spots. Large white area in centre of cell.

cell 2 Grey cytoplasm contains many black lines and spots which fill the entire cell.

cell 3 Pale blue cytoplasm surrounds a single dark blue spot.

cell 4 Many green structures are enclosed within a rectangular shape with visible boundaries.

Which table identifies the type of cell and the type of microscope used to take each photograph?

A

	animal cell	plant cell
electron microscope	1	2
light microscope	3	4

B

	animal cell	plant cell
electron microscope	1	2
light microscope	4	3

C

	animal cell	plant cell
electron microscope	2	1
light microscope	3	4

D

	animal cell	plant cell
electron microscope	2	1
light microscope	4	3

107 Which cell structures may contain cisternae?

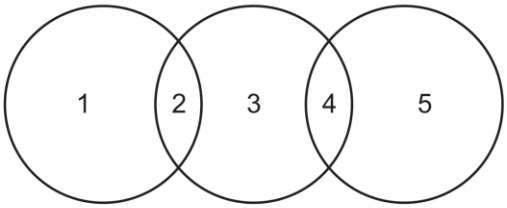
	chloroplast	endoplasmic reticulum	Golgi body	mitochondrion
A	✓	✓	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

key
✓ = may contain cisternae
✗ = does not contain cisternae

108 Which row correctly describes the function of the cell structures?

	lysosomes	mitochondria	smooth endoplasmic reticulum	Golgi body
A	digestion of unwanted structures	abundant in sites of active transport	processing of proteins	a stack of flattened sacs
B	digestion of unwanted structures	ATP synthesis	lipid production	glycoprotein production
C	spherical sacs containing hydrolytic enzymes	abundant in sites of active transport	lipid production	glycoprotein production
D	spherical sacs containing hydrolytic enzymes	ATP synthesis	glycoprotein production	lipid production

109 The diagram shows the relationship between various cells and their components.



Which row is correct?

	1	2	3	4	5
A	80S ribosome	eukaryotic cell	mitochondrion	70S ribosome	prokaryotic cell
B	chloroplast	plant cell	cell wall	prokaryotic cell	80S ribosome
C	circular DNA	nucleus	eukaryotic cell	mitochondrion	70S ribosome
D	prokaryotic cell	circular DNA	chloroplast	membrane bound	70S ribosome

110 Which comparison of bacteria cell walls and plant cell walls is correct?

	bacteria cell wall	plant cell wall
A	made of a polymer of α-glucose	made of cellulose
B	made of a polymer of β-glucose	made of a polymer of amino sugars
C	made of a polymer of amino sugars	made of a polymer of α-glucose
D	made of peptidoglycan	made of a polymer of β-glucose

111 What is the diameter of a typical prokaryote, such as *Streptococcus*?

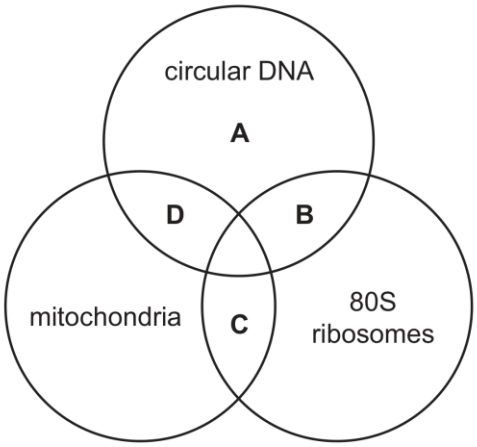
A 7.5×10^{1} nm

B 7.5×10^{2} nm

C 7.5×10^{0} μm

D 7.5×10^{1} μm

112 Which structures are present in a *Vibrio cholerae* cell?



113 Which statements are correct for a green plant?

1 ATP is produced by mitochondria.

2 ATP is produced by chloroplasts.

3 ATP forms part of the DNA.

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

114 Which processes occur in eukaryotes and prokaryotes?

1 hydrolysis

2 mitosis

3 transcription

4 translation

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