

MEGA LECTURE

Chapter 1

CELLS

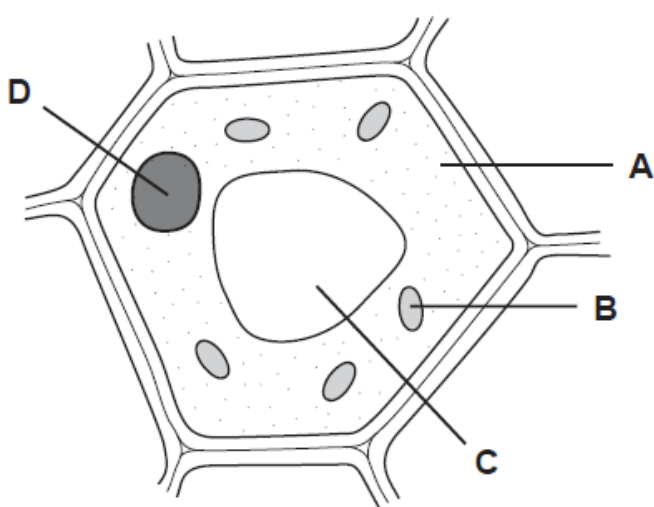
1.	<p>An actively growing cell is supplied with radioactive amino acids.</p> <p>Which cell component would first show an increase in radioactivity?</p> <p>A Golgi body B mitochondrion C nucleus D rough endoplasmic reticulum</p>																									
2.	<p>Which pair of organelles has internal membranes?</p> <p>A chloroplasts and mitochondria B chloroplasts and nuclei C mitochondria and ribosomes D nuclei and ribosomes</p>																									
3.	<p>Which combination is found in a prokaryotic cell?</p> <table border="1" data-bbox="285 1360 1281 1692"> <thead> <tr> <th></th> <th>endoplasmic reticulum</th> <th>DNA</th> <th>RNA</th> <th>nucleus</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>✓</td> <td>✓</td> <td>x</td> <td>x</td> </tr> <tr> <td>B</td> <td>✓</td> <td>x</td> <td>x</td> <td>✓</td> </tr> <tr> <td>C</td> <td>x</td> <td>✓</td> <td>✓</td> <td>x</td> </tr> <tr> <td>D</td> <td>x</td> <td>x</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table> <p>key ✓ pres x abs</p>		endoplasmic reticulum	DNA	RNA	nucleus	A	✓	✓	x	x	B	✓	x	x	✓	C	x	✓	✓	x	D	x	x	✓	✓
	endoplasmic reticulum	DNA	RNA	nucleus																						
A	✓	✓	x	x																						
B	✓	x	x	✓																						
C	x	✓	✓	x																						
D	x	x	✓	✓																						

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4. What is the order of size of cell components?

	largest \longrightarrow smallest			
A	mitochondria	ribosomes	starch grains	nuclei
B	nuclei	chloroplasts	mitochondria	ribosomes
C	ribosomes	mitochondria	chloroplasts	starch grains
D	starch grains	mitochondria	chloroplasts	ribosomes

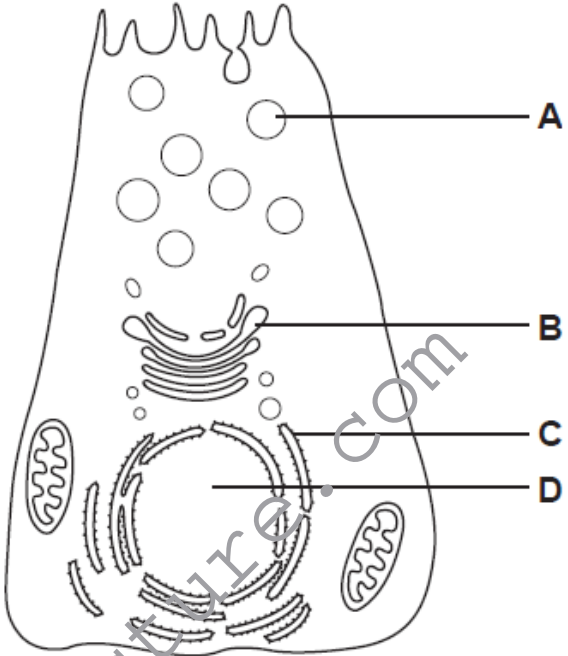
5. The diagram shows the structure of a typical plant cell.
Which cell component is also present in prokaryotes?



6. What is responsible for the high resolution of the electron microscope?

- A** high magnification
- B** short wavelength of the electron beam
- C** use of heavy metal stains
- D** very thin sections

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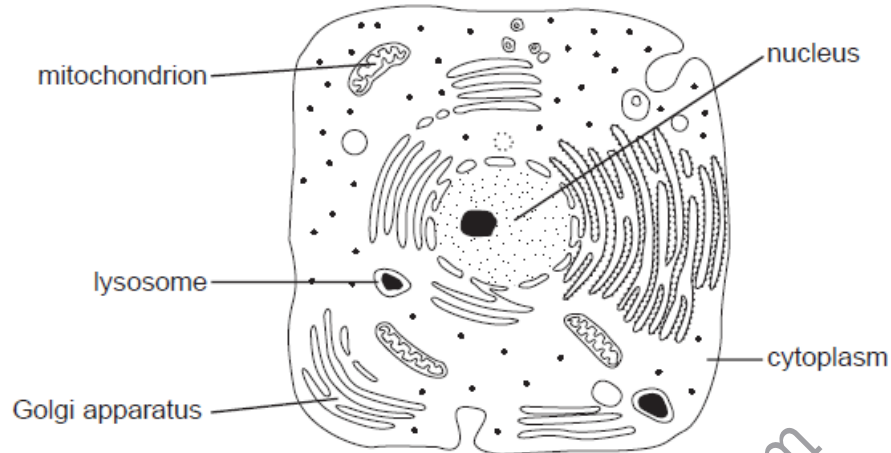
<p>7.</p>	<p>Radioactively-labelled amino acids are introduced into a cell.</p> <p>In which cell structure will the radioactivity first become concentrated?</p> 
<p>8.</p>	<p>What is the function of nucleoli?</p> <p>A the formation and breakdown of the nuclear envelope</p> <p>B the formation of centromeres</p> <p>C the formation of ribosomes</p> <p>D the organisation of the spindle during nuclear division</p>
<p>9.</p>	<p>What identifies a cell as a prokaryote?</p> <p>A The DNA is associated with protein.</p> <p>B The DNA is in a circular form.</p> <p>C The DNA is in the form of a double spiral.</p> <p>D The DNA is surrounded by a membrane system.</p>

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10.	<p>A lysosome measures 0.4 μm in diameter.</p> <p>What is the diameter in nm?</p> <p>A 4 nm B 40 nm C 400 nm D 4000 nm</p>															
11.	<p>What describes resolution in microscopy?</p> <p>A the ability to distinguish between two objects that are very close together</p> <p>B the clarity of the image formed by the microscope</p> <p>C the number of times the image has been magnified by the objective lens</p> <p>D the power of the microscope to focus on very small objects</p>															
12.	<p>What is a function of the smooth endoplasmic reticulum?</p> <p>A aerobic respiration</p> <p>B intracellular digestion</p> <p>C synthesis of steroids</p> <p>D transport of proteins</p>															
13.	<p>For which process is the large surface area of the cristae in the mitochondria important?</p> <p>A energy radiation</p> <p>B enzyme reaction</p> <p>C gaseous exchange</p> <p>D protein synthesis</p>															
14.	<p>What is the resolution, in nanometres, of an electron microscope and of a light microscope?</p> <table border="1" data-bbox="289 1507 734 1812"> <thead> <tr> <th></th> <th>electron microscope</th> <th>light microscope</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.5</td> <td>20</td> </tr> <tr> <td>B</td> <td>0.5</td> <td>200</td> </tr> <tr> <td>C</td> <td>5.0</td> <td>20</td> </tr> <tr> <td>D</td> <td>5.0</td> <td>200</td> </tr> </tbody> </table>		electron microscope	light microscope	A	0.5	20	B	0.5	200	C	5.0	20	D	5.0	200
	electron microscope	light microscope														
A	0.5	20														
B	0.5	200														
C	5.0	20														
D	5.0	200														

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15. The diagram shows a drawing of an electron micrograph of a cell.



Which structures are surrounded by double membranes?

	Golgi apparatus	lysosome	mitochondrion	nucleus	cytoplasm
A	✓	✓	✓	✓	✓
B	✓	x	x	x	x
C	x	x	✓	✓	x
D	x	✓	x	x	✓

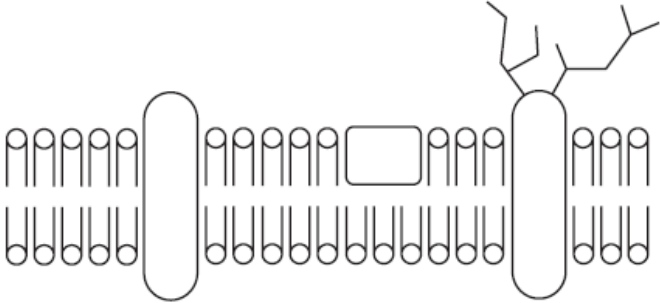
16. In which animal cells would Golgi apparatus be most abundant?

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

17. Which is a feature of all prokaryotic cells?

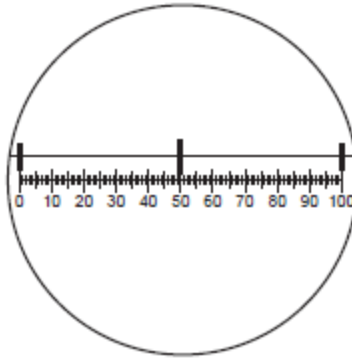
- A** absence of cell surface membrane
- B** division by mitosis
- C** presence of mitochondria
- D** presence of ribosomes

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<p>18.</p>	<p>The diagram shows a cell surface membrane. The lipid bilayer has an approximate width of 8 nm.</p>  <p>How many times has the diagram been magnified?</p> <p>A 2.5×10^2 B 2.5×10^4 C 2.5×10^6 D 2.5×10^8</p>						
<p>19.</p>	<p>The diameter of living cells varies considerably.</p> <p>Typical diameters are:</p> <table border="0" style="margin-left: 40px;"> <tr> <td>a prokaryote, such as <i>Streptococcus</i></td> <td>-</td> <td>750 nm</td> </tr> <tr> <td>a eukaryotic cell, such as a white blood cell</td> <td>-</td> <td>15 μm</td> </tr> </table> <p>Given these measurements, the diameter of the white blood cell is how many times greater than the prokaryote?</p> <p>A x 2 B x 20 C x 50 D x 200</p>	a prokaryote, such as <i>Streptococcus</i>	-	750 nm	a eukaryotic cell, such as a white blood cell	-	15 μ m
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a eukaryotic cell, such as a white blood cell	-	15 μ m					
<p>20.</p>	<p>Membranous sacs containing products of metabolism are formed by the endoplasmic reticulum in cells.</p> <p>Where are these products used?</p> <p>A inside and outside the cell B inside lysosomes only C inside the cell only D outside the cell only</p>						

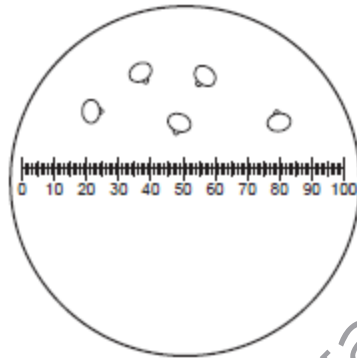
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21. The diagram shows a graduated slide, with divisions of 0.1 mm viewed using an eyepiece graticule.



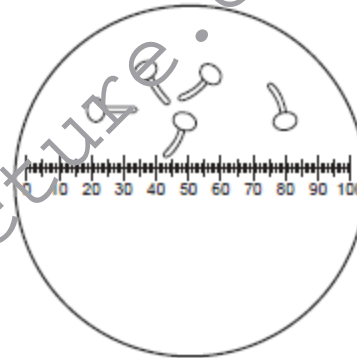
Pollen grains were grown in a sugar solution and viewed using the eyepiece graticule. Diagram 1 shows the pollen grains at first and diagram 2 shows them after four hours.

diagram 1



at start

diagram 2



after 4 hours

What is the growth rate of the pollen tubes?

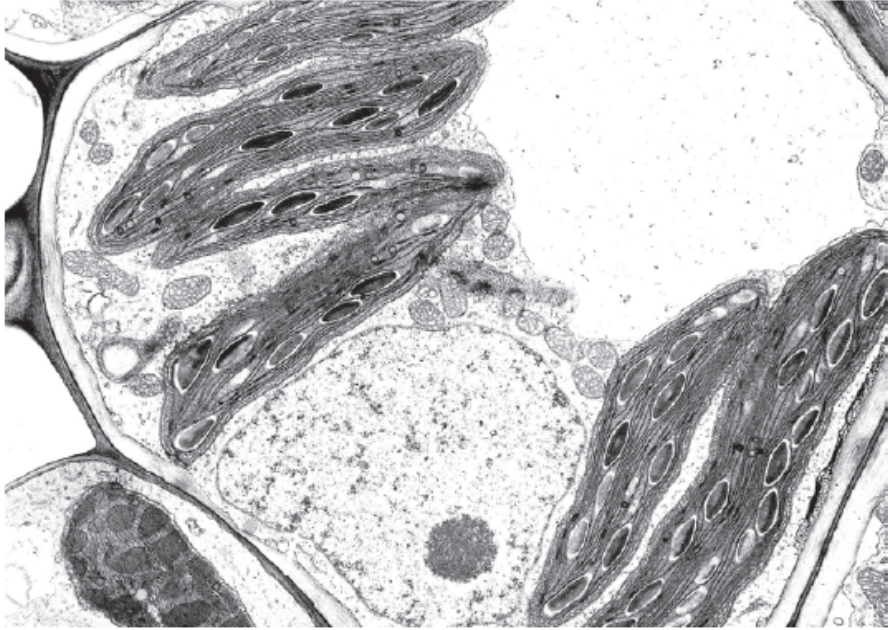
- A** $5 \mu\text{mh}^{-1}$ **B** $10 \mu\text{mh}^{-1}$ **C** 5mmh^{-1} **D** 10mmh^{-1}

22. In 1985, a giant bacterium, *Epulopiscium fishelsoni*, was discovered.

Which cell structure(s) would be present in *Epulopiscium* enabling biologists to classify this organism as prokaryotic?

- A** a cellulose cell wall outside the plasma membrane
- B** a pair of centrioles close to the nuclear area
- C** circular DNA lying free in the cytoplasm
- D** smooth endoplasmic reticulum throughout the cytoplasm

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23.	<p>What is the order of size of cell components?</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td colspan="3">largest \longrightarrow</td> <td>smallest</td> </tr> <tr> <td>A</td> <td>centrioles</td> <td>mitochondria</td> <td>lysosomes</td> <td>nucleoli</td> </tr> <tr> <td>B</td> <td>mitochondria</td> <td>nucleoli</td> <td>lysosomes</td> <td>centrioles</td> </tr> <tr> <td>C</td> <td>nucleoli</td> <td>mitochondria</td> <td>centrioles</td> <td>lysosomes</td> </tr> <tr> <td>D</td> <td>nucleoli</td> <td>centrioles</td> <td>mitochondria</td> <td>lysosomes</td> </tr> </table>		largest \longrightarrow			smallest	A	centrioles	mitochondria	lysosomes	nucleoli	B	mitochondria	nucleoli	lysosomes	centrioles	C	nucleoli	mitochondria	centrioles	lysosomes	D	nucleoli	centrioles	mitochondria	lysosomes
	largest \longrightarrow			smallest																						
A	centrioles	mitochondria	lysosomes	nucleoli																						
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C	nucleoli	mitochondria	centrioles	lysosomes																						
D	nucleoli	centrioles	mitochondria	lysosomes																						
24.	<p>The magnification of this electron micrograph is 5×10^3.</p>  <p>What is the actual size of the nucleolus?</p> <p>A $0.2\mu\text{m}$ B $0.5\mu\text{m}$ C $2\mu\text{m}$ D $20\mu\text{m}$</p>																									
25.	<p>Which structure is present in cells of eukaryotes but not present in cells of prokaryotes?</p> <p>A 70s ribosome B chromatin C mesosome D plasmid</p>																									

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26.	<p>What are the appropriate units for measuring diameters of alveoli, diameters of white blood cells and the width of cell walls?</p> <table border="1" data-bbox="298 277 1019 562"> <thead> <tr> <th></th> <th>diameters of alveoli</th> <th>diameters of white blood cells</th> <th>width of cell walls</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>mm</td> <td>μm</td> <td>μm</td> </tr> <tr> <td>B</td> <td>μm</td> <td>mm</td> <td>μm</td> </tr> <tr> <td>C</td> <td>μm</td> <td>μm</td> <td>nm</td> </tr> <tr> <td>D</td> <td>mm</td> <td>mm</td> <td>nm</td> </tr> </tbody> </table>		diameters of alveoli	diameters of white blood cells	width of cell walls	A	mm	μm	μm	B	μm	mm	μm	C	μm	μm	nm	D	mm	mm	nm
	diameters of alveoli	diameters of white blood cells	width of cell walls																		
A	mm	μm	μm																		
B	μm	mm	μm																		
C	μm	μm	nm																		
D	mm	mm	nm																		
27.	<p>Cells which do not have nucleoli die because they do not have</p> <p>A centrioles and cannot divide.</p> <p>B mitochondria and cannot release energy</p> <p>C mRNA and cannot transcribe DNA</p> <p>D ribosomes and cannot synthesise protein.</p>																				
28.	<p>What describes the features of an electron microscope?</p> <table border="1" data-bbox="302 1125 1393 1558"> <thead> <tr> <th></th> <th>maximum magnification</th> <th>resolution/ nm</th> <th>specimen</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>2.5×10^3</td> <td>2.5×10^2</td> <td>dead</td> </tr> <tr> <td>B</td> <td>2.5×10^4</td> <td>5.0×10^{-1}</td> <td>living</td> </tr> <tr> <td>C</td> <td>2.5×10^5</td> <td>5.0×10^{-1}</td> <td>dead</td> </tr> <tr> <td>D</td> <td>5.0×10^5</td> <td>2.5×10^2</td> <td>living</td> </tr> </tbody> </table>		maximum magnification	resolution/ nm	specimen	A	2.5×10^3	2.5×10^2	dead	B	2.5×10^4	5.0×10^{-1}	living	C	2.5×10^5	5.0×10^{-1}	dead	D	5.0×10^5	2.5×10^2	living
	maximum magnification	resolution/ nm	specimen																		
A	2.5×10^3	2.5×10^2	dead																		
B	2.5×10^4	5.0×10^{-1}	living																		
C	2.5×10^5	5.0×10^{-1}	dead																		
D	5.0×10^5	2.5×10^2	living																		

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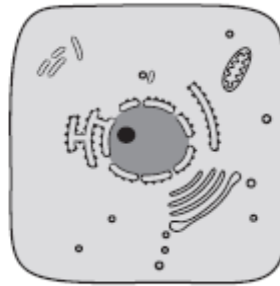
29.

Which structures are measured using these units?

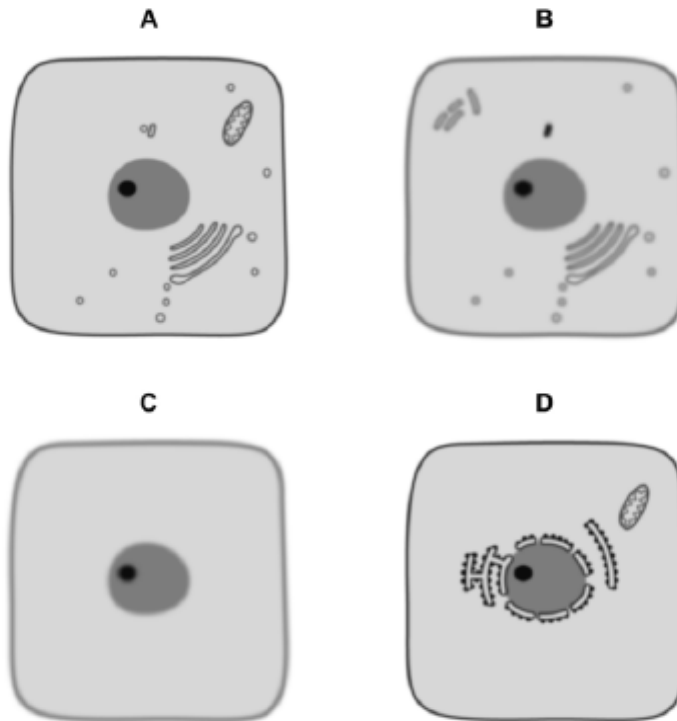
	10^{-3} m	10^{-6} m	10^{-9} m
A	chloroplast	ribosome	nucleus
B	nucleus	chloroplast	xylem vessel
C	ribosome	xylem vessel	chloroplast
D	xylem vessel	nucleus	ribosome

30.

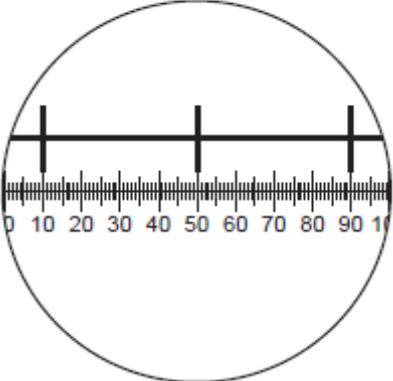
The diagram below is drawn from an electron micrograph of an animal cell.



Which represents the same cell, seen under a light (optical) microscope at $\times 400$ magnification?



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<p>31.</p>	<p>The diagram shows a stage micrometer, with divisions 0.1 mm apart, viewed through an eyepiece containing a graticule.</p>  <p>What is the area of the field of view of the microscope at this magnification? ($\pi = 3.14$)</p> <p>A $\pi \times 12.5 \times 12.5 = 4.9 \times 10^2 \mu\text{m}^2$</p> <p>B $\pi \times 55 \times 55 = 9.5 \times 10^3 \mu\text{m}^2$</p> <p>C $\pi \times 125 \times 125 = 4.9 \times 10^4 \mu\text{m}^2$</p> <p>D $\pi \times 250 \times 250 = 2.0 \times 10^5 \mu\text{m}^2$</p>
<p>32.</p>	<p>Which structures are found in both animal and plant cells?</p> <ol style="list-style-type: none"> 1 centriole 2 lysosome 3 nucleolus 4 vacuole <p>A 1 and 3 only</p> <p>B 2 and 4 only</p> <p>C 2, 3 and 4 only</p> <p>D 1, 2, 3 and 4</p>

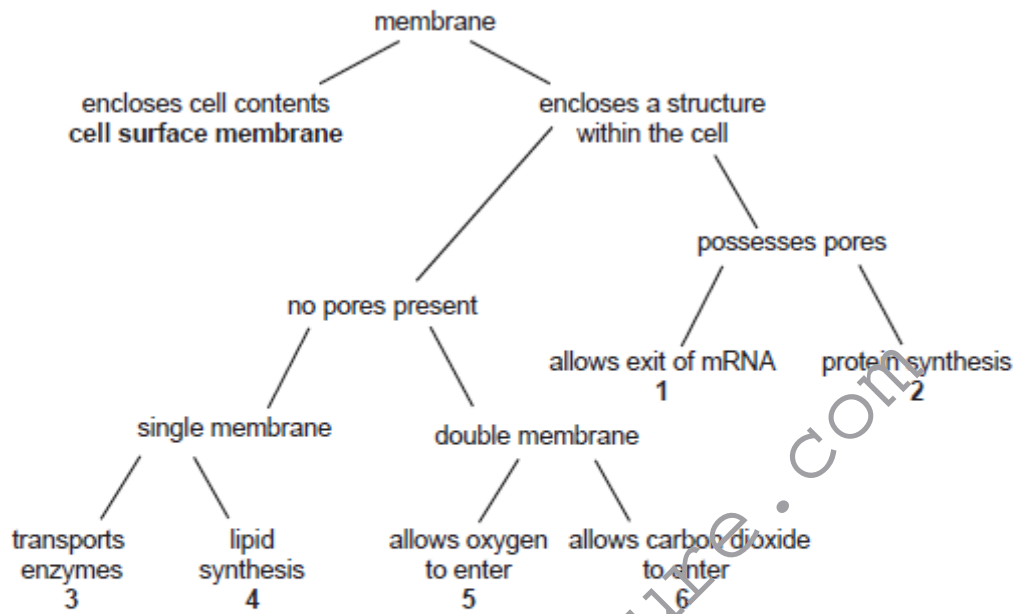
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33.	Which observations suggest that a cell is eukaryotic?			
	cytoplasm includes endoplasmic reticulum	protein molecules are associated with the DNA	ribosomes distributed through the cytoplasm	
A	✓	✗	✓	key ✓ = found in eukaryotes ✗ = not found in eukaryotes
B	✗	✓	✗	
C	✗	✗	✗	
D	✓	✓	✓	
34.	When making measurements in experiments, which methods have parallax errors?			
	<ol style="list-style-type: none"> 1 using a calibrated eyepiece graticule to measure length 2 using a measuring cylinder to measure volume 3 using a ruler to measure length of a shoot 			
A	1 and 2 only			
B	2 and 3 only			
C	3 and 1 only			
D	1, 2 and 3			

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35. Membranes within and at the surface of cells have different roles.

The diagram allows the identification of the various organelles within the cell, by describing the membrane structure and function.



Which of the outcomes shown below correctly identifies the organelles that possess the membrane and function concerned?

	1	2	3	4	5	6
A	chloroplast	vesicle	smooth ER	rough ER	nucleolus	mitochondrion
B	nucleolus	rough ER	vesicle	smooth ER	nucleus	mitochondrion
C	nucleus	rough ER	vesicle	smooth ER	mitochondrion	chloroplast
D	nucleus	smooth ER	mitochondrion	rough ER	vesicle	chloroplast

36. The enzyme lysozyme secreted from tear glands forms deposits on contact lenses.

Which ingredient would be effective in a contact lens cleaner for removing these deposits?

- A** ethanol
- B** lysosomes
- C** pH buffers
- D** proteases

37. A cell organelle measures 4×10^{-1} mm in diameter.

What is the diameter in μm ?

- A** $4 \times 10^1 \mu\text{m}$ **B** $4 \times 10^2 \mu\text{m}$ **C** $4 \times 10^3 \mu\text{m}$ **D** $4 \times 10^4 \mu\text{m}$

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38. In the following table, which is the correct comparison between light and electron microscopes?

	light microscope		electron microscope	
	resolution	magnification	resolution	magnification
A	high	high	low	low
B	high	low	low	high
C	low	high	high	low
D	low	low	high	high

39. Which structures are present in a typical plant cell?

	centrioles	cilia	mitochondria	vacuole
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✓	✓

key
✓ = present
✗ = absent

40. Plant cells are stained and then viewed through a light microscope.
Which structures would be clearly visible at a magnification of $\times 400$?

A chloroplast grana
B lysosomes
C nucleoli
D ribosomes

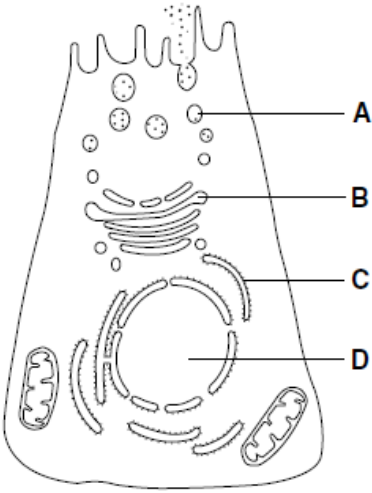
41. Using a stage micrometer scale, one unit of an eyepiece graticule was calculated as 0.005 mm. The diameter of a spongy mesophyll cell was counted as 3.5 units on the eyepiece graticule.
What is the estimate of the diameter of the cell?

A 0.18 μm **B** 1.8 μm **C** 18.0 μm **D** 180 μm

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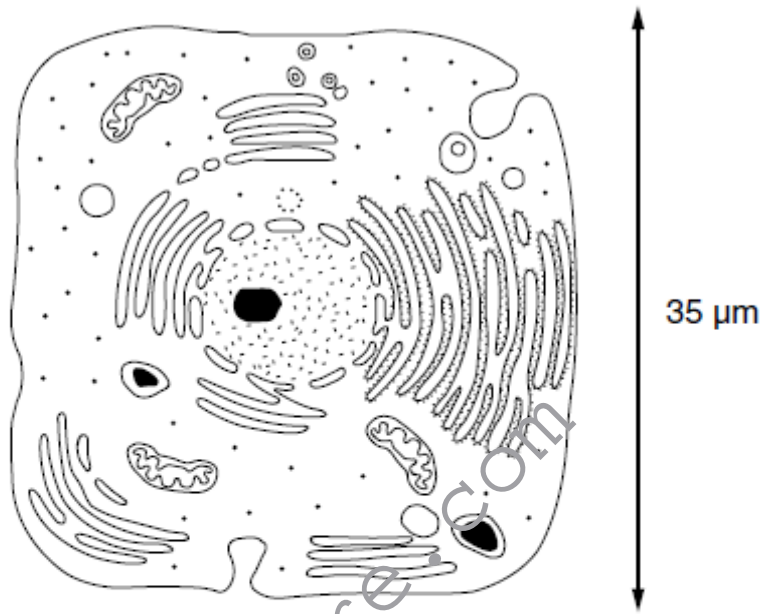
42.	<p>Membranous sacs containing products of metabolism are formed by the endoplasmic reticulum in cells.</p> <p>Where are these products used?</p> <p>A inside and outside the cell</p> <p>B inside lysosomes only</p> <p>C inside the cell only</p> <p>D outside the cell only</p>
43.	<p>Which of the structures are found in photosynthetic prokaryotes?</p> <p>1 cell surface membrane</p> <p>2 cellulose wall</p> <p>3 mesosomes</p> <p>4 ribosomes</p> <p>5 chloroplasts</p> <p>A 1, 2, 3 and 4 only</p> <p>B 1, 2, 4 and 5 only</p> <p>C 1, 3 and 4 only</p> <p>D 2, 3 and 5 only</p>
44.	<p>A human aorta has a lumen width of 2 cm.</p> <p>A human red blood cell has a diameter of 7 μm.</p> <p>How many red blood cells could be laid end to end across the diameter of the aorta lumen?</p> <p>A 2.9×10^{-3} B 2.9×10^{-2} C 2.9×10^2 D 2.9×10^3</p>
45.	<p>Which feature is a characteristic of prokaryotic organisms?</p> <p>A a cell wall</p> <p>B circular DNA</p> <p>C mitochondria</p> <p>D rough endoplasmic reticulum</p>

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46.	<p>What is meant by <i>resolution</i> in light microscopy?</p> <p>A the product of the magnifications of the eyepiece and the objective lenses</p> <p>B the shortest distance between two objects that can be seen as separate</p> <p>C the size of the smallest object that can be seen</p> <p>D twice the wavelength of the light used to illuminate the specimen</p>															
47.	<p>From which cell organelle are nucleic acids absent?</p> <p>A chloroplast</p> <p>B Golgi body</p> <p>C mitochondrion</p> <p>D ribosome</p>															
48.	<p>The diagram is taken from an electron micrograph of a cell which secretes digestive enzymes.</p> <p>Where are these enzymes made?</p> 															
49.	<p>What is the resolution, in nanometres, of an electron microscope and of a light microscope?</p> <table border="1" data-bbox="293 1556 675 1850"> <thead> <tr> <th></th> <th>electron microscope</th> <th>light microscope</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.5</td> <td>20</td> </tr> <tr> <td>B</td> <td>0.5</td> <td>200</td> </tr> <tr> <td>C</td> <td>5.0</td> <td>20</td> </tr> <tr> <td>D</td> <td>5.0</td> <td>200</td> </tr> </tbody> </table>		electron microscope	light microscope	A	0.5	20	B	0.5	200	C	5.0	20	D	5.0	200
	electron microscope	light microscope														
A	0.5	20														
B	0.5	200														
C	5.0	20														
D	5.0	200														

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50. The diagram shows a drawing of an electronmicrograph.

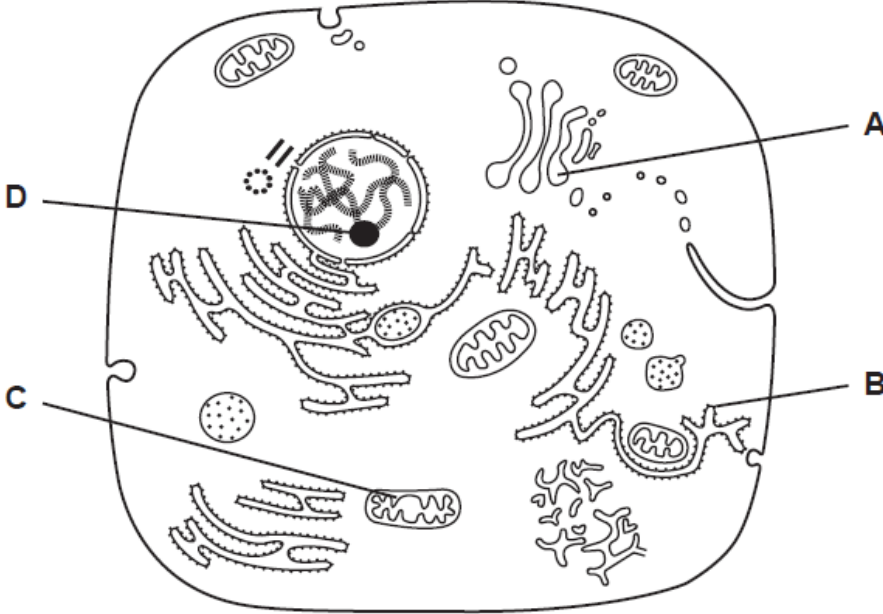


What is the approximate length of one mitochondrion in this cell?

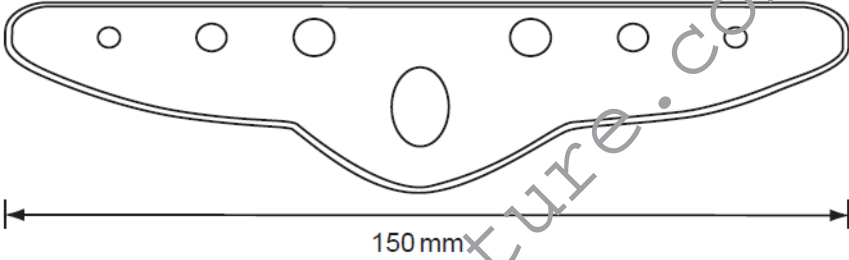
- A 5 to 6 µm
- B 7 to 8 µm
- C 8 to 10 µm
- D 10 to 15 µm

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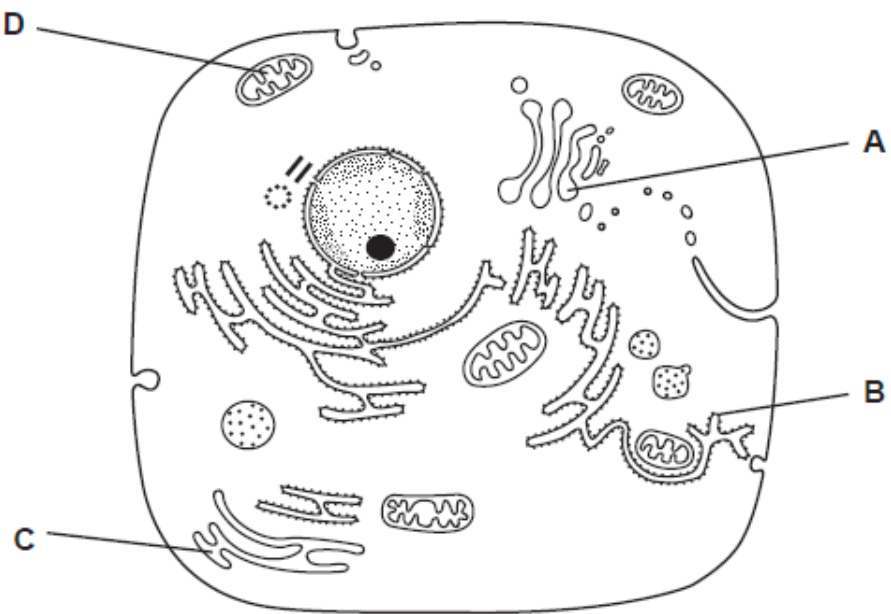
<p>51.</p>	<p>The diagram shows the ultrastructure of a eukaryotic cell.</p> <p>Which organelle does not contain nucleic acid?</p> 
<p>52.</p>	<p>Which cell structure can be seen only with an electron microscope?</p> <p>A cell surface membrane B cell wall C chromosome D nucleolus</p>
<p>53.</p>	<p>When not involved in protein synthesis, ribosomes exist as separate subunits.</p> <p>What do these subunits consist of?</p> <p>A mRNA and lipid B mRNA and tRNA C rRNA and lipid D rRNA and protein</p>

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54.	<p>Which components are present in prokaryotic cells?</p> <p>A chloroplasts, DNA, nuclear envelope</p> <p>B chromosomes, mitochondria, nuclear envelope</p> <p>C cytoplasm, DNA, mitochondria</p> <p>D cytoplasm, DNA, ribosomes</p>																				
55.	<p>The diagram is a plan of a transverse section through a leaf, drawn using a x5 eyepiece and a x8 objective lens of a microscope.</p>  <p>The actual distance across the leaf section is 7.5 mm. What is the magnification of the diagram?</p> <p>A x5 B x8 C x20 D x40</p>																				
56.	<p>What describes the features of an electron microscope and its use?</p> <table border="1" data-bbox="290 1215 1289 1598"> <thead> <tr> <th></th> <th>maximum magnification</th> <th>resolution / nm</th> <th>specimen used</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>x 2 500</td> <td>250</td> <td>dead</td> </tr> <tr> <td>B</td> <td>x 25 000</td> <td>0.5</td> <td>living</td> </tr> <tr> <td>C</td> <td>x 250 000</td> <td>0.5</td> <td>dead</td> </tr> <tr> <td>D</td> <td>x 500 000</td> <td>250</td> <td>living</td> </tr> </tbody> </table>		maximum magnification	resolution / nm	specimen used	A	x 2 500	250	dead	B	x 25 000	0.5	living	C	x 250 000	0.5	dead	D	x 500 000	250	living
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A	x 2 500	250	dead																		
B	x 25 000	0.5	living																		
C	x 250 000	0.5	dead																		
D	x 500 000	250	living																		

MEGA LECTURE

57. The diagram shows the ultrastructure of a typical animal cell.
Which structure synthesises and transports lipids and steroids?



58. Which structures are found in plant cells but not in animal cells?
A centrioles
B mitochondria
C nucleoli
D plasmodesmata

59. What is the correct order of size of organelles?

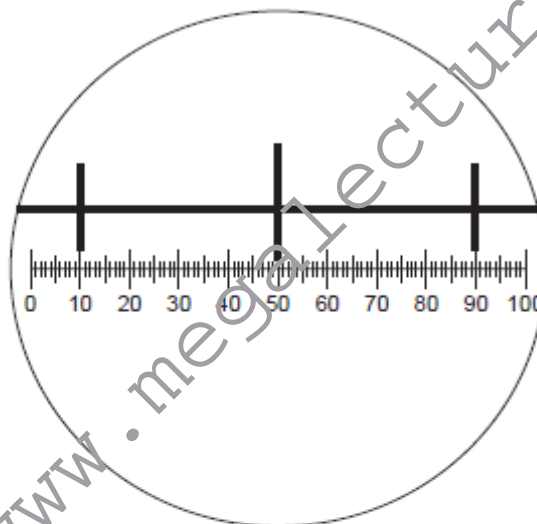
	largest	→			smallest
A	mitochondrion	nucleus	lysosome	ribosome	
B	mitochondrion	nucleus	ribosome	lysosome	
C	nucleus	mitochondrion	lysosome	ribosome	
D	nucleus	mitochondrion	ribosome	lysosome	

MEGA LECTURE

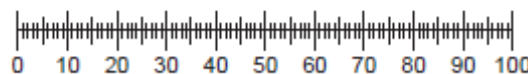
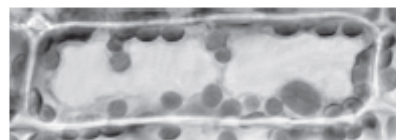
60. An amino acid enters a cell and is used to synthesise an enzyme secreted by the cell.
What is the sequence of cell components involved in this pathway?

	first	→	last
A	endoplasmic reticulum	Golgi apparatus	ribosome exocytotic vesicle
B	endoplasmic reticulum	ribosome	Golgi apparatus cell surface membrane
C	ribosome	Golgi apparatus	endoplasmic reticulum cell surface membrane
D	ribosome	endoplasmic reticulum	Golgi apparatus exocytotic vesicle

61. The diagram shows a stage micrometer on which the small divisions are 0.1 mm. It is viewed through an eyepiece containing a graticule.



The stage micrometer is replaced by a slide of a plant cell.



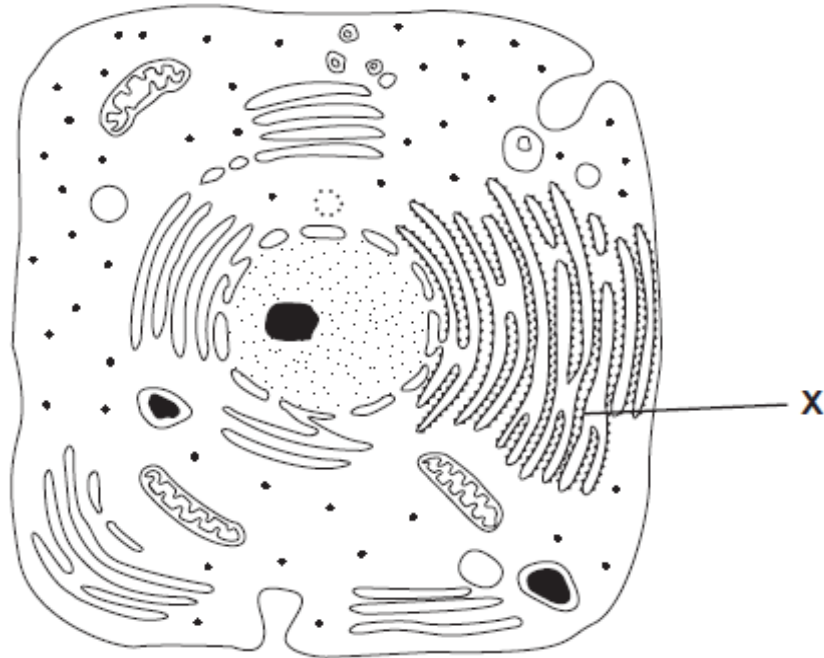
What is the width of a chloroplast?

- A** 5 μm **B** 10 μm **C** 50 μm **D** 100 μm

MEGA LECTURE

62.

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

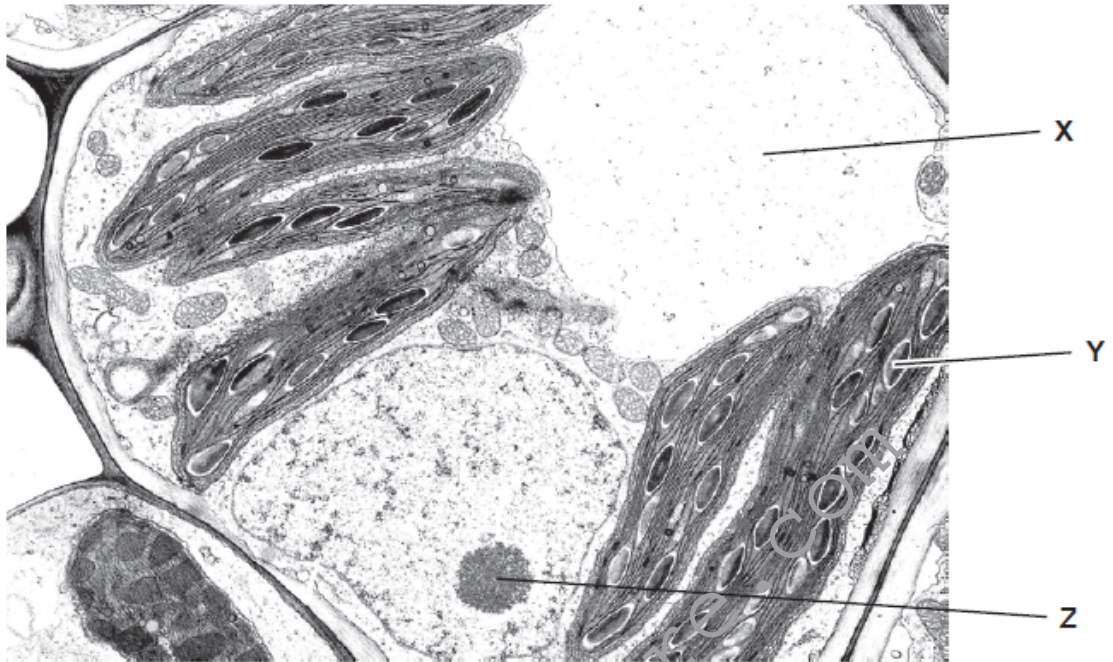


What is the function of the membrane system labelled X?

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

MEGA LECTURE

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



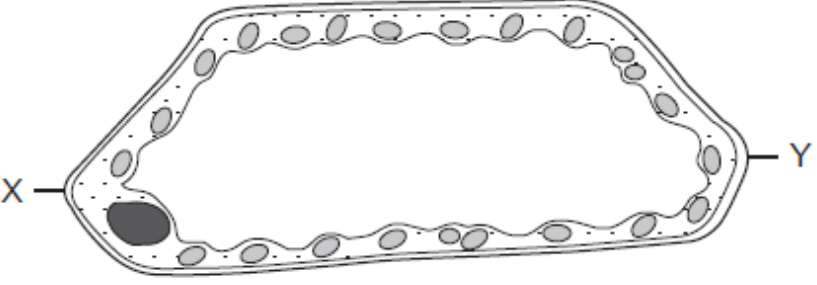
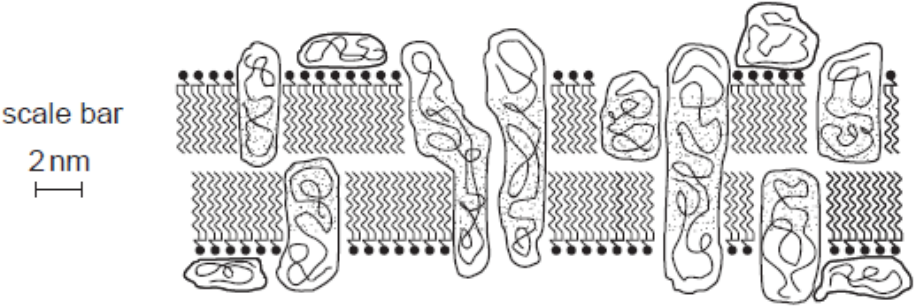
What do structures X, Y and Z contain?

	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

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

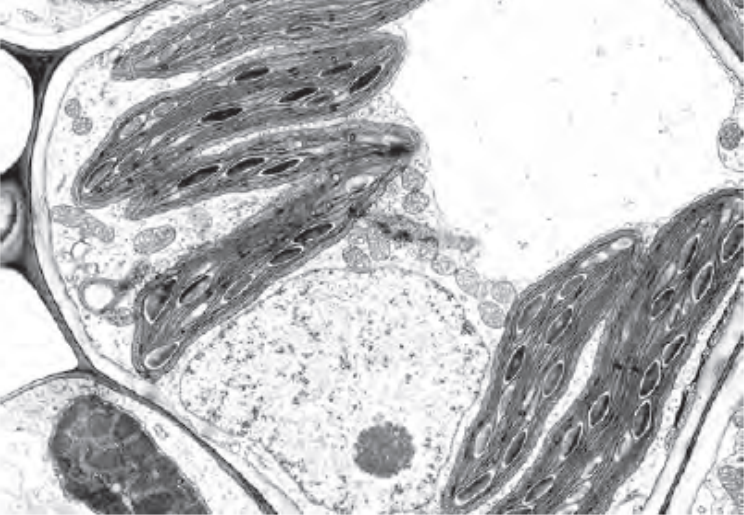
- A chloroplasts
- B Golgi apparatus
- C mitochondria
- D ribosomes

MEGA LECTURE

<p>65.</p>	<p>The diagram shows a high-power drawing of a plant cell.</p> <p>The actual length of the cell between X and Y was $160\ \mu\text{m}$.</p>  <p>What is the magnification of the cell?</p> <p>A $\times 50$ B $\times 100$ C $\times 500$ D $\times 1000$</p>
<p>66.</p>	<p>The diagram shows part of a membrane around a vacuole of a plant cell.</p>  <p>What is the width of the membrane?</p> <p>A $7.5 \times 10^{-3}\ \text{m}$ B $7.5 \times 10^{-6}\ \text{m}$ C $7.5 \times 10^{-9}\ \text{m}$ D $7.5 \times 10^{-12}\ \text{m}$</p>

MEGA LECTURE

67.	<p>A specimen is viewed under a microscope using green light with a wavelength of 510 nm.</p> <p>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?</p> <table border="1" data-bbox="289 373 902 625"> <thead> <tr> <th></th> <th>magnification</th> <th>resolution</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>decreased</td> <td>decreased</td> </tr> <tr> <td>B</td> <td>increased</td> <td>increased</td> </tr> <tr> <td>C</td> <td>remains the same</td> <td>increased</td> </tr> <tr> <td>D</td> <td>remains the same</td> <td>decreased</td> </tr> </tbody> </table>		magnification	resolution	A	decreased	decreased	B	increased	increased	C	remains the same	increased	D	remains the same	decreased
	magnification	resolution														
A	decreased	decreased														
B	increased	increased														
C	remains the same	increased														
D	remains the same	decreased														
68.	<p>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.</p> <p>The student observed</p> <ol style="list-style-type: none"> 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 <p>Which features can be seen because of the higher resolution of the electron microscope?</p> <p>A 1, 2 and 3 B 1, 2 and 4 C 1, 3 and 4 D 2, 3 and 4</p>															

<p>69.</p>	<p>The diagram shows a photomicrograph. Its magnification is $\times 2800$.</p>  <p>What is the diameter of the nucleolus?</p> <p>A $2.5\mu\text{m}$ B $5\mu\text{m}$ C $10\mu\text{m}$ D $20\mu\text{m}$</p>															
<p>70.</p>	<p>Which eyepiece and objective lens combination enables you to see the greatest number of cells in the field of view?</p> <table border="1" data-bbox="298 1062 764 1308"> <thead> <tr> <th></th> <th>eyepiece</th> <th>objective</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>$\times 5$</td> <td>$\times 10$</td> </tr> <tr> <td>B</td> <td>$\times 10$</td> <td>$\times 10$</td> </tr> <tr> <td>C</td> <td>$\times 5$</td> <td>$\times 40$</td> </tr> <tr> <td>D</td> <td>$\times 10$</td> <td>$\times 40$</td> </tr> </tbody> </table>		eyepiece	objective	A	$\times 5$	$\times 10$	B	$\times 10$	$\times 10$	C	$\times 5$	$\times 40$	D	$\times 10$	$\times 40$
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B	$\times 10$	$\times 10$														
C	$\times 5$	$\times 40$														
D	$\times 10$	$\times 40$														
<p>71.</p>	<p>From which cell organelle are nucleic acids absent?</p> <p>A chloroplast</p> <p>B Golgi apparatus</p> <p>C mitochondrion</p> <p>D ribosome</p>															

MEGA LECTURE

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

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

A cell wall
B circular chromosome
C endoplasmic reticulum
D ribosomes

73. 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 μm **B** 3.0 μm **C** 10.0 μm **D** 30.0 μm

74. 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	✓	✓	

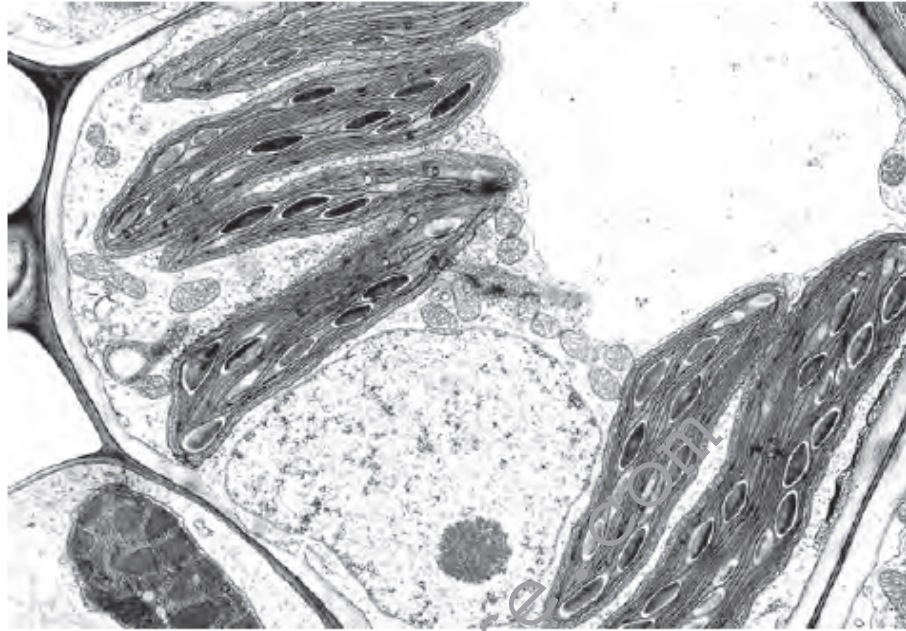
MEGA LECTURE

75.	<p>Which cell structure can be seen only with an electron microscope?</p> <p>A cell surface membrane</p> <p>B chromosome</p> <p>C nucleolus</p> <p>D vacuole</p>
76.	<p>A lymphocyte has a diameter of 1×10^{-6} millimetres (mm).</p> <p>What is the diameter in nanometres (nm)?</p> <p>A 1×10^1 B 1×10^2 C 1×10^3 D 1×10^4</p>
77.	<p>What is a function of the smooth endoplasmic reticulum?</p> <p>A protein synthesis</p> <p>B protein transport</p> <p>C steroid synthesis</p> <p>D steroid transport</p>

MEGA LECTURE

78.

The photomicrograph of a cell has a 2 cm scale line labelled 5 μm .



What is the magnification of the photomicrograph?

- A** 1×10^3 **B** 2×10^3 **C** 4×10^3 **D** 5×10^3

79.

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

MEGA LECTURE

80. Which of the cell organelles, when appropriately stained, will be clearly visible under the high power ($\times 400$) of the light microscope?

	lysosomes	endoplasmic reticulum	mitochondria	chloroplasts
A	✓	✓	x	x
B	✓	x	✓	x
C	x	✓	✓	✓
D	x	x	x	✓

key
 ✓ = visible
 x = not visible

81. 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

82. 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.

MEGA LECTURE

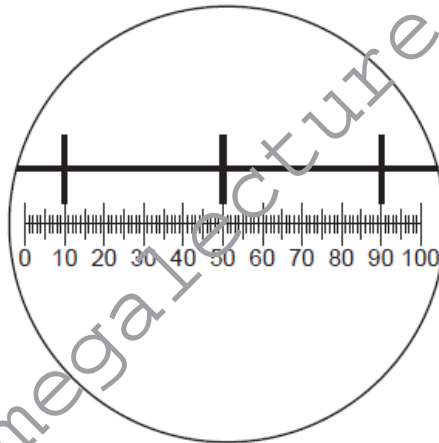
83.

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

84.

The diagram shows a stage micrometer, with divisions 0.1 mm apart, viewed through an eyepiece containing a graticule.



The same eyepiece is now used to examine a blood smear.

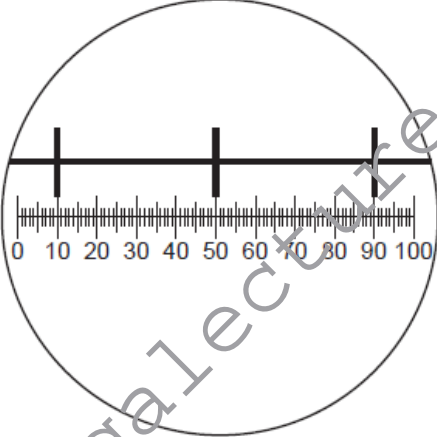
How many graticule divisions will cover the diameter of a white cell of $10\mu\text{m}$?

- A** 1 **B** 4 **C** 10 **D** 20

MEGA LECTURE

85.	<p>Which steps are needed to find the actual width of a xylem vessel viewed in transverse section using a $\times 40$ objective lens?</p> <ol style="list-style-type: none"> 1 Convert from mm to μm by multiplying by 10^{-3}. 2 Calibrate the eyepiece graticule using a stage micrometer on $\times 10$ objective lens. 3 Measure the width of the xylem vessel using an eyepiece graticule. 4 Multiply the number of eyepiece graticule units by the calibration of the eyepiece graticule. <p>A 1, 2, 3 and 4 B 2, 3 and 4 only C 1 and 2 only D 3 and 4 only</p>																									
86.	<p>The diameter of living cells varies considerably.</p> <p>The typical diameters are</p> <p>a eukaryote, such as a white blood cell $1.5 \times 10^1 \mu\text{m}$ a prokaryote, such as <i>Streptococcus</i> $7.5 \times 10^2 \text{ nm}$</p> <p>Use these measurements to find the maximum number of each cell type which could fit along a line 1 cm long.</p> <table border="1" data-bbox="302 1087 894 1360"> <thead> <tr> <th></th> <th>number of white blood cells</th> <th>number of <i>Streptococcus</i> cells</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>6.7×10^3</td> <td>1.3×10^5</td> </tr> <tr> <td>B</td> <td>6.7×10^2</td> <td>1.3×10^4</td> </tr> <tr> <td>C</td> <td>6.7×10^1</td> <td>1.3×10^3</td> </tr> <tr> <td>D</td> <td>6.7×10^0</td> <td>1.3×10^2</td> </tr> </tbody> </table>		number of white blood cells	number of <i>Streptococcus</i> cells	A	6.7×10^3	1.3×10^5	B	6.7×10^2	1.3×10^4	C	6.7×10^1	1.3×10^3	D	6.7×10^0	1.3×10^2										
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D	6.7×10^0	1.3×10^2																								
87.	<p>Cells consist of a number of different components.</p> <p>Which row shows the components present (\checkmark) in both a prokaryotic and eukaryotic cell?</p> <table border="1" data-bbox="305 1539 1232 1835"> <thead> <tr> <th></th> <th>lysosomes</th> <th>Golgi apparatus</th> <th>ribosomes</th> <th>cell surface membrane</th> </tr> </thead> <tbody> <tr> <td>A</td> <td></td> <td>\checkmark</td> <td></td> <td>\checkmark</td> </tr> <tr> <td>B</td> <td>\checkmark</td> <td>\checkmark</td> <td></td> <td></td> </tr> <tr> <td>C</td> <td></td> <td></td> <td>\checkmark</td> <td>\checkmark</td> </tr> <tr> <td>D</td> <td>\checkmark</td> <td></td> <td>\checkmark</td> <td></td> </tr> </tbody> </table>		lysosomes	Golgi apparatus	ribosomes	cell surface membrane	A		\checkmark		\checkmark	B	\checkmark	\checkmark			C			\checkmark	\checkmark	D	\checkmark		\checkmark	
	lysosomes	Golgi apparatus	ribosomes	cell surface membrane																						
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D	\checkmark		\checkmark																							

MEGA LECTURE

88.	<p>The graticule and stage micrometer are used to measure cells.</p> <p>Which is the correct reason why the graticule calibrated?</p> <p>A The graticule can be used to make measurements.</p> <p>B The graticule is magnified by the objective lens.</p> <p>C The graticule magnifies the specimen.</p> <p>D The graticule makes comparisons.</p>
89.	<p>The diagram shows a stage micrometer, with divisions 0.1 mm apart, viewed through an eyepiece containing a graticule.</p>  <p>The same eyepiece is now used to examine a blood smear.</p> <p>How many graticule divisions will cover the diameter of a white cell of $10\mu\text{m}$?</p> <p>A 1 B 4 C 10 D 20</p>

MEGA LECTURE

90.	<p>What are the characteristics of a prokaryotic cell?</p> <table border="1" data-bbox="297 268 1360 630"> <thead> <tr> <th></th> <th>DNA structure</th> <th>endoplasmic reticulum</th> <th>plasmids</th> <th>ribosomal size</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>circular</td> <td>absent</td> <td>present</td> <td>small</td> </tr> <tr> <td>B</td> <td>circular</td> <td>present</td> <td>absent</td> <td>large</td> </tr> <tr> <td>C</td> <td>linear</td> <td>absent</td> <td>present</td> <td>small</td> </tr> <tr> <td>D</td> <td>linear</td> <td>present</td> <td>absent</td> <td>large</td> </tr> </tbody> </table>		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
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B	circular	present	absent	large																						
C	linear	absent	present	small																						
D	linear	present	absent	large																						
91.	<p>What is the diameter of a typical prokaryote, such as <i>Streptococcus</i>?</p> <p>A 7.5×10^1 nm</p> <p>B 7.5×10^2 nm</p> <p>C 7.5×10^0 μm</p> <p>D 7.5×10^1 μm</p>																									
92.	<p>Which cell components contain ribosomes?</p> <p>1 chloroplast</p> <p>2 mitochondrion</p> <p>3 nucleus</p> <p>4 cytoplasm</p> <p>A 1, 2, 3 and 4</p> <p>B 1, 2 and 3 only</p> <p>C 1 and 2 only</p> <p>D 3 and 4 only</p>																									

MEGA LECTURE

93. 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

94. Which cell components are present in all prokaryotic cells?

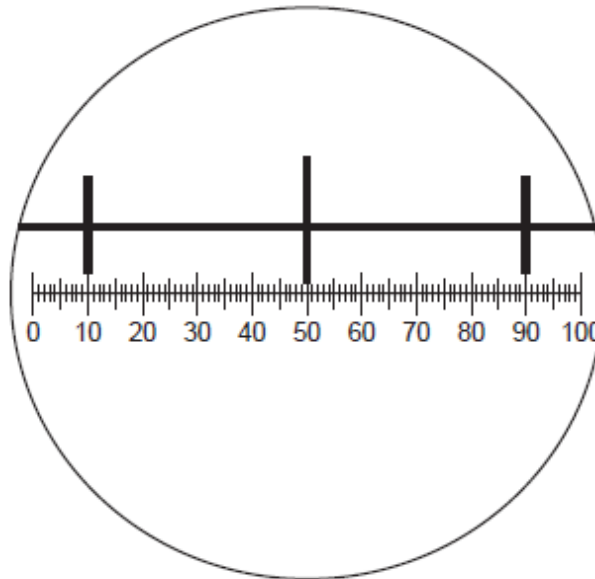
	cell surface membrane	cell wall	endoplasmic reticulum	flagellum
A	✓	✓	x	✓
B	✓	x	✓	x
C	✓	✓	x	x
D	x	✓	✓	✓

key
✓ = present
x = not present

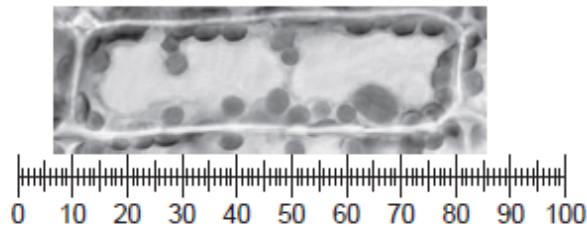
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MEGA LECTURE

95. The diagram shows a stage micrometer on which the small divisions are 0.1 mm. It is viewed through an eyepiece containing a graticule.



The stage micrometer is replaced by a slide of a plant cell.



What is the length of the nucleus?

- A** 0.8mm **B** 8 μ m **C** 25 μ m **D** 200 μ m

96. 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.

MEGA LECTURE

97.	<p>Where would cisternae be found in a cell?</p> <ul style="list-style-type: none">1 endoplasmic reticulum2 Golgi apparatus3 mitochondrion <p>A 1 and 2 B 1 and 3 C 2 and 3 D 1 only</p>
98.	<p>Ribosomes exist as separate subunits that bind together during protein synthesis.</p> <p>What do these subunits consist of?</p> <p>A mRNA and protein B mRNA and tRNA C rRNA and protein D rRNA and tRNA</p>
99.	<p>Which cell components contain mRNA?</p> <ul style="list-style-type: none">1 chloroplast2 mitochondrion3 nucleus4 rough endoplasmic reticulum <p>A 1, 2, 3 and 4 B 1, 2 and 3 only C 2, 3 and 4 only D 3 and 4 only</p>

**MEGA LECTURE**

100.	<p>Which processes occur in eukaryotes and prokaryotes?</p> <ul style="list-style-type: none">1 hydrolysis2 mitosis3 transcription4 translation <p>A 1, 2 and 3 B 1, 2 and 4 C 1, 3 and 4 D 2, 3 and 4</p>
------	--