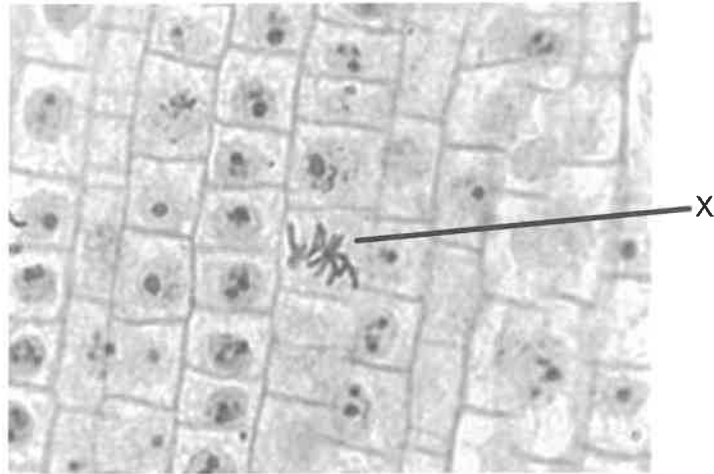


1. Which feature of striated muscle cells allows them to be considered as a possible exception to the cell theory?
  - A. They are found in multicellular organisms.
  - B. They contain more than one nucleus.
  - C. They are specialized for movement.
  - D. They do not carry out mitosis.
  
2. Which characteristic of stem cells makes them useful for treating Stargardt's disease?
  - A. They can differentiate into retinal cells.
  - B. They are readily available from especially created embryos.
  - C. They transport white blood cells to the eyes.
  - D. They divide by binary fission so provide sufficient cells.
  
3. The cell membrane model proposed by Davson–Danielli was a phospholipid bilayer sandwiched between two layers of globular protein. Which evidence led to the acceptance of the Singer–Nicolson model?
  - A. The orientation of the hydrophilic phospholipid heads towards the proteins
  - B. The formation of a hydrophobic region on the surface of the membrane
  - C. The placement of integral and peripheral proteins in the membrane
  - D. The interactions due to amphipathic properties of phospholipids
  
4. What provides evidence for the endosymbiotic theory?
  - A. Mitochondrial DNA in eukaryotic cells
  - B. 70S ribosomes in prokaryotic cells
  - C. Gene transfer from prokaryotic cells to eukaryotic cells using plasmids
  - D. Prokaryotic cells (*Escherichia coli*) in the large intestine digest proteins

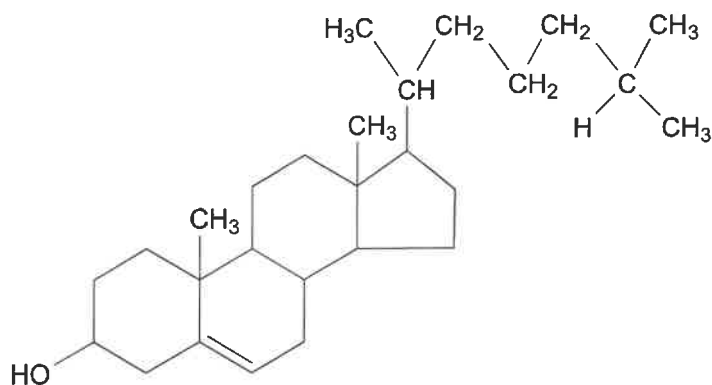
5. Which mitotic phase is labelled X in the micrograph of an onion (*Allium cepa*) root tip?



[Source: adapted from Microscope-microscope.org ([www.microscope-microscope.org](http://www.microscope-microscope.org))]

- A. Prophase
  - B. Metaphase
  - C. Anaphase
  - D. Telophase
6. Which type of reaction is the breakdown of starch into sugars?
- A. Denaturation
  - B. Reduction
  - C. Catabolic
  - D. Condensation

7. The diagram shows a molecular structure.



Which type of molecule is shown?

- A. Amino acid
  - B. Lipid
  - C. Carbohydrate
  - D. Nucleotide
8. Which properties explain the ability of water to dissolve solutes?
- I. Polarity of water molecules
  - II. High specific heat capacity of water
  - III. Hydrogen bonding
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III

9. A fever in a normally healthy adult during an illness is not usually a problem and can be regarded as a defence mechanism. However, a fever higher than 41 °C might be dangerous. What is the cause of the possible damage due to a high fever?
- A. Loss of body mass
  - B. Muscle damage due to shivering
  - C. Overactive metabolic enzymes
  - D. Spread of infection
10. What is a similarity between DNA and RNA?
- A. Both are polymers of nucleotides.
  - B. Both are composed of antiparallel strands.
  - C. Both contain adenine, cytosine and thymine.
  - D. Both contain ribose sugar.
11. What enables bacteria to produce human growth hormone?
- A. DNA replication is semi-conservative.
  - B. The polymerase chain reaction can be used.
  - C. They need the hormone for growth.
  - D. The genetic code is universal.

12. Which pair of molecules are products of aerobic and anaerobic cell respiration in some organisms?

	<b>Aerobic cell respiration</b>	<b>Anaerobic cell respiration</b>
A.	oxygen	pyruvate
B.	lactate	adenosine triphosphate
C.	carbon dioxide	glucose
D.	adenosine triphosphate	carbon dioxide

13. What is produced by somatic-cell nuclear transfer?

- A. Adult sheep
- B. Cloned embryos
- C. Rooted stem-cuttings
- D. Genetically modified food

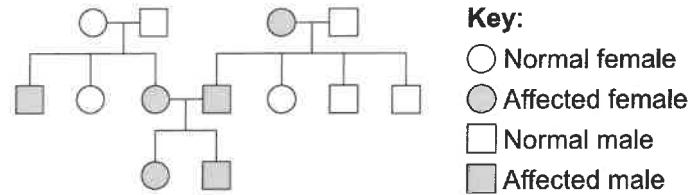
14. The diploid number of chromosomes in humans (*Homo sapiens*) is 46 and the diploid number of chromosomes in rice (*Oryza sativa*) is 24. What does this indicate about diploid chromosome numbers?

- A. Plant species have a lower diploid number of chromosomes than animals.
- B. Members of a species have the same diploid number of chromosomes.
- C. The evolutionary progress of species is determined by the diploid number of chromosomes.
- D. The complexity of the organisms is correlated to the diploid number of chromosomes.

15. Which is a valid comparison between prokaryotic and eukaryotic DNA?

	<b>Prokaryotic DNA</b>	<b>Eukaryotic DNA</b>
A.	one circular chromosome	one linear chromosome
B.	plasmids present	plasmids absent
C.	contains uracil	contains thymine
D.	associated with histones	associated with proteins

16. The diagram shows a pedigree chart.



- What does it reveal about the inheritance of the blood disorder beta-thalassaemia?
- A. The allele is autosomal recessive.
  - B. The allele is autosomal dominant.
  - C. The allele is sex-linked.
  - D. The allele is co-dominant.
17. What is the classification of an organism that is able to make organic compounds from inorganic nutrients?
- A. Autotroph
  - B. Consumer
  - C. Detritivore
  - D. Saprotroph
18. What restricts the length of a food chain?
- A. Energy losses between the trophic levels
  - B. A greater biomass at the higher trophic levels
  - C. The number of species in the food web
  - D. The consumption of waste by detritivores

19. Lichens are returning to the forests of the industrial areas of the United Kingdom due to strict pollution control.



[Source: adapted from [www.the-scientist.com](http://www.the-scientist.com)]

What is the expected outcome in the population of peppered moths (*Biston betularia*)?

- A. Increased numbers of light-coloured peppered moths
  - B. Increased industrial melanism in peppered moths
  - C. Increased predation of peppered moths
  - D. Increased speciation of peppered moths
20. Which evidence for evolution do the common features in the bone structure of vertebrate limbs provide?
- A. Adaptive radiation
  - B. Divergent radiation
  - C. Convergent evolution
  - D. Discontinuous variation
21. What is the major contributor to the increase in antibiotic resistance in bacteria?
- A. Sexual reproduction
  - B. Mutation
  - C. Natural selection
  - D. New antibiotics

22. In which domain are bryophyta found?

- A. Plantae
- B. Archaea
- C. Eubacteria
- D. Eukaryote

23. The scientific name of the Wakatobi flowerpecker is *Dicaeum kuehni*.



[Source: By Seán B. A. Kelly, David J. Kelly, Natalie Cooper, Andi Bahrin, Kangkuso Analuddin, Nicola M. Marples - Edit of File:Dicaeum\_celebicum\_compared\_to\_Dicaeum\_kuehni\_(realigned).jpg, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=33618785>]

Which species is most closely related?

- A. *Amerila kuehni*
- B. Wakatobi white-eye
- C. *Kuehneon duchyense*
- D. *Dicaeum celebicum*

24. What is the main method of transport of monosaccharides such as fructose across the intestinal epithelium?

- A. Osmosis
- B. Facilitated diffusion
- C. Endocytosis
- D. Active transport

Turn over



25. What is the position of heart valves when blood pressure is highest in the aorta?

	<b>Atrioventricular valves</b>	<b>Semilunar valves</b>
A.	open	closed
B.	closed	open
C.	closed	closed
D.	open	open

26. Why is penicillin **not** used in the treatment of human immunodeficiency virus (HIV)?

- A. HIV patients may be allergic to penicillin.
- B. Penicillin does not affect viruses.
- C. Penicillin affects helper T-cell metabolism.
- D. Penicillin causes antibiotic resistance.

27. What is the purpose of pulmonary surfactant?

- A. Promotes capillary growth
- B. Decreases surface tension
- C. Adheres alveoli and capillaries
- D. Stretches the inside surface of the alveoli

28. Which conditions are correct for inspiration?

	<b>Muscles contracted</b>	<b>Pressure in thorax</b>
A.	external intercostal	decreases
B.	internal intercostal	increases
C.	diaphragm	increases
D.	abdominal	decreases

**29.** Which hormone controls circadian rhythms?

- A. Thyroxin
- B. Melatonin
- C. Leptin
- D. Glucagon

**30.** Which is a negative feedback mechanism in the menstrual cycle?

- A. Follicle stimulating hormone inhibits estrogen
  - B. Estrogen inhibits luteinizing hormone
  - C. Estrogen inhibits follicle stimulating hormone
  - D. Progesterone inhibits estrogen
-