

Respiration

1. Citrate synthase catalyses the conversion of oxaloacetate into citric acid in the Krebs cycle. It exhibits product inhibition.

Which of the following is the correct description of citrate synthase?

	Type of respiration involved in	Location of enzyme	Inhibitor
A	anaerobic	cytoplasm	citric acid
B	aerobic	mitochondria	citric acid
C	aerobic	mitochondria	oxaloacetate
D	anaerobic	cytoplasm	oxaloacetate

Your answer

[1]

2. Which of the following statements is / are true?

Statement 1: Microtubules are part of the '9 + 2' formation in bacterial flagella.

Statement 2: Microtubules can be prevented from functioning by a respiratory inhibitor.

Statement 3: Microtubules are involved in moving chromosomes from the equator to the poles of the cell during mitosis.

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

answer

Your

[1]

3. The respiratory quotients (RQs) of three respiratory substrates are shown below:

carbohydrates: 1.0
lipids: 0.7
proteins: 0.9

An experiment was carried out to investigate which molecules are used as respiratory substrates in different cell types. The results are shown in the table below.

Cell type	Oxygen consumed ($\text{mm}^3 \text{min}^{-1}$)	Carbon dioxide produced ($\text{mm}^3 \text{min}^{-1}$)
cancerous	12.78	12.82
normal	13.45	9.40

Which of the statements, **A** to **D**, supports these results?

- A** cancer cells respire mainly carbohydrates
- B** cancer cells respire mainly lipids
- C** normal cells respire mainly carbohydrates
- D** normal cells respire mainly proteins

Your answer

[1]

4. Which of the following, **A** to **D**, is the correct summary of the net products of the Krebs cycle for **one** molecule of pyruvate?

- A** 3 reduced NAD, 1 reduced FAD, 2 CO_2 , 1 ATP
- B** 2 reduced NAD, 2 CO_2 , 2 ATP
- C** 4 reduced NAD, 2 reduced FAD, 3 CO_2 , 2 ATP
- D** 2 reduced NAD, 1 reduced FAD, 3 ATP

Your answer

[1]

5. LHON is an inherited mitochondrial condition that causes problems with aerobic respiration. It is the result of a mutation in mitochondrial DNA (mtDNA) and is passed from mother to child. LHON is presently incurable, but one theoretical treatment involves removing the mutation from the mother's mtDNA.

Which of the statements, **A** to **D**, correctly explains why this could be a viable treatment for LHON?

- A** enzymes involved in glycolysis are unaffected by mtDNA
- B** enzymes involved in the Krebs cycle, link reaction and electron transport chain are affected by mtDNA
- C** enzymes involved with oxidative phosphorylation are unaffected by mtDNA
- D** enzymes involved with photophosphorylation are affected by mtDNA

Your answer

[1]

6. The serial endosymbiotic theory suggests that some eukaryotic organelles came about as a result of close associations between early unicellular organisms.

The following statements describe oxidative phosphorylation in bacteria:

1. The enzymes involved in electron transport and oxidative phosphorylation are on the inner layer of the bacterial membrane.
2. The inner layer of the membrane is folded, increasing its surface area.
3. The membrane contains cytochromes and ATP-synthase complexes.

Which of the statements above demonstrates a link between bacterial cells and the mitochondria of eukaryotes?

- A 1, 2 and 3
- B Only 1 and 2
- C Only 2 and 3
- D Only 1

Your answer

[1]

7. Which of the following, **A** to **D**, is a similarity in the way ATP is made in respiration and photosynthesis?

- A both involve NAD
- B both involve substrate level phosphorylation
- C both involve photons
- D both involve proton gradients

Your answer

[1]

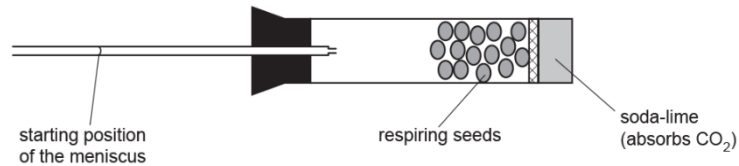
8. Which of the following statements, **A** to **D**, describes and explains the relative yield of ATP in anaerobic and aerobic respiration?

- A Anaerobic respiration produces less ATP per molecule of glucose because lactate is converted to pyruvate.
- B Anaerobic respiration produces less ATP per molecule of glucose because NAD is not regenerated in oxidative phosphorylation.
- C Anaerobic respiration produces more ATP per molecule of glucose because NAD is regenerated in oxidative phosphorylation.
- D Anaerobic respiration produces more ATP per molecule of glucose because pyruvate is converted to lactate.

Your answer

[1]

9. The diagram shows a respirometer used to compare respiration in two types of germinating seeds.



A student set up the respirometer to measure oxygen consumption.

The student investigated two types of seed, pea and sunflower:

- pea seeds store mainly starch
- sunflower seeds store mainly lipid

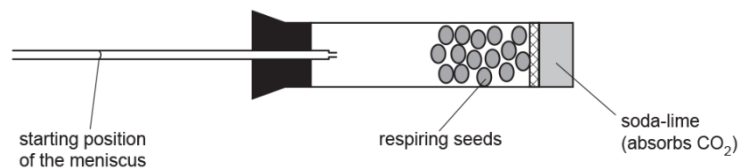
Which of the following, **A** to **D**, describes the results you would expect with each type of seed?

- A** The meniscus would move to the left with pea seeds and further to the left with sunflower seeds.
B The meniscus would move to the left with sunflower seeds and to the right with pea seeds.
C The meniscus would move to the right with pea seeds and further to the right with sunflower seeds.
D The meniscus would not move.

Your answer

[1]

10. The diagram shows a respirometer used to compare respiration in two types of germinating seeds.



A student set up the respirometer to measure oxygen consumption.

- The narrow tube contained coloured water.
- The position of the meniscus was noted at the beginning of the experiment.
- The tube was left for 20 minutes.
- The new position of the meniscus was noted.
- The experiment was repeated with the other type of seed.

Which of the following would be necessary to ensure valid results?

- 1 Keeping the respirometer in the dark during the experiment.
- 2 Keeping the respirometer at the same temperature during the experiment.
- 3 Using the same dry mass of seeds each time.

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

Your answer

[1]