D3.3 Homeostasis: data-based questions

What the Cell · DP Biology · data-based questions

Name _____ **Date** _____ **Total** _____ / 19

Read the data carefully before you answer. The number of marks shows how many separate points to make. Show your working in calculations.

1 A glucose tolerance test

7 marks

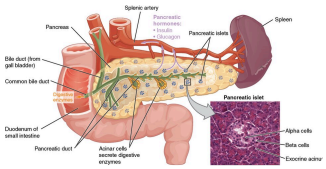
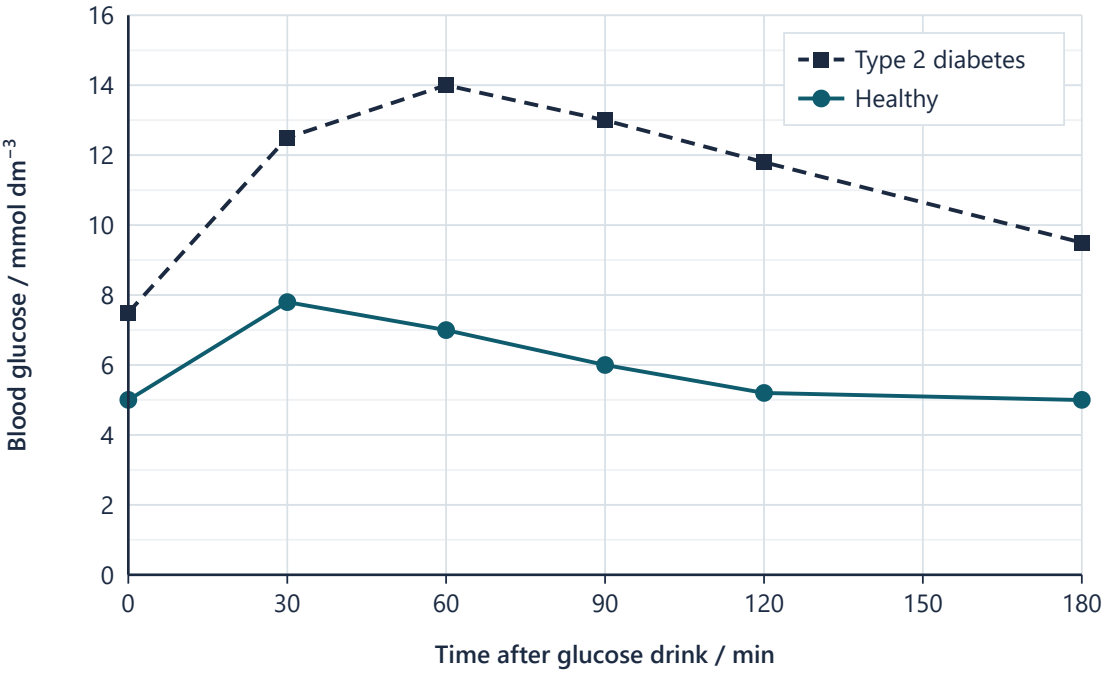


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In an oral glucose tolerance test, a person who has not eaten overnight drinks a solution containing 75 g of glucose, and blood glucose is measured for three hours. The graph shows mean results for 20 healthy adults and 20 adults with type 2 diabetes.



a **State** the blood glucose of healthy adults 60 minutes after the drink. **[1]**

b **Compare** the results of the two groups. **[2]**

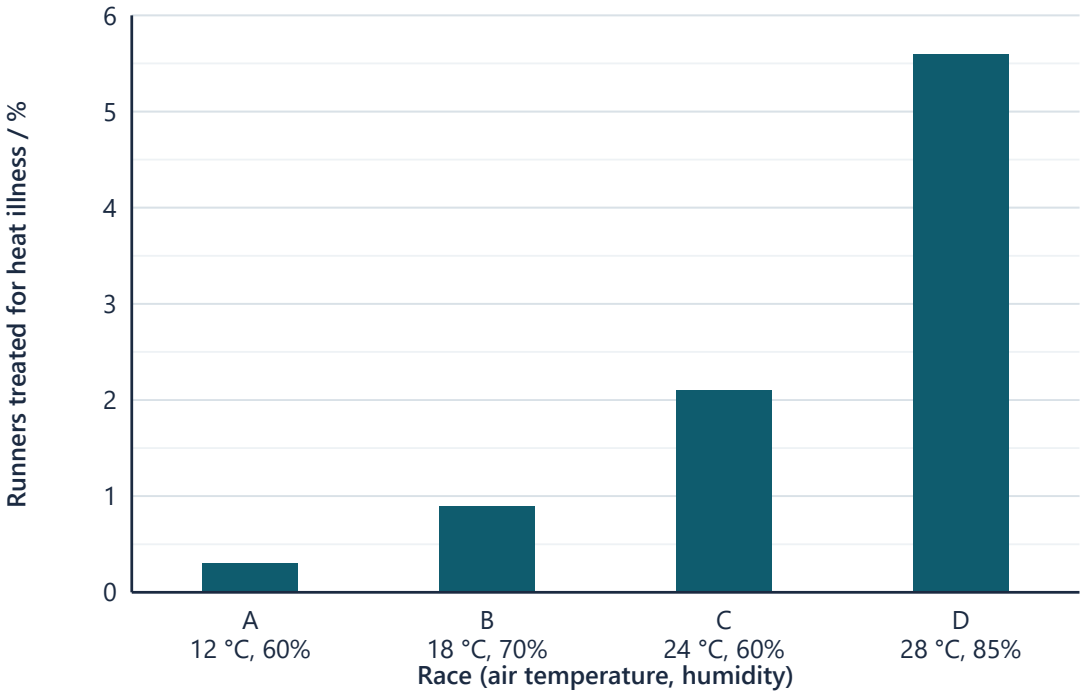
c A value of 11.1 mmol dm^{-3} or more at 120 minutes indicates diabetes. **Deduce** whether the test identifies the diabetic group. **[1]**

d **Explain** how blood glucose returns to normal in the healthy adults. **[3]**

2 Heat illness in marathon runners

6 marks

Organisers of four city marathons recorded the percentage of runners treated for heat illness. Weather at the start of each race is shown.



a **Describe** the relationship between air temperature and heat illness. **[1]**

b One organiser claimed that humidity, not temperature, causes most heat illness. **Evaluate** this claim using the data. **[2]**

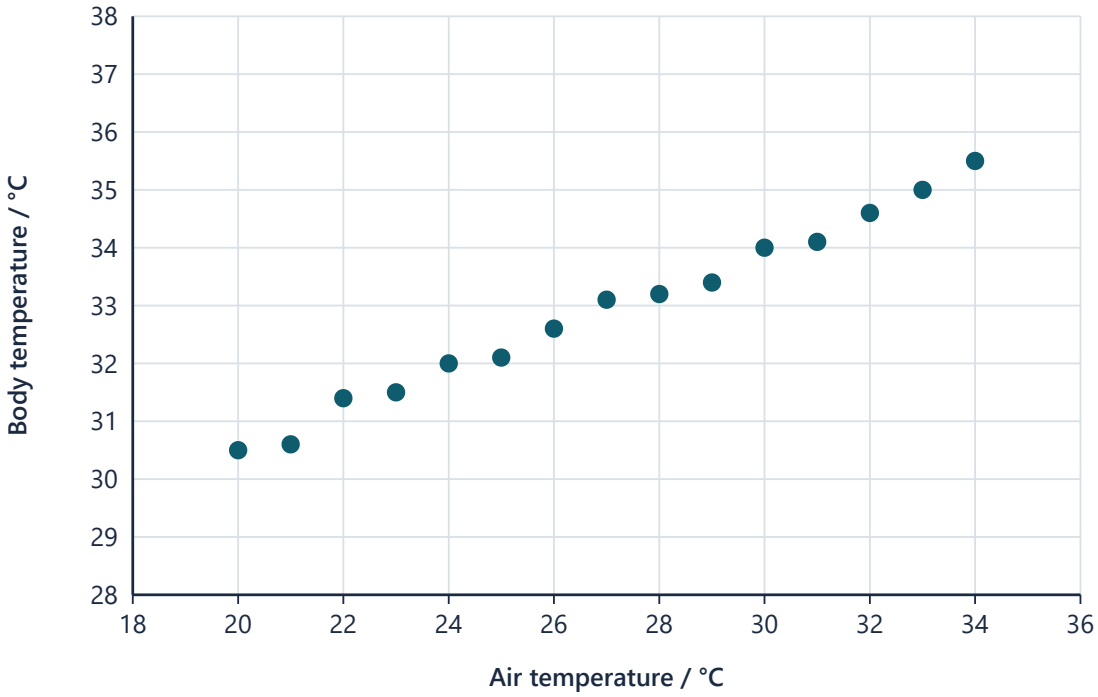
c **Explain** why high humidity increases the risk of overheating. **[1]**

d **Suggest** two ways runners can reduce the risk of heat illness. **[2]**

3 Body temperature in a sloth

6 marks

Brown-throated three-toed sloths (*Bradypus variegatus*) live in trees in Central and South America and eat leaves, which give little energy. The body temperature of sloths was measured at different air temperatures.



a **Describe** the relationship between air temperature and body temperature. **[1]**

b **Calculate** the mean change in body temperature for each 1 °C rise in air temperature between 20 and 34 °C. **[1]**

c **Compare** the sloths with a human in the same conditions. **[1]**

d **Suggest** two reasons why it is an advantage for sloths not to keep a constant body temperature. **[2]**

e **Suggest** why sloths eat more on warm days. **[1]**

What the Cell. Original questions written for this course, with data based on published patterns.