

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD)

ACTIVITY 4 – BIOLOGY

STUDENT ANSWERS

Q3(a)(i)

#1

- (i) Explain how training may affect the athletic performance of this person.
Use information from the table to support your answer.

(5)

Training will ...prove the athletic performance of the individual. As they train, ~~they~~ the number of capillaries has increased by 23 capillaries over the last 6 week and that is with a small ~~volume~~^{area} of muscle so is a significant increase. The increased amount of capillaries will mean that more oxygen is able to diffuse in the muscle and more CO_2 will be taken away. Therefore the person will be able to aerobically ~~re~~respire ~~no~~ more efficiently as oxygen is needed to make the ~~atp~~^{ATP} that is needed for muscle contraction. Thus the ~~per~~^{individual} ~~be~~ will be able to have more muscle contractions.

2

- (i) Explain how training may affect the athletic performance of this person. Use information from the table to support your answer.

(5)

The table shows that the mean number of capillaries increases ~~to~~ after training, going from 437 to 460 capillaries per mm^2 . This is a percentage increase of 5.26%. The capillaries transport the blood to ~~so~~ muscles ~~and~~. The blood carries oxygen and glucose to these muscles used for aerobic respiration. With more capillaries then more blood and thereby oxygen and glucose can reach the muscle tissue and muscle cells meaning the rate of aerobic respiration increases so that the person can have ^{increased} more muscle contraction. ~~and~~ Respiration releases energy for the athlete's performance, increasing it. With more capillaries there is also a higher surface area for the ~~to~~ oxygen and glucose to diffuse in and CO_2 and waste products to diffuse out. increasing the rate of aerobic respiration

3

- (i) Explain how training may affect the athletic performance of this person.
Use information from the table to support your answer.

(5)

Training may affect the athletic performance of this person by increasing the number of capillaries per mm^2 in this person's muscle tissue. An increase in the number of capillaries is shown in the table as this person gained 23 capillaries after 6 weeks of training. This would affect this person's athletic performance ~~at~~ the fact that they have more capillaries means more blood can get to the ~~is~~ muscle tissue at any one time. This means that there will be more aerobic respiration to generate energy as the more blood that gets to the muscle, ~~the~~ more oxygen ~~that~~ gets to the muscle.

Q3(a)(ii)

1

(ii) Give **two** ways in which the design of the study could be improved.

(2)

1. The experiment could be repeated ~~on~~ at least three different individuals and the results compared ^{→ same gender, weight, age}
2. The length and intensity of training could be varied and the effects of the measured. i.e. 3 weeks, ~~3 and~~ 12 weeks

2

(ii) Give **two** ways in which the design of the study could be improved.

(2)

1. Use more participants
2. Use a longer training period.