OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL A-LEVEL BIOLOGY

(9610) BL01

Report on the examination

June 2019

REPORT ON EXAMINATION: INTERNATIONAL A-LEVEL BIOLOGY BL01 UNIT 1 JUNE 2019

Overall, students demonstrated a good level of understanding in a number of different topic areas. Good knowledge was shown regarding the structure of the plasma membrane including the role of cholesterol. Students also showed confidence in their knowledge of the biochemical foods tests, in giving descriptions of the degeneracy of the genetic code and in the quaternary structure of proteins.

There were a few aspects that students found more challenging. These aspects were as follows: interpreting evolutionary relationships between species in a phylogenetic tree diagram, drawing a peptide bond between two amino acids, how control groups should be treated and why control groups are often needed in investigations. It is recommended that future students look carefully at required practical 3 and develop a complete understanding of the steps involved in chromatography.

Students should always remember to read the wording of the questions very carefully and to look at the figures and tables closely before attempting their answers. A number of errors seemed to stem from misinterpretation of the question.

Question 1

In **01.1**, the majority of students gained two or more marks and these were typically for naming phospholipid for A and a protein for C. Fewer students identified structure E as the hydrocarbon chain. **01.2** proved rather more problematic for large number of students. There were many responses that only described the membrane as being fluid-like and described the phosphate heads as giving a mosaic pattern. Despite this, students were much stronger in **01.3**, and many responses correctly described the function of cholesterol in a plasma membrane.

Question 2

Overall, this question proved to be quite challenging for a large number of students. Despite this, in parts **02.1** and **02.2**, students achieved very well, and the majority gave both the correct order of the taxa and the binomial name of the giant salamander. The only error seen occasionally was some students giving the species name with an upper case letter. **02.3** was more challenging, with only a small proportion of students achieving both marking points. Many students misinterpreted the question and simply gave a description, rather than providing an explanation of what figure 3 showed about the evolutionary relationships between species B and the other species. Many responses also showed an incorrect interpretation of the diagram, with answers stating that species A

and B were the most closely related. The application of **02.4** also proved to be challenging, with only a minority of responses making a suitable suggestion e.g. enzymes involved in (aerobic) respiration. In this question, most responses simply described the role of mitochondria, without linking to the protein in question. **02.5** was answered better, with two-thirds of responses gaining at least one mark. Students did well to describe the degeneracy of the genetic code and therefore why the base sequence would provide more information that comparing the amino acid sequence. Unfortunately, many responses didn't link to the idea of a triplet code and so didn't gain mark point 1. Only a small proportion of responses gained a mark in **02.6.** Many answers focused only on the idea that the released salamanders could be hunted to extinction, despite the question informing them that large populations of species B are kept in captive breeding farms. If the responses gained credit, this was commonly due to linking to reduced biodiversity or to the idea of increased competition.

Question 3

At least half of the responses gained one mark for **03.1** by stating that a codon codes for an amino acid. The majority omitted that the sequence of 3 bases is on mRNA. Most students gained all three marks in **03.2**, however, there some were occasional mistakes observed, such as the DNA sequence including uracil. In a similar way for **03.3**, most students correctly named uracil, although around a third of students just stated U. Only about half of students gained the one mark for **03.4**, with many interpreting the question as just a peptide with three amino acids, but not the same first three amino acids as the peptide in the question. Two-thirds of students gained the one mark in **03.5** for describing how the deletion mutation results in the 4^{th} codon forming UGA which acts a stop codon. Where students didn't gain the mark, it was for general answers about the degeneracy of the genetic code, which wasn't required.

Question 4

This question was about an experiment to separate different amino acids in a mixture using paper chromatography. In **04.1**, students were asked to describe how a solution containing this mixture of amino acids should have been applied to the paper. Around half of the responses did not gain more than one mark. The idea of drawing the start / origin line in pencil was the most commonly awarded mark, but this was missed by a good number of students. Many responses had only vague references to the method of transferring the solution to the paper and didn't include the use of, for example, a glass rod or a capillary tube. The idea of applying several drops on the same spot was missed by most students, as was the idea of allowing the solution to dry between applications. **04.2** was similar in that half of the responses gained no marks. Many students made only

general references to health and safety without linking to this particular practical. In **04.3**, students had to identify amino acid X. Table 5 should have indicated to students that they needed to calculate the R_f value for X and then use this value to see that tyrosine was the closest. Table 5 showed the Rf values for some amino acids and many students misinterpreted this as corresponding directly to V – Z. As a result, many responses incorrectly named alanine due to it being the middle value. **04.4** was answered well, with many students recognising that it must be the R / variable group that causes different amino acids to move different distances along the paper. In **04.5**, around half were successful in gaining at least one mark, and this was mainly for making the point that a different solvent could be used. A number of students also referred to running the chromatography for longer.

Question 5

This was a comprehension question about the formation of glycogen. **05.1** and **05.2** were answered very well, with around three-quarters being successful in defining the term polymer and naming alpha-glucose as the monomer in glycogen. In **05.3**, two-third gained the mark for naming maltose as the disaccharide. Unfortunately, in **05.4** few students realised that it was a chain of glucose molecules that was being tested and therefore it would give a negative result (blue colour) when tested for a reducing sugar. However, around two-thirds of students gained a mark for realising that glycogenin is a protein and therefore a purple colour would be observed as a positive test result. This also meant that in **05.5**, over two-thirds gained the mark for stating that a protein was present. Students had to draw the peptide bond formed between two amino acids in **05.6**, but less than one-fifth of students gained the mark. In **05.7**, students had to calculate a percentage increase, but over half of students didn't gain any marks. Many students did not first work out the difference in time taken for hydrolysis, but instead just divided the time taken for B (323 minutes) by the time taken for A (61 minutes). **05.8** proved to be very challenging for students, with only a tenth of responses gaining one mark. Few students seemed to realise that with fewer 1-6 glycosidic bonds, there would be fewer ends available for the enzymes to hydrolyse. **05.9** was answered more successfully, with over two-thirds of students gaining the two marks available for correctly calculating the rate of reaction. There were several different mistakes seen for where students didn't gain marks, but the most common was for giving the rate of reaction per minute.

Question 6

In **06.1**, just over two-thirds of students gained the one mark available for correctly describing the quaternary structure of a protein. Some incorrect answers included a

protein containing more than one peptide bond or more than two peptide chains. Only a third of responses gained both marks for **06.2**. Many students simply stated that those in the control group should not be given ALA. A number of students confused a control group with control variables. Over half of the responses gained at least one mark in **06.3** and this was almost entirely for the idea of allowing a comparison with the experimental group. Very few went any further in explaining that if there was an increase in the EPO concentration in the experimental group then this would therefore likely be due to the addition of ALA. In **06.4**, students had to evaluate the use of ALA to increase EPO concentration. Just over three-quarters gained at least one mark, but only a minority of responses were awarded three or four marks. Many students stated that the experimental group had a higher EPO concentration, but that this was based on just a small sample size. It was rare to see any responses that commented on the standard deviations and what these would indicate. In **06.5**, around two-thirds of the responses gained either one or two marks. Many students stated that more red blood cells would mean more haemoglobin, but few went on to describe the idea that more oxygen could be transported to respiring cells. Responses linking increased respiration to improved athlete performance, e.g. through increased ATP production for muscle contraction and / or the delay in onset of anaerobic respiration were seldom seen.

Question 7

Over half of the responses gained at least one mark in **07.1** by stating that the increase in carbon dioxide concentration caused the spiracles to open. Many did not refer to figure 10 to expand on their answers e.g. when carbon dioxide concentration reaches 2.8 AU. Students performed slightly better in **07.2,** with two-thirds of responses gaining at least one mark. Many of these responses had a correct explanation, e.g. that this was the total time that oxygen concentration was increasing but the stated time was often incorrect, e.g. 2 seconds was commonly stated. **07.3** proved a more challenging question for many students, but despite this, just under half achieved at least one mark. In responses, students sometimes described SA:V the wrong way round, e.g. larger insects have a larger SA:V and it was common that responses stated that active insects would have higher metabolic rates did not go on to say that they therefore have a higher demand for oxygen. Students did not refer to the abdominal pumping in their responses.

Question 8

Many students both correctly named phosphate in **08.1** and went on to name at least one biological molecule that contains phosphorus in **08.2**. In a similar way, many students correctly named DNA polymerase as the enzyme in **08.3**. Two-thirds of responses gained the two marks in **08.4** and this proportion would have been even higher had more

students given their answer to two significant figures. In **08.5**, two-thirds of responses correctly stated that theory B could not be supported by the results presented in figure 11. **08.6** proved to be very challenging with few students realising that C was the only theory supported by both results. It was common that a number of responses simply repeated the stem of the question or did not refer to theories A and B.

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