[SS08]

UNIVERSITY OF BOLTON

SCHOOL OF CLINICAL AND BIOMEDICAL SCIENCES

BSC (HONS) MEDICAL BIOLOGY

SEMESTER ONE EXAMINATION 2022/2023

CANCER BIOLOGY

MODULE NO: BIO6009

Date: Wednesday 11th January 2023 **Time: 10am – 1pm**

INSTRUCTIONS TO CANDIDATES:

Candidates are advised that the examiners attach importance to legibility of writing and clarity of expression. YOU ARE STRONGLY ADVISED TO PLAN YOUR ANSWERS

There are TWO sections in this paper.

Answer ALL QUESTIONS.

This examination is THREE hours long.

INSTRUCTIONS TO INVIGILATORS:

Please ensure all candidates are provided with a copy of the journal article (Section A), and are given access to the notes that they have prepared (Section B). Both of these should be included in the envelope.

Students must not bring in their own copy of the journal article, or their own version of the notes.

School of Clinical and Biomedical Sciences
BSc (Hons) Medical Biology
Semester 1 Examinations 2022/23
Cancer Biology
Module No. BIO6009

Section A: 5 marks per question, 75 marks in total

Questions in this section relate to the following journal article:

Nersesian *et al*. (2018). Effects of Modulating Actin Dynamics on HER2 Cancer Cell Motility and Metastasis. Sci Rep. 2018 Nov 22;8(1):17243. (Supplied separately; also provided to you in advance).

If a copy of this article is not provided to you in the examination, please inform an exam invigilator. The answers to the questions below are not necessarily found in the article but are based on topics and methodologies discussed therein. In your answers, please do **not** simply copy sections of the article text to answer the questions.

1. Discuss the rationale for this research. What are the researchers hoping to achieve by carrying out this work?

2. What is the function of HER2 and how does it relate to cancer progression?

3. The paper states that 'new therapies are needed that target major drivers of metastasis'. How does metastasis occur?

4. Monoclonal antibody therapy is an example of a targeted therapy. What is a targeted therapy and how does it relate to the treatment of cancer?

5. What is the difference between the antibody Trastuzumab, and the antibody-drug conjugate Trastuzumab Emtansine (T-DM1)?

Please turn the page

School of Clinical and Biomedical Sciences
BSc (Hons) Medical Biology
Semester 1 Examinations 2022/23
Cancer Biology
Module No. BIO6009

6. The paper describes the use of a combination therapy. What is your understanding of combination therapy in cancer treatment and state any potential benefits over monotherapy treatment.

7. What is your interpretation of Figure 2(c)?

8. Describe how Propidium Iodide in the Propidium Iodide Cytotoxicity Assays works.

9. What is a xenograft model and why are they used?

10. What is the purpose of Alexa555-conjugated Phalloidin and DAPI in tissue staining?

11. Referencing Figure 4(c), what is the purpose of the wound migration assay and what is your interpretation of the result?

12. Summarise Figure 6(b) in your own words and state what your treatment of choice as tested in the figure would be and why.

13. With reference to Figure 6(e), what is your interpretation of the result? Why is D-luciferin injected into the mice when using SKOV-3/Luc cells?

14. Describe how fluorescence *in situ* hybridisation (FISH) can be used to detect increased HER2 expression.

School of Clinical and Biomedical Sciences
BSc (Hons) Medical Biology
Semester 1 Examinations 2022/23
Cancer Biology
Module No. BIO6009

15. In addition to those used in this article, briefly discuss two other laboratory-based approaches that could be used to characterise cellular properties.

[SECTION A TOTAL: 75 marks]

Section B

Over the last few months, you have been given introductory lectures in numerous aspects of cancer biology. These can be split into five main themes:

1. The prevention of cancer
2. The onset of cancer
3. The progression of cancer
4. The diagnosis of cancer
5. The treatment of cancer

This can be considered to be a timeline of how a healthy individual can initially be cancer free but can ultimately be in need of treatment for cancer.

With reference to **each** of these aspects, synthesise a detailed narrative of some of the relevant biological aspects for a specific type of cancer of your own choosing.

In your answer, you should include elements of justification (e.g. why was something done?) and critical analysis (e.g. what were the consequences?).

Evidence of extra reading is expected, and you must show evidence of having consulted recent scientific publications in your answer. You are permitted to refer to the ONE side of A4 notes (maximum of 200 words) that you made on the topic.

[SECTION B TOTAL: 75 marks]

END OF QUESTIONS