Examination Candidate Number: ______________

University of York
Department of Biology
B. Sc Stage 3 Degree Examinations 2017-18

Human Molecular Parasitology

Date released: Tuesday 17th April
Date due: Monday 14th May, 12pm

Work should be submitted via the Yorkshare VLE
Total marks available for this paper: 100

Your assignment will be put through turnitin on submission. We recommend you also put your work through turnitin prior to submission.

All questions 1 & 2 should be answered on this question paper. Question 3 answer either A or B.

All questions should be answered using Arial font size 11 or larger

Question 1: It has been postulated that exosomes may be produced by some parasites. Cite references where appropriate.

a) How has the discovery of exosomes impacted the field of parasitology? (300 word limit; 6 marks)

b) Outline an experimental design strategy to isolate, identify and functionally characterise exosomes from a specific parasite culture. (300 word limit; 10 marks)

c) Evaluate potential strengths and weaknesses of using culture-derived parasites for your exosomal analyses. (200 word limit; 5 marks)

d) Compare obstacles to exosomal function for an extracellular versus an intracellular parasite. Provide specific examples. (200 word limit; 4 marks)
Question 2: Paper analysis (25 marks). The following questions refer to Valentim et al. Science, 2013 (doi:10.1126/science.1243106); the pdf is supplied on the VLE.

a) Summarise the significance of this paper to the research field. (200 word limit; 4 marks)

b) Why are all F1 progeny of the LE x HR cross sensitive to OXA? Were the frequencies of resistant and susceptible F2 parasites expected and why? (100 word limit; 3 marks)

c) Compare and contrast the implications of the data from Fig. 2A and Fig. 2C. (200 word limit; 4 marks)

d) Design an experiment to test why oxamniquine shows variable activity against different species of schistosome. Explain your rationale. (200 word limit; 4 marks)

e) Parasite drug resistance is prevalent in veterinary helminth infections whilst OXA and PZQ resistance is observed in laboratory and field schistosome isolates. Explain why widespread resistance has not developed despite mass drug administration programs. (200 word limit; 4 marks)

f) Describe a molecular mechanism through which OXA might kill susceptible schistosomes. (100 word limit; 3 marks)

g) What is the evidence that OXA resistance has evolved more than once? (100 word limit; 3 marks)

Question 3: Essay. Answer either question A or B. (1,000 word limit; 50 marks)

A. What factors have been instrumental in the success of a phenotypic screening approach to malaria drug discovery?

B. Compare and contrast the gene expression and function of surface proteins of mammalian stage Trypanosoma brucei vs Trypanosoma cruzi parasites.