UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For The Following Qualification:-

B.Sc. (Intercal)

Surgery 1: Cancer Research

COURSE CODE	:	**SURG0001**
UNIT VALUE	:	**0.50**
DATE	:	**29-APR-04**
TIME	:	**14.30**
TIME ALLOWED	:	**3 Hours**

04-C1438-3-30

TURN OVER

UNIVERSITY OF LONDON
(University College London)

BSc Degree 2004

TUMOUR BIOLOGY. SURG 0001: CANCER RESEARCH

29 April 2004: 14.30 to 17.30

Answer Sections A, B and C: 6 questions from 3 sections

Please answer each Section in a separate answer book

You should allow about 1 hour for each Section

Marks allocated equally between Sections

SECTION A Answer **ONE** of the following three questions

A1 Trace the fall and rise of immunotherapy. Is the latter sustainable in the 21st century?

A2 Draw a diagram of the hypothetical life history of a cancer, indicating the main clinico-pathological stages and the proposed timescales involved. Discuss, with examples, the clinical and laboratory evidence on which this diagram is based.

A3 You are given chemical X. Describe how you would assess *in vivo* the following activities of X:
a) as a carcinogen
b) as a chemopreventative agent
c) as a chemotherapeutic agent.

For each part of the answer you may choose a different hypothetical organ system in which to measure the biological effect concerned.

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SECTION B Answer **TWO** of the following four questions

B1 You are given part of a freshly excised human epithelial tumour. Outline the methods you would use to detect and characterise the infiltrating haematogenous cells.

B2 A drug under development is thought to be cytostatic. How would you assess:
a) at which stage in the cell cycle the block occurs
and
b) how well the drug is likely to penetrate tissue

Explain the principles of the methods you give.

B3 You have an epithelial cell line which produces a protein against which you have raised a monoclonal antibody. How would you test the following hypotheses *in vitro*?
a) the protein stimulates the growth of the cell line
b) the protein is angiogenic
Outline the experimental materials and methods of assessment you would use. If your results support one, or both, of the hypotheses, what would be their biological significance?

B4 A clinical trial is described as Phase III, triple blind and crossover, with blocked randomisation. The main outcome measure is to be assessed by Bayesian monitoring.

What do all these descriptors mean and what alternatives are available for each of them?

SECTION C Answer **THREE** of the following five questions

C1. Outline the impact which **two** of the following have had on cancer research:
a) the bioluminescent jellyfish *Aequorea victoria*
b) the thermophilic bacterium *Thermus aquaticus*
c) the nematode *Caenorhabditis elegans*
d) the histidine-independent mutant of *Salmonella typhimurium.*

C2. "No theory of cancer is completely new". Give **two** examples to illustrate this statement.

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C3 Answer ALL of the following:_
a) define a polyclonal antibody
b) define a monoclonal antibody
c) give **two** advantages of a polyclonal antibody
d) give **two** disadvantages of a polyclonal antibody
e) give **two** advantages of a monoclonal antibody
f) give **two** disadvantages of a monoclonal antibody
g) give **two** reasons why you might wish to modify an antibody
h) give **two** examples of the use of antibodies in research AND **two** examples of the use of antibodies clinically

C4. For **each** of the following, outline **one** use in clinical or laboratory cancer research.
a) ELISA
b) affinity chromatography
c) magnetic 'Dynabeads'
d) ISH
e) western blotting

On what common biological reaction do all of these techniques or assays depend?

C5. Explain the reasons underlying the use of the following in cancer research:
a) immune-deprived rodents
b) clonal cancer cell lines
c) DNA microarrays of tumours

END OF PAPER