



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF MASTER
OF SCIENCE IN MEDICAL BIOCHEMISTRY**

SBC 581 MOLECULAR ASPECTS OF DISEASE

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DATE: TUESDAY 27TH MARCH 2012

TIME: 9.00 A.M. – 12.00 P.M.

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INSTRUCTIONS

**ANSWER ALL QUESTIONS IN SECTIONS “A” (COMPULSORY) AND ANY
OTHER THREE QUESTIONS IN SECTION B**

(All answers MUST be written in the Examination Booklet)

SECTION A: Answer ALL the Questions (40 marks)

1. The “multistage theory” is the unanimously accepted theory of carcinogenesis. Briefly expound on the three distinct stages of cancer evolution the theory ascribes to. (5 marks)

2. Folate analogues are extensively used in the management of human diseases including tumours and parasitic diseases. State five mechanisms through which antifolates are rendered ineffective at the cellular and molecular levels. (5 marks)

3. Transformation of proto-oncogenes into potentially tumorigenic oncogenes is termed as activation. List and expound on the five ways through which this activation takes place. (5 marks)

4. Most anticancer drugs are known to mediate their activity through apoptosis. Briefly explain the hallmark biochemical feature of apoptosis and its significance. (5 marks)

5. Using malaria as a model disease and citing specific drugs as examples for each case, briefly explain possible reasons why some drugs possess long therapeutic lives while others have short ones. (5 marks).
6. Briefly explain the limitations of the current cancer therapies. (5 marks)
7. Define the term metastasis and briefly explain three bottlenecks the cells of primary tumor must overcome to metastasize. (5 marks)
8. Briefly explain two categories of carcinogenic factors that justify cancer as molecular disease. (5 marks)

SECTION B: Answer ANY THREE Questions (60 marks)

1. One of the new attractive targets currently being pursued in development of novel antimalarial drugs is the apicoplast since the parasite harbors the organelle, which is absent in the host cell. Briefly explain diverse metabolic processes that are unique to the organelle that offer promising drug targets, while citing specific drugs to validate this. (20 marks)
2. Briefly discuss the role the *var gene* family, the rosettin/rif gene family, and the Pf60 gene family play in antigenic variation, which confers malaria parasites the ability to challenge the human immune system. (20 marks)
3. Briefly explain the three main theories of tumor angiogenesis. (20 marks)
4. Out of the five classical theories of carcinogenesis, the “Multistage theory” is the widely accepted one. Briefly explain the major aspects of the theory. (20 marks)