

**UNIVERSITY COLLEGE LONDON**

University of London

**EXAMINATION FOR INTERNAL STUDENTS**

*For the following qualifications:*

*B.Sc. (Intercal)*

**HEALTH SCIENCES C101:  
CONNECTIVE TISSUE BIOLOGY**

|              |   |                   |
|--------------|---|-------------------|
| COURSE CODE  | : | <b>HESCC101</b>   |
| UNIT VALUE   | : | <b>0.50</b>       |
| DATE         | : | <b>1 May 2003</b> |
| TIME         | : | <b>10. 00 am</b>  |
| TIME ALLOWED | : | <b>3 hours</b>    |

## **HEALTH SCIENCES C101: CONNECTIVE TISSUE BIOLOGY**

Answer **TWO** questions from Section A and **SIX** from Section B

### **SECTION A**

Answer **TWO** questions (25 marks for each answer)

Answer each question in a **SEPARATE** book

1. The fibril-forming collagens provide skeletal tissues with mechanical strength and are relatively stable. Describe the features, from the molecular to the fibrillar level, which ensure the stability of collagen.
2. Describe in detail the structure of aggrecan and explain how this relates to the functional requirements of articular cartilage.
3. Discuss the mechanisms involved in three dimensional limb patterning during embryonic development.
4. What is the cellular basis for the connection of bone resorption and bone formation in the healthy normal skeleton?
5. Describe, with the help of a diagram, the sequential cellular events in a wound bed after clot formation with particular reference to the role of specific cytokines.

**TURN OVER**

## HEALTH SCIENCES C101: CONNECTIVE TISSUE BIOLOGY

### SECTION B

Answer **SIX** questions with short notes (Total 30 marks)

Start a **NEW BOOK** and answer each question on a **SEPARATE** page

1. Briefly describe a model system that can be used for studying the role of movement during development in the embryo, giving the advantages and disadvantages of the system.
2. Describe the basic structure of a cell microtubercle and give one function.
3. The major role of matrix metalloproteinases is the degradation of matrix; however they are known to have other functions. Choose two of these other roles and write short notes on them.
4. Define the structural and functional characteristics of the "small leucine-rich proteoglycan" family of proteoglycans. Give two examples of members of this family.
5. Two types of domain are found in tropoelastin. What are these and how do they contribute to fibrillogenesis?
6. List the requirements of cells to grow in an *in vitro* system and give an example of how each might be provided.
7. Draw a diagram of an osteoclastic cutting cone in cortical bone. Relate this to the structure of compact bone. Draw a diagram of the organisation of osteoclasts on trabecular bone. Include in both diagrams dimensions and time intervals.
8. Compare and contrast the molecular composition of meniscus and the tensional region of tendon stating how this relates to specific functional requirements of each tissue.
9. Outline the systemic factors that regulate bone turnover.