

University of Cambridge
Department of Biochemistry

NATURAL SCIENCES TRIPOS PART IB

AIMS and OBJECTIVES for **Biochemistry & Molecular Biology 2011-2012**

Course Organisers (Michaelmas): Prof. R. W. Farndale (E-mail rwf10@cam.ac.uk)
(Lent and Easter): Dr T. R. Hesketh (E-mail trh12@bioc.cam.ac.uk)

Aims

The course aims to build on the NST IA Biology of Cells course, and to provide an advanced foundation for specialist further study of Biochemistry or other molecular biosciences, by giving students an understanding of:

- 1) the structural organisation of genes and the control of gene expression in prokaryotes and eukaryotes;
- 2) protein structure, enzyme catalysis and protein engineering;
- 3) the control of metabolic pathways, energy transduction and cell growth;
- 4) the methods used to analyse biochemical structures and processes, including the use of molecular genetic tools.

Objectives

By the end of the course, the students should be able to demonstrate knowledge and understanding of

- 1) the principles and exploitation of methods of recombinant DNA technology;
- 2) chromatin structure, RNA synthesis, processing and translation;
- 3) protein domain structure and folding, conformational mobility and stability, enzyme kinetics, enzyme mechanisms, allostery and antibody recognition and protein design;
- 4) the structural basis and mechanism of energy transduction processes in mitochondria, photosynthetic bacteria and chloroplasts, and of the control of metabolic flux;
- 5) the control of eukaryotic cell cycle;
- 6) signal transduction across membranes and within and between cells;
- 7) bacterial chemotaxis, motility and secretion systems;
- 8) aspects of the molecular biology of protozoa: evolution, disease causation, antigenic variation, and regulation of gene expression in trypanosomes.

and be skilled in

- 9) the design and execution of simple experimental protocols, be skilled in the use of laboratory equipment to obtain reproducible data, and to be able to use computer applications to analyse gene and protein sequences and structures;
- 10) analysis and critical interpretation of the results of biochemical experiments, using examples from their own laboratory practice, journal clubs and lectures;

and continue their learning by

11) building on their knowledge, understanding and skills by further study of specialised biomolecular courses within the Natural Sciences Tripos.