

**University of Cambridge**  
**Faculty of Biology**

**MEDICAL AND VETERINARY SCIENCES TRIPOS PART IA**

AIMS and OBJECTIVES for the **Molecules in Medical Science** course 2011-2012  
Course Organiser: Dr F. J. Livesey (E-mail [fj11000@cam.ac.uk](mailto:fj11000@cam.ac.uk))

**Aims**

The course aims to provide students with a basic understanding of:

- 1) the molecular architecture of eukaryotic cells and organelles, including membrane structure and dynamics;
- 2) the principles of bioenergetics and enzyme catalysis;
- 3) the chemical nature of biological macromolecules, their three-dimensional construction, and the principles of molecular recognition;
- 4) dietary requirements of man and selected domestic animals;
- 5) the metabolism of dietary and endogenous carbohydrate, lipid, and protein;
- 6) the principles and major mechanisms of metabolic control and of molecular signalling by hormones;
- 7) the control of cell proliferation;
- 8) how the DNA in a genome is organized, replicated, and repaired;
- 9) how genetic information in the DNA is selectively expressed as functional proteins;
- 10) how genes are transmitted between generations, and how and when errors can arise;
- 11) how natural polymorphism and genetic variation can give rise to mutant genes, and how these genetic errors are inherited;
- 12) how inherited genetic errors can cause both single gene and multifactorial diseases and the consequences of this inheritance for individuals and populations;
- 13) the tools used in molecular genetics, and their potential applications to medical and veterinary science;
- 14) from their own laboratory practice, the experimental dimension of the molecular approach to biology;
- 15) the significance for clinical and veterinary practice of the molecular approach to medical science;
- 16) an awareness of the ethical aspects of molecular science.

**Objectives**

By the end of the course, students should be able to:

- 1) demonstrate knowledge and understanding of the molecular machinery of living cells;
- 2) demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition;
- 3) demonstrate knowledge and understanding of the principles and basic mechanisms of metabolic control and molecular signalling;
- 4) use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments;
- 5) implement experimental protocols, and adapt them to plan and carry out simple investigations;
- 6) analyse, interpret, and participate in reporting to their peers on the results of their laboratory experiments;
- 7) participate in and report orally on team work investigations of problem-based assignments;
- 8) build on their knowledge and understanding in tackling more advanced and specialised courses, and more widely to pursue independent, self-directed and critical learning.