Immunotherapy

Immunotherapy (40 credits)

The module will build on basic knowledge provided in previous modules with a focus on applied immunology and translating basic science into safe and effective therapeutics.

The module will be divided into four sections:

Microbes - immunomodulation and vaccination: This module section presents a detailed insight into how immune responses develop to infectious agents and vaccines, outlining the similarities and differences between such responses and the "classical" picture of an immune response. Particular foci will be how innate and adaptive responses can contribute and collaborate to induce and maintain an immune response, how systemic vs. mucosal immune responses function and the importance of localizing infection. This information will then be taken forward to show how responses to vaccines, infectious agents and their antigens can aid in the control of non-infectious disease by modulating the host environment.

Small molecules: Despite the success of biologic agents in the management of certain inflammatory diseases, there remains both unmet medical need and significant advantages in the small-molecule approach. Consequently this remains a very active area of translational research interest with a large number of investigational agents including inhibitors of kinases involved in intracellular signalling, and inhibitors of chemokine and Toll-like receptors. Time will be given to discuss how a pharmaceutical company selects, screens and progresses active compounds. Furthermore, the recent discovery of endogenous peptides that have potent immune-modulating properties represents a promising new small molecule approach to inflammatory disease.

Cellular immunotherapy: Established cellular therapies will be covered in addition to emerging cellular therapies such as mesenchymal stem cells (MSC) and induced pluripotent stem cell (iPSC) derived therapies.

Biologics: This section of the module will include an historical perspective to macromolecular therapeutics and will cover cytokine mediated therapeutics and how this has given rise to antibody-based therapeutics, and more recent biologics leaning heavily on synthetic biology. Students will be given a number of case studies and taken through the development process for a given drug.

Students will also be guided through the process of writing a description of a piece of research with the aim of communicating the major concepts or conclusions to a lay audience. MCQs are introduced as part of the assessment of this module to ensure that students have a breadth of understanding regarding the vast range of immunotherapies currently in use or under development.

Module attendance required: Six weeks of lectures and small group tutorials.

Module dates: TBC

Assessment:

Examination (60%):

- 40 MCQ questions and 2 essays (3h exam).

Coursework (40%):

- Course work will consist of two parts:
  1. A project with a candidate therapeutic antibody designed using available building blocks with a 3,000 word report summarising the required developmental stages (25%).

  2. A description of a piece of research with the aim of communicating the major concepts or conclusions to a lay audience. (1500 words) (15%).

Academics involved in the delivery of this module:

Dr Ben Fisher (/staff/profiles/iandi/fisher-benjamin.aspx) (Institute for Biomedical Research), Dr Mark Cobbold (School of Immunity & Infection) and **Prof Adam Cunningham (/staff/profiles/iandi/cunningham-adam.aspx)** (Institute for Biomedical Research) and a number of other researchers from across the College of Medical and Dental Sciences, including **Prof. Phil Newsome (/staff/profiles/iandi/newsome-philip.aspx)**, **Prof. David Adams (/staff/profiles/iandi/adams-david.aspx)**, **Prof. Andy Clark (/staff/profiles/iandi/clark-andy.aspx)**, **Dr Ye Oo (/staff/profiles/iandi/Oo-Ye.aspx)**, and **Prof. Ben Willcox (/staff/profiles/cancer/willcox-benjamin.aspx)**.

Course fact file

Type of Course: Module