

BSc in Medical Sciences with CANCER FRONTIERS

Introduction

Cancer Frontiers will provide an introduction to cancer, within the context of normal development and cell differentiation. We will explore our current understanding of mechanisms associated with cancer development and progression, particularly in relation to how these are exploited by current cancer treatments. You will also investigate how evidence-based medicine and new technologies can impact on patient management and survival.

As a starting point, the “Hallmarks of Cancer” will be used to introduce some of the concepts behind our understanding of cancer, and how these continue to shape our thinking on how to best treat cancer patients. The “Hallmarks of Cancer” model argues that the complexity of cancer can be reduced to a small number of underlying principles - i.e. "Hallmarks" - that govern the transformation of normal cells to cancer cells.

In Cancer Frontiers, we will explore and expand on these concepts, with particular focus on their implications for our understanding of cancer. Importantly, we will focus on how this understanding can be used to improve the treatment of patients by developing more personalised or stratified approaches using evidenced based medicine through clinical trials.

This course will comprise an introductory foundation course, followed by three modules: a 12 week taught module, a 4 week patient orientated research module, and a 12 week research project module.

Course Director Professor Bob Brown b.brown@imperial.ac.uk

Aims and Objectives. The aim of this course is to provide a scientific basis for the practice of, and research into, cancer. It will allow students to achieve the following broad outcomes:

- Recognise the hallmarks of cancer and the role these have in the development and progression of cancer.
- Relate scientific understanding of mechanisms of tumorigenesis to drug targets and cancer treatment.
- Explore how molecular profiling can help in the understanding of cellular transformation through the cancer journey, as well as translation of this knowledge into improved patient management and precision medicines.
- Discuss how evidence-based medicine and new technologies can impact on medical and surgical oncology through clinical trials.
- Critically appraise cancer research literature, synthesise current evidence and opinion, and identify knowledge gaps.
- Organise, analyse and report laboratory and clinical data, justifying selection of the approaches used and conclusions reached.

Most important of all, we hope by the end of the course students will be excited about the current directions of cancer research and see opportunities for their own involvement in future cancer research frontiers.

Module 2

Module Leads Dr Jon Krell
 Ms Naina Patel

This module aims to provide students with a collaborative experience of working with their peers to provide a critical synthesis of a scientific problem. It aims to:

- Enable students to seek and use published data
- Train them to assess literature, consider caveats and draw appropriate conclusions
- Teach students to communicate experimental strategies, results and conclusions effectively and succinctly
- Provide opportunity to participate in the processes of article submission, peer review and rebuttal

This 4-week module will consist primarily of group work. Students will work in groups of 4-5 to develop their team working, communication, critical appraisal and clinical translation skills through a literature review assignment that focusses on translation of basic understanding of cancer into patient-orientated research. They will receive academic mentorship throughout, but will be encouraged to set their own group contract and terms of engagement.

Students will also work independently on a case-based learning “Science in Context” task to understand and critique evidence-based practice combined with personalised medicine, preparing them to be able to critique the evidence base of their future medical practice. This case study component will be due at the end of this self-directed learning period and will involve an interpretation of the clinical management pathway following molecular and histological diagnosis of a patient’s tumour.

Module 3

Module Lead Dr Jaya Nautiyal

The third module aims to facilitate the planning and carrying out of supervised research resulting in a project write-up in the style of an academic research paper. Students will have opportunity for critical reflection on design of research, validation of approach, and robustness of data interpretation. Projects that link with cancer clinical studies will be encouraged.

A range of current and topical research projects will be offered in a range of environments. Students will have regular meeting with their supervisors and be provided with day-to-day supervision.

Supporting workshops on core topics such as study design, statistics will also be provided during this module.

At the end of the project, as well as the write-up, students will give an oral presentation reflecting on their individual research journey and future research directions.