The Oxford-Percival Stanion Graduate Scholarship

Scholarship details:

The Oxford-Percival Stanion graduate scholarship is available for Home applicants who are applying to a full-time DPhil (Phd) course in the Department of Biochemistry, University of Oxford for 2025 entry:

The scholarship covers course fees, college fees and a grant for living costs for full-time students of at £19,975. Awards are made for the full duration of your fee liability for the DPhil.

The scholarship is jointly funded by the University and a generous endowment from PERCIVAL STANION an alumnus of Pembroke College where he was an undergraduate in the 1970s, and a member of the Pembroke Master's Circle as well as of its Investment Committee.

The scholarship is only tenable at Pembroke College, and a close match of research interests with the Pembroke Biochemistry Fellow Associate Professor André Furger, is highly desirable.

PEMBROKE COLLEGE

Pembroke College main site is located in the centre of Oxford Pembroke and has a vibrant graduate community made up of more than 250 graduate students. The College offers a range of accommodation graduates can apply for, including self-contained flats for couples. Pembroke graduates also have the opportunity to apply to the Dean of Graduate fund for financial support for conference attendance and travel costs. For more information about the graduate community in Pembroke College and Pembroke Graduate accommodation, follow the links below:

Pembroke Graduate Community Pembroke Accommodation Pembroke College

FURGER LAB RESEARCH

Key words: mRNA metabolism, Circadian Rhythm, Controlled Cooling, Control of gene expression, pre-mRNA processing, alternative polyadenylation, RNA Therapeutics

Overview:

The research in the Furger laboratory broadly focusses on mRNA metabolism in human cells under stress conditions and during disease progression. We currently focus on how cells reprogram gene expression at the transcriptional, co-transcriptional and post-transcriptional level when they are exposed to cold stress and during cancer progression and how these changes affect cell physiology. To understand these processes, we use a wide range of methodologies including high resolution microscopy, functional genomics approaches and

cell biology and work closely with a number of longstanding national and international collaborators.

RESEARCH PROJECTS:

1) Molecular Characterisation of the Human Cold Shock Response: "Cooling the Cellular Clock"

Controlled cooling is widely used in a number of medical applications principally to reduce the metabolic needs of cells when the blood supply to tissues and organs is restricted, and oxygen becomes scares. Cold temperature exposure has additional medical benefits, but the underlying molecular processes are largely unknown. The Furger lab has recently addressed this issue by systematically characterising gene expression responses and structural changes that are associated with cooling and subsequent rewarming of cells. This research identified a previously unknown link between very low temperatures and the resetting of the circadian clock. This unexpected finding is of high interest as the circadian clock is evolutionary highly conserved and is present in almost all cells. The circadian clock is a cell autonomous timekeeper that at the molecular level is driven by interconnecting transcription and translation feet-back loops that are created by products of the core clock genes that regulate their own rhythmic expression. The oscillating core clock genes encode transcription factors that also regulate the expression of thousands of genes and so align the physiology of the cells, organs and behaviour of organisms with the 24h day and night cycle of the earth. We aim to understand the molecular processes and factors that are activated by cooling and force the reset of the circadian clock upon rewarming of the cells. As the circadian clock regulates fundamental cellular processes and is critical to health, it is of great importance to understand how the circadian clock can be manipulated.

DPhil projects are available that:

1) Aims to unravel how structural changes molecular mechanisms that are activated by cooling and rewarming, affect the transcription and translation feedback loops of the core clock genes and force a resetting of the circadian clock.

Recent publications:

- **Cold-induced chromatin compaction and nuclear retention of clock mRNAs resets the circadian rhythm.** Fischl H, McManus D, Oldenkamp R, Schermelleh L, Mellor J, Jagannath A, Furger A. EMBO J. 2020 Nov 16;39(22):e105604. doi: 10.15252/embj.2020105604.

2) RNA Therapeutics

We have recently started a new research avenue where we use our expertise in RNA metabolism and RNA structure and function to design RNA therapeutics. The DPhil project will be multidisciplinary and more details are available by directly contacting Prof. Furger.

What do the projects offer?

The projects offer training in a wide range of state-of-the-art methodologies including, super resolution microscopy, high through-put sequencing technologies, bioinformatics, *in vitro*

mRNA production, tissue culture, cell biology and classic biochemistry and molecular biology techniques.

All projects are best suited to highly motivated applicants wanting to work in a supportive, collaborative and multidisciplinary environment.