National Cancer Centre Singapore
SingHealth

Light and Death: Developing light-activated agents to control cell growth differentiation and death

Date & Time: 7th June, Thursday, 7.30am to 8.30am
Location: Peter & Mary Fu Auditorium, NCCS Level 4



Speaker: **Dr Carrie Ambler**
Associate Professor ,
Biosciences Department,
Durham University, UK
Chief Scientific Officer,
LightOx Ltd

Bio: Dr Carrie Ambler is currently an Associate Professor in the Biosciences Department at Durham University, UK. She is also Chief Scientific Officer of a spin-out company, LightOx Ltd. LightOx is a company focused on developing novel chemicals for targeted phototherapies. Carrie received her PhD at the University of North Carolina at Chapel Hill studying vascular biology before joining the group of Prof Fiona Watt (King's College London, UK) as a Postdoctoral Fellow researching skin stem cells. In 2008, she joined Durham University as Principal Investigator of Epithelial Stem Cell Biology Laboratory and over the past decade, Dr Ambler's group has studied how the interplay between epidermis and surrounding cell types influence skin homeostasis and wound repair. She has extensive experience using human 2D and 3D models to study aspects skin stem cells biology including cell differentiation, proliferation, and migration. Her lab has been developing engineering organotypic models of skin and other epithelial tissues composed of both immune cells and tissue-specific cells suitable for studying the inflammatory phase of wound repair. Recently, the Ambler lab has worked closely with chemists to develop novel fluorescent chemicals for use as biological imaging probes and for cell killing agents.

Abstract: The ability to target and destroy specific cells selectively is an important tool both for life science research and in the clinic. One route to achieve this goal is by the application of a selective, targeted chemical and subsequent light activation; the latter typically initiating production of reactive oxygen species (ROS). Moreover, the generation and modulation of ROS is of huge importance in the wider aspects of life; ROS controls the maintenance, defence and death of both eukaryotic and prokaryotic cells. Consequently, ROS is produced by a number of biochemical processes in order to modulate cellular behaviour; however, it can also be generated by the action of certain chemical compounds known as photosensitizers (PSs) through their interaction with light.
The ability to finely control the release of ROS is not possible with current PSs. Consequently, there is a major need for novel compounds and ROS generation mechanisms that are able to elicit an entirely controlled either destructive or proliferative cellular response based on the requirements of the disease. In this seminar, I introduce first our work studying skin wound repair and then discuss how this work has lead us to develop a novel type of low molecular weight PS system which exhibits the potential to elicit such controlled ROS generation. I will describe our research using this phototherapy system to both promote skin wound repair, but also to target unwanted cells for light-selected ablation.