COMPARE

CENTRE OF MEMBRANE PROTEINS AND RECEPTORS

Newsletter

Edition 6, April 2018

Grants

A joint BHF infrastructure grant to support cardiovascular research in COMPARE has been awarded by the BHF. This will include a state of the art FCS/STED in Nottingham and a SIM and light-sheet ultramicroscope for cleared tissue in Birmingham.

Light-sheet workshop

The COMPARE inaugural workshop on light-sheet microscopy was held on the 26th and 27th February at The University of Birmingham with Dr Steve Thomas, Technology Lead of COMPARE, opening the event. The sell-out workshop attracted delegates from eleven different countries, and speakers including Ferenc Mueller, Charlotte Buckley, Gopi Shah, Johannes Stegmaier, Jochen Gehrig, Rob Wilkinson, Vikas Trivedi, René Hägerling and Ebba Brakenhielm. In addition, day one included industry techno-bite sessions from 3i, Zeiss, Luxendo Bruker, Labtech, LaVision, Cairn, and Acquifer, which provided delegates with the opportunity to catch up on latest company advancements in light-sheet microscopy. The day ended with a reception, serving as an excellent forum for further discussion with the speakers and company specialists. The event continued into day two with four interactive workshops (3i Marianas light-sheet, Zeiss Z1, Luxendo Bruker MuVi and Labtech X-Clarity). The application specialists covered every detail of light-sheet microscopy and tissue clearing from sample preparation, technique development and application through to image reconstruction and analysis. The COMPARE workshop on light-sheet microscopy was only made possible through the generous support of its sponsors and industry partners.

Seminars—21st March 2018

Dmitry Veprintsev, University of Nottingham, gave and live broadcast a seminar from the University of Birmingham entitled "The inner workings of a G protein-coupled receptor: molecular basis for biased signalling".

Malou Zuidscherwoude from University of Birmingham presented on light-sheet microscopy as the fourth Team Science Seminar. Her talk focussed on the technique as well as its applications in the characterisation of platelet biology.

COMPARE Publications

Latest publications with COMPARE affiliation or by COMPARE PIs

Hollinshead, K.E.R., Munford, H., Eales, K., Bardella, C., Li, C., Escribano-Gonzalez, C., Nonnenmacher, Y., Thakker, A., Murren, R., Cuozzo, F., Ye, D., Laurenti, G., Zhu, W., Hiller, K., Hodson, D.J., Hua, W., Tomlinson, I., Ludwig, C., Mao, Y. and Tennant, D.A. (2018). Oncogenic IDH1 mutations promote enhanced proline synthesis through PYCR1 to support the maintenance of mitochondrial redox homeostasis. Cell Rep. Accepted.

Beazley-Long N, Moss CE, Ashby WR, Bestall SM, Almahasneh F, Durrant AM, Benest AV, Blackley Z, Ballmer-Hofer K, Hirashima M, Hulse RP, Bates DO, Donaldson LF, (2018). VEGFR2 promotes central endothelial activation and the spread of pain in inflammatory arthritis. Brain, Behav & Imm (online).

We would like to celebrate our successful publications via the newsletter and the COMPARE website. Please email compare@birmingham-nottingham.ac.uk with the references of published papers.

COMPARE Vacancies

COMING SOON—Birmingham Chair and Research Fellow—details of these two vacancies will be advertised shortly.

Key Dates

COMPARE Launch
Keynote: Brian Kobilka
Nobel Prize Laureate
LT1 Medical School, Nottingham
18th April 2018 16:00
https://comparelaunch.eventbrite.com

COMPARE Team Science and ONCORNET Research Symposium
LT4 Medical School, Nottingham
18th April 2018 09:30
https://compare-oncornet.eventbrite.com

Team Science Away Day
Fazeley Studios
Birmingham
18th May 2018
https://www.eventbrite.com/e/compare-team-science-away-day-tickets-44099152753

Sandpit, Birmingham
26th October 2018 14:00
"Gene editing and stem cell approaches in the study of membrane proteins"

Annual Research Symposium
Birmingham Hotel & Conference Centre
28th September 2018

birmingham-nottingham.ac.uk/compare

If you have any items for the next newsletter please send to:

compare@birmingham-nottingham.ac.uk

Dual Inverted Selective Plane Illumination Microscopy (diSPIM)

The 3i Marianas diSPIM with custom-built OKO environmental chamber is available at The University of Birmingham site, for all enquiries please contact Dee Kavanagh, **D.M.Kavanagh@bham.ac.uk.**

Conventional imaging methods such as widefield and confocal microscopies use an illumination configuration that exposes the entire sample to light. In live cell imaging, this whole cell illumination strategy can be detrimental to the physiological state of the specimen. Light-sheet microscopy (LSM) or selective plane illumination microscopy (SPIM) allows non-destructive imaging of living samples by confining the excitation light to the detection plane only.

The diSPIM is a dual inverted light-sheet microscope developed by Hari Shroff and team at NIH [1]. In contrast to other SPIM techniques, the diSPIM acquires two perpendicular views of a sample by alternating orthogonal objectives for excitation and detection. This results in the acquisition of two 3D datasets, which are computationally merged and deconvolved, generating a single volume with isotropic spatial resolution. Image stacks are acquired by sweeping the light-sheet through the sample, while a piezo keeps the detection objective focused on the light-sheet. Samples can be prepared using conventional glass coverslips or mounted in agarose. The diSPIM can be used to image cells, cleared tissues and small organisms such as nematode, zebrafish and fruit fly. In imaging applications where environmental control is critical, the diSPIM is custom fitted with an OKO environmental chamber allowing precise control of temperature, humidity and CO_2. In combination, samples can be can be imaged over the course of hours to days.

[1]Wu et al. Spatially isotropic four-dimensional imaging with dual-view plane illumination microscopy. *Nature Biotechnology* (2013).

Welcome

Jackie Glenn joined the COMPARE Team as a Research Technician in November 2017 and will be working in the labs in Nottingham alongside Dr Laura Kilpatrick and Steve Hill. Jackie has a background in platelet research but has worked for the university in Cell Signalling for the past four years. Originally collaborating on a project involving the P2Y2 receptor, Jackie is currently providing technical support for studies of the EGF receptor.
Jackie.glenn@nottingham.ac.uk, 0115 82 31012

David Sykes has over 20+ years of experience working in a drug discovery environment mainly in a specialist assay development role and most recently with Novartis. In 2014, David joined the University of Nottingham and began a part-time PhD in Molecular Pharmacology and Drug Discovery. David is currently employed as a Senior Experimental Officer having recently taken up a new position at the university in November working in the Molecular and Cellular Pharmacology group led by Prof Dmitry Veprintsev. His current interests include the development of HTS fluorescence-based kinetic binding assays specifically designed to assess the kinetics of unlabelled compounds (and chemical fragments) and the use of purified receptor/ effector proteins as tools for drug discovery.
David.sykes@nottingham.ac.uk, 0115 82 30458

Team Science Away Day—18th May 2018

On **Friday 18th May** the COMPARE Team Science Committee are hosting an Away Day for COMPARE PhD students, technicians and early career researchers. The event is being held at the Old Ikon Gallery, Fazeley Studios, 191 Fazeley Street, Digbeth, Birmingham D5 5SE. The general theme for the Away Day is being split between forging collaborations between COMPARE members, and a discussion on authorship driven by a panel of invited speakers, including Prof Jason Swedlow (University of Dundee). For more details and registration; https://www.eventbrite.com/e/compare-team-science-away-day-tickets-44099152753

Team Science—Summer Placements

The following Researchers have been awarded funding for the six week summer placements.

Supervisor	Student	PI	Project Title
Alex Slater	Hanh Nguyen	S Watson	Studying the interaction of platelet receptor GPVI with its major ligands collagen and fibrin
Mark Soave	Zarah Tabrizi	S Hill	Using NanoBRET to investigate ligand binding of VCP746 at the rat adenosine A2B receptor
Leigh Stoddart	Julija Sirina	S Hill	Characterization of adenosine A3 receptor selective fluorescent agonists
David Sykes	David Tippet	D Veprintsev	Development of cannabinoid CB2 receptor specific HTRF and BRET-based binding assays