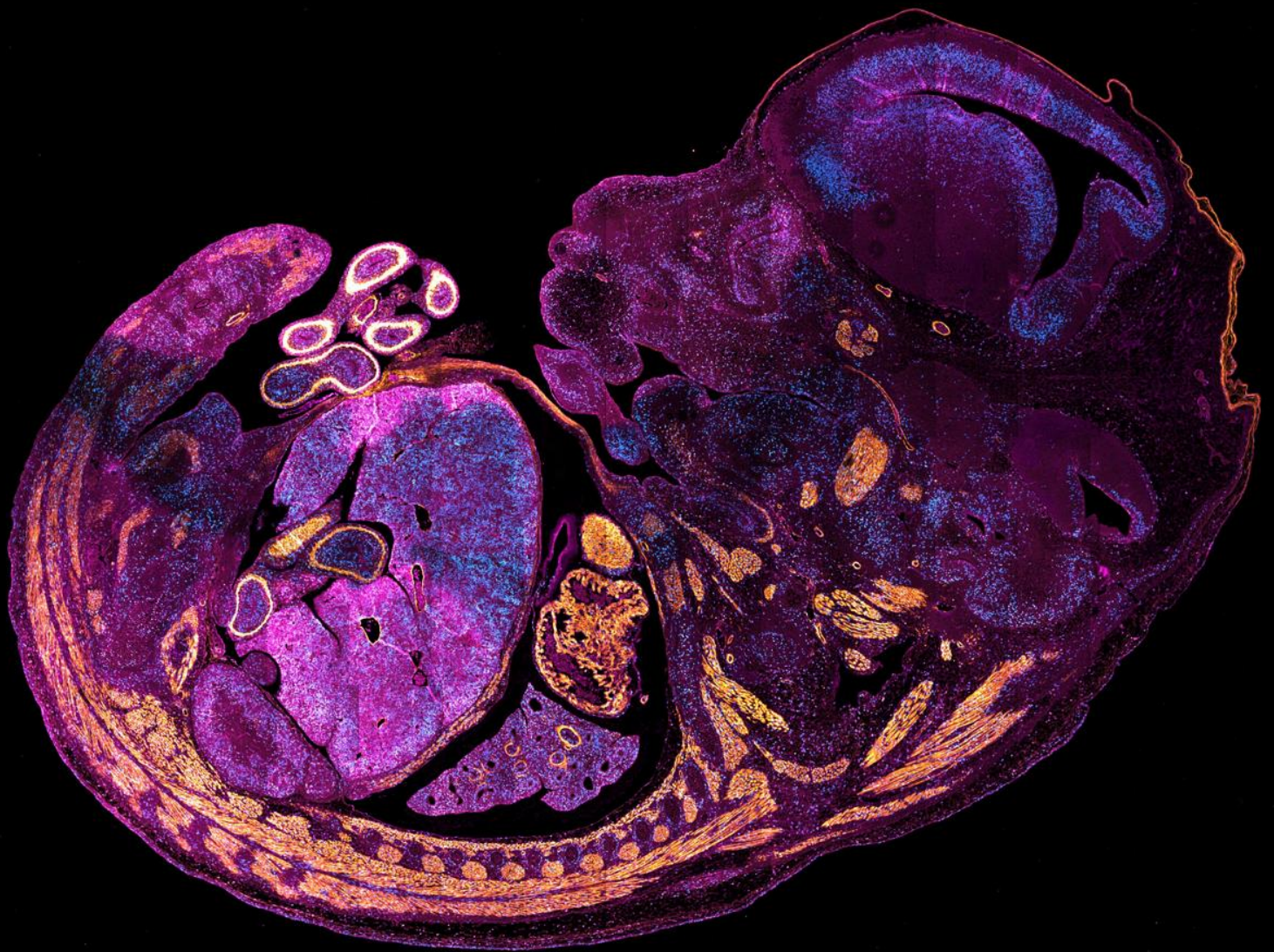


ANZSCDB

Australia and New Zealand Society for
Cell and Developmental Biology Inc.



SUMMER NEWSLETTER 2024

ANZSCDB

Australia and New Zealand Society for
Cell and Developmental Biology Inc.



NEWSLETTER February 2024

President's welcome statement

Dear colleagues,

It is with pleasure and gratitude that I extend a warm welcome to both our longstanding members and those who have recently joined our dynamic community. As the newly appointed President of the Australian and New Zealand Cell and Developmental Biology Society, I am both honoured and excited to represent the society and its members for the next two years.

I joined the society shortly after my arrival in Australia in 2006 when I attended and met like-minded cell biologists at my first ComBio meeting. Since then I have found the society and its members' dedication to the pursuit of knowledge, excellence, and innovation in cell and developmental biology inspiring. The interactions at the diverse meetings through the years have helped me shape valuable collaborations and long-lasting friendships. I share a common passion for unravelling the intricacies of molecular, cellular and physiological mechanisms with all of members as I focus my energy on the powerhouse of the cell, the mitochondrion.

I have been privileged to have taken active roles in the Society as a WA state representative over 10 years ago and more recently as a member of the Council where I have become familiar with the initiative of the society and the dedication to its running by all the members. The ANZSCDB society has a rich history of promoting cutting-edge research, facilitating collaborations, and disseminating knowledge to national and global audiences. Alexis, Jan and I, as part of the incoming executive, are committed to fostering an inclusive and collaborative environment that encourages the exchange of ideas, the cultivation of new talents, and the mentorship of emerging scientists. Whether you are a seasoned researcher with decades of experience or a young scientist embarking on your academic journey, we'd like our members to feel that the Society is your home ground, where you can find support, guidance, and a platform to showcase your work.

In the coming year, we have an exciting line-up of events, webinars, conferences, and newsletters that will provide opportunities for you to engage with experts in the field, present your research, and stay updated on the latest breakthroughs. We will also be expanding our efforts to support travel for exchange of ideas and new initiatives, aiming to foster the next generation of cell and developmental biologists.

I would like to encourage each of you to actively participate in the society's activities and take full advantage of the resources we offer. Your contributions, ideas, and enthusiasm are vital to the growth and success of our organization. I am confident that, as a united community of passionate individuals, we will continue to advance and promote our society's values and make a lasting impact for our members and our field.

Thank you to the outgoing executive, Kieran, Alex and Jenny have been a terrific force that has increased the visibility and activities of the society. I thank our members for being a part of the ANZSCDB Society and continuing to support its causes. I look forward to working with you in the coming year and promoting your successes, ideas and initiatives. Please feel free to reach out to me with your ideas, concerns, or suggestions, as your input is highly valued and essential for the focus of the society.

Finally, if you have any ideas for how ANZSCDB can best serve its members, please contact me.

Warm regards, Aleksandra Filipovska

In this issue

P3 ANZSCDB @ ComBio

P4-P8 Biomolecular Horizon

P9-10 Our state representative

P11-14 State meeting report.

P15 Upcoming events

P16 Australian Bioresources

P17 Zeiss: super-resolution
imaging across scales

P18-23 Livecyte ATA

ComBio

ComBio is the biannual meeting of the ANZSCDB. This year, ComBio is branded through Biomolecular Horizons 2024 and held as a joint event between IUBMB, FAOBMB, and ComBio at the Melbourne Convention Centre. Leonie Quinn (ANU) and Sharad Kumar (UniSA) led ANZSCDB representation on the organising committee and have planned our upcoming event. A huge thank you to Kieran Harvey, Alex Combes, and Jennifer Zenker for organising this activity during their period in the executive committee of our Society. This is an extraordinary opportunity for all our members to participate in this meeting featuring an impressive lineup of plenary and keynote speakers. Your active participation and support are invaluable to us, and we encourage you to share this information widely within your network. We hope to see all of you there! (More details in pages 4 - 7)

The ANZSCDB Executive committee

President serves a 2-year leadership term. The society aims to ensure that our Presidents represent the many different aspects of our society that make it a success and serve our membership base effectively. It is my great pleasure to inform you that Aleksandra Filipovska has commenced her role as President of ANZSCDB. Aleks, based at the Harry Perkins Institute of Medical Research in Western Australia, is a stellar scientist, renowned for major discoveries on the role of mitochondria in both health and disease.

As part of her team, Aleks has appointed Jan Manent as Treasurer, a research fellow at the Regenerative Medicine Institute at Monash University. Jan completed his PhD in Human Genetics at Pierre and Marie Curie University in Paris. During his doctoral research, Jan focused on the cancer-predisposition syndrome Neurofibromatosis type 2, developing and characterising in vitro models of NF2-related Schwann cell tumours. After a stint in industry with the Monash-embedded startup Cell Mogrify, he joined the laboratory of Associate Professor Edwina McGlinn at ARMI. Currently, Jan investigates the gene regulatory networks controlling growth and patterning of the early mammalian embryo using mouse models and pluripotent stem cells. Jan has been an active member of the Australia and New Zealand Society for Cell and Developmental Biology since 2013, serving as the Victoria state representative from 2021 to 2023.

Aleks has also appointed Alexis Diaz-Vegas as the Secretary of ANZSCDB. Alexis, a cell biologist, focuses on dissecting the role of mitochondrial dysfunction in disease. Alexis obtained his PhD from The University of Chile in 2018. Joining the University of Sydney in 2019 as a postdoctoral research fellow, Alexis explores the role of mitochondria in muscle and adipocyte health. Alexis has been an active member of the Australia and New Zealand Society for Cell and Developmental Biology since 2022, Alexis served as the NSW state representative in 2023.

Cover: 'Sleeping Beauty'

"The image shows an embryonic day 14 paraffin embedded embryo, which was sectioned and deparaffinized followed by OpenEMU multiplexing." **Dr. Osvaldo Contreras** (Victor Chang Institute), winner of best image award NSW state meeting 2023.

Keep up to date: Remember to follow [@ANZSCDB](#) on Twitter for news and tag us in your work-related posts for retweets.

Contribute to the ANZSCDB newsletter!

Please send items to [Alexis Diaz-Vegas](#), the society Secretary, or get in touch with your [state representative](#). We want to hear about your latest papers, promotions, prizes and other news, perspectives, or opinion pieces about life as a student, RA, Postdoc or PI in cell biology or developmental biology. The newsletter will be published 3 times a year and distributed to all ANZSCDB members via e-mail. Previous newsletters are hosted on our website. Please ensure that your submissions are succinct and have been fact-checked.

A very warm welcome to our New Executive Committee Members



Prof. Aleksandra Filipovska Professor Aleksanda Filipovska is an NHMRC Senior Research Fellow and Research Professor at the Harry Perkins Institute of Medical Research and the University of WA. Her research interests are in the regulation of mitochondrial gene expression by RNA-binding proteins in health and disease. In addition, her research group uses next generation sequencing technologies to identify pathogenic mutations in mitochondrial genes that cause mitochondrial disease in genetically isolated populations.



Dr. Alexis Diaz-Vegas, a cell biologist with a PhD from The University of Chile, has dedicated his research to understanding the implications of mitochondrial dysfunction in metabolic diseases. Their postdoctoral work at the Advanced Centre for Chronic Diseases (ACCDIS) in Chile focused on studying mitochondrial-endoplasmic reticulum interaction in cardiac hypertrophy. Joining the University of Sydney in 2019 as a postdoctoral research fellow, Alexis has delved into the role of mitochondria in muscle and adipocytes health.



Dr. Jan Manent, a research fellow at the Australian Regenerative Medicine Institute at Monash University, holds a PhD in Human Genetics from Pierre and Marie Curie University in Paris. His research journey began with a focus on Neurofibromatosis type 2 during his doctoral studies, where he developed in vitro models of related Schwann cell tumors. Transitioning to postdoctoral roles at Harvard Medical School and the Peter MacCallum Cancer Centre, he delved into signal integration in organ growth and cancer using *Drosophila melanogaster*. Following industry experience at Cell Mogrify, he joined Associate Professor Edwina McGlenn's laboratory at ARMI, investigating gene regulatory networks in early mammalian embryo growth and patterning using mouse models and pluripotent stem cells. Actively involved in the Australia and New Zealand Society for Cell and Developmental Biology since 2013, Jan served as the Victoria state representative from 2021 to 2023.

BIOMOLECULAR HORIZONS 2024: DISCOVER CREATE INNOVATE

ComBio 2024 MELBOURNE

22nd COMBIO CONFERENCE

22 TO 26 SEPTEMBER 2024

MELBOURNE CONVENTION AND EXHIBITION CENTRE

www.bmh2024.com

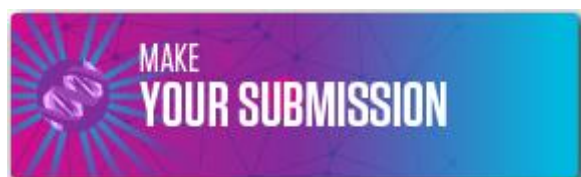
As a valued ANZSCDB member, we invite you to join us at Biomolecular Horizons 2024 to be held in Melbourne from 22-26 September 2024. This important forum will bring together three prestigious congresses, each with a strong history of attracting the Bioscience and Biotechnology communities to discuss and examine the latest developments and research:

- 22nd ComBio Conference (ComBio)
- 26th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB)
- 17th Congress of the Federation of Asian & Oceanian Biochemists & Molecular Biologists (FAOBMB)



CALL FOR ABSTRACTS

Contribute to this important global conversation by submitting an abstract for consideration. You can nominate the preferred [theme](#) and symposium relevant to your work. Submissions close **Tuesday 12 March 2024** so act now and click on the button below for more information.



PROGRAM OVERVIEW

This truly global forum will bring together renowned scientists from across the world, from Nobel Laureates to early career scientists. Visit the [website](#) for an overview of the program and more details on the outstanding array of international presenters will be leading the program including:

PLENARY SPEAKERS



BRIAN KOBILKA
Stanford University USA
Nobel Prize in Chemistry 2012
Grimwade Award Lecturer



PAMELA SILVER
Harvard University USA
MEMB Jubilee Award Lecturer



SERGEY OCVINNIKOV
Harvard University USA



SANDRA EADES
University of Melbourne AUSTRALIA



PETRO TERBLANCHE
Afrigen Biologics & Vaccines SOUTH AFRICA



CAIXIA GAO
Chinese Academy of Sciences CHINA

INVITED KEYNOTE SPEAKERS



KEI SATO
The University of Tokyo JAPAN



MARIAN WALHOUT
University of Massachusetts USA



YUE WAN
Genome Institute of Singapore SINGAPORE



WEI XIE
Tsinghua University CHINA



NORBERT PARDI
University of Pennsylvania USA



ALEXIS KOMOR
UC San Diego USA



ALEXANDRA NEWTON
UC San Diego USA



NICK BARKER
Institute of Molecular & Cell Biology SINGAPORE



JENNIFER LISTGARTEN
UC Berkeley USA



SHOBHNA KAPOOR
Indian Institute of Technology INDIA



ELIZABETH MCKINLEY
University of Melbourne AUSTRALIA



RICHARD J ROBERTS
New England Biolabs USA



PETER FINERAN
University of Otago NEW ZEALAND



ROMMIE AMARO
UC San Diego USA



HOZUMI MOTOHASHI
Tohoku University JAPAN



JOB DEKKER
University of Massachusetts USA



VICTOR NIZET
UC San Diego USA



SEIGO SHIMA
Max Planck Institute GERMANY



NIENG YAN
Tsinghua University CHINA



GREG COOK
University of Otago NEW ZEALAND



DREW BERRY
WEHI AUSTRALIA



HEATHER CHRISTOFK
UC Los Angeles USA



LEO EBERL
University of Zurich SWITZERLAND
FERS Worldwide Award Lecturer



MICHAEL BARRETT
University of Glasgow UNITED KINGDOM



YOU-ME KIM
KAIST KOREA



JOHN CHAMBERS
Nanyang Technological University SINGAPORE



MICHAEL FUNK
Science USA

YOUNG SCIENTIST PROGRAM

Opportunities exist for PhD students to participate in additional programs or to apply for travel support through the Young Scientist Program or the IUBMB Travel Fellowships. Applications close 29 February 2024. To learn more, please [visit our website](#).

REGISTRATION NOW OPEN - EARLY BIRD SAVINGS ON OFFER

Take advantage of early bird savings and register now! Secure your place at the Congress, join us at optional events, and secure accommodation within walking distance of the Melbourne Convention & Exhibition Centre. Visit the website for more information:

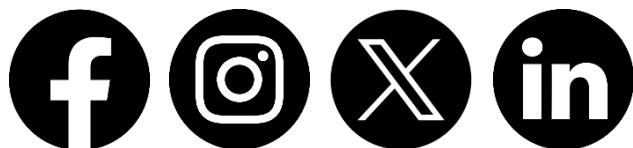


DISCOVER MELBOURNE

Why not stay a day or two longer to experience Melbourne at its finest - a city with a rich multicultural mix celebrating the creativity and diversity of its people and the city. For more information [view our website](#).



Be sure to follow the Congress on social media and be part of the conversation. Click on the icons below:



Don't miss out on this amazing opportunity to learn, connect, and grow. We look forward to welcoming you and colleagues to this significant event.

HOSTED BY:



SUPPORTED BY:



BMH2024 Congress Office:



119 South
T
E
www.bmh2024.com

Melbourne
+61

Buckhurst
VIC
3

3205
9645

Street
Australia
6311
bmh2024@wsm.com.au

Get to know your State Representatives

Our website has been updated to include profiles of the new Executive Committee, and for our new and continuing State Representatives.

Australian Capital Territory



Teresa Bonello
Australian National University



Rachel Woodhouse
Australian National University



Dr. V. Pragathi Masamsetti
Children's Medical Research Institute



Dr. James Burchfield
University of Sydney

Queensland



Sean Coakley
University of Queensland



Merja Joensuu
QBI, University of Queensland



Genevieve Secker
CCB, University of South Australia



Yasmyn Winstanley
University of Adelaide

South Australia

Tasmania



Jessica Fletcher
University of Tasmania



Lorenzo Odierna
University of Tasmania

Victoria



Gonzalo del Monte Nieto
Monash University



Maria Tanzer
WEHI

Western Australia



David Martino
Group Leader, Clinical Epigenetics
Telethon Kids Institute



Liisa Hirvonen
University of Western Australia

New Zealand



Laura Gummy
University of Otago



Louise Bicknell
University of Otago

11th ANZSCDB Adelaide Meeting Report

The 11th ANZSCDB Adelaide meeting, which was held on 18 October 2023 at the Centre for Cancer Biology (UniSA), brought together more than 70 members of the South Australian cell and developmental biology community. We once again had a full program filled with innovative research and many fabulous image competition submissions.

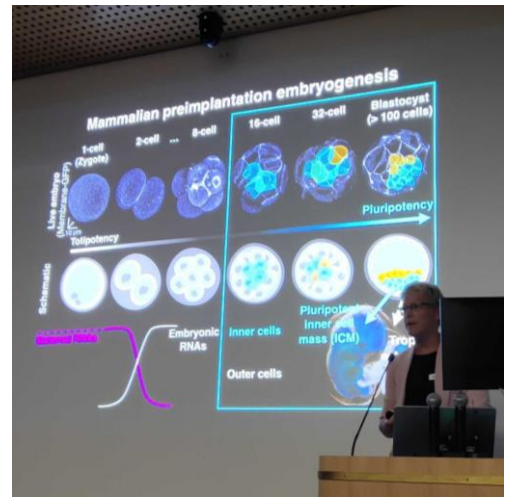
Our plenary presenters Dr Jennifer Zenker (Australian Regenerative Medicine Institute, Monash University) and Associate Professor Kelly Smith (University of Melbourne) gave fascinating talks that promoted many great questions and discussions. We also had a special seminar given by invited speaker Dr Lachlan Jolly (University of Adelaide) which garnered a lot of interest from our audience.

We featured 9 student and 3 post-doc presentations and 17 posters selected from a high number of exceptional abstracts. The outstanding quality of the research presented our judges with the very hard task of deciding prize winners. We would like to congratulate all prize winners: Best Post-doctoral Oral Presentation winner Dr Chloe Shard, Best Student Oral presentation winner Ruchi Umargamwala and runner-up Andrea Usseglio Gaudi, Best Post-doctoral Poster Presentation winner Dr Genevieve Secker, Best Student Poster Presentation winner Daniel Bishop and runner-up Michael Katschner, and Best Research Image winner Edward Buckley.

The meeting was concluded by drinks and networking. Free registration, catering and prizes were all possible thanks to the generous support we received from the ANZSCDB and our sponsors (Platinum sponsors: ATA Scientific, Centre for Cancer Biology; Gold sponsors: Zeiss, Eppendorf, GeneWorks; Bronze Sponsor: Emgrid Australia). We would also like to thank all plenary and featured speakers, judges, volunteers, poster presenters and the CCB Operations team for their help in organising this very successful meeting.

The 11th ANZSCDB Adelaide meeting's organisation was led by the ANZSCDB SA State Representatives Dr Anna Oszmiana and Dr Yasmyn Winstanley, with the support of the organising committee: Ruchi Umargamwala, Dr Chloe Shard, Dr Jan Kazenwadel, Dr Zahied Johan.

We wish to give our heartfelt thanks to outgoing SA State Representative Dr Anna Oszmiana for her invaluable contributions to the ANZSCDB during her term, and welcome incoming State Representative Dr Genevieve Secker.



Congratulations to Dr Sophie Wiszniak

Congratulations to Sophie Wiszniak on being awarded a Heart Foundation Vanguard Grant to investigate how congenital heart defects, specifically pulmonary stenosis, can arise during foetal development. This grant will provide much needed research into the molecular mechanisms of how cardiac neural crest cells are involved in heart development, and will discover new genetic pathways that may be causative of congenital heart defects.

Click on this link to discover more about the project!

<https://x.com/SophieWiszniak/status/1718804925961187445?s=09>



Inaugural ANZSCDB WA Meeting Connects Researchers and Sets Vision for Collaboration

The WA branch of the Australia and New Zealand Society for Cell and Developmental Biology (ANZSCDB) successfully hosted its first-ever state meeting at the Harry Perkins Institute on October 18th, 2023. The program attracted researchers from diverse backgrounds and expertise across WA, including renowned keynote speakers Professor Justine Mintern from the University of Melbourne and Professor Robert Parton from the University of Queensland.

Professor Alexandra Filipovska, who organized the meeting, delivered a welcoming address and established a clear vision for a more connected and collaborative WA branch. Presentations covered a wide range of topics, encompassing immunity and vaccinology, microscopy and mitochondrial biology, cancer, precision medicine, and CRISPR tools for rare disease biology.

The WA branch is committed to hosting at least one meeting each year and aims to foster a thriving community of researchers, fostering valuable connections, and driving collaborative initiatives within the state.

News from New Zealand

Genetics Otago is a headline University of Otago Research Centre, which supports > 400 researchers across Otago to bring visibility to their research, learn new skills and interact with other researchers to progress their projects (and NZ state representative Associate Professor Louise Bicknell is Co-Director). A major way we do this is through our Technology Hubs, and a new Hub this year, led by Dr Megan Leask, a newly returning Lecturer in the Department of Physiology, is a Zebrafish Hub – to support all things zebrafish. We held our first meeting in September, joined by Auckland University researcher Associate Professor Chris Hall. Megan's plans are for this to be a national Hub to support all zebrafish-related researchers, and we can see significant potential to link these plans to ANZSCDB.

In November, successful Marsden grants were announced – these are prestigious grants for blue skies research, covering all domains of research in Aotearoa New Zealand. There are two categories: fast-start grants provide funding for early career researchers, whereas the standard grants are for established researchers. Successful recipients with projects of interest to ANZSCDB are:

Fast-start:

- Dr Dafni Anastasiadi (Plant & Food Research) - Sex and the epigenome: how does reproductive mode influence transgenerational epigenomic inheritance?
- Dr Amy Yewdall (University of Canterbury) - Coming together for better or worse? How biomolecular interactions impact the self-assembly and properties of nucleoli-like condensates
- Dr Teodora Georgescu (University of Otago) - Prolactin-mediated suppression of fever during pregnancy

Standard:

- Dr Jonathan Austin (University of Auckland) - Tracing the drains: Uncovering a new origin for lymphatic vessels.
- Associate Professor Debbie Young (University of Auckland) - Harnessing disease-specific signals to restrict the targeting of gene therapy to vulnerable cells in the brain
- Dr Jules Devaux (University of Auckland) - Powering flying athletes, paradoxes of bumblebee flight muscles
- Professor Ros Kemp (University of Otago) - Tumor-derived WNT signalling reprograms T cell phenotype and function
- Associate Professor Louise Bicknell (University of Otago) - ORC3: A novel disease gene with a moonlighting role in brain development
- Professor Rebeca Campbell (University of Otago) - GnRH neurons: Beyond fertility
- Professor Greg Anderson (University of Otago) - A neuronal circuit for stress-induced infertility
- Dr Tirta Susilo (Victoria University of Wellington) - Sensory hypothesis of developmental prosopagnosia.

New Zealand also offers government funding for research programmes that are commercially focused. These are especially difficult for biology researchers, who often need to retrain their minds to think about more profit, less knowledge! Successful Endeavour programmes that might be of interest are:

- Professor John Reynolds (University of Otago) - A window into the brain: smart wearable technologies to target neurological disorders (\$10.2 million)
- Professor Peter Dearden (University of Otago) - Whatu raranga o ngā koiora – weaving cultural authority into gene-drives targeting wasps (\$9.9 million).
- Dr Jane Symonds (The Cawthron Institute) - Fast-tracking Finfish Climate Change Adaptation (\$11 million)

ANZSCDB NSW Meeting Report

After 2019, ANZSCDB NSW committee held the in-person NSW conference for the first time since COVID-19 at Charles Perkins Centre. It was a wonderful day of science with over 100 delegates attending the conference. It was great to hear and learn from the keynote speakers: David Komander, Anai Gonzalez-Cordero, Kelly Smith and Peter Gunning. We thank our platinum and major sponsors for their generous support and presence at this year's conference. More pictures and updates about the conference were posted on ANZSCDB social media. Congratulations to the prize winners of best oral and poster presentations. Best oral prize winner- Harry Cutler. Best poster prize winner- Lucien Lambret.

We congratulate the best image prize winner, Osvaldo Contreras and runner up image prize winner, Neftali Florez Rodriguez. The conference concluded with social hour for networking. We thank the ANZSCDB NSW 2023 meeting organising committee- Alexis Diaz Vegas, Peter Su, Belinda Yau, Stewart Masson, Julie Thoms, Marcus Heisler, Osvaldo Contreras for a great conference.



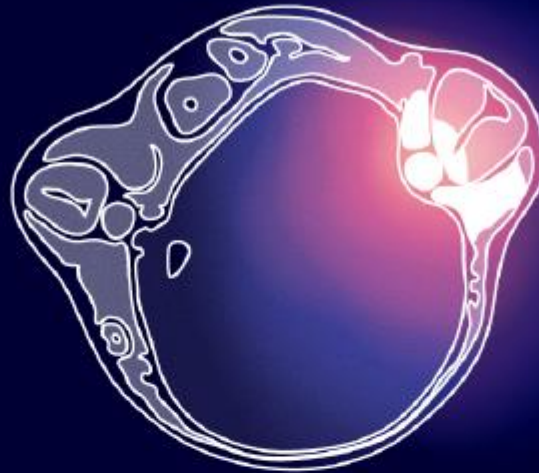
Upcoming events

16–19 Sept 2024 | Freiburg, Germany



Self-Organization in Biology

Freiburg Spemann-Mangold Centennial Symposium



Conference Website
and Registration:
<https://t1p.de/rkaif>

Symposium Organizers

Eddy De Robertis Los Angeles
Wolfgang Driever Freiburg
Roberto Mayor London

Speakers

Makoto Asashima Tokyo
Detlev Arendt Heidelberg
Marianne Bronner Pasadena
Danelle Devenport Princeton
Denis Duboule Geneva
Brigitte Galliot Geneva
Kat Hadjantonakis New York
Richard Harland Berkeley
Thomas Holstein Heidelberg

Dagmar Iber Basel
Ray Keller Charlottesville
Alfonso Martinez Arias Barcelona
Kate McDole Cambridge, UK
Anming Meng Beijing
Mary Mullins Philadelphia
Christof Niehrs Mainz
Angela Nieto Alicante
Christiane Nüsslein-Volhard Tübingen
Stefano Picolo Padova
Siegfried Roth Cologne
Alejandro Sanchez Alvarado Kansas City
Alexander Schier Basel
Amy E. Shyer New York
Lila Solnica-Krezel St. Louis
Claudio Stern London
Ben Steventon Cambridge, UK

Yi-Hsien Su Taipei
Hiroyuki Takeda Tokyo
Patrick Tam Sydney
Ulrich Technau Vienna
Naoto Ueno Okazaki
John Wallingford Austin
Val Wilson Edinburgh
Jennifer Zallen New York
Magdalena Zernicka-Goetz Pasadena & Cambridge, UK

Local Organizing Committee

Sebastian Arnold Freiburg
Martin Blum Hohenheim
Anne Classen Freiburg
Peter Walentek Freiburg

This conference is co-organized by
**Elsevier and the International Society
of Developmental Biology.**



This conference is supported by:



universität freiburg





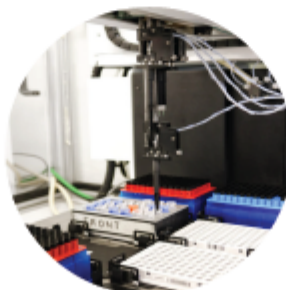
Australian
BioResources

ABR Services

- *Agistment of GM mouse lines*
- *Import & Export – Domestic / International*
- *Rederivation*
- *Cryopreservation*
- *MEGA (CRISPR/Cas9 – genome editing)*
- *Surgically modified models*
- *Online colony details provided via Stuart Web*

Garvan Molecular Genetics

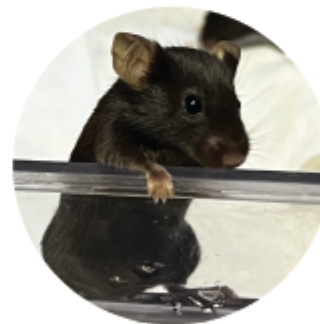
- *Mouse Genotyping*
- *Copy number analysis*
- *SNP analysis*
- *Mouse health screening*
- *DNA & RNA extraction*
- *Cell line identification*
- *Mycoplasma testing*



ABR Contact

- ☎ *02 92958565*
- ✉ *orders@abr.org.au*
- 📍 *PO Box 322, Moss Vale NSW 2577*
- 🌐 *www.abr.org.au*

Become a member and save 15%
Commit to a minimum level of usage for a 1-2-year period.



Garvan Contact

- ✉ *Please send all questions including requests for quotations to gmg@garvan.org.au*
- 🌐 *You can find our pricing here: <https://www.garvan.org.au/research/capabilities/molecular-genetics/shop>*



Super-resolution imaging across scales



ZEISS Lattice SIM 3

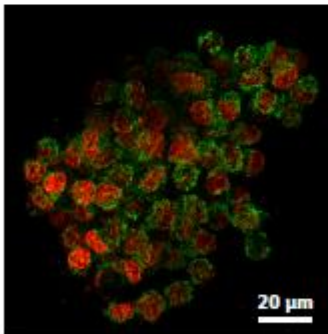
Your fast optical sectioning solution for studying developing organisms and tissue microstructures

ZEISS Lattice SIM 5

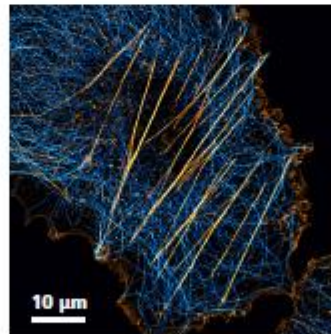
Your live imaging system for uniform super-resolution in all spatial dimensions

ZEISS Elyra 7 with Lattice SIM

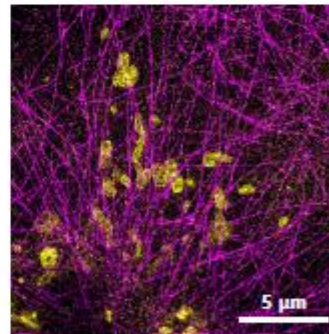
Your complete super-resolution system with unprecedented resolution down to molecular details



Spheroid stained for mitochondria (MitoTracker Green) and nuclei (NucRed Live 647)



Cos-7 cells stained for microtubules (anti-tubulin Alexa Fluor 488, cyan) and actin (Phalloidin Alexa Fluor 568, orange)



Dual-color 2D STORM of Cos-7 cells stained for microtubules (anti-tubulin-Alexa Fluor 647, magenta) and mitochondria (anti-TOMM20-CF568, yellow)

ZEISS Lattice SIM Family

Full Access to Super-Resolution Imaging for all Research Areas

zeiss.com/lattice-sim



Seeing beyond

FIVE COMPELLING REASONS TO USE LIVECYTE:



1. Nothing like it

<https://bit.ly/BoyswmE5>

A huge array of analysis possibilities allow you to ask questions that no other system can answer - Dr Mat Hardman, University of Hull

2. Disrupts common theory

LiveCyte was used to disprove a long held theory about how stable nevus melanocytes switch to cancerous melanoma cells - Dr Robert Judson-Torres, Huntsman Institute

3. Expect the unexpected

LiveCyte has led to observations of unexpected cell behaviour when quantifying live-cell drug resistance - Dr Kurt Anderson and Dr Alix Le Marois, The Francis Crick Institute

4. See change as it happens

De-risks cell transplantation therapy, increasing likelihood of success - Perry Cross Spinal Research Foundation

5. Simplifying not simpler

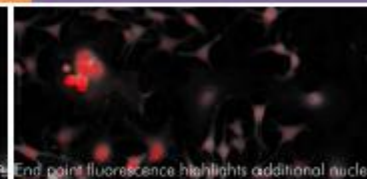
LiveCyte removes barriers to entry for junior students - Greg Perry, St George's University of London

Cell Growth & Proliferation

Cell Motility & Migration

Cell Cycle & Lineage

Fluorescence Expression



Uncover strange behaviours. See more at vimeo.com/Phasefocus

NEW LiveCyte T-Cell killing assay quantifies effector-target cell interactions at the single cell level

- ✓ Generate multiple outputs with one experiment
- ✓ Ptychography technology removes the need for expensive lasers reducing running costs unlike other systems

- ✓ Leverage powerful tracking algorithms to explore population heterogeneity and track single cell lineage
- ✓ High-contrast label-free imaging, correlative fluorescence and auto image analysis from standard 96-well plate assays



Register your interest for a demo today!



ATA Scientific Pty Ltd | enquiries@atascientific.com.au | www.atascientific.com.au | +61 2 9541 3500

Neurite outgrowth analysis using Livecyte: A high content, label-free platform

Jess Rickman, Martin Humphry, Life Science Applications, Phasefocus Ltd, Sheffield, UK.

1. Introduction

Neuronal cells are renowned for their extreme sensitivity and in vitro handling difficulty. As such, care and consideration must be given to the processing of these cells, particularly when imaging, due to their high susceptibility to the adverse effects of fluorescence microscopy. Fluorescent labelling can lead to phototoxicity, causing reduced viability and perturbing cellular behaviour, disrupting overall neuronal physiology. This can significantly impact the drug discovery pipeline, resulting in reduced physiological relevance in the results of in vitro drug screening.

To protect neuronal cells from these fluorescence-associated responses it is desirable to use a label free imaging modality, especially when performing timelapse imaging. Phasefocus' Livecyte uses ptychography, a form of completely non-invasive Quantitative Phase Imaging (QPI), to generate high-contrast, fluorescent-like timelapse videos of cells. These high contrast images can be input into Livecyte's Cell Analysis Toolbox™ (CAT) software suite to produce a vast array of single cell metrics and network quantification, such as network length and branching levels. This study illustrates the differences in neuronal outgrowth and branching between SH-SY5Y cells differentiated with varying doses of Brain Derived Neurotrophic Factor (BDNF) and shows the effects of a laminin coating upon outgrowth levels. Because Livecyte can identify and segment single cells, a vast array of single cell data on cell growth, proliferation, motility, and morphology can also be obtained automatically. This can help account for disparities in neuronal cell seeding density which can skew differentiation and network formation. Combined with its 7 channels of fluorescence, this make Livecyte a powerful and versatile tool to add to your research facility.

2. The problem: Phototoxicity

The sensitivity of neuronal cells, particularly primary neuronal cells lead to a high potential for the process of fluorescent imaging to alter a cell's viability and innate behaviour, leading to misleading results in vitro. This is even more pronounced in timelapse imaging, where phototoxicity can accumulate over long periods of time.

As such, the most non-invasive techniques are favourable, with label-free imaging being the optimal choice. Livecyte uses the label-free modality of ptychography; a form of QPI. QPI enables robust single cell segmentation and automated phenotypic profiling at a population and single cell level. QPI also parallels dry cell mass which directly relates to the cellular biomatter within cells minus the water.

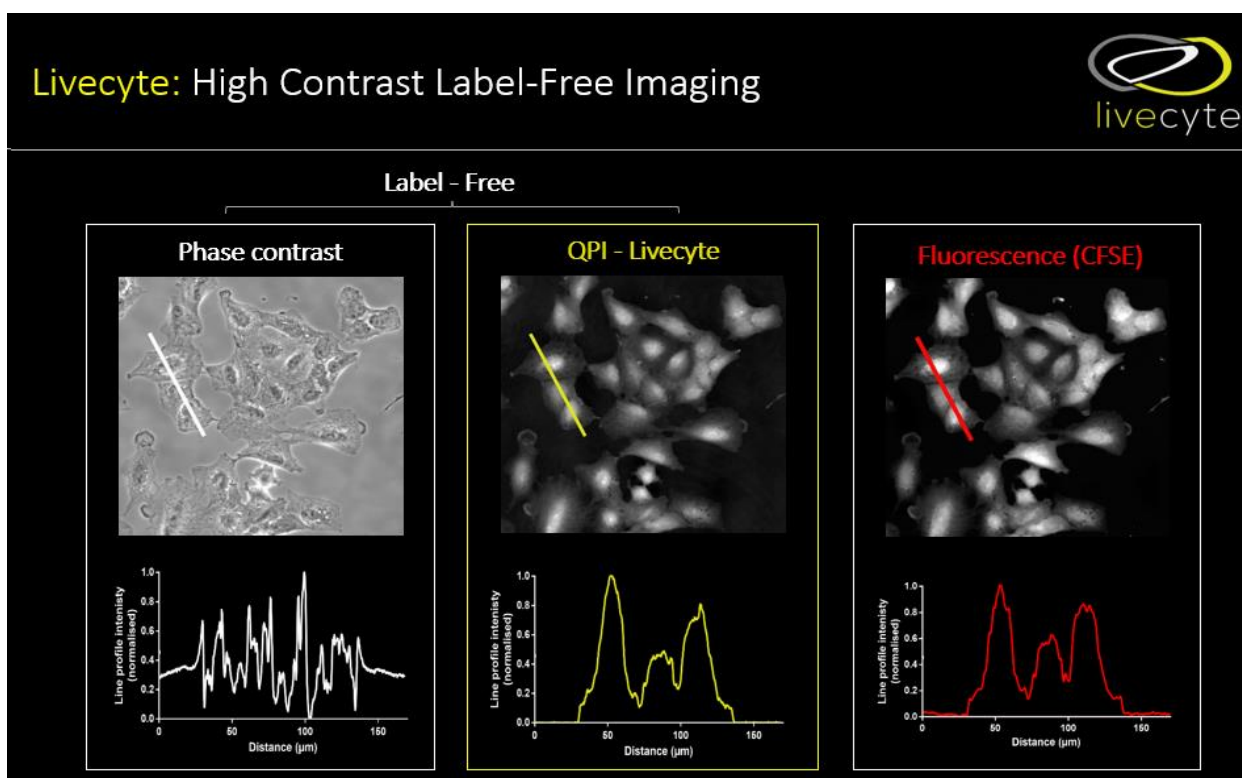


Figure 1: Quantitative phase imaging (QPI – centre panel) uses the small thickness variations of cells to generate images that have far superior contrast to traditional phase contrast techniques. Images appear similar to those labelled with a fluorescent dye (right hand panel).

3. Livecyte label-free analysis of neurite outgrowth

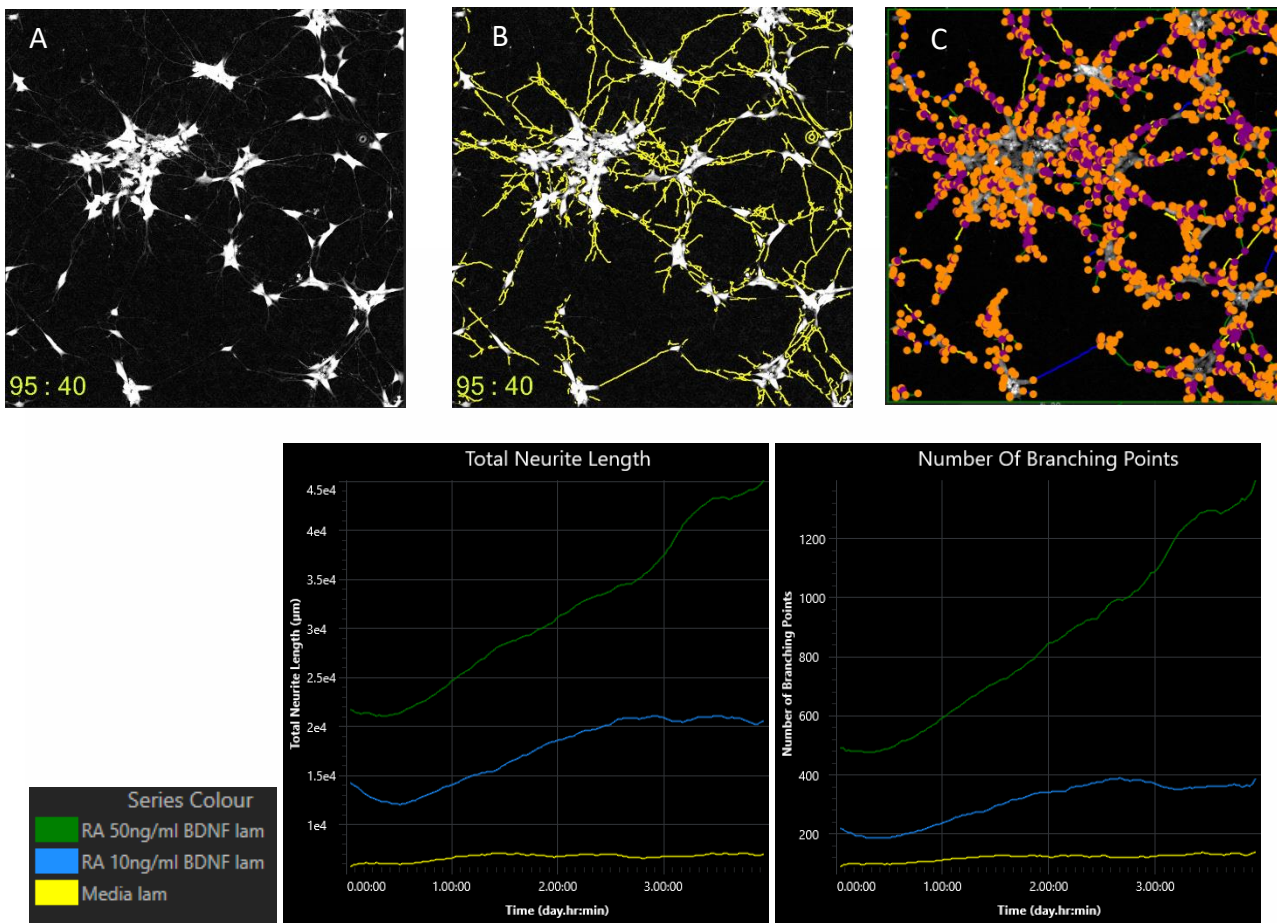
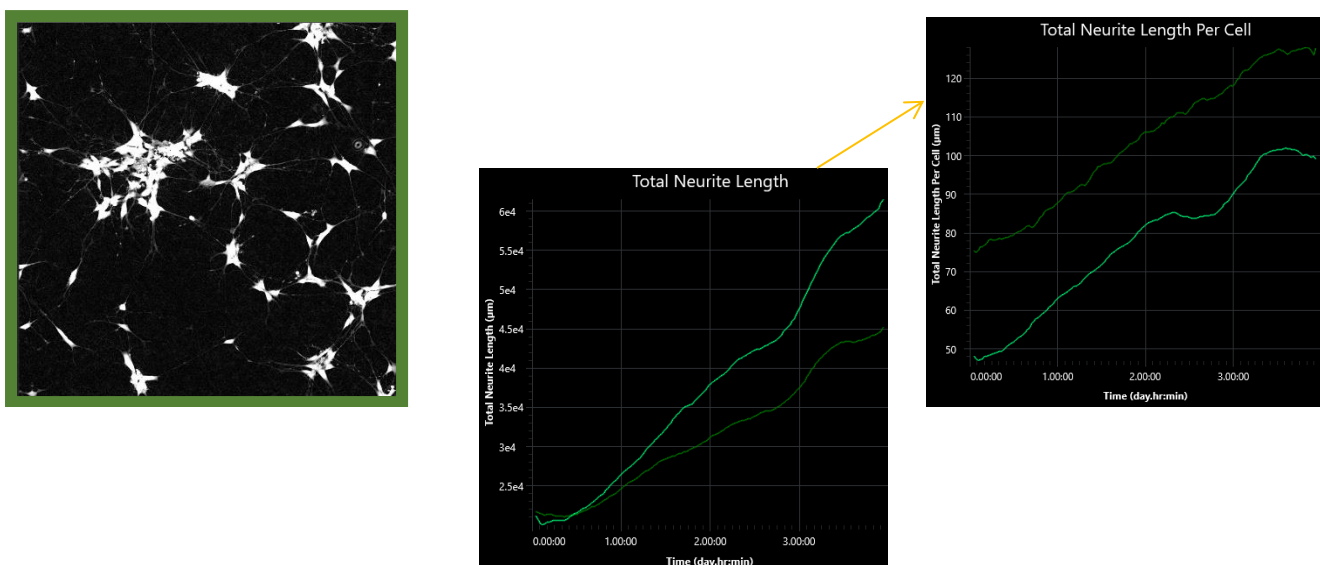


Figure 2: A) QPI image, B) skeletonised to indicate network length, and C) with nodes to indicate branching. Here Livecyte was used to quantify the total network length and the total number of branching points. SH-SH5Y cells were incubated for 4 days with 10µM All trans Retinoic acid (RA), and then dosed with RA and BDNF at 10ng/ml and 50ng/ml for a further 4 days whilst imaging using Livecyte. Cells with the highest dose of outgrowth stimulating BDNF showed higher network length, and branches compared to the lower dose and the undosed controls.

4. Account for disparities in seeding densities

Livecyte can identify and segment each individual cell, allowing for neurite length and number to be normalised to overall cell count. This means that any differences in seeding density can be accounted for, vital for getting reproducible results.



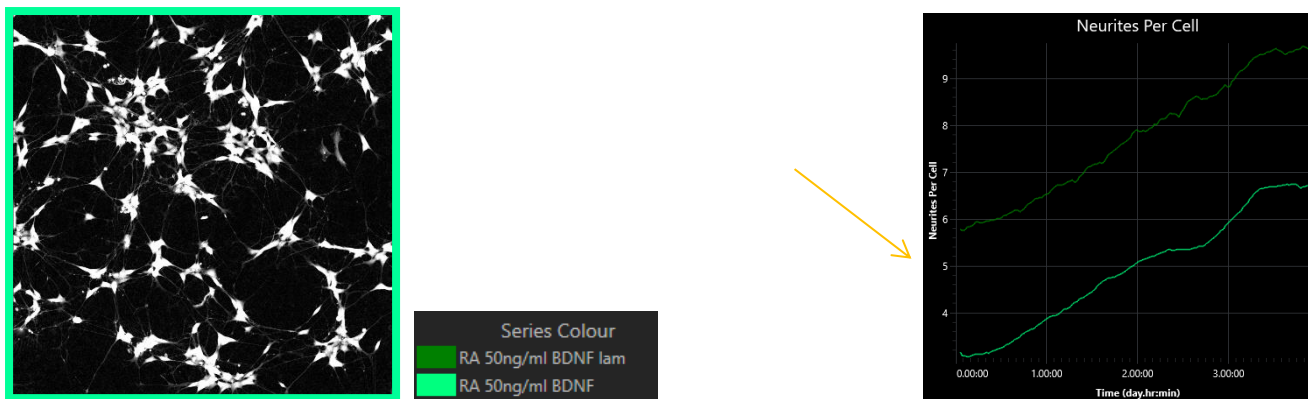
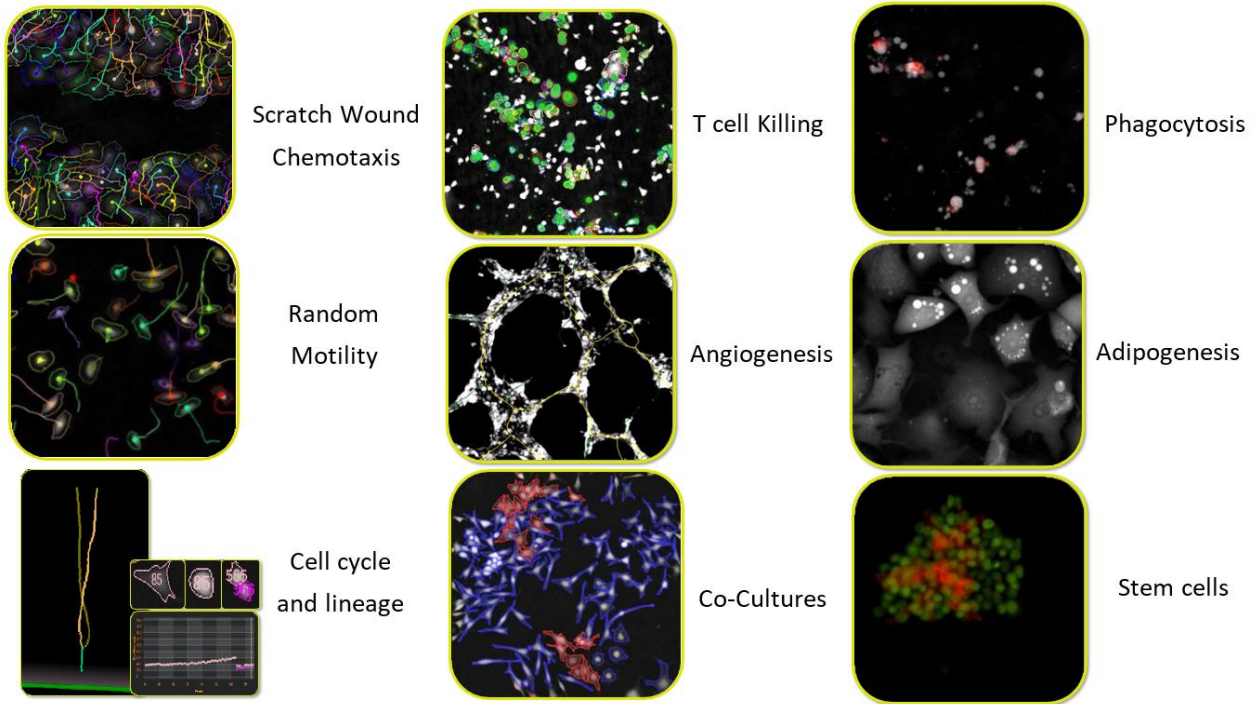


Figure 3. QPI images on the left exhibit neurite outgrowth of differentiated SH-SY5Y cells after 4 days grown on laminin (top) and glass (bottom). Laminin is known to stimulate higher levels of neurite outgrowth than glass, however this is masked in the total neurite length due to the differences in cell count. When the total number of cells is accounted for, the laminin coating does indeed lead to a higher number and length of neurites.

5. In depth data exploration. And so much more...



Figure 4. Livecyte Analyse software's Neuronal cell analysis dashboard. Here you can easily review and interact with your data, and view other metrics such as Motility, morphology, proliferation, and growth, which are collected automatically for every assay. In addition to the neuronal analysis, Livecyte also has the ability to perform a wide array of different applications, such as:



6. Summary & Conclusion

The combination of QPI and powerful software functionality found with Livecyte gives researchers the ability to image and easily analyse sensitive neuronal cells label free, reducing the risks of physiological perturbation of cells associated with fluorescence imaging. As well as neurite outgrowth quantification, Livecyte can help users dive into the intricate details of their experiments and investigate cellular morphology, motility, growth, and proliferation, and account for uneven cell seeding, all in one assay!

Livecyte has a wide range of applications allowing for many experimental hypotheses to be tested, and the high content analysis platform will allow you to collect population-based data, or to dive down deeper into your results to gather information at the single cell scale. This, combined with the ability to use low intensity LED fluorescence to gather additional information, results in an incredibly versatile system which can fit into an extremely broad range of research work-flows.

Livecyte is helping to find a cure for paralysis



The Perry Cross Spinal Research Foundation together with the Spinal Injury Project team recently celebrated their new Phasefocus Livecyte microscope at the Griffith Institute for Drug Discovery. The Livecyte system represents a significant advancement in

capability and is set to revolutionise the Spinal Injury Project undertaken by the Clem Jones Centre for Neurobiology and Stem Cell Research at Griffith University. It will enable the research team to perform critical cell analysis and screening procedures, a crucial step toward the cell transplantation and rehabilitation human clinical trials commencing shortly. The clinical trial aims to test cell transplantation therapy to repair spinal cord injury, ultimately leading to the restoration of function. Professor James St John said the advanced microscope is new to the market and offers the capability to track the fate of each cell through high-resolution live cell imaging.

“Liveocyte allows for the identification of any cells exhibiting abnormalities or likely to cause complications such as tumour formation. By screening the cells that are prepared for the patient, and ensuring the cells are healthy, we can decrease the risk of adverse events for the patients. The Liveocyte microscope will play a pivotal role in ensuring the safety of the cells used in the transplantation process.” (<https://www.pcsrf.org.au/cutting-edge-microscope-to-help-find-a-cure-for-paralysis/>)

Contact us to learn more about the Liveocyte’s capabilities or to request a guided demo.

VISIT US DURING LMA 2024 - REGISTER FOR OUR WORKSHOP – 5 March 2024 (<https://lma2024.org/>)

ATA Scientific Pty Ltd | Ph: +61 2 9541 3500 | enquiries@atascientific.com.au | www.atascientific.com.au

Reference

This poster was presented during Neuroscience 2023 (11-15 November 2023) in Washington DC

See press release, <https://www.phasefocus.com/about/news-events/news/new-neurite-outgrowth-assay-liveocyte>