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FIRST PERSON

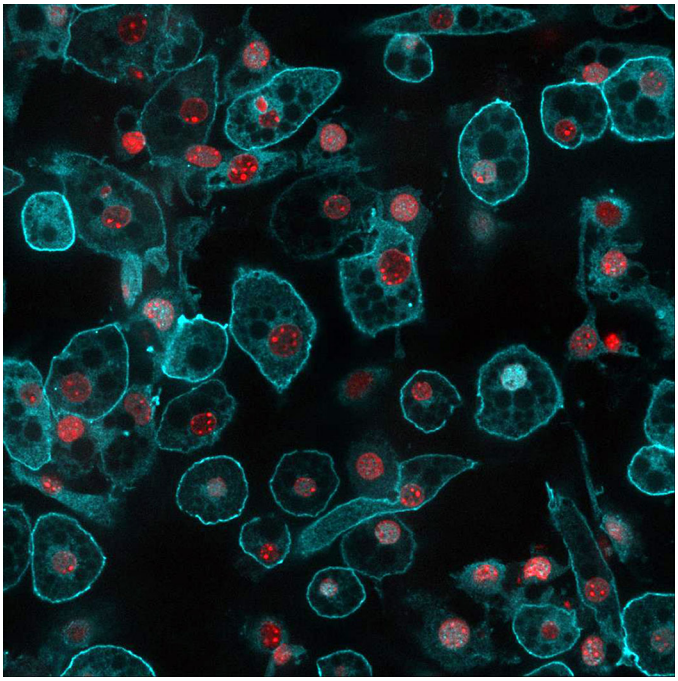
First person – Dougall Norris

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Dougall Norris is co-first author on 'An improved Akt reporter reveals intra- and intercellular heterogeneity and oscillations in signal transduction', published in Journal of Cell Science. Dougall is a PhD student in the Metabolic Systems Biology Group at The University of Sydney Charles Perkins Centre in Australia, where his project focuses on live-cell imaging, multiplexing fluorescent constructs and imaging modalities, coupled with powerful computational analysis.

Dougall Norris

How would you explain the main findings of your paper to non-scientific family and friends?

I use an analogy where proteins in a cell are represented by people in a dark room, and understanding their movement and communication in the room teaches us about important cellular processes. In order to follow the movements of a set of these people (representing signalling protein Akt), we put bright lights on their heads. Whilst we were not expecting the colour of the lights to affect people's behaviour, we found that when they wore a green light (eGFP) on their head, they acted differently to how they would normally and did not move around much or talk to other people in the room. In contrast, when we put red lights (TagRFP-T) on their heads, they moved around the room and spoke to others as they normally would. This means that, in future, we must be careful when choosing lights, to ensure that they don't affect how people act. As the people with red lights on their heads acted normally, we were able to use them to find out more about the movement and interactions of the people in the room. We found that they ran to the walls in order to hear a message (insulin) that came from outside the room. It appeared that the people approached some parts of the wall more than others, and they moved along the walls in groups that would continue to join hands and disband as they moved.



Akt (cyan) in adipocytes after stimulation with insulin. The nuclei of the cells (red) are labelled with DAPI.

Were there any specific challenges associated with this project? If so, how did you overcome them?

The biggest challenge of this project was realising that the dynamics of the eGFP–Akt construct were altered by the addition of the eGFP tag. Having observed some recruitment of the construct to the plasma membrane, we assumed that Akt was signalling correctly. Once we saw the improvement with a different tag, TagRFP-T, we realised something was awry with the eGFP construct.

When doing the research, did you have a particular result or 'eureka' moment that has stuck with you?

When we were assessing movies of recruitment and I started moving a small region of interest around the cell and seeing different

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intracellular membrane responses, that was a great moment. We thought, wow, it isn't simply blanket recruitment to the membrane.

Have you had any significant mentors, and how have they helped you?

Yes, James Burchfield is the imaging master in our lab. He has taught me a lot, particularly the power of, and how to acquire, robust live-cell microscopy data.

"[…] ask yourself: what am I investigating that is novel, why is it necessary and am I confident I can't learn more from the literature first?"

What's the most important piece of advice you would give first-year PhD students?

For any experiment, ask yourself: what am I investigating that is novel, why is it necessary and am I confident I can't learn more from the literature first? Late realisations, after the work is done, are shattering.

What changes do you think could improve the professional lives of early-career scientists?

Job certainty. It's really disheartening when you enjoy your job, give it more time than you probably should, further scientific and technological discovery, and yet it's a constant fight to justify your role and keep your job.

What's next for you?

I would like to post-doc overseas and continue to do awesome live-cell imaging.

Tell us something interesting about yourself that wouldn't be on your CV

Whilst they have left me battered and bruised, I love snowboarding and skateboarding.

Reference

Norris, D. M., Yang, P., Krycer, J. R., Fazakerley, D. J., James, D. E. and Burchfield, J. G. (2017). Improved Akt reporter reveals intra- and intercellular heterogeneity and oscillations in signal transduction. *J. Cell Sci.* **130**, 2757-2766.