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FIRST PERSON

First person – Rachel Caines

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. Rachel Caines is first author on 'The RNA-binding protein QKI controls alternative splicing in vascular cells, producing an effective model for therapy', published in JCS. Rachel is a PhD student in the lab of Dr Andriana Margariti at the Wellcome-Wolfson Institute for Experimental Medicine, Belfast where she is specifically interested in the repair and regeneration of the cardiovascular system through the application of induced pluripotent stem cells (iPSCs).

Rachel Caines

How would you explain the main findings of your paper in lay terms?

Stem cells are capable of becoming any cell type in the body and current technology has allowed us to derive stem cells from adults instead of embryos. Therefore, if your blood vessels become diseased, you can create new vessels from your own stem cells to regenerate the vasculature. Our study has discovered a novel mechanism for the production of a critical component of the blood vessel (vascular smooth muscle cells; VSMCs), regulated by the RNA-binding protein Quaking, which allows us to produce VSMCs from stem cells with greater efficiency and functionality than was shown previously. By manipulating the different forms of the Quaking gene, we can create enhanced cells with which to regenerate the vascular system and restore blood flow with potential application in diseases such as heart attack and stroke.

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

Stem cells are not the easiest cells to look after, particularly not iPSCs. A lot of time and energy is spent maintaining the stem cell state and weeks of work can be lost if the cells decide not to differentiate properly for no obvious reason. To overcome this, I had lots of alarms, timers and reminders set to try and keep everything as regulated as possible!

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

While a rather simple experiment, treating the Quaking-derived VSMCs with potassium chloride to stimulate their contraction particularly sticks in my mind. Seeing the cells respond in a physiological way and to a visibly greater extent than control cells was great to see. I was also amazed to see the cells incorporating into the vasculature in our *in vivo* models. Often, these cells only function via paracrine mechanisms, whereas our cells had directly formed new vasculature.

Why did you choose Journal of Cell Science for your paper?

The initial work on this mechanism of VSMC differentiation from embryonic stem cells was published in JCS by my supervisor, Dr Andriana Margariti, in 2009. It was a nice opportunity for us to complete the story in a more up to date and translatable model of iPSC differentiation and publish our findings alongside each other in JCS. The wide audience of JCS was also a factor which attracted us as well as their support in promoting the work of early-career researchers.

Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

My supervisors and the previous PhD students of the laboratory have been my greatest mentors. Dr Margariti is always capable of making you excited about your data while encouraging laboratory independence and letting me guide my project as I became more experienced in the lab. As for the PhD students who came before me, they had done it all before and could be relied on for answering my hundreds of questions in the early years as well as providing support over a much needed cup of coffee in the frustrating moments of the later years.

What motivated you to pursue a career in science, and what have been the most interesting moments on the path that led you to where you are now?

I remember becoming instantly fascinated by science, particularly biology, during my years at school and pursued biology, chemistry and physics. I undertook a bioengineering research placement at the

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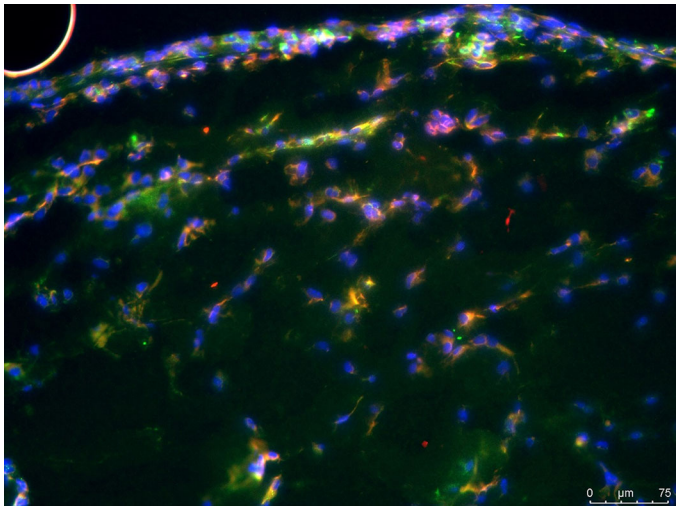

Quaking-derived vascular cells can create new vessels *in vivo*.

age of 17 and loved spending time in the lab and instantly felt at home there. A degree in human biology allowed me to study all aspects of anatomy and physiology, tailoring my course to my personal preferences. Two further summer placements in the lab, one with my current PhD supervisor, confirmed that vascular biology and regenerative medicine was where I wanted to be. By chance, my supervisor was applying for a PhD studentship from the British Heart Foundation and added me as the named student. I feel incredibly lucky to be in the position I am and have had a great 4 years working with the support of the British Heart Foundation and Queen's University Belfast.

Who are your role models in science? Why?

I would find it hard to name one, but every woman in science that has worked hard to follow passion while being able to maintain a family life are my role models.

What's next for you?

Right now, I'm in the last stretch of writing my thesis and my viva is on the horizon. Ultimately I would like to move into a more translational medicine-based position, on the interface of new scientific research and the patients involved. I have also had some great teachers over the years and have gained some small-group teaching experience as well as supervising students in the lab, which I have greatly enjoyed, so I would like to incorporate some sort of teaching into my career as well.

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

I've been quite the dancer over the years covering Latin American, ballroom, tap, and more recently, swing!

Reference

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