

## FIRST PERSON

# First person – Gillian Johnson

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. Gillian Johnson is the first author on 'Mesenchymal stem cell mechanotransduction is cAMP dependent and regulated by adenylyl cyclase 6 and the primary cilium', published in Journal of Cell Science. Gillian is a PhD student in the lab of David Hoey at Trinity College Dublin, Ireland, and works on deciphering the molecular mechanism of cilia-mediated stem cell mechanotransduction both *in vitro* and *in vivo*.

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

Osteoporosis is a disease state characterised by weak, brittle bone that is prone to fracture. Osteoporosis occurs when there is a decoupling of bone formation and resorption. Our lab is looking at bone formation as a novel method to treat osteoporosis; however, how the cells in bone regulate this formation following mechanical loading is unknown. The primary cilium is an antenna-like structure that protrudes from the cell and can sense its mechanical environment. In this study, we identify an enzyme that colocalizes to the primary cilium and is required for fluid-flow-induced increases in osteogenic gene expression and cAMP signalling. This enzyme, adenylyl cyclase 6 (AC6), can be activated biochemically with a drug called forskolin to mimic the effects seen following fluid flow, therefore identifying it as a potential therapeutic target for osteoporosis.

**“I’ve learned how to ask the right questions, design the proper experiments and interpret the results within that precise context.”**

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

We chose Journal of Cell Science because it has a strong reputation in the field of cell biology and we wanted this publication in a journal that has a good reputation in the scientific community. Our work is looking at the molecular mechanisms employed in primary cilia-dependent stem cell mechanotransduction; therefore, we believed that it fitted well into the scope of Journal of Cell Science. Throughout my PhD, I have been exposed to the high-quality work published in Journal of Cell Science, and I am delighted that our work passed the rigorous review process and was found to be suitable for the journal.

### Have you had any significant mentors who have helped you beyond supervision in the lab?

I have been very lucky that all my mentors have been special and so encouraging. In particular, the guidance offered by my PhD supervisor, Dr David Hoey, has been distinctive in the sense that he



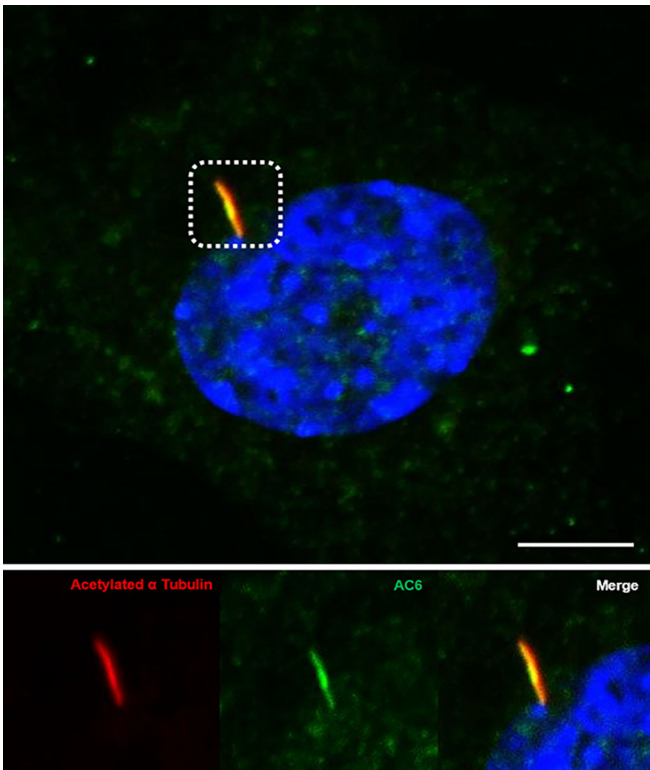
Gillian Johnson

makes science seem very easy. Under his supervision I’ve learned how to ask the right questions, design the proper experiments and interpret the results within that precise context. I’m also so grateful that I get to work so closely with the postdoctoral researcher Dr Mathieu Riffault. Despite not being my PhD mentor, Dr Riffault always makes time to discuss any ongoing or future experiments. We work together on multiple projects and, when faced with a problem, he encourages me to think independently about alternative experimental approaches, while at the same time we manage to keep in a constant state of laughter. I can approach Dr Riffault and seek advice on any issue, and he is a mentor that has become a close friend.

### 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?

The point at which I knew I wanted to pursue a career in science is when I got the opportunity to perform research during the summer of my second undergraduate year. I returned to the lab for all the remaining summers of my undergraduate degree. Having won multiple scholarships and awards for my undergraduate research, I decide to pursue a PhD in stem cell mechanobiology, a change from anything I had ever done, but a challenge I was excited to tackle.

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**AC6 co-localization to the primary cilia.** Immunostaining was undertaken for primary cilia, seen as linear structures enriched in acetylated  $\alpha$ -tubulin (red) and AC6 (green). Nuclei are counterstained with DAPI (blue).

### What's next for you?

I'm finishing up my PhD and will undertake a postdoctoral position looking at follicle-stimulating hormone receptor and ovarian ageing in the new year. I'm excited for this change of path that will allow me to translate the technical skills I've gained over the last 4 years, while expanding my knowledge in the areas of reproductive and endocrine physiology.

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

When I'm not in the lab I love being outdoors. I love spending time with my dogs, horses and playing tag rugby.

### Reference

Johnson, G. P., Stavenschi, E., Eichholz, K. F., Corrigan, M. A., Fair, S. and Hoey, D. A. (2018). Mesenchymal stem cell mechanotransduction is cAMP dependent and regulated by adenylyl cyclase 6 and the primary cilium. *J. Cell Sci.* 131, jcs222737.