

FIRST PERSON

First person – Tyler Picariello

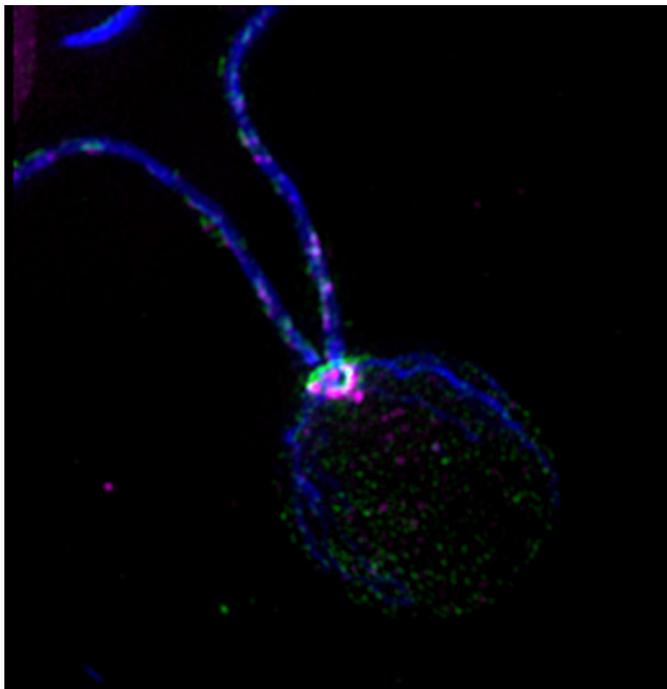
First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Tyler Picariello is first author on 'A global analysis of IFT-A function reveals specialization for transport of membrane-associated proteins into cilia', published in JCS. Tyler is a postdoc in the lab of George B. Witman at the University of Massachusetts Medical School in Worcester, MA, currently working on cilia and the intraflagellar transport system.

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

Every cell has a cilium at some point in its lifetime. Two main types of cilium exist: primary cilia, which function as signaling centers; and motile cilia, which beat to facilitate movement (e.g. movement of cerebrospinal fluid in the brain). Cilia are established and maintained by an internal transport system called intraflagellar transport (IFT). This system transports proteins into and out of the cilium, and it is divided into two main components: IFT complex A and IFT complex B that act together in the cilium. Defects in the IFT system cause a variety of human disorders. Our work focuses on a component of



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A structured illumination super-resolution fluorescence microscopy image of our model organism *Chlamydomonas reinhardtii* expressing a GFP-tagged version of the intraflagellar transport protein IFT140. IFT140-GFP, green; IFT172, magenta; acetylated α -tubulin, blue.

IFT-A known as IFT140. IFT-A was initially thought to function mostly in the removal of proteins from the cilium; however, more recent work has shown that IFT-A is involved in carrying individual proteins into the cilium as well. Our work advanced this idea by demonstrating that IFT-A plays a role in the import of entire groups of proteins into cilia and these protein groups are believed to be particularly important for proper ciliary signaling. Additionally, our work suggests a previously uncharacterized role for IFT-A in the initial entry of IFT-A and IFT-B into the cilium. Our work provides (1) a catalogue of proteins whose levels in cilia are dependent on IFT-A and (2) a more comprehensive list of proteins that may be involved in the development of diseases associated with IFT-A dysfunction.

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

Identification of protein groups whose ciliary levels decreased as a result of IFT140 mutation was a particularly interesting one. It provided a much more global and comprehensive view of proteins that are dependent on IFT-A for entry into cilia. It demonstrates that IFT-A plays a much larger role in the import of ciliary proteins than had previously been thought, and it provides a solid foundation to begin investigating which of these ciliary proteins are critical for the development of disease symptoms associated with mutation or dysfunction of IFT140 and IFT-A.

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

Journal of Cell Science covers a large range of topics in cell and molecular biology. Since our work utilized a wide range of techniques, from basic cell biology to cutting-edge super-resolution

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fluorescence microscopy, we felt Journal of Cell Science was the best fit for our manuscript.

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?

My father taught biology for 30 years. He taught me to question things before accepting them and to avoid conclusions, if possible, in the absence of data. Without that influence I do not believe I would work in science.

Who are your role models in science? Why?

Carl Sagan. In my opinion, his ability to communicate scientific ideas to those not trained in science was amazing. Most scientists are excited and engaged when they discuss new discoveries or ideas with their colleagues, but it seems much more difficult to get the public excited about

scientific discoveries. I think that more open communication between scientists and the public is a critical first step in this process.

What's next for you?

I still have several promising projects in lab, so it's more experiments for me!

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

When I'm not in the lab, you'll find me in the mountains, hiking, biking or skiing.

Reference

Picariello, T., Brown, J. M., Hou, Y., Swank, G., Cochran, D. A., King, O. D., Lechtreck, K., Pazour, G. J. and Witman, G. B. (2018). A global analysis of IFT-A function reveals specialization for transport of membrane-associated proteins into cilia. *J. Cell Sci.* **132**, jcs220749.