

FIRST PERSON

First person – Debatrayee Sinha

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. Debatrayee Sinha is first author on 'Fission yeast polycystin Pkd2p promotes cell size expansion and antagonizes the Hippo-related SIN pathway', published in JCS. Debatrayee is a PhD student in the lab of Qian Chen at The University of Toledo, OH, USA, where she is integrating genetics and microscopy to explore the mechanisms by which the Pkd2 channel mediates its function.

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

Autosomal dominant polycystic kidney disease (ADPKD) is a genetic disorder that affects one in 1000 individuals. Patients develop numerous kidney cysts leading to renal failure. ADPKD is the result of loss-of-function mutations in human polycystins. Although the ion channel function of polycystins has been extensively studied, how their function affects growth and division remains unknown. We used a fission yeast model system to investigate the homologous gene *pkd2*. Interestingly, yeast Pkd2p is essential, and previously we have shown that it regulates cytokinesis – the last step in cell division. In this study, we further explored the function of Pkd2p by developing and examining a temperature-sensitive mutant. We found that *pkd2-B42* mutant cells temporarily shrank, like a deflated balloon, before recovering to their original size. This observation and follow-up experiments confirmed that Pkd2p functions in maintaining cellular turgidity. We also discovered that Pkd2p has a role in cell tip expansion during growth. Furthermore, we found that Pkd2p might regulate cytokinesis by antagonizing an essential cytokinesis pathway – the yeast septation initiation network (SIN) pathway. Overall, our study has identified vital functions of yeast polycystin in cellular processes, including growth and turgor, and has further described the role that polycystin plays in cytokinesis by regulating the SIN pathway.

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

Since the Pkd2p ion channel is essential for yeast survival, isolating a temperature-sensitive mutant was necessary to further understand its function. The biggest challenge was overcoming the unfruitful attempts during the several steps involved in isolating the mutant. It wasn't the easiest 7–8 months of arduous daily lab work before I finally succeeded, and I guess it's safe to say that the *pkd2-B42* temperature-sensitive mutant is figuratively my 'thesis baby'.

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

Discovering the role of Pkd2p in cell tip expansion during growth. The functions of yeast Pkd2p were not well established. Previously our group had identified its role in cytokinesis. Utilizing the temperature-sensitive *pkd2-B42* mutant, we were able to shut off the



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gene, which enabled us to observe the growth defect and discover the role of Pkd2p in tip expansion and, therefore, growth.

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

I have often presented papers from JCS during our weekly journal club meetings in the lab. Also, I have heard high appraisals of the quality of research published in JCS and its impact – from seminar speakers to general word-of-mouth in the cell biology research community, both within and outside the department.

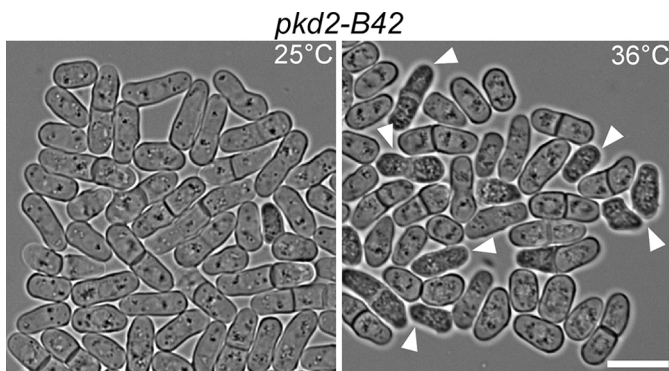
Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

Not in particular, but crucial feedback from my thesis committee and other faculty members at meetings and seminars has positively impacted the outcome of this project.

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?

Honestly, I wish I had an intriguing life-changing story or an awe-inspiring moment, but there was nothing of that sort. I grew up in a family where education was highly valued, and amongst the science subjects, biology seemed to come naturally to me – be it through my hobbies such as gardening, having pets, or obsessively reading any scientific approach to explaining the processes of life.

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Deflation in *pkd2-B42* cells. Brightfield micrographs of *pkd2-B42* cells at either 25°C (permissive) or 36°C (restrictive). Arrowheads point to cells undergoing deflation – a temporary cell shrinkage.

Who are your role models in science? Why?

Amongst the many people I look up to in various aspects of life, Barbara McClintock is best suited for this context. I first heard about her contribution to genetics during an undergraduate lecture, and hearing about her perseverance to establish the field was nothing short of surreal. Over the years, I have heard similar stories from other professors, both inside and outside the classroom, that have

helped to garner this ‘superwoman in science’ image of hers in my head. There isn’t enough space here for me to describe her numerous contributions to cytogenetics and biology overall.

What’s next for you?

Becoming a postdoctoral researcher. Of the daily ups-and-downs experienced in research, I enjoy the ideas, daily pursuits and lifestyle associated with being a research scientist.

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

I have way too many hobbies and struggle balancing time for them. During my upbringing in India, I was trained in classical music and art, and I went to dance school as well. Owing to time constraints during graduate school, this has shifted towards learning about different fields of medical science, viewing health-related content from reputed channels on YouTube, taking rare weekend hiking trips and, yes, DOGS – I love dogs to the point my husband thinks I am obsessed with them.

Reference

Sinha, D., Ivan, D., Gibbs, E., Chetluru, M., Goss, J. and Chen, Q. (2022). Fission yeast polycystin Pkd2p promotes cell size expansion and antagonizes the Hippo-related SIN pathway. *J. Cell Sci.* **135**, jcs259046. doi:10.1242/jcs.259046