

FIRST PERSON

First person – Leeba Ann Chacko

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping researchers promote themselves alongside their papers. Leeba Ann Chacko is first author on 'Microtubule-mitochondrial attachment facilitates cell division symmetry and mitochondrial partitioning in fission yeast', published in JCS. Leeba Ann is a PhD student in the lab of Vaishnavi Ananthanarayanan at the Single Molecule Science initiative, University of New South Wales, Sydney, Australia, investigating how mitochondrial volume homeostasis is maintained during the cell cycle.

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

During mitotic cell division in fission yeast, it is important that the resulting daughter cells have enough content to go on to the next growth cycle. This is usually the case when cells divide symmetrically; however, when cells divide asymmetrically, the bigger cell grows faster, thereby possessing a competitive advantage within the population. We identified that the mitochondria drive the faster growth in bigger cells. We also discovered that altering the attachment of mitochondria to microtubules can increase the probability of asymmetric division, because this attachment changes the dynamics of the microtubules. For the first time, we show that altering the normal interaction between microtubules and mitochondria can cause cells to divide asymmetrically, thereby partitioning mitochondria asymmetrically.

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

As with most work carried out during the past couple of years, the project was longer than usual due to disruptions caused by the COVID-19 pandemic. Additionally, the lab relocated from India to Australia midway through the project. There was a time when it was very difficult to cross the borders, which was worrying. However, my mentor, Dr Vaishnavi Ananthanarayanan, made sure that the new lab was completely set up before my arrival, and because of that, soon after I was allowed to fly in, I was able to start experiments and push this project forward.

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

I have had several such moments. The 'eureka-est' moment was quantitatively confirming that there is a linear relationship between mitochondrial concentration and the growth rate of the cell. I was also very excited when I first observed that the nucleus is more dynamic in cells with fewer mitochondria. Lastly, I loved the beautiful ultrastructure expansion microscopy images that Felix Mikus (PhD student at EMBL Heidelberg) and Dr Gautam Dey (EMBL Heidelberg group leader) acquired.

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Leeba Ann Chacko

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

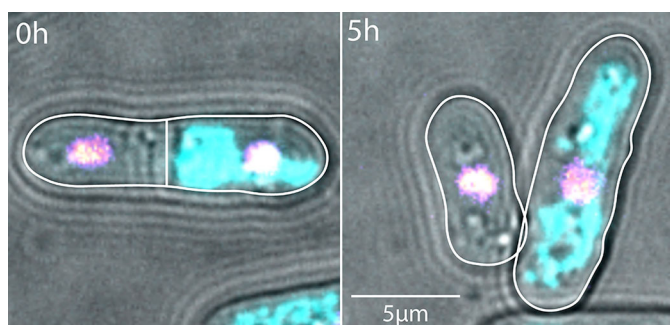
I am a writer for preLights, which is a preprint highlighting service (supported by The Company of Biologists). I would always highlight preprints that I enjoyed the most, and I noticed that many of them would get published in Journal of Cell Science. Also, many of the papers I read are from Journal of Cell Science, and I am thrilled that my work is being published here.

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

My partner, Shawn, has been my biggest support. He has always been there to cheer me up when I come home after a failed experiment. Before I met him, my life revolved around my experiments, but now my perspective has shifted, and my work and personal life are a lot more balanced. Being happier made it a lot easier for me to accept failure.

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?

When I was younger, my father – who is a scientist – would spark my curiosity in science by helping me build DIY telescopes from recycled PVC pipes as a weekend science project. Growing up, his enthusiasm made science fun for me, which is what motivated me to pursue a short stint at the National Centre for Biological Sciences,



Cells that have more mitochondria grow faster.

Bangalore, where for the first time, I was exposed to academia and everything that comes with it.

The most interesting moment that led me to where I am is that a lab that I had applied to for a research assistant position rejected my application and directed me to apply to Vaishnavi's lab instead. That was honestly the best thing that ever happened to me, because Vaishnavi is a fantastic mentor who introduced me to the breathtaking world of live-cell imaging.

Who are your role models in science? Why?

My biggest role model in science is my mentor, Vaishnavi. She is an extremely driven and hard-working individual. As a mentor she is very supportive and kind, and she treats everyone with respect. The thing that inspires me most about her is her passion and the work she puts in for equity and diversity in academia. Additionally, my lab mates have been wonderful role models. For example, I had no idea how to use MATLAB until my lab mate, Dr Nireekshit Addanki

Tirumala (now a postdoctoral fellow at NIH, Bethesda) taught me a lot of the basics, and I learned everything I know about primers, PCRs and gels from another lab mate, Dr Nida Ul Fatima (postdoctoral fellow in our lab). Some of the most stimulating discussions that have stuck with me are the ones I've had with my colleagues during tea breaks.

What's next for you?

I am currently investigating how mitochondrial homeostasis is maintained during the cell cycle. We are working with collaborators to build microfluidic devices to do long-term live-cell imaging, which is very exciting to me.

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

I am obsessed with cat videos on YouTube, and I occasionally draw them on my iPad. My latest drawing of Licky Lee and Minnie Mouse can be found here: <https://leeba-ann-chacko.format.com/353a802fc2-gallery#0>.

Do you like to draw things besides cats?

Yes, I also take inspiration from my research; for example, I have recently drawn a fission yeast cell (with the nucleus, mitochondria and microtubules visible) doing an impressive backstroke in a swimming pool (<https://leeba-ann-chacko.format.com/57a9269b7f-gallery#1>).

Reference

Chacko, L. A., Mikus, F., Ariotti, N., Dey, G. and Ananthanarayanan, V. (2023). Microtubule-mitochondrial attachment facilitates cell division symmetry and mitochondrial partitioning in fission yeast. *J. Cell Sci.* **136**, jcs260705. doi:10.1242/jcs.260705