

## FIRST PERSON

# First person – Debasna Panigrahi

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. Debasna Panigrahi is first author on 'The inner mitochondrial membrane fission protein MTP18 serves as a mitophagy receptor to prevent apoptosis in oral cancer', published in JCS. Debasna conducted the research described in this article while a PhD Research Scholar in Dr Sujit Kumar Bhutia's lab at National Institute of Technology Rourkela, Odisha, India. She is now a DBT Research Associate in the lab of Dr Arvind Ramanathan at Institute for Stem Cell Science and Regenerative Medicine, Bengaluru, India, investigating the regulation of the balance between mitochondrial division and recycling for optimal cellular health.

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

Mitochondria, the powerhouses of the cell, constantly combine with and separate from each other to maintain their health. Damaged mitochondria are separated and degraded through a process called mitophagy, which helps cells cope with external stress. Manipulation of mitophagy might be useful for improving cancer treatments. Our work describes how an inner mitochondrial membrane protein (MTP18) controls mitochondrial fission as well as mitophagy. We explored whether MTP18 acts as a mitophagy receptor and directly interacts with a protein called LC3 to target damaged mitochondria for degradation. We found that the outer mitochondrial membrane is degraded through a well-known mitophagy pathway, and the inner mitochondrial membrane, where MTP18 is found, is then exposed to LC3. Restriction of MTP18-mediated mitophagy sensitizes oral cancer cells to anticancer drugs that promote cancer cell death. These findings not only support our understanding of MTP18-mediated mitophagy but might also support new anticancer therapies.

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

Our preliminary research and sequence analysis found the presence of a LC3-interacting region (LIR) motif in MTP18. But the question arose of how this inner mitochondrial protein interacted with LC3, which is usually found on autophagosomes. The limited research on MTP18 challenged us to find the missing link. Then, we found that proteasomal degradation of the outer mitochondrial membrane allows the interaction. That observation kick started this work and shaped our research, and we found the connection between mitochondrial fission and mitophagy.

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

We found three LIR motifs in MTP18 during sequence analysis, but we doubted whether these could interact with LC3 as MTP18 is an inner mitochondrial protein. Then we performed



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immunoprecipitation expression and mitophagy analysis in a LIR motif mutant and confirmed the interaction – that result was the best moment of this research.

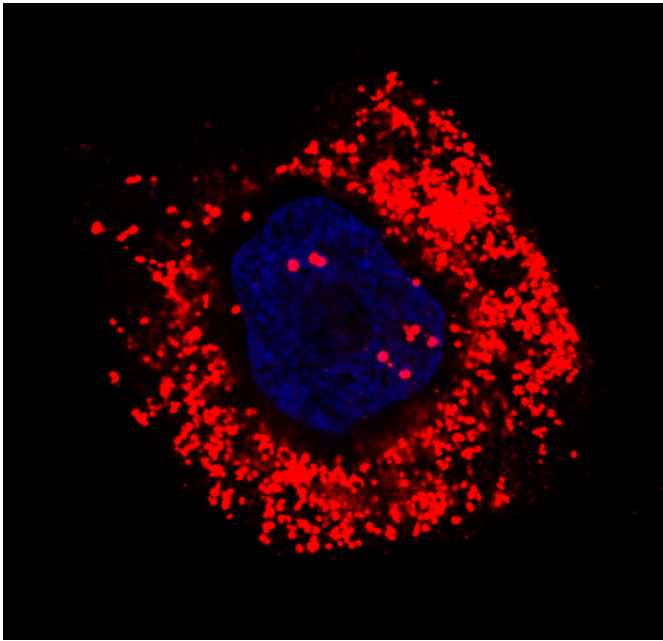
### Why did you choose Journal of Cell Science for your paper?

When selecting a journal for my paper, I found that this journal aligns exceptionally with my research. First and foremost, this journal's reputation within the academic community played a significant role in our decision. Journal of Cell Science has constantly published high-quality research in my field, and its rigorous peer review process ensures the research standard. It will also allow my research to have a broader impact and reach diverse researchers.

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

I have been fortunate to have had significant mentors who have played a crucial role in shaping my research skills and my overall professional development: Dr Prashant Panda and Dr Prajna Paramita Naik. This mentorship extended to various aspects of my academic journey. They encouraged me to explore diverse research topics and challenged me to think critically and broaden my perspectives. I learned to collaborate with other researchers, attend conferences, and engage in scholarly discussions, which exposed me to a wider academic community. Their guidance not only helped me sharpen my technical research skills but also nurtured my ability to communicate effectively and think independently.

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Mutant LIR MTP18 with TOM20 staining (red), mitochondrial fission without mitophagy.

**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 motivation to pursue a career in science comes from a combination of personal curiosity and a desire to positively impact the world around me. During high school, I was always fascinated by why things happen and how things work. My father introduced me to the world of science and constantly encouraged me to be curious and find the answers. As I grew older, I realized that science

holds the potential to find sustainable solutions, whether it is for an environmental issue or for any critical disease. That fuelled my passion and motivated me to create some meaningful difference towards humanity.

**Who are your role models in science? Why?**

Dr A.P.J. Abdul Kalam, an Indian aerospace scientist and former president of India, was my childhood role model; I was inspired by his life story. When I joined my PhD program at the National Institute of Technology Rourkela, I came across Dr Sujit Kumar Bhutia, my supervisor. He is not just a boss to me: his hard work, dedication, and integrity towards science inspires me every day. He consistently shows a deep understanding of science, and I am fortunate to have such an exceptional supervisor who inspires me for my professional growth. Also, I am so passionate about the work done by Dr Richard J. Youle, who is also working on selective mitochondrial fission and mitophagy. I would love to get the opportunity to work with him.

**What's next for you?**

Currently, I am working as a postdoctoral research associate at the Institute for Stem Cell Science and Regenerative Medicine in India. In the future, I would be interested in working in academia so I could encourage more people to explore science.

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

I used to do the regional classical dance called 'Odishi'. I think I am a decent cook and love to share the food I make with my friends.

**Reference**

Panigrahi, D. P., Prahara, P. P., Behera, B. P., Patra, S., Patil, S., Patro, B. S. and Bhutia, S. K. (2023). The inner mitochondrial membrane fission protein MTP18 serves as a mitophagy receptor to prevent apoptosis in oral cancer. *J. Cell Sci.* 136, jcs259986. doi:10.1242/jcs.259986