

## FIRST PERSON

# First person – Shweta Santra

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. Shweta Santra is first author on ‘Estimates of differential toxin expression governing heterogeneous intracellular lifespans of *Streptococcus pneumoniae*’, published in JCS. Shweta is a PhD student in the lab of Anirban Banerjee at Indian Institute of Technology, Bombay, India, working on decoding host–pathogen interactions and understanding cellular processes.

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

The functioning of our immune system determines whether we are going to fall sick because of an infection, as the immune system helps eliminate invading bacteria inside our bodies’ cells. In order to dodge such detrimental attacks from immune cells, the bacteria must have a strategic counterplan. In this paper, we have unveiled that the bacteria *Streptococcus pneumoniae* try to survive inside host cells by manipulating their own toxin expression. Given that high toxin secretion is detrimental for the bacteria’s survival, they strategically produce low toxin levels in order to prolong their survival inside the host.

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

The primary challenge that we faced was successfully imaging our samples in one shot, because this study demanded a lot of heavy imaging. Thankfully, we have very good supervisors who made the work a bit less challenging.

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

It has already been established that certain bacterial toxins show optimised activity in response to various external stimuli. But this type of information regarding the bacterial toxin pneumolysin was not yet known. Therefore, the ‘eureka’ moment of the project was when we discovered that pH is the key player behind all the consequences that a bacterium is facing inside a host cell, to the extent that the host cell pH decides its degradation fate. Another moment was when we realized that by lowering its toxin production, a bacterium induces an osmotic imbalance in the host cell vacuole and thus can sustain itself longer inside host cells.

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

Journal of Cell Science is a distinguished and reputed journal which has shown commitment towards publishing groundbreaking research throughout the years. Renowned for its editorial standards, this journal showcases cutting-edge research that defines the forefront of scientific inquiry. By consistently featuring state-of-the-art research, it has been successful in



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attracting contributions from scholars exploring various facets of biology. As our manuscript deals with cellular systems and host–pathogen interactions, we found this journal to be a perfect fit for our publication.

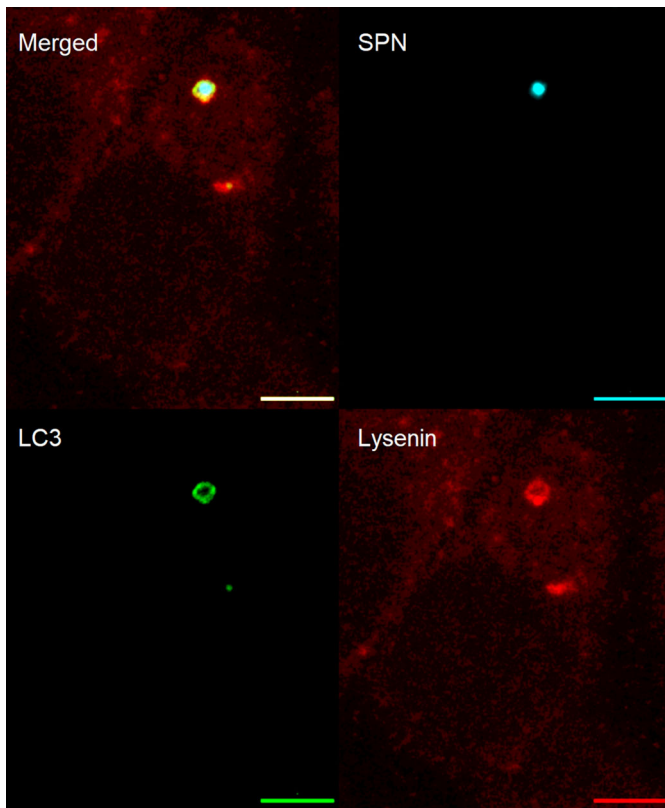
### Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

My PhD supervisor Prof. Anirban Banerjee is largely responsible for my scientific achievement, as his constant supervision has helped me grow each and every day. Besides him, my senior colleagues have played the part of watchful protectors in my life. They have guided me not only in my work, but also in shaping my philosophical views.

### 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?

Like any other student, I have been captivated by many fascinating aspects of biology. More specifically, while working on my dissertation project, I have gradually realized that the sheer excitement of getting a desired DNA band in an agarose gel holds so much happiness for me. Moments like that have been what drove me towards pursuing research.

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**Depiction of a representative state of an intracellular low-pneumolysin-producing bacteria, which is decorated with lysenin, showing a minor rupture of the endosome.** This endomembrane perturbation further induces LC3 lipidation on the vacuolated bacteria, as is evident from the green ring surrounding the bacteria in the picture.

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

We know in science that success and failure go hand-in-hand and it is a formidable challenge to be mentally strong during these phases. Therefore, each and every scientist who is driven by passion and works tirelessly is a role model to me.

### What's next for you?

As I enjoy working at the bench, my next aim is to apply for a post-doctoral research position.

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

If I had not gone into academia, I would have pursued a career in Eastern classical dance, something that always has given me immense confidence in life. Apart from this, going swimming acts as therapy for me during my research setbacks.

### Reference

Santra, S., Nayak, I., Paladhi, A., Das, D. and Banerjee, A. (2024). Estimates of differential toxin expression governing heterogeneous intracellular lifespans of *Streptococcus pneumoniae*. *J. Cell Sci.* **137**, jcs260891. doi:10.1242/jcs.260891