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FIRST PERSON

First person – Krishanu Bhowmick

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. Krishanu Bhowmick is first author on '*Plasmodium falciparum* GCN5 acetyltransferase follows a novel proteolytic processing pathway that is essential for its function', published in JCS. Krishanu conducted the research described in this article while a PhD student in Prof. Suman Kumar Dhar's lab at the Special Centre for Molecular Medicine, Jawaharlal Nehru University, New Delhi, India. He is now a research associate in the lab of Dr Rohini Muthuswami and Prof. Suman Kumar Dhar at Jawaharlal Nehru University, investigating how proteolytic processing of PfGCN5 is essential for its function in the malaria parasite *Plasmodium falciparum*.

Krishanu Bhowmick

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

The function of a cell is determined by networks of proteins and their specific roles. Each protein's functions are further regulated at the translational or post-translational level through several modifications. One post-translational modification is protease-mediated processing of the protein so that its becomes its mature functional form. In our lab, we are studying the malaria parasite *Plasmodium falciparum* (Pf) to find out key factors and processes that make this parasite the deadliest among the *Plasmodium* species. Here, we show that the PfGCN5 protein undergoes processing by a cysteine protease. Additionally, we found that the processing of the protein occurs in the vicinity of the digestive vacuole of the parasite. Our results suggest that this processing event is important for the function of the PfGCN5 protein. PfGCN5 is an essential nuclear protein in the parasite and regulates the global expression of parasite genes. These findings indicate that *P. falciparum* has evolved in a manner where functional regulation of some nuclear proteins is not confined to a particular compartment, but rather distributed in other organelles, which suggests the presence of a complex signaling network in this deadly parasite. Such unique processing and trafficking of proteins in the parasites may offer new targets for antimalarial therapy.

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

The main challenge associated with the project was to ask the right questions to move forward and unfold this work. When you come up with an extraordinary hypothesis you have to be rigorous with your experiments. Our study is focused on trafficking and processing of protein, which is important for its function, and that was somewhat different from our main focus in the lab, studying parasite replication biology. Therefore, to carry out this work I had to do thorough research on published articles associated with this field and designed the experiments accordingly. Additionally, my supervisor and my collaborators helped a lot in discussing the work regularly.

Krishanu Bhowmick's contact details: School of Life Science and Special Centre for Molecular Medicine, Jawaharlal Nehru University, New Delhi 110067, India.
E-mail: bhowmick.krishanu@gmail.com.

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

Initially, I did some bioinformatics analysis to narrow down the possible class of protease involved in PfGCN5 processing. After that analysis, when I treated the parasite with E64d in the culture followed by western blotting the full-length protein stabilized significantly. That was the eureka moment for me as I realized something new was happening with this protein that nobody had studied before.

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

I am fascinated by the findings that are published in Journal of Cell Science. It has been at the forefront of publishing manuscripts in the fields of cellular and molecular biology that reach the broader audience of cell biologists.

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

My significant mentor was my PhD supervisor, Prof. Suman Kumar Dhar. I began my research career in his lab. His enthusiasm, patience, and sincerity towards scientific research always encouraged me and other students. I would like to express my deep gratitude to him for his continuous support, which helped me pursue my research interests during my PhD.

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?

During my masters degree, I started reading about the history behind the key discoveries in our field that led us to where we are now. That motivated me to grow my interest in science and to pursue it as a career. Being a researcher it is very rewarding and satisfying to know that you will learn something new and interesting every day.

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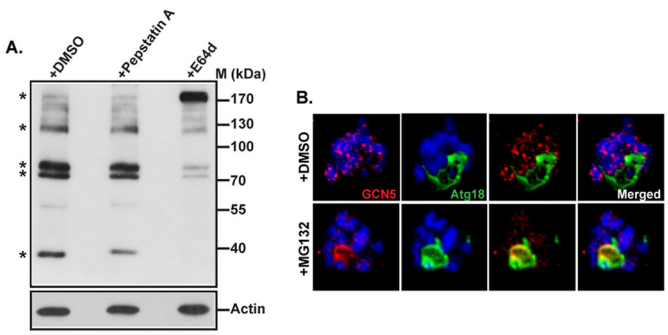

Analysis of the PfGCN5 protein. Western blot (A) and immunofluorescence analysis (B) show that the PfGCN5 protein is stabilized upon treatment cysteine protease inhibitor E64d and the full-length protein localizes in the vicinity of parasite digestive vacuole.

What's next for you?

I have now completed my PhD and want to continue my studies at the postdoctoral level. I am very excited and looking forward to the next step of my career.

Reference

Bhowmick, K., Tehlan, A., Sunita, Sudhakar, R., Kaur, I., Sijwali, P. S., Krishnamachari, A. and Dhar, S. K. (2020). *Plasmodium falciparum* GCN5 acetyltransferase follows a novel proteolytic processing pathway that is essential for its function. *J. Cell Sci.* **133**, jcs236489. doi:10.1242/jcs.236489