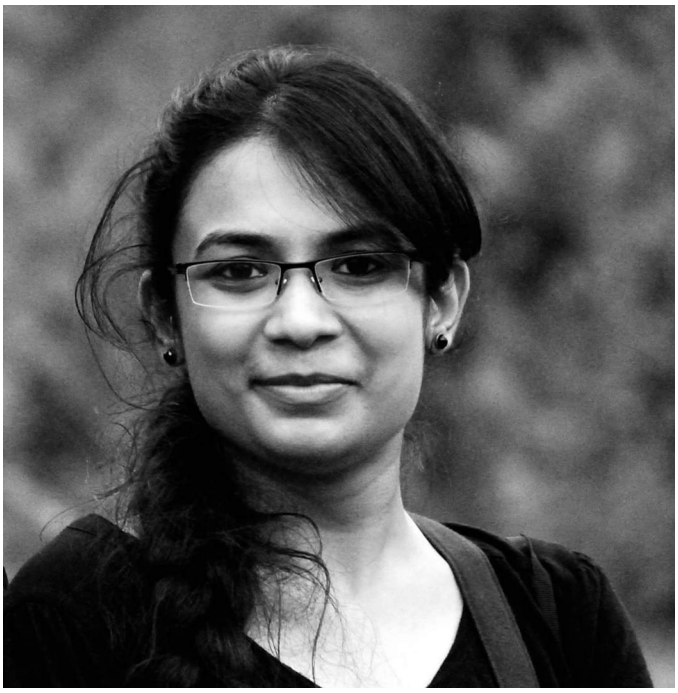
© 2021. Published by The Company of Biologists Ltd | Journal of Cell Science (2021) 134, jcs258780. doi:10.1242/jcs.258780

FIRST PERSON

First person – Bartika Ghoshal

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. Bartika Ghoshal is first author on 'Non-canonical argonaute loading of extracellular vesicle-derived exogenous single-stranded miRNA in recipient cells', published in JCS. Bartika is a PhD student in the lab of Dr Suvendra Nath Bhattacharyya at CSIR-Indian Institute of Chemical Biology, Kolkata, India, investigating extracellular vesicle or exosome biology and cell biology.



Bartika Ghoshal

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

Cells need to communicate among themselves for normal functioning. Sometimes, in order to establish communication, they release certain vesicles, which can carry different cargo messages to other cells near and far. These extracellular vesicles (EVs) can carry a special class of regulatory RNA molecules called microRNAs (miRNAs) to regulate the functioning of other mRNAs of other cells. This mode of communication has been found to play a pivotal role in the normal immune system, as well as in spreading different malignancies. Thus, it is imperative to understand the mechanism of how these tiny regulatory RNAs are transferred to other cells by EVs and where they localize in the recipient cell to elicit an effective response. Upon investigating the mechanism of internalization of EV-enclosed miRNAs, we found that miRNA uptake into host cells exploits the endocytic pathway to reach the endoplasmic reticulum (ER), the site where the miRNA can interact with its target mRNAs. The miRNA travels in a single-stranded form, associates with the Ago2 protein of the recipient cell to repress target genes and utilizes the pH gradient of the endosomal pathway to facilitate its release from the EVs onto endosomal membranes containing Ago2 to finally reach the ER.

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

Since EVs are vesicles of 30–100 nm in size, their visualization is challenging. In fact, obtaining consistent data every time was impossible because visualizing internalization of EVs by microscopy was sometimes difficult. Rigorous optimization procedures were the only way we could overcome our setbacks.

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

We were initially unable to consistently quantify the levels of miRNA being internalized in the recipient cells. We hankered after finding a suitable model system where we could easily track a foreign miRNA being transferred successfully. Finally, we were able to properly track transfer of a liver-specific miRNA in HeLa cells, which propelled our project forward. Furthermore, being able to pinpoint that the EV-miRNAs localize in the ER of the recipient cells also proved an important finding for our study.

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

The reason we chose Journal of Cell Science for our paper was that it has wide visibility and publishes work that encompasses different interdisciplinary fields of cell biology and biochemistry as well as EV biology.

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

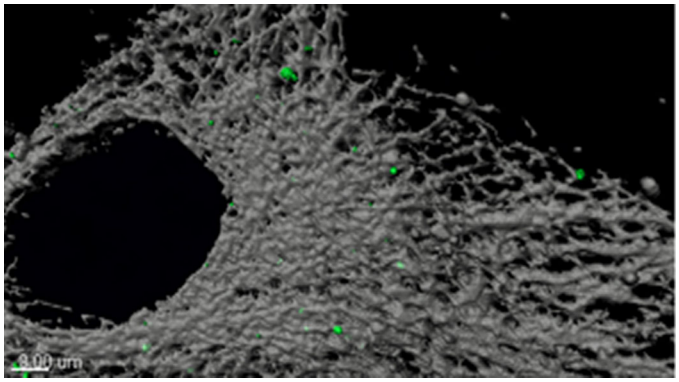
I am grateful to my PhD mentor, Dr Suvendra Nath Bhattacharyya, for giving me the opportunity to work on such a challenging project. He has constantly guided me throughout my entire PhD tenure. I would also like to thank Dr Edouard Bertrand for his insights and collaborative work in this paper. I had the opportunity to work in his lab for a period of 3 months, which helped me to devise the different strategies for visualizing EVs by microscopy.

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?

To be honest, I have always been interested in studying life sciences since my school days. Research has always intrigued me as there is an excitement in unraveling simple questions about how life systems function through inducing a tiny change. For me, the joy of dissecting a novel mechanism or searching for answers on how cells can work in an organized and orchestrated manner, motivated me to pursue a career in science.

Bartika Ghoshal's contact details: CSIR-Indian Institute of Chemical Biology, 4, Raja S. C. Mullick Road, Kolkata 700032, West Bengal, India.
E-mail: bartikaghoshal.11@gmail.com

Journal of Cell Science (2021) 134, jcs258780. doi:10.1242/jcs.258780



3D reconstituted image for visualization of transfer of EVs to recipient cells. Recipient cells were incubated with CD63–GFP EVs and visualized by confocal imaging. The cell was stained with β-tubulin to denote the cell boundary and was pseudo-colored gray. Scale bar: 3 µm.

Who are your role models in science? Why?

Marie Curie has been an inspiration since my school days. Her contribution towards science has not only inspired me but many women to pursue science as a career. I would like to add to this list two eminent scientists Dr Gagandeep Kang and Dr Soumya Swaminathan. Their contributions in the field of science has inspired me to pursue science as a career.

What's next for you?

I plan to pursue post-doctoral research in the field of EV biology as EVs have a lot of new facets that have recently been discovered. However, I am also open to exploring other options such as scientific writing apart from staying in academia.

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

I am interested in performing arts and have always enjoyed acting in plays since school. Also, I enjoy photography and capturing the beauty of nature whenever I get time.

Reference

Ghoshal, B., Bertrand, E. and Bhattacharyya, S. N. (2021). Non-canonical argonaute loading of extracellular vesicle-derived exogenous single-stranded miRNA in recipient cells. *J. Cell Sci.* **134**, jcs253914. doi:10.1242/jcs.253914