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FIRST PERSON

First person – Mariana De Niz

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. Mariana De Niz is first author on 'Hijacking of the host cell Golgi by *Plasmodium berghei* liver stage parasites', published in JCS. Mariana conducted the research described in this article while a PhD student in Volker T. Heussler's lab at Institute of Cell Biology, University of Bern, Switzerland. She is now a Postdoctoral fellow in the lab of Luisa M. Figueiredo at Instituto de Medicina Molecular, University of Lisbon, Portugal, where she is interested in understanding cell and biophysical properties of host–pathogen interactions mediating parasite invasion of mammalian hosts.

Mariana De Niz

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

The *Plasmodium* parasite is causative of malaria, a devastating disease in humans and other animals. A lot is known about the blood stage of the parasite's life cycle within humans, as this stage is associated with the pathology and complications characteristic of malaria, which include compromised function of the brain, the placenta and the lungs, and multi-organ failure. While the blood stage is important clinically, the liver stages precede this stage and feature one of the fastest replication rates in nature. The *Plasmodium* sporozoite is the form the parasite is injected into the skin by the *Anopheles* female mosquitoes. Sporozoites find their way to the blood vasculature and, from there, to the liver where they invade hepatocytes. Within hepatocytes, any single sporozoite can replicate into thousands of merozoites within 40–60 h. The liver possesses vast amounts of nutrients that the parasite can use up to fuel such replication. In our work, we explored in detail the parasite's hijacking of the host cell Golgi. Using live microscopy, we found that the *Plasmodium* parasite, via its parasitophorous vacuole membrane, makes contact with the host-cell Golgi, fragments it and hijacks it for the benefit of its own growth and survival. We generated mutant cells that lacked different Rab and Arf proteins, and we found that a compromised Golgi structure has a negative effect on *Plasmodium* fitness and survival.

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

I wouldn't say there were experimental challenges that we couldn't overcome. We were a great team working together with different strengths and expertise, and so all the authors brought something valuable to the work. The main challenge with this work was that it began as a side project during my PhD. Both myself and several co-authors had left Prof. Heussler's lab, where we had begun this work, and we were all facing the demands of postdoc positions or other work or life situations, so bringing it to an end took a lot of perseverance, persistence and team work.

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

For this specific project, the first exciting moment for me was looking down the microscope and seeing that, in the majority of parasites, the parasitophorous vacuole was associated with the host-cell Golgi. This was very exciting, particularly because live imaging allowed us to see a very dynamic process, suggesting very tight interactions between the host cell and the parasite. I think there is a lot going on at contact sites regarding nutrient transport that we still don't know. But it's exciting to observe nonetheless.

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

As a cell biologist myself, I enjoy a lot the research I read in Journal of Cell Science. We were inspired to submit to JCS when a special issue was announced that would be focusing on host–pathogen interactions. I and all the co-authors thought the journal was a perfect match.

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

I think every person I have worked with taught me something valuable. I have been privileged to have worked with great people during my career. While many people think that only group leaders are mentors, I had various important mentors who were postdocs. My role model postdocs during my PhD were Dr Rebecca Stanway and Dr Carolina Agop-Nersesian – they were selfless in their work and, using their knowledge and time, were dedicated to making our lab strong and versatile. I have also been lucky to have great mentors

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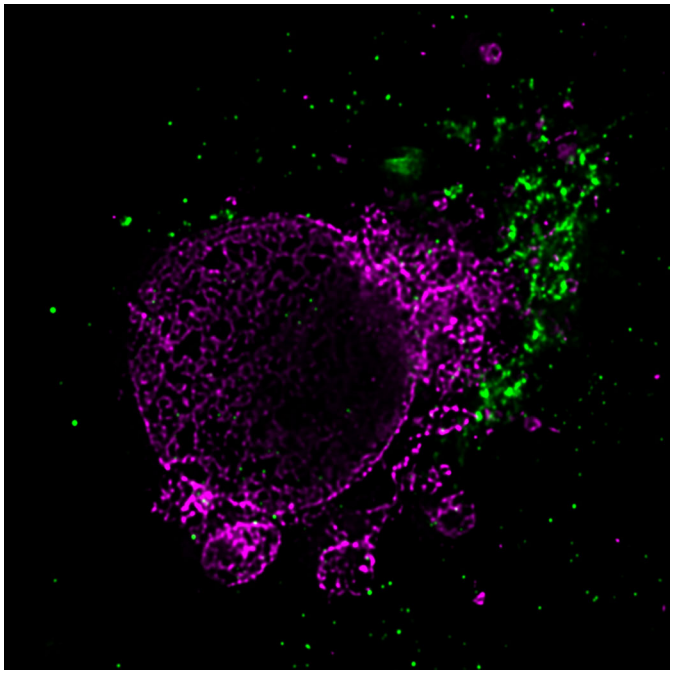

The image shows the *Plasmodium* parasite parasitophorous vacuole (in magenta) interacting with the host cell Golgi complex (green).

among group leaders I have worked with. My first mentors included Prof. Robert Nibbs and Prof. Chris Drakeley when I was starting my career. They both believed in my capacities and encouraged me to pursue science as a career, and to strive for independent thinking already at this early stage. As a PhD student my mentor was Prof. Volker Heussler. Apart from the vast intellectual independence I enjoyed in my PhD, his guidance was special in that he taught me a whole new philosophy of science I had not been exposed to before, including the importance of open science and emphasising curiosity- and creativity-driven science. For me, this ultimately has become the core of the work I do. Later in my career, Prof. Elena Levashina and Dr. Luisa Figueiredo have been important mentors as I slowly steer my career towards independence and leadership. They have both been invaluable in their guidance.

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?

I was interested in pathogens since as long as I can remember. As the time to choose a degree came closer, I knew I wanted to study pathogens from the host's point of view. So I chose to study Immunology for my BSc and found it absolutely fascinating. I think my career has been full of interesting moments ever since. After studying immunology, I went on to do an MSc in Control of Infectious Diseases, which allowed me to go to Uganda and later Malaysia to study *Plasmodium* infections and factors influencing parasite transmission. This was fascinating to me. But I have many interests, so I chose my PhD because I was interested in using microscopy to visualize host–pathogen interactions. I went to a fantastic lab that brought my interests in microscopy and infection biology together. And from then I think it became very clear to me the niche I would like to investigate, and the tools and methods that I vastly enjoy and want to specialize further in – microscopy and biophysics.

Who are your role models in science? Why?

I have tried to learn equally from my fellow PhD students and postdocs, as much as from the group leaders I have been privileged to work with. I think among the different friends I have made in academia, I learned from their maturity, their perseverance, their creativity, their kindness, their loyalty and commitment, their resourcefulness, their work ethic, and many other qualities I either shared or came to embrace thanks to their example.

What's next for you?

I will move to Paris to do a postdoc in Prof. Philippe Bastin's lab, exploring the fascinating cell biology of the parasite *Trypanosoma brucei*.

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

I love sports, music and languages, and have tried to learn a new one of each in every new lab I go to. In the case of sports I try something that is typical of the country, so in Scotland I did rowing, in Switzerland I took up cross-country skiing; in Portugal, it was my intention to take up surfing but sadly the pandemic got in the way. I haven't decided yet which sport to do in France.

Reference

De Niz, M., Caldelari, R., Kaiser, G., Zuber, B., Heo, W. D., Heussler, V. T. and Agop-Nersesian, C. (2021). Hijacking of the host cell Golgi by *Plasmodium berghei* liver stage parasites. *J. Cell Sci.* **134**, jcs252213. doi:10.1242/jcs.252213