

## FIRST PERSON

# First person – Julia Romano

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. Julia Romano is first author on ‘*Toxoplasma gondii* scavenges mammalian host organelles through the usurpation of host ESCRT-III and Vps4A’, published in JCS. Julia is a Senior Research Associate in the lab of Isabelle Coppens at Johns Hopkins University Bloomberg School of Public Health, Baltimore, USA, investigating how intracellular parasites interact with host cells to scavenge host materials such as lipids and vesicles.

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

The parasite *Toxoplasma* invades and lives inside mammalian cells within a compartment it creates during invasion. This compartment is called the parasitophorous vacuole (PV). To survive, the parasite needs to scavenge materials, such as nutrients present in vesicles, from the mammalian cell. These materials need to be transported into the PV so that the parasite can access them. One way that *Toxoplasma* brings host vesicles into its compartment is by forming inward-facing pockets (or invaginations) of the membrane encircling the PV, creating conduits into the PV. These pockets then need to be detached from the rest of the PV membrane (PVM) to allow the contents to penetrate further into the PV. We found that the parasite hijacks a mammalian multi-protein complex that is involved in membrane remodeling (ESCRT-III). Additionally, using a mutant component of ESCRT-III led to a deformation of the PVM through the accumulation of PVM invaginations, and parasite mutants with defective interactions with ESCRT-III subcomponents had a deficiency in transporting host vesicles into the PV.

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

There are two related moments that have stuck with me. The first is when we saw the significant accumulation of the CHMP4B dominant-negative mutant along the PVM. The second, even more dramatic moment was when our electron microscopy (EM) imaging revealed that CHMP4B filaments induce tubular deformations of the PV membrane by forming circular arrays. These tubular invaginations were found all along the PV and in every EM section.

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

We wanted to reach a broad cell biology audience with our work. As Journal of Cell Science has a good reputation for publishing cell biology research, it was a natural fit.

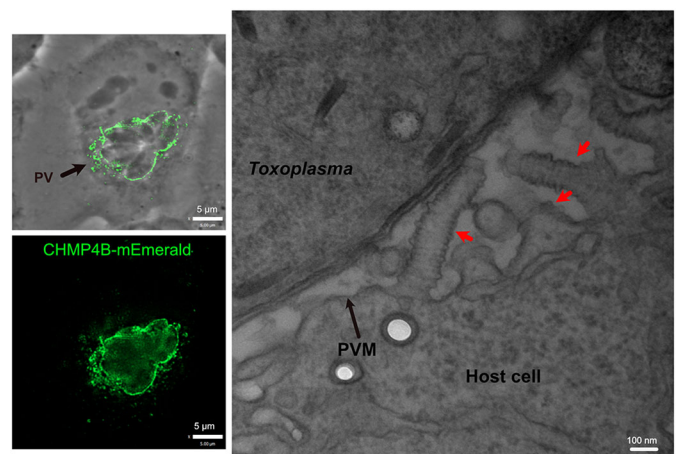
### Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

I have been lucky to work with many talented and collaborative scientists. In fact, our paper is the result of a wonderful



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collaboration between three labs that study *Toxoplasma*. Each of our labs (Coppens, Carruthers and Weiss) found a connection between host ESCRT components and the *Toxoplasma* PV using different techniques. We reached out to each other and set up a fruitful and congenial collaboration, with monthly video conferences to discuss experiments, results and interpretations. It continues to be a real pleasure, and we learn much from each other.



Fluorescence and EM images of the host CHMP4B dominant-negative mutant amassing on the *Toxoplasma* PV and deforming the PVM via the accumulation of PVM invaginations. Red arrows indicate the PVM invaginations containing CHMP4B spiral filaments.

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**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?**

It has always fascinated me that there is an entire world that we cannot see with our eyes. The first time I saw cells (especially microbes) using a microscope, I was hooked.

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

I have been involved in cat rescue, though not in a formal way. It began when a pregnant feral cat appeared in our backyard. We

socialized the kittens and got them adopted (keeping one for ourselves). We did trap, neuter and release (TNR) for the mother cat, who lives in a cat house in our backyard. Since all cats, great and small, are integral in the lifecycle of *Toxoplasma*, perhaps I was destined to study this parasite.

**Reference**

Romano, J. D., Mayoral, J., Guevara, R. B., Rivera-Cuevas, Y., Carruthers, V. B., Weiss, L. M. and Coppens, I. (2023). *Toxoplasma gondii* scavenges mammalian host organelles through the usurpation of host ESCRT-III and Vps4A. *J. Cell Sci.* **136**, jcs260159. doi:10.1242/jcs.260159