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FIRST PERSON

First person – Chiara Cassioli

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. Chiara Cassioli is first author on 'The Bardet–Biedl syndrome complex component BBS1 controls T cell polarity during immune synapse assembly', published in JCS. Chiara is a postdoc in the lab of Cosima T. Baldari at the University of Siena, Italy, investigating regulation of immune synapse assembly in the non-ciliated T cells by components of the ciliary machinery.

Chiara Cassioli

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

Immune cells need to exchange information and instructions in order to activate and coordinate several of their functions. However, in the immune system, cell–cell communication is highly specific, and T lymphocytes constantly move around in an environment filled with bystanders, searching for a limited number of selected cells, which can be engaged in a transient interaction, called the immunological synapse.

Over the past two decades, several studies have contributed to unveil the mechanisms driving the assembly of the fascinating structure of the immune synapse, as well as the molecular actors taking part in this process. The unexpected identification of the machinery that controls ciliogenesis as a new regulator of the immune synapse in T lymphocytes (which lack primary cilia) has opened a new direction of research in the immune synapse field. Here, we found that a component of the ciliary Bardet–Biedl complex, BBS1, participates in immune synapse assembly, allowing for centrosome reorientation and the acquisition of cell polarity. The ability of the centrosome to move right up to the contact site is indirectly regulated by local proteasome-mediated protein degradation that, together with *de novo* synthesis, has now emerged as a mechanism to control cytoskeleton remodeling during the early stages of immune synapse formation. I am confident and hope that our work addressing basic questions in the field of immunology and cell biology could help to advance the understanding of the molecular mechanisms behind impaired T cell function and in cilia-related diseases.

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

This project had a slow start. We dealt with the lack of commercial, high-quality reagents (lack of good anti-BBS1 antibodies suitable for immunoblotting or immunofluorescence), and we struggled a lot to silence BBS1 expression in T cells. Still, we persevered, and, with a bit of luck, we succeeded in exploring the potential role of BBS1 in immune synapse assembly.

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

We had two 'eureka' moments. The first and most important 'eureka' moment in this project was when we saw the immune synapse phenotype of BBS1-depleted T cells. We were testing the ability of BBS1-knockdown T cells to form functional immune synapses, when we stumbled on a surprising finding: in the absence of BBS1, the centrosome remains far away from the synaptic contact. The second moment was when we found a link between proteasome activity and centrosome reorientation to the T cell synapse.

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

We selected Journal of Cell Science for submission because, consistent with the broadest sense of 'cell science', it publishes articles that cover different fields and aspects of cell biology research. Publishing in JCS is an excellent opportunity to make your findings accessible to a wide readership. I also appreciate all the efforts made by JCS to actively support the scientific community, for example by sponsoring conferences and by funding travel fellowships for junior researchers.

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

I feel extremely fortunate and grateful for having met Tatiana, who has supervised me since my master's thesis work. She is a constant source of inspiration and encouragement, always willing to take time off her busy schedule and to share her unlimited expertise. She provides me with a stimulating environment and the means to make progress in my early scientific career.

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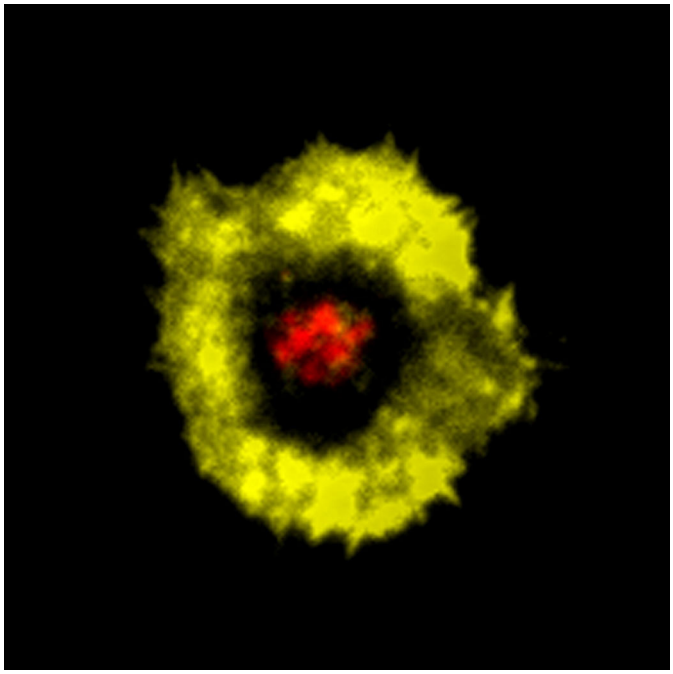

Getting a closer look at T cell immune synapse! Fluorescence image of a mature immune synapse formed by a T cell interacting with planar lipid bilayers and co-stained for CD3 (red) and F-actin (yellow).

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?

Genuine curiosity pushed me to graduate in biology and keeps my vocation alive. During my undergraduate degree at the University of Siena, I thoroughly enjoyed my master's thesis work, when I approached the study of the immunological synapse. I contributed to the publication of work investigating the regulation of membrane trafficking to the immunological synapse, and I realized that I wanted to become a scientist. At that time, I could not imagine how uphill the path to becoming a scientist would have been, but I have never regretted my choice. During this challenging journey, I have met many wonderful people, not only scientifically but also on the human side. Some have become good friends, who have taught and supported me so much. Another experience that inspired me to continue in research is a six-month period in the dynamic atmosphere of Prof. Michael Dustin's lab at the University of Oxford, where I had excellent supervision, training in supported bilayer system and advanced fluorescence microscopy, as well as opportunities to establish fruitful collaborations.

Who are your role models in science? Why?

I would say that I do not have any specific role model, but I look up to every woman working in science, especially if she is also a mother and has found her balance between work and life.

What's next for you?

I will pursue my dream of becoming a scientist in an academic institution. I am currently a postdoctoral fellow in the lab of Prof. Cosima T Baldari. I am honored to be part of a synergy European Research Council (ERC)-funded team that envisage developing a novel cancer therapy; it is almost like working in a 'super-lab'. I like to surround myself with people I admire and to join forces with others in pursuit of a common goal.

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

I usually cope with failed experiments in the lab by experimenting in the kitchen! A more active hobby is walking in the Tuscan countryside with my four-legged friend.

I enjoy tasting and trying new things, and exploring new surroundings and different cultures. I am also fascinated by nature photography, even though the immunological synapse remains my favorite subject to be imaged.

Reference

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