

CELL SCIENTISTS TO WATCH

Cell scientist to watch – Mounia Lagha

Mounia Lagha studied Biology at the Grande École AGRO-INA-PG in Paris (now AgroParisTech). She then pursued her PhD in the lab of Margaret Buckingham at the Institut Pasteur, where she worked on the regulation of myogenesis by the transcription factor Pax3. In 2010, she joined the lab of Michael Levine at UC Berkeley, USA for her postdoc; there, she discovered that minimal promoter sequences control RNA polymerase II pausing, which is essential for transcriptional synchrony and coordinated cell behaviour during gastrulation in the fly embryo. Mounia started her independent research group in 2015, funded by an ERC starting grant, at the Institute of Molecular Genetics of Montpellier (IGMM), French National Centre for Scientific Research (CNRS). Using live imaging approaches in *Drosophila*, her lab studies the coordination of transcription and transcriptional memory, and more recently the dynamics of translation. In 2021, Mounia was selected as an EMBO Young Investigator.



Mounia Lagha. Image credit: © Alexandre Darmon.

What inspired you to become a scientist?

I think I was influenced by my mother, who is a researcher in mathematics. I remember that she made some school games for me and my friends when I was a kid, and taught maths to us in a playful way. I really liked the process of having a theorem and then proving it, or in biology, having a hypothesis and then designing an experiment to test it. In high school, I had a great biology teacher, which is probably why I didn't become a mathematician. The experimental side of biology was very appealing – and it's actually similar to cooking, which is something I also really enjoy!

During your PhD in Paris, you worked on myogenesis and muscle stem cells in the mouse embryo. How did you decide to then move to UC Berkeley for your postdoc and study transcription regulation in *Drosophila*?

I hesitated a lot, but there were several things that led me to switch from mouse to flies. First of all, during my PhD, I did a lot of mouse genetics and was always frustrated by how long it was taking – I'm actually quite impatient by nature. Also, the researcher who was supervising me, Frédéric Relaix, told me many times that I think like a *Drosophilist* and would do really well in fly genetics. Then, during a meeting I had with Claude Desplan, he told me that with flies there is no limit to what you can test – and this sentence stuck in my head for a long time. I ultimately decided to join Mike Levine's lab after he gave a great talk at Institut Pasteur, where I was doing my PhD.

“[...]during a meeting I had with Claude Desplan, he told me that with flies there is no limit to what you can test – and this sentence stuck in my head for a long time.”

Mounia Lagha's contact details: Institut de Génétique Moléculaire de Montpellier, CNRS-UMR 5535, 1919 Route de Mende, 34293 Montpellier- Cedex 5, France. E-mail: mounia.lagha@igmm.cnrs.fr

Did you find it difficult to switch systems?

What was hard mentally is that when you finish your PhD, you're confident and feel a bit like a star, but then I needed to start again from scratch and learn things like how to distinguish between male and female flies. So, experiments in the beginning were difficult, but what saved me was that during my PhD in Margaret Buckingham's lab I really learned the 'culture' of developmental biology and gene regulation, and could always contribute to lab meetings with ideas. Looking back, I don't regret making this move at all.

Take us back to when you first started imaging transcription in living embryos. I bet those were exciting times!

They were! It was cool when I saw the embryonic transcription of my transgene under the microscope for the first time; but I have to say, before that, seeing the original publications and movies that were produced by the Gregor and Dostatni labs on live imaging of transcription in flies was even more exciting. Recently, I had a similar experience with Jeremy Dufourt, who is a staff scientist in my lab, when we managed to implement live imaging of translation in a multicellular organism for the first time. Seeing the dots and that the method works was amazing!

What questions are your lab trying to answer just now?

Since starting my lab, we've been working on transcription, studying how promoters and enhancers dictate transcriptional dynamics and regulate transcriptional bursting. We are now focusing quite a lot on the role of RNA polymerase II pausing in bursting, and moving into studying the developmental functions of pausing, enhancer priming and mitotic memory using CRISPR and optogenetic tools. Our other research direction, now that we can image translation live, is to understand how different nuclear events, including transcription and RNA export, affect translational dynamics. We're also looking into how RNA localization affects translation heterogeneity, and how this in turn influences patterning.



Mounia with her family hiking in the Burgundy region in France.

Could you tell us what you found the most challenging when starting your group?

For me, the biggest challenge was finding the right people to work with and actually knowing what kind of people I was looking for. Scientifically, the challenge was to set up analysis approaches for live imaging from scratch. My strategy was to hire a physicist in the lab, and he's been taking the very time-consuming extra step to create a graphical user interface for the image analysis codes. This is important because people get more excited by their data when they can do the analysis themselves and really answer the exact questions they've asked. But for building models, we do collaborate a lot with mathematicians and physicists.

What advice would you give to someone about to start their own lab?

In the beginning, you only need to have two or three good students around you and build the team spirit while also continuing pipetting yourself. Another important thing is to stay focused and drive your people towards getting a paper. This takes a lot of energy and isn't possible if your lab is too big at the start, which is why the push to get grants and hire many people quickly is not great. I would also recommend completing a management course as early as possible, and it's important to know how to hire people.

“In the beginning, you only need to have two or three good students around you and build the team spirit while also continuing pipetting yourself.”

When hiring, what characteristics do you look for in people?

I really like passionate and curious people. It's also an advantage if they are interested in using interdisciplinary approaches, and are rigorous and not convinced by just one type of result. In our lab, we always test hypotheses using at least two or three different approaches.

Tell us a piece of advice you received that stuck with you during your career.

This was to trust my intuition. Sometimes, especially as a female researcher, you might not be confident enough, and you can

question whether your scientific ideas are good. It really helped me when colleagues told me, “Mounia, your intuitions are usually great so just follow them!”. Even if your hypothesis is wrong, you'll learn something from the experiments, which can even take you further.

In the early stages of your career, how do you get the most out of scientific meetings?

In the beginning, I invested a lot of time applying to give talks at meetings that I was not invited to, and I was quite often selected for a short talk. This helped me a lot by giving me more visibility and resulted in conference invitations later. When attending conferences, it's good to contact three or four people in advance whose work is relevant for you and schedule a time to meet – you'll always find something to talk about. Finally, to make sure that my lab also gets the most out of the meetings I attend, I always send them the feedback or congratulations I receive on their research after I have presented it – it's important that they know their work is appreciated. When I get back from a conference, I also usually do a meeting report with my team and other colleagues at the institute where I select a few talks I liked and we together reflect on the data and results.

What has been your experience with virtual meetings?

Many scientists seem very keen to attend in-person conferences again, but are virtual events also here to stay in some form?

I agree that many people are a bit sick of virtual meetings because we have had way too many of them – but actually, before COVID, we already had too many conferences. This is difficult to juggle with family, and we should also be thinking about our carbon footprint. So, in the future I would like to have a mix and attend maybe three or four in-person meetings a year, which are not too big, because human interactions are really important. However, one of the big advantages I experienced at virtual meetings is that PhD students, postdocs, and even I, would more easily write questions, even tricky ones, in the chat. You feel much less inhibited compared to having to stand up in front of a room of hundreds of people. Following several virtual meetings, people have contacted me by email and we have done some follow up Zoom calls, where I feel we exchanged more than during some in-person conferences.

What are your views on the feasibility of being both a good parent and a good scientist?

Of course it is not easy, but the key thing here is to share the workload and responsibilities. With kids, it's important that the father is as involved as the mother; my husband is also a scientist and there are dedicated days when he is in charge and I can stay at the lab late if I need to and vice versa. And what I learned from my mother is that what really matters is the quality time you spend with your children, so when I'm with them I'm really present – there is no phone, cooking or cleaning. I'm also very lucky to get a lot of help from my mother and my father, who don't live too far away. Then on the work side, it's also important to get help, for example for admin; I've been lucky to have had an absolutely wonderful lab manager who I knew I could always count on.

Finally, what is something people might not know about you?

I was born and raised in Algeria, and I think my childhood shaped my character a lot and gave me the strength and fighting spirit. I was 13 when there were terrorist attacks in Algeria, and both of my

parents were threatened, so we suddenly moved to France and had to start a new life there. My parents managed to find jobs because of their degrees, and I studied really hard to be at the top – also to prove to people who questioned why I was in France as an Algerian that I can do things better than them. I was also influenced by my grandmother in Algeria, who I spent a lot of time with when my

parents were busy. She was illiterate but taught me a lot about social interactions and the importance of staying humble.

Mounia Lagha was interviewed by Máté Pálffy, Features & Reviews Editor at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.