

CELL SCIENTISTS TO WATCH

Cell scientist to watch – Lidia Vasilieva

Lidia received a bachelor's degree from Krasnoyarsk State University in Russia and a master's degree from the Institute of Protein Research in Moscow. She then moved to Finland to work with Leevi Kääriäinen on the replication of RNA viruses for her PhD. Her postdoctoral studies led her to Harvard Medical School with a fellowship from the Leukemia and Lymphoma Society. Under the supervision of Steve Buratowski, Lidia focused on transcriptional regulation in eukaryotes. In 2009, Lidia obtained a Wellcome Trust Career Development Fellowship and started her own research group at the Department of Biochemistry in Oxford. She has been named a Wellcome Trust Senior Research fellow in 2015, and was awarded the British Society for Cell Biology Women in Cell Biology Early Career Medal the following year. Her group investigates the molecular transcriptional and post-transcriptional mechanisms that control RNA levels of protein-coding and non-coding transcripts in response to cellular or developmental programmes.

What inspired you to become a scientist?

I have always liked nature and animals. As a child, I wanted to be a farmer and raise chickens. My ideas about science were shaped early in school, I suppose. I think the fact that both of my parents are in scientific professions (my dad is a theoretical physicist and my mum was a professor in art history) has influenced that as well.

What questions is your lab trying to answer just now?

The long-term vision is to understand how cells regulate and maintain proper levels of individual transcripts in the cell. We want to understand both the transcriptional and post-transcriptional mechanisms involved. The exosome is a major eukaryotic RNA degradation and RNA processing machine. It is able to recognise and target its substrates through so-called specificity factors. We discovered that these specificity factors are recruited to nascent RNA as early as during transcription, therefore pre-programming the specific transcripts for their future fate. Currently, we have two different directions in the lab. One direction aims to understand how RNA regulators are recruited to RNA and to uncover transcriptional mechanisms that regulate their recruitment. Another direction is to understand what happens to RNA after transcription, and this deals more with mechanisms involved in exosome function.

How are the specific transcripts distinguished by the cell?

This is the big question – both protein-coding and non-coding transcripts are produced by the RNA polymerase II machinery, but they are regulated and function in a very different manner. How do cells distinguish those different types of transcripts? What are the fundamental principles that allow this very dynamic and specific regulation of transcripts in a cell? We are looking at highly regulated messenger RNA coding transcripts, and also non-coding transcripts for a conceptual angle, and we want to understand how the cells are



Portrait of Lidia Vasilieva.

able to regulate transcripts differently in response to the needs of the cell.

What challenges did you face when starting your own lab that you didn't expect?

I personally found the transition from postdoc to group leader quite tough. It's a huge responsibility – you have to manage people, you need to really plan the life, the experiments and the future direction of the whole lab. When I was just starting, it was challenging because every individual is very different, and I think with my first PhD student it was a steep learning curve. Certainly for her, but it was an even steeper learning curve for me. Eventually it worked out really well, she's a really bright scientist and I'm proud of her. This actually is a big part of the joy of leading a group – you have a responsibility to mentor people and to help them to make the best of their potential.

How are the challenges that you're facing now different?

When you reach mid-career stage, the challenge is to manage and coordinate all the activities that you are involved in without getting stressed out. At this stage, you have people who depend on you, and it can be difficult to manage the pressure and not to lose sleep over this. Another challenging thing in academia – but this applies to all career stages – is that you need to keep moving all the time. But this is not a bad thing, it's stimulating because you have to keep your

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Lidia and her kids on a hike in the Lake District.

eyes open and learn new things all the time. It's like the Red Queen's race in *Alice in Wonderland* by Lewis Carroll: "It takes all the running you can do, to keep in the same place!"

How do you achieve a work/life balance when you're trying to establish yourself as an independent investigator? You had your first child while starting your own lab – this must have been demanding?

It was pretty scary, I won't deny this. Everything was new, starting my lab when I was pregnant and then having a family... I'm not sure I had been very strategic about it, but that's life. I think in life and science you just need to do what your heart feels like doing, and if it feels right, just go for it. Eventually the key is to be motivated and to want to make it work, and it always does, as long as you put effort into it. I mean, you have to rise to the occasion and find resources in yourself; I also got great help from my husband.

"[Academia is] like the Red Queen's race in *Alice in Wonderland* by Lewis Carroll: 'It takes all the running you can do, to keep in the same place!'"

What's the most important advice you would give to someone about to start their own lab?

Recruitment is key. As a young group leader, your best chances probably rely on students. It made a big difference for my lab when I

started to recruit students, and they were both brilliant. They were very enthusiastic and motivated, and I was working quite close with them. It really makes a big difference because things started to work and we got exciting data. This of course changes the whole atmosphere, and then I was really lucky to recruit an excellent postdoc and then things got moving.

What elements, inside or outside the lab, have been key to your success so far?

There's no recipe I suppose, it's probably a combination of different factors. I think you definitely need to be passionate about what you're doing. You certainly need to be motivated and focused; but above all you need passion, because if you don't love what you do, I think it's difficult to make it work. Then, for me, having a family was and is emotionally quite important because it gives a lot of positive energy and another dimension to your life. I was never driven by the thought that I want to be successful, I just enjoy doing what I'm doing and I think that's probably enough.

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What is your advice on establishing good collaborations?

It's important to trust your collaborators and to be generous – it's a give-and-take relationship. I haven't been very strategic about collaborations, because sometimes it's difficult to predict how a project will go and what will be each side's contribution. It starts as a chat and a joint interest, and then it grows naturally. I have many productive collaborations, and for me it's about trust and generosity.

Could you tell us an interesting fact about yourself that people wouldn't know by looking at your CV?

We become very one-dimensional in science and focus on it all the time, but my second passion is probably art. My mother is a specialist in art history, therefore I've been influenced early on, and I've seen the works of many artists and also went to art school as a kid. I enjoy painting and I believe there are a lot of parallels between art and science: not only the creativity aspect but also the concept of thinking about big questions, such as: what is true, how does it work? In searching for solutions to the fundamental problems, both scientists and artists undergo multiple cycles of thinking and doing until it all comes together and we come up with a 'magic solution'.

Since we're talking about hobbies I have to ask you one more thing: are you raising chickens in your garden in Oxford?

No! *laughs* I have channelled this interest into more molecular dimensions. But my daughter keeps asking about having animals. When my kids are ready to take care of them, it would be really nice to have a pet – or chickens.

Lidia Vasilieva was interviewed by Manuel Breuer, Features & Reviews Editor at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.