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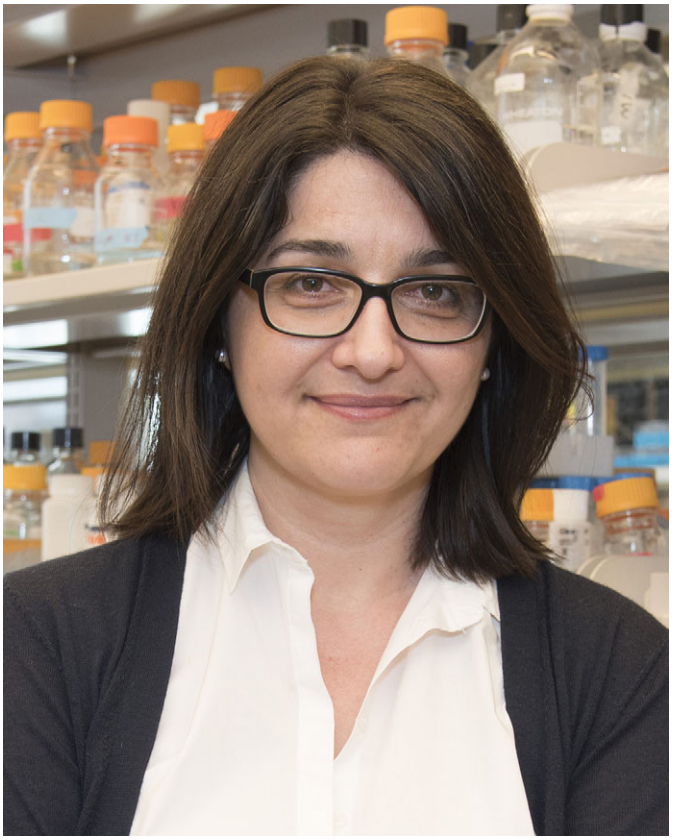
CELL SCIENTISTS TO WATCH

Cell scientist to watch – Christine Mayr

Before completing a PhD in immunology at the Humbolt University of Berlin, Christine Mayr received a medical degree from the Freie Universität Berlin. She received postdoctoral training with Michael Hallek at the Ludwig Maximillian University in Munich. In 2005, Christine moved to the United States for a second postdoctoral position in the laboratory of David Bartel at the Whitehead Institute for Biomedical Research at MIT, funded by a fellowship from the Deutsche Forschungsgemeinschaft. She started her own group at Memorial Sloan Kettering Cancer Center in 2009, supported through funding from Memorial Sloan Kettering Cancer Center, National Cancer Institute, the Starr Cancer Consortium, a Damon Runyon-Rachleff Innovation Award, a Kimmel Scholar Award and, most recently, a Pershing Square Sohn Prize for Young Investigators in Cancer Research. Her current research focuses on elucidating how proteins of the same sequence can have different functions due to differences in the untranslated regions of their mRNAs.



What motivated you to become a scientist?

When I was a kid, I watched this animated TV series called Captain Future. It's about an astronaut who discovers new worlds, and is still my absolute favourite. I was so influenced by this that I wanted to become an astronaut. I realized that this was probably not going to happen and I became a biologist, but I really think that this TV series was the start.

What motivates you now?

What I really want to do is to find out things that are not obvious. There are many questions that you could pursue, but what really drives me is to connect dots that nobody has ever connected before and to do things that people thought were impossible.

What are the questions that your group is currently trying to answer?

We work on 3′UTRs, and recently found that they can regulate protein localization and, in the bigger picture, induce the formation of protein–protein interactions and change the function of the protein. The 3′UTR recruits proteins to the site of translation that can then bind to the nascent peptide chain to form a protein complex. Half of all human genes can actually make either a short or long 3′UTR. Simply put, if you have the long UTR, the protein that is made is in a protein complex, and if you have the short UTR, it's just the naked protein. So, one protein can have different interaction partners and therefore it can have different functions. We think that this is a very widespread function of 3′UTRs, and this is what we are working on right now.

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You changed the focus of your research. Was there a particular reason for that?

I want to discover new things and you need to have a naïve approach for that. So, the less you know in the beginning, the better. People, myself included, have set ideas in their heads, but this prevents people from seeing something new. So, the best experiment is well controlled, but the result is the opposite of what you expect. That is a good day, because then you know that what you thought you knew is wrong. Here is something new and it's not how everybody imagined it.

> "(…) the best experiment is… [when] the result is the opposite of what you expect."

Were you concerned with the risks associated with changing fields?

It's more that I see a new result and if I really think it's promising, I go for it, no matter which area it is in. The problem is that I always feel like an outsider in every field. What is really important is to talk to people in the field, to discuss the work with the experts, so that you don't make really stupid mistakes.

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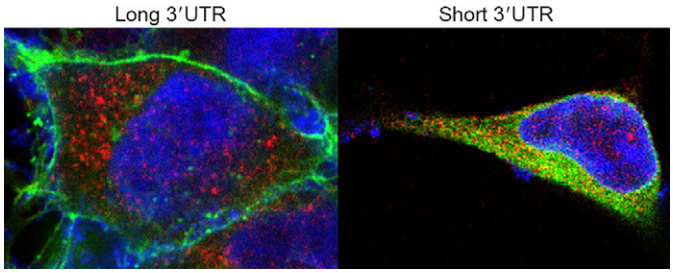


Localization of RNA (red) and protein (green) that is generated from constructs comprising GFP fused to CD47 (the transmembrane domains and C-terminus) and either containing the long 3′UTR (left) or the short 3′UTR of *CD47* (right) in U2OS cells. The long 3′UTR facilitates plasma membrane localization of GFP independently of RNA localization, whereas GFP generated from a construct with a short 3′UTR is retained in the endoplasmic reticulum. Nuclei are counterstained in blue.

What was the biggest experimental roadblock you came across and how did you address it?

The question is – when do you stop trying? It's very hard because you might have the breakthrough next week, in a year, or never. When I was a postdoc, I was trying to establish these very sensitive northern blots. It took a while and after a few months when I didn't have anything, my supervisor said "don't you want to work on something else?" and I said "no, I think I'm really close". Two weeks later it worked out. When you do experiments yourself you know that, but if now postdocs come to me with a problem, I don't know how far away they are from a solution, and so it is more a judgement call from them. Of course, if it really drags on, I suggest a change, but it is very hard, because the person is sometimes reluctant to give up, and who am I to say "I think now is the time"? I can only make suggestions.

What were the elements, inside or outside the lab, that were key to your success?

I never only work on one thing, I actually work on several things and I try many different ways. In retrospect it looks like a linear thing, but it actually isn't. If you only do one thing at a time it will take forever, but if you do a few things in parallel, then one of them will work, and you go with that.

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

It's a very different job, going from a postdoc to being a PI. I didn't really think about it, and I was very surprised about how many different things you actually have to do that you are really unprepared for! Science was the least of my worries. Who to hire is probably the most important decision, but you're not getting the good applicants that the big labs get. You also need to get good results and do some marketing, so that people know about you and spread the word to be visible, and then you have to get grants. In your postdoc lab there is always somebody to discuss things with. When you start a lab there is no other person, no sounding board. This is really hard in the beginning.

Do you have any advice on how to hire people when you're starting out?

What is really important, and a senior PI told me this when I started out, is that you need to really like the people that you hire. You need to be happy when they come to your office, and just being neutral about it is not enough! I think this is very important advice.

What is your advice on good collaborations?

The ideal case is to find somebody who is as excited as you are about the kind of project that you want to do. Because most of the time, labs already have their research focus, and that is what they care about. The ideal collaboration is really when both parties are equally excited about it. It's important, because then you don't have to beg the other person to do it as a favour.

" (…) if you want people to understand what you are doing, you need to give a talk."

How important is it for you to attend meetings?

I think meetings are very important because what I realized is that people don't actually read papers! So much is published, and I also don't read everything. This is very sad, but if you want people to understand what you are doing, you need to give a talk.

How do you get the most out of meetings?

I think meeting people is what a meeting is about. When I was younger, I didn't enjoy meetings at all, because I'm a little bit timid, and it's very hard for me to approach people, but it's the most important thing in a meeting. At the start it's really hard, but it becomes easier. If you are a student, you should not hang out with your lab. Try to make an effort, for example, for all the meals sit at a table where you don't know anybody. Try to meet as many people as possible because it might help you later.

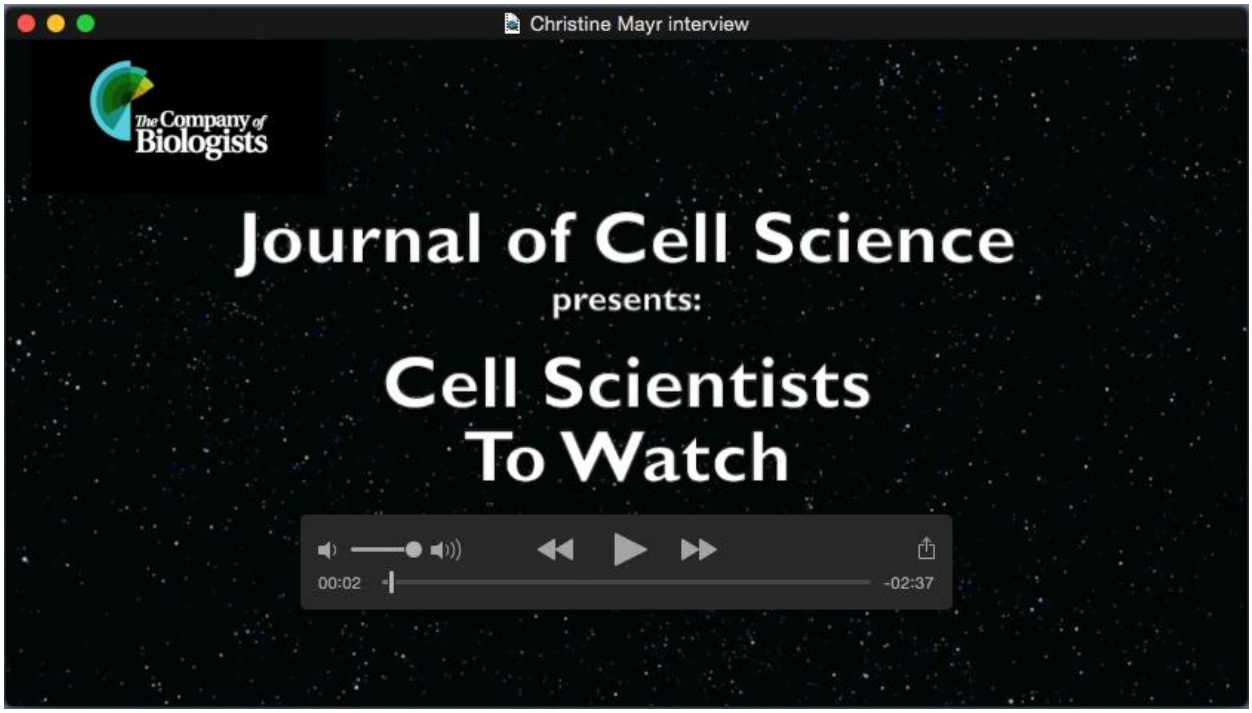
What would people be surprised to find out about you?

I was a practising physician. People are often surprised that I am an MD, because I'm interested in very basic research. I often think that my medical background is completely useless, but actually, I recently realized it helps me see the big picture without effort. Sometimes I'm a little jealous of biochemists because I would like to do better biochemistry. But often when they give a talk, I realize they know the molecular part well, but they don't know what they can do with their stuff. This part is easy for me, and often you don't realize that the things that are easy for you are also important.

Video interview

An additional, short video interview with Christine Mayr is also available, and can be viewed directly here: http://jcs.biologists.org/lookup/suppl/doi:10.1242/jcs.181958/-/DC1 or on the JCS Interviews page: http://jcs.biologists.org/content/interviews.

Christine Mayr was interviewed by Anna Bobrowska, Editorial Intern at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.



Video Interview Short