CALIPER
Gender Equality in STEM Research

Linking Research & Innovation for Gender Equality

Role Model Interview

Professor Ángela Neito, Neurosciences Institute (CSIC-UMH)

As part of the CALIPER project, we are conducting a series of interviews with inspirational women who work in STEM research and innovation. We explore what motivated them to choose their career, their experiences and the barriers that they faced.

Professor Ángela Nieto achieved her PhD in biochemistry and molecular biology from the Universidad Autónoma de Madrid and since 2004 has been Professor at the Instituto de Neurociencias de Alicante. She combines this role with other positions, including her role as President of the International Society of Developmental Biology . She is also a member of several prominent academies, including the Academia Europaea, and the Academies of Sciences of Spain, France and Latinoamerica.

Ángela has been awarded several prestigious international and national awards for her work. Her research has paved the way for the development of new therapeutic approaches in the treatment of cancer and its spread to other tissues, and served as motivation for other scientists in Spain to continue broadening relevant research on this topic.

You can watch the full video of the interview on the CALIPER website.

Professor Ángela Nieto (left) and Dr María Macías (right)

Could you tell us a little bit about your background, what factors led you to choose the scientific topics that you have pursued and what your current research focuses on?

"Yes, I actually always wanted to be a scientist and I can't really explain why. I wasn't ever very interested in dolls. I liked to see things that no one had seen before, I liked to learn those kinds of things, and in fact from a young age I played with chemistry sets. I ended up studying biology, as you said, at the Universidad Autónoma. And then I started my scientific career doing my doctoral thesis, studying how molecules interact, a thesis that was purely biochemical and then I thought that I wanted to move up in the level of biological complexity and I was working on how cells communicate with each other and studying mechanisms of cell death and survival.

And then, this time in Madrid, at the Institute of Biomedical Research. I thought I would like to study a slightly higher order of cellular organisation, more complex, and for that I thought to work in developmental biology and to understand how organisms are formed and indeed this is what I did. First doing a short doctoral stay in Germany and then in England, working on how cells have the information to form the different organs that we have in our body, how the miracle of the creation of a complete individual from a single cell happens and what is happening, what are the processes that govern the correct running of everything, because, of course, if something doesn't work, there are many types of problems, including congenital malformations. So, for the basis of our work, we study these processes, but what we found a long time ago, more than 20 years ago, is that there is a very important connection between embryonic development and cancer. Why? It can be explained in a very, very short time.

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It turns out that cancer cells, or tumour cells, use mechanisms that are specific to embryos for their own benefit. Essentially, it is about them using the mechanisms that embryos use to move cells from one location to another in order to form organs and, unfortunately, this same mechanism is used by cancer to spread to other tissues and form metastasis, which we know to be the cause of more than 90% of cancer deaths."

When you were starting out, did you have any role models that influenced your career choice? How do you think we could give more visibility to women who are scientists?

"I think when I was starting out, even now, there are not so many female scientist role models that are well known in such a way that it allows them to inspire people in the best way. I was inspired by my biology teacher at COU [University Orientation Course], which was the course that I did just before I went to university, because as I have already said, since I was a little girl I played with chemistry sets. My intention was to study chemistry, but in COU, this professor, Isabel Bauzá, who was a fabulous professor, she taught me what I was telling you about, about what life is. I learned about how life forms, and I ended up working exactly in that - in how life develops, how organisms are formed.

That's when I decided to study biology and in that sense, I think that she did have a huge influence on my career decision. And how do you think we could give more visibility, what do you think? I believe that, like everything else, you have to start from the beginning and what we really have to do, and in fact I can say that we are already doing it, is go into schools and talk to children in general, and with the girls, of course, and by doing that we will be able to inspire many more to work in science.

Unfortunately the messages that are received about working in science, about being a scientist, are often not so positive. There is always talk of it being a lot of work, there is always talk that there are not many opportunities, that perhaps it is better to dedicate oneself to something else, and I'd like to say that we need to be a little more optimistic about this, because that reflects just one side of the story. It reflects the bit about the necessary sacrifice, but does not reflect all the fantastic things about working in science. For example, every day for us is different. That cannot be said of many other professions.

I mean that science is of course rigour and a great deal of effort, but it's also passion, it's also freedom and it's also progress, and it also allows us to get to know many, many people around the world. I can say that one of the most important things that science has given me is having friends in many, many countries, and if you name a country, I'm sure I can think of several people with whom I have had a relationship and with whom I can always talk and communicate. We also have to promote this very positive view of science."

You have commented on occasion regarding the so-called "dream gap", the belief that young women have, feel like they are not going to be able to be successful in certain scientific disciplines because these areas have traditionally been closely associated with men's work. How do you think we can encourage girls and young women to choose a scientific career? What advice would you give to young women who are now thinking about becoming scientists?

"What you're saying is absolutely fundamental, this thing called the "dream gap", is the barrier to your dreams. It is very important to mention it, because there is a study by Princeton University that says that girls at the age of 6 already consider that they are not as capable as boys of studying or dedicating themselves to a certain kind of discipline. Naturally, we are talking about the STEM disciplines: science, technology, engineering and mathematics, and this is really unfortunate because there is no reason to think this. Imagine, at 6 years old, that this is what they think already.

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Clearly, we have to do what we were talking about before, we have to go earlier, we have to go to the schools very early and tell them that they can do it, of course they can, there is no biological reason why they should think this, that there are differences and that women cannot work in these disciplines.

I think this is very important because unfortunately we are seeing that in recent years, the number of women in these disciplines not only is not increasing like it was doing over the last few decades, but it is even declining. So we have to think that the professions of today and those of the very near future are going to be closely related to these disciplines, especially if we think about big data, in the analysis of large accumulations of data that come from both numerical data and image data. All of this requires having a very strong training in these disciplines, and if we do not intervene, and we do not intervene now, we are going to end up with an even more masculinised society in these disciplines than the one we have now, and we have to avoid that at all costs.

So what do I say to girls, what do I say to young women? I explain to girls that there is no problem, that it can be done and that if that's what they like then please do it, because we need them. Society cannot lose the talent of 50% of society, which we women constitute - a little bit more than 50%. And what I say to young women is that I hope they have a family environment that helps them, and that perhaps one of the most important decisions they have to make in their lives is to choose their partner wisely, because this is absolutely fundamental.

In other words, it is very important to be in a home environment that understands scientific work, that supports it, that appreciates it, and that helps a great deal in balancing life and work, which is absolutely necessary in a family and in society."

You have recently been awarded the L'Oréal-UNESCO International Award for Women in Science 22 for Europe, and you have dedicated it to the people you have worked with and also in particular to all women scientists and girls who want to be scientists. What are your hopes for the next generations of women in science?

"Scientists are optimists, I believe, by nature. I always think positive thoughts and I think things are going to go very well. What happens is that it is also up to us. Precisely what we were talking about, we have to provide role models, we have to show girls, teenagers, and women that it can be done, that it can be done well, and that it is also appreciated by society.

In fact, I have to say that in Spain, I have not had difficulties being promoted just because I am a woman. It is true that perhaps I have always been in a very appropriate environment with a lot of support from my family and in institutions that have not had this consideration, but we still have a lot to do. And the first thing that we have to do is to instil that confidence in women, that they are really capable of being scientists, and not only that they are capable of being scientists, but that they are going to do it very well and that they can also really enjoy it.

Like I said, for me science is rigour, it is effort, but it is passion, it is freedom, and it is generosity, and we cannot forget, especially now that we have just gone through - well, we haven't finished going through it yet, this pandemic, but we have seen the importance of science, for example by developing vaccines in less than a year. We can realise that each of us, with a little bit, like little grains of sand, we will be able to collaborate for progress in society and for the progress of humankind. It is also a very important task, very relevant, and it can also be- and I even tell girls this- very fun, because indeed, all of our workdays are totally different, we do so many different things."

To find out more, please visit the CALIPER Project website.

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