

TrendsTalk

Interview with Federico Ariel



Federico Ariel began his research for his PhD into the role of transcription factors in symbiotic nodule organogenesis in legumes with Dr Raquel Chan at Instituto de Agrobiotecnología del Litoral (IAL) in Santa Fe, Argentina. In 2010, his work was chosen as the best from all over Latin America by the Brazilian Society of Molecular Biology and Biochemistry (SBBq). He then obtained a European Molecular Biology Organization (EMBO) fellowship to join the group of Dr Martin Crespi at the Institute of Plant Sciences Paris-Saclay (IPSS) in France. During his time at Saclay (between 2011 and 2016), Federico pioneered the characterization of long noncoding RNAs (lncRNAs) in plants and contributed to the mechanistic understanding of their role in epigenetics and alternative splicing. In 2016, he obtained a permanent position at the Argentinian Research Council (CONICET) and set up his own group (the Epigenetics and Noncoding RNAs, EPILAB) at IAL, Santa Fe. The Ariel group currently studies the evolution of lncRNAs and their role in the dynamic 3D organization of the genetic information hosted in the nucleus of plant cells. Since his return to his home country, Federico Ariel has been awarded two national prizes for his research.

How did you decide on your current research topics?

My PhD research was undertaken in the framework of a collaborative project between the groups of Raquel Chan in Argentina and Martin Crespi in France. Between 2006 and 2010, I visited the French lab several times for our work on transcription factors in legumes. The Crespi group was by then pioneering the identification and preliminary characterization of the first set of lncRNAs in arabidopsis. Martin was fascinated by the potential roles of the so-called 'dark matter' of the genome. Also, anyone who knows Martin is likely to confirm his contagious enthusiasm about science. These were all reasons that made it easy for me to accept Martin's invitation to join his group in the challenging task of uncovering the function of lncRNAs in plants. During my postdoc in his lab, our work on lncRNAs guided me to the captivating field of epigenetics and genome topology, which remains to be the main research interest of our team in Argentina. Nowadays, I'm happy to keep on working with Raquel and Martin in very fruitful collaborations.

What would you be if you were not a plant biologist?

Certainly, an architect. This had always been my call as a teenager. However, a few months before graduating from high school, the world awoke to an amazing publication: the first version of the human genome. I still remember the precise moment when I came across an article about this scientific breakthrough in the local newspaper. I felt I was witnessing the beginning of a new era, and I followed my curiosity and the temptation to switch to science. At that point, I decided to study biotechnology at university. I definitely still like architecture, but I don't regret the choice I made.

Do you have a scientific hero?

A few years ago, I read *The Eternaut (El Eternauta)*, a science fiction comic created by the Argentinian writer Héctor Oesterheld who was murdered by the last military dictatorship in the 1970s. The main message I got from the story is that the true hero is the 'collective' hero, the 'group' hero, not the individual. And in my viewpoint, that's exactly what science is about. It aims at cooperating in the collective construction of knowledge.

Having said that, if I had to choose one person whose work I find inspiring, I'd mention John Mattick. His general view of the role of the noncoding genome in gene expression regulation from an evolutionary perspective helped me to leave behind the rigid dogmas which had shaped my initial understanding of biology. In other words, his work allowed me to step back, take a wider perspective, and better understand the larger picture of cell and molecular biology.

Are there any issues in scientific funding you feel strongly about?

Scientific funding in developing countries has been a recurrent problem. I try hard to keep an international environment in my group, hosting foreign students and setting fruitful collaborations. However, local investment in science fluctuates dramatically with each government, having an impact not only on our ongoing projects but also on our possibilities to participate in international networks.

I also observe a general trend around the globe towards funding applied plant science at the cost of fundamental research. Although I believe that the creation of novel

technologies deserves to be promoted, I firmly support the idea that fundamental plant biology is essential for developing innovative strategies for sustainable agriculture. We certainly cannot take care of the unknown. We need to gain a more comprehensive understanding of plant development and of the integrative responses to the environment. Given the current challenges in relation to agriculture, climate change, and global wellbeing, it is mandatory to minimize the negative impact of current agricultural methods.

What is the biggest hindrance to science?

Inequality. If every child had access to food and good quality education, there would certainly be a larger number of outstanding scientists helping to push the frontiers of knowledge. Inequality is, at the same time, the reason why so many people in this world don't have access to the benefits that science readily provides in order to improve our quality of life.

What big questions interest you in the long term?

I'm particularly interested in uncovering the basis governing the incredible high variability of functional lncRNAs across species and their contribution to evolution. My present ambition is to better understand how divergent noncoding transcripts can exert similar molecular roles in very distantly related organisms, even across kingdoms, and what functional information remains hidden in their sequences and structures. With respect to this, I've recently obtained a Fulbright Fellowship to visit John Rinn's group in Boulder, Colorado in the near future. I've always found John's work fascinating and this will be a great opportunity to undertake extensive research and compare plant and animal RNA biology and chromatin dynamics.

What are the future challenges in plant science?

In my opinion, the scientific community today is confronted with the enormous challenge [of] how to increase crops' productivity in the face of the impending climate crisis, while protecting and harnessing the rich genomic diversity which exists in local landraces. To that end, governments need to increase the investment in fundamental biology and make their decisions based on scientific evidence, even when this goes against economic interests.

<https://doi.org/10.1016/j.tplants.2020.06.001>