Nonia Pariente, Editor of PLOS Biology: "When i feel like working at a benchtop, i go to the kitchen"

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Nonia Pariente, Editor-in-Chief of PLoS Biology, delivered the seminar 'Behind the Scenes of Scientific Publishing

Dr Nonia Pariente graduated in biochemistry and holds a doctorate in molecular biology from the Autonomous University of Madrid. Her thesis focused on studying the evolution of RNA virus and the development of new antiviral strategies at Esteban Domingo's laboratory in the Centro de Biología Molecular. She later transferred to UCLA to undertake postdoctoral research, where she investigated the development of lentiviral vectors for gene therapy in IIrvin Chen's laboratory. Her idea was to cure HIV, but her path took an unexpected turn. In 2007, she joined the editorial team of EMBO reports and for 8 years she occupied different editorial positions, with responsibility for a wide range of subjects within molecular and cell biology. In 2015, she joined the team that launched Nature Microbiology, and focused her efforts on the field of microbiology for the publication, *Nature* , for several years until, in 2019, she became editor-in-chief of *Nature Microbiology*y. In March 2020, she joined *PLOS Biology* as editor-in-chief.

- **What is a virologist such as yourself doing in the world of medical publishing?**

I am a virologist. I devoted myself to science because I wanted to find a cure for AIDS; that was my vocation. That was my goal, and that's why I moved from a Coruña to Madrid: I wanted to do research in virology. I was in Esteban Domingo's group at CBM, the Molecular Biology Centre, and I did my postdoctoral research in the HIV lab. But I realised that the world of HIV is one of the least constructive scientific communities I've seen, and I've seen quite a few. That environment made me think of other things, it wasn't an atmosphere I liked. I like constructive science better, where everyone is rowing in the same direction to make advances in scientific knowledge. And I didn't see that philosophy in the field of HIV.

- **How did the idea for a change of scene arise?**

In Spain, there is a reductionist view of careers in science and a tendency to think that the only route is academia. When I did my post-doc, I soon realised that most of the group leaders spend most of their time seeking funding for their laboratory and, honestly, that didn't appeal to me. Also, at that time, 2003 to 2007, when I was doing my post-doctorate in the USA, the percentage of funding for HIV research was very low, lower than 10%. Knowing that you are going to spend your life asking for money in a very competitive world, with a very low probability of being given it, did not appeal. So I thought about the things I did like about science and what my strengths were. For instance, I'm good at interacting with people, being sociable, something that is not really necessary in a laboratory. So, I thought about finding something that would fit in with my skill set and I began looking for something related with science. I wanted to stay close to scientific knowledge and I began to be interested in scientific publishing. Through an email from a friend, I heard that they were looking for an editor at EMBO for one of their journals. It was a very long selection process, but finally I began working in EMBO Press, where I spent 8 years.

Editing was something that appealed to me. I write well and I have analytical skill. One of the things that made the connection easier for me was that the director of my post-doctorate was editor of a review, the Journal of Virology, and that's where I started. And that's how it all began.

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- **After EMBO, you went to the Nature Publishing Group**

I heard that Nature was going to launch the journal Nature Microbiology and it just so happened that I already knew the person who was going to be its editor-in-chief. I applied because I was excited about the launch of a microbiology journal, the Nature Group, etc. They were very exciting years.

I was also lucky to be able to cover a couple of maternity leaves at Nature, 2 years, and the opportunity to opt to editor-in-chief at Nature Microbiology. At that was when PLoS Biology contacted me.

The truth is that I began at EMBO, which is a non-profit publisher. After working at Nature for 5 years, when I began to have a more executive role as editor-in-chief, I began to see things that I didn't like. You have to take into account that the Nature Group is a business that aims to make a profit and when you are an ordinary editor you don't notice that, or your daily life is not affected by it, but when you are involved in strategic decisions, you get to see what that world is really like. And then PLoS appeared at a key moment when everyone was talking about open access, not-for-profit science. There were many things that appealed to me.

- **How can we classify the appearance of PLoS and the open science concept?**

The arrival of PLoS represented a catalysis of the system. At first, PLoS was set up thinking that it could act as a pressure group to make publishers 'see the light' and realise that open science was positive for science. They did not want to be a publisher, but as they faced reticence from business interests, they decided to launch their first journals to prove that it was possible. It's interesting to note that PLoS biology, which is now 20 years old, came out the same year as BMC Biology.

Why is there so much science in China, the best and the worst? Because they have invested to the hilt, much more than the USA, and of course, more than Spain

- **What is the meaning of the normalization of publication preprints that has arisen in biomedicine since COVID?**

Not everything goes, but we are moving towards a transformational future. Preprints were already beginning to take off before COVID and when the pandemic hit their time had come.

Preprints already existed in mathematics and physics. There was a movement that said, "we are going to put it out there and then we'll do the peer review." The reason is that publication is an increasingly slow process. I think that moulds will be broken in this area too. It often takes 1 or 2 years to publish, which means your scientific work is hostage, so to speak. And people need to publish to get on in their careers. There was already a movement that wanted to try to escape this dynamic, and the way this was done in physics and mathematics, areas where the peer review processes are even longer, is to publish in preprint. During COVID we saw that it does actually help scientific knowledge progress more quickly; that is unquestionable. But I should also highlight that open science is not the same as reliable science: they are not necessarily the same thing. There are even notorious examples of publications in *The New England Journal of Medicine* or *The Lancet* of articles that were wrong; peer review does not always get everything right. Although it is true that, in my experience, peer review improves articles. There have been innumerable surveys and research studies analysing the publication process, and in them researchers always say that to a large extent peer review improves their own articles.

- **Paying to publish seems a strange concept.**

The first time I published a scientific article in the Journal of Virology, a subscription review, I had to pay. I remember my father asking me how much they were going to pay me. And how I laughed when I answered him that the person who was paying was me!

So, we have to bear in mind that publication costs money. Even PLoS, a non-profit business, has to maintain a whole system to receive articles and pay all of its contributors.

- **There is a lot of talk about 'impact phobia'. Exactly what is it?**

Como as an anecdote, I'll tell you that although PLoS is not concerned about impact, our current impact factor (IF) is lower than 10, we have increased our IF while almost all of the journals in our ecosystem have dropped. For instance, we have one article whose citations have not been correctly counted. The great scandal about this is not merely that impact factor is a measure that was not created to evaluate specific scientists and articles: the concept was created so that libraries could know whether they wanted to subscribe to a journal or not. The scandal is also the fact that IF is calculated by a private, profit-making company with totally opaque practices. And the data are so bad that, for instance, the article I mentioned has been cited many times, but the citations have not been correctly counted, and we are fighting because this is a subject that matters to our authors. In my opinion, there is an obsession with the impact factor, which is a terrible measure of the impact a scientist's research. There are few things worse than the impact factor, however, the whole world is indeed obsessed with it.

- **In this sense there is now a new framework for open science in Spain, which has just been published and, in fact, one of its objectives is to change the way of evaluating researchers.**

Because in Spain, in some way, importance is evaluated. Sometimes articles are published in a journal and it's like throwing it in the bin. Not everything goes. We need to move towards a system that values much more how your research is reused and how useful it is to advance scientific knowledge. That's what real impact is. The problem we have, which the whole industry has, and what is being worked on, is that we do not have good measurement systems. Nowadays, there is no comparative measurement of all the journals in terms of HTML or PDF downloads, of the use of the data when they are open access, to create a series of measures that can serve us better than IF. For instance, to publish in Nature, what is valued is, of course, the novelty, but it also needs to be sexy. In the end, a lot of research is not replicated because people are doing acrobatics with the data to tell their narrative instead of explaining what happened. In fact, the appearance of the new publication paradigm, preregistered reports, is interesting. It consists of pre-registration of clinical trials, i.e., what is sent to a review to be evaluated is almost as if it were a project requesting funding. "This is my idea, and this is how I'm going to conduct the research." And if it is accepted, they will publish the article, regardless of the results obtained, because the question is interesting, and your approach is going to be conclusive. If we compare the articles that have been published in this way to normal articles, we find a significant percentage of negative or inconclusive results. And we also see that when there are ethical problems, the not-completely-reliable results are also presented, and they are almost always included during the review of the article. That means, you know what you have to do to be able to publish in the journal.

- **Are you intending to return to research in the future?**

I don't know. I think that ship has sailed and I'm happy with my career. When I feel like working at a benchtop, I go the kitchen