Dra. Valerie M. Weaver: “Most of our findings have been achieved through serendipity”

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Dr. Weaver participated in the Sixth Edition of the CNIC Conference, a scientific event organized by CNIC researchers Jorge Alegre-Cebollada, Nadia Mercader, Maria Montoya, and Miguel Á. Del Pozo and Martin Schwartz from the University of Yale (USA) titled 'Mechanical forces in physiology and disease'

Dr. Valerie M. Weaver is the Director of the Center of Bioengineering and Tissue Regeneration at the Surgical Department of the University of California in San Francisco. Dr. Weaver has been leading interdisciplinary research in Oncology for more than 20 years. Her current research focuses on the contribution of cell-intrinsic matrix as well as extracellular forces to oncogenesis and to the development of cancer. The excellence of her scientific career has been acknowledged with several awards: Breast Cancer Scholar Award and A Scholar Expansion Award from the Defense Department; the AACR Pancreatic Action Network Award, and the Women in Cell Biology MidCareer Award. Dr. Weaver participated in the Sixth Edition of the CNIC Conference, a scientific event organized by CNIC researchers Jorge Alegre-Cebollada, Nadia Mercader, Maria Montoya, and Miguel Á. Del Pozo and Martin Schwartz from the University of Yale (USA). The conference, titled "Mechanical forces in physiology and disease", gathered together international experts in the field of mechanobiology from many areas of expertise, including technology, cellular biology, animal models, human disease, and development.

For you, what does it mean to be a scientist?

At this moment developing a scientific career is a privilege. We have endless tools at our disposal, we get to ask ourselves the most interesting questions that lead to very original ideas, and there are more and more young people who get involved in this passionate career that is research.

When did your interest in science begin?

In my case, it was very natural. Pursuing a scientific career just seemed like the natural thing to do; for some reason, research was in my nature. And I knew it from a very young age. The problem was that my family was very traditional and my mother was very surprised, almost in shock, because at that time that wasn't what a young woman should do with her life. Fortunately, things have changed a lot and nowadays most women can freely choose what they want to study and be what they want to be. I have tried to give the most of myself and have dedicated a large part of my work to sponsoring other young people so that they have what they need in order to be able to build their scientific careers.

In your opinion, what personal qualities should a researcher have?

There is no doubt that having a mentor helps in building a scientific career, but a researcher also needs many other qualities. In my opinion, the most important quality a researcher should have is curiosity: the more interest they have in answering questions, the more possibilities they have in making a good scientific career. In addition, they must be creative. Most scientists, and I see a lot of this in my classes daily, are intelligent, and though you need this in order to be a researcher, it is not enough. No matter how much training you have and how intelligent you are, there is another requirement to be a good researcher: humility. Because, in reality, we are not discovering things, but rather, learning from what is already there. Being modest enables us to see things, listen to other people, learn from others' ideas that help us see our work in a different way and be humble enough to admit the truth when we find it. The key is knowing what the truth is. And, supposedly, we should be the "seekers of the truth". And that is what I try to do when I build a team of researchers from different subjects and ethnic, social, economic, and cultural groups. The idea is that they are able to reflect on how they want the world to be.

The more interest you have in answering questions, the more possibilities you have in making a scientific career

What "truth" are you looking for at this moment?

I would like to look into the relations that the mother cells have with their microenvironment. Concretely, I'm working on determining how the interaction of stromal-epithelial cells regulate the tissue development and homeostasis. Specifically, my group is exploring the molecular mechanisms by which these extracellular matrix receptors modulate the cellular destination. We are investigating how the mechanical and topological properties of the matrix, that are related with its composition and organization, regulate the function of the matrix's receptors, in order to alter the cellular behavior. Our investigation program is divided into two fields of investigation. The first one is centered on the understanding of how the composition and organization of the matrix influence the development of the breast tissue and the tumor development, and the second, focuses on figuring out the role that the strength of the extracellular matrix has on the destination of the embryonic and adult mother cells.

Why did you choose this field in particular? What do you think you can contribute to it?

I'm aware that there are many intelligent people researching in this field, but what I believe that I can contribute to this line of research is the capacity to integrate and combine different approaches, from the nano, going through the research of tissues, and reaching the clinic. This way, travelling from the most basic to the clinic, we can define with the clinical researchers what the most important things are to going back to the nano, and in that way, work in that direction. My idea of research covers from the smallest – the nano, until the patient. That's why I work from the most basic till the clinical. Working in just in one area is not enough for me. I believe that at one point of this line, we can find the truth. And, there's something that I'd like to highlight: I wouldn't be able to do this type of research if I didn't have such great collaborators or such a great team. In some ways, I see myself as an "integrator or conciliator" of different ideas, areas, perspectives, etc.

We researchers are a privileged group and we should be conscious of this

How should the scientific advances be transmitted to society?

As scientists, we cannot live isolated from society. In my case I try to have lots of relationships, for example, with patients that could really benefit from my research, and also with other groups of people. All the groups need to collaborate with one another. Most of the findings we have achieved have been through serendipity. And that is why I think modesty is important, we cannot believe that we know it all. The reality is that a lot of times you make a discovery in something that you were not really working on. For example, recently we discovered something that we had never worked on before and now we are doing a pilot clinical trial on chemoprevention with the clinical researchers. Not in a million years would I have been able to predict that I'd have these results. Every time that I think I know what I'm doing, something happens that makes me go back, to the most basic. And, that's marvelous.

However, we cannot forget that we are in debt with society. Our obligation is to transmit what we are doing. If we are arrogant and we distance ourselves from society, the image that we give is very negative. Us researchers are a privileged group and we have to be conscious of this. For example, for me it's a privilege that I was invited to CNIC to talk about science.

CNIC Conference: 'Mechanical forces in physiology and disease'. 4th and 5th of November 2016. Invited by Jorge Alegre-Cebollada, Nadia Mercader, María Montoya and Miguel Á. del Pozo (CNIC) and by Martin Schwartz, from Yale University (USA).