Interview: Mariano Esteban Rodriguez â?? President, Royal Academy of Pharmacy of Spain (RANF)

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Mariano Esteban Rodriguez, president of the Royal Academy of Pharmacy of Spain (RANF) and of the Institute of Spain (that integrates the 10 Royal Academies), discusses his current research interests in the field of virology as well his role within RANF, whose mission is to utilize the academyâ??s centenar expertise as a tool to advise the government on health and industry related issues.

Can you start by providing our international readers with an introduction to your area of expertise: vaccinology?

Over the last 20 years, we have been focusing on developing vaccines for the most prevalent human diseases worldwide, such as HIV that since the beginning of the epidemic in 1981 about 76 million people have been infected and 35 million have died. While the mortality rate has been greatly reduced through development of antivirals, it is still close to over one million deaths a year. In addition to our vaccines against HIV that have been tested in phase I clinical trials, our field of research also takes care of emerging diseases such as Ebola and Zika as well as diseases that have just been cured such as Hepatitis C, but still about 170 million are infected and most do not have access to current antiviral therapies. Last but not least, we are also considering developing vaccines against tumours using oncolytic viruses. We know that the WHO tell the world that vaccines is the most effective way to control diseases and it is, overall, the best way to save lives. Since their introductions, millions of lives have been saved. Thanks to the advancements in biology and

immunology, we now know how to best stimulate the immune system.

In essence, we aim to train and activate the immune system through the use of vaccination. This way the WHO campaign eradicated in 1980 the only human disease that caused endless deaths â?? smallpox. Through the knowledge that we have acquired in genetics, we are able to use the related attenuated viruses of the poxvirus family which we can modify genetically and use as a vector system to deliver genes from other pathogens or even from tumours. These vectors act as vehicle which, when introduced into the human body, they trigger specific immune responses that are going to activate the main components of the immune system and neutralize virus infection through the activation of B cells that produce antibodies and T lymphocytes able to recognize and destroy the infected cell.

[Featured_in]

Who do you collaborate with and how do you fund your research?

Since the start of the epidemic, the European Commission has considered HIV/AIDS as a top priority and has significantly invested in research. Our current efforts to develop a HIV vaccine is being funded in the framework of the EU response to the 2030 agenda of the Sustainable Development Goal (SDG) under Horizon2020. In addition to this, we receive support from the Bill & Melinda Gates foundation. We are currently in the process of conducting clinical trials â?? three phase III trials failed and only one proved 31.2 percent efficacy which is in the same range as the malaria vaccine. We also collaborate with Sanofi at global level. Spanish funding is also an important contribution to our research.

What is the function, the mission and the main objectives of the Royal National Academy, one of Spainâ??s most prestigious and ancient scientific institutions?

The purpose of every Royal Academy in Spain is to incorporate individuals which are distinguished by excellence in different fields â?? be it arts, humanities, sciences, legislature or engineering. Every academy has the responsibility to take the knowledge of every specialty and disseminate it through Spain. Among the responsibilities that we have, we advise the government as well as the private sector without having any political commitment. For instance, we have regular meetings with representatives of the health commission within the Congress and the Senate and our annual conference last year was in the Parliament. This interaction is very effective as we try to understand each other and conduct in-depth analysis of the needs and possible ways to joint forces. We have the very same approach with pharmaceutical companies â?? we offer them the opportunity to organize high-level panels open to the public on various issues, be it diseases or more technical regulatory matters. We also have regular meetings with King Felipe VI of Spain.

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In terms of research, Spain faces competition in Europe from the likes of Switzerland and the UK. What do you think is the role of Spain within the European and global life sciences sphere?

If we think of the Spanish research landscape over the past years, it is safe to say that it developed rapidly and significantly. Before the crisis, Spanish science was thriving, and it was spread out across the country and in all areas â?? biomedicines, physics and mathematics. This was also due to the fact that the government was very supportive towards science. Whenever I would travel abroad I remember officials would acknowledge how blossoming the Spanish life sciences sector was. However, after the crisis everything stopped and while we are gradually trying to move up, we need more resources and, above all, more investments as well as an increasing industrial

partnership to increase research and development.

Within the healthcare system, we have fantastic hospitals, with excellent physicians, well-trained technicians, and each and every one of them carries out excellent work. In fact, Spain is the second largest clinical trials hub in Europe and we have great research centers that emerged from this â?? the National Center of Biotechnology, the National Center of Cancer Research, the Cardiology Institute and various others based out of Barcelona and the Bask country which are both performing very well. All in all, we have a great network of research centers, hospitals and scientists, which is key for making things happen and develop products to be launched. As stated above, however, the crises scare investments away and it is our responsibility now to consolidate our position.

Now, it is widely recognized that there is going to be a need to integrate activities from the private sector with that of the public one. This is a big plus and I believe that this concept, which was unimaginable until some years, has disappeared. The government has the responsibility to attract further investments. Unlike other countries, we do not have a Minister for Science and Innovation dealing with such needs. During a high-level meeting in Lisbon in 2000, every EU country committed to improve their R&D spending, including Spain setting it at two percent of GDP by 2020. Nevertheless, just recently we came out with a press release to inform the government that Spain finds itself in a very delicate situation in regard to R&D and that the academies are very concerned about the way science is being neglected due to insufficient support from the central government. However, the government claims the private companies do not invest enough in R&D, support is insufficient and more should be done. During the crisis, while the UK and Germany have increased the funding for R&D by almost 30 percent, Spain decreased it by 10 percent. Now that the economy is back on track, the academies are asking for further support in the field of R&D and, specifically, for the creation of a Ministry of Science and Technology. In addition to this, we are advocating for new jobs and new positions in the public institutions such as hospitals and research centres, also in view of attracting back both Spanish talents that migrated abroad and foreign talents.

Why did you pick virology as a field of research and after all these years what made you stay in this field?

Given that my father was a pharmacist, I spent a lot of time in his pharmacy during my childhood. I have always wanted to come up with things that could potentially cure people and make them feel better. I started studying microbiology and I wrote my thesis in the field of microbes; it has always been of great fascination to me. Then I moved into studying viruses â?? right when smallpox was considered the most lethal virus in the world â?? and I gradually advanced into understanding how the virus works and affects people. This is how I continued. I learned that viruses are great tools to understand ourselves as our genome is filled with viral sequences. It is like microbes in our organism â?? they are actually helping our body to have a balance and stimulate our immune system! The â??bad guysâ?• are now helping us in the design of effective vaccines!

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