

Interview: José Carlos Machado, Vice President & Researcher, The Institute of Molecular Pathology and Immunology of the University of Porto (IPATIMUP)



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José Carlos Machado, Vice President & Researcher at The Institute of Molecular Pathology and Immunology of the University of Porto (IPATIMUP) speaks about Portugal's excellent research capacity and the need for greater collaboration between clinical and research centers to facilitate private funding.

Despite being a relatively small country and the economic crisis of the last few years, Portugal is very strong in research. Would you say that the research output in Portugal is where it should be compared to other countries?

In terms of research papers, number of PhDs, and academic related output, Portugal is at a good level due to significant investment in science over the last 30 years. Many Portuguese scientists publish in the most reputable scientific journals in the world. In the 1990s and early 2000s, there was an inflow of Portuguese scientists who were previously living abroad, which helped. But this output has dwindled somewhat due to the crisis.

In terms of interaction with industry, i.e. patents and licenses, Portugal is not at the same level as other countries or even at the level it should be given the number of scientists in Portugal. While science has evolved rapidly in Portugal, the industrial and commercial sectors have not kept up. I still think most Portuguese companies are not prepared to take in people with PhDs or to open up their own R&D departments. Portugal is simply not at the same level as Germany, Denmark or

Sweden. We have scientific expertise but without an industrial sector in the market that can absorb that expertise.

IPATIMUP is concentrated in oncology. How can the institution act as a driver for strengthening the country's oncology portfolio?

HCP and ITPATIMUP are bringing together institutions that are clinically strong and have good basic and translational research. IPATIMUP is very strong in identifying new biomarkers, performing studies and characterizing patients based on specific biomarkers. If we put together these two competencies with clinical institutions, we can attract the pharmaceutical industry to organize big clinical trials.

Over the last few years it has not been that easy. The big clinical institutions are in development, which makes them difficult to organize. The Porto Cancer Platform is trying to create a platform where different institutions can come together without typical institutional complexity. I think that bringing patients together through clinical trials using strong biomarker characterizations could be very interesting for oncology. The pharmaceutical industry needs this, and they struggle to organize this in wealthier countries. Portugal could provide this service at a more affordable price for pharmaceutical companies than in Germany or the US for example. We have the expertise to provide them with basic translational aspects, assuming that it is hard for a pharmaceutical company to conduct a clinical trial in oncology without bringing in the biomarker field immediately. Today you can no longer apply one therapy to all patients. The FDA would never approve a drug without being sure that there is a strategy to select the right patients for that drug. Portugal is betting on the need for this expertise to make us competitive in this field.

How would you describe the dynamics between government funded research and private research in Portugal today?

Research in Portugal is 99 percent government-funded for biological health sciences. There is very little input from the private sector, and for many years we have stated that the private sector should provide more capital for research. State funding usually means EU money. This must change, and it is not that difficult. Countries like the Nordics have better organization of research, and half of their funding is private. Those countries allocate three to four percent of their total GDP into research compared to one percent in Portugal. Unfortunately, I do not think any of this will change, unless perhaps research-based startups strive and help foster a more business-oriented perception of research in the private sector.

What are the relationships like between IPATIMUP and its partners?

We maintain two types of relationships. The first is through contract research. We meet regularly with international representatives of companies to help them with specific research tasks they need to perform. The most recent partnership was with Merck-Serono, who is funding IPATIMUP for a three-year project in which we will supervise the project jointly.

The other partnership relates to specific tasks in Portugal that are useful for pharmaceutical companies to sell their products, such as biomarker characterization in patients. For example, Roche has been selling Herceptin in Portugal for many years and needs breast cancer samples to be tested for HER2 amplification, which is primarily done at IPATIMUP. We are a reference center for that. We test while Roche helps by covering the costs. Thus, every hospital that wants their breast cancer samples tested for HER2 amplification can send them to IPATIMUP at no extra cost. We have similar protocols for other tasks and with other companies.

IPATIMUP has also received philanthropic support from a number of different pharmaceutical companies over the years. In what ways has the institute been able to give back?

The second situation I described fulfills that requirement. At this stage, there is no reason for a cancer patient in Portugal not to be treated at the highest level. If there is a specific therapy available, certainly there is local expertise to provide the patient, health institution or pharmaceutical company with whatever is needed at the clinical or molecular level. Currently, there are a number of limited protocols in place for specific cancer treatment. With just a few drugs available, if the patient falls out of these protocols there is nowhere to go. We cannot move away from established clinical protocols, but people are starting to understand that you can perform a molecular characterization and then treat the patient despite no previous clinical trials showing the effectiveness of the drug with that type of cancer.

If we continue with old methods, there are cancers that will never be treated because we will not be able to perform a clinical trial in standard terms simply because of a lack of patients.

IPATIMUP is planning to provide this type of service in Portugal. We will try to convince the pharmaceutical industry that we can establish a genetic testing platform here, freely available to every hospital and patient if the pharmaceutical industry provides some support to keep it running.

You serve as head of the diagnostics unit at IPATIMUP, which provides consulting services and training for medical and technical professionals. What is the added value of these services?

These services allow us to obtain good materials for translational research, which often comes from the diagnostic services we provide to the medical community. This also helps us establish connections with clinicians. You cannot do translational research without good clinical characterization of the materials that you study.

We also train many professionals. In the evolving area of molecular pathology, many pathologists still limit their activity to the use of the microscope, so to say. But now pathologists are being asked to look at things in a different way. The medical association in Portugal recently established a specific internship course for molecular pathology, and IPATIMUP will host the training for that. Now every pathologist doing an internship in Portugal will have the opportunity to get this type of training at IPATIMUP. This is an example of the value that our diagnostic service provides, which is of very high quality.

We are the only pathology and genetics lab in Portugal and Spain that is certified and accredited by the College of American Pathologists, which helps explain why we are considered a reference center in these areas.

How does that accreditation serve you in terms of broadening your international outreach?

While it took a long time, this accreditation allows us to form international partnerships. In 2013 we became a reference center for testing some biomarkers in Spain. We established an agreement for BRCA testing with India, and we now receive breast cancer samples from India for genetic diagnosis. There is a commercial kit available that is produced by Life Technologies. These next-generation sequencing platforms were developed by IPATIMUP and a genetics lab in the Netherlands. Through our partnership with Life Technologies, the BRCA testing kit is one of our flagship achievements and it is very much because of our accreditation.

In terms of genetic testing, what is IPATIMUP's competitive advantage compared to other groups focused on this kind of research?

We are very much interested in genetics in research terms, but on a small scale. IPATIMUP cannot compete with larger labs with factory-sized laboratories and 500 sequencing machines. We have the same technology, but use it on a smaller scale and to answer very specific questions.

Where do you envision Portugal's translational research by 2020?

If clinical and research centers could collaborate in an organized way to bring into clinical trials enough patients, that would be great. This would allow for the private funding we currently do not

have, although it would be quite tailored toward the pharmaceutical industry, which is not ideal because there are other industries that should be doing their part. But if we could put institutes together, we would create big partnerships with pharmaceutical companies and basic research would be more effective. But when we are 100 percent dependent on public funding, it is difficult, especially in today's context.

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