

Interview: José Pereira Leal, Group Leader Head, Bioinformatics Unit, Instituto Gulbenkian de Ciência Portugal

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Jose Pereira Leal, Group Leader Head of the Bioinformatics Unit at Instituto Gulbenkian de Ciencia, discusses the institute's unique selling point, stating that, "researchers will continue to come and stay here based on the excellence of research" that the country, and institute in particular, are currently experiencing.

Since its founding in 1961, by the Gulbenkian Foundation and through donations by Calouste Gulbenkian, what have been some major changes for the company throughout the years?

This Institute had ambitious goals, focusing its efforts in many different areas. This was during a time of dictatorship in Portugal, where universities and knowledge were not promoted as highly as they should have been, and those in universities were often not at the forefront of knowledge. However, many new activities were established at this Institute, such as the first computing center in Portugal. In the 1980s the focus shifted to biology, and in 1993 António Coutinho, former director, decided to establish a new PhD program to send people abroad. This was a pioneering program that sent 16 young people each year to the best research institutes in the world. Some came back, some did not. I came back after 10 years and set up my own research group. The Foundation had become an incubator of leadership, giving young people full independence at the beginning of their career. This has been the mode of operation for the Institute until now. The idea was to attract people from abroad and spread them throughout the country. It worked for a few years, but there has been an incredible development in the quality of many institutes in Portugal, thus this mode of action to attract people no longer made sense. Coutinho left in 2012 and was replaced by Jonathan Howard, which was also part of the plan to become more independent, which will involve recruiting different types of people and retaining people for longer. Despite the changes over the years, the constant evaluation of researchers by an external scientific advisory board has not changed, nor has the principle that the Group leaders need to obtain funding for their own labs, not relying on any core funding from the Institute.

Seventy percent of the Institute's funds come from various national and international private and public grants. Could Portugal stand out in comparison to other hubs for research around Europe to attract those investments?

Last year, the Institute received EUR 6.5 million from the Foundation, and the total budget is about €20 million. Therefore, EUR 13.5 million is obtained in grants. Looking at those grants, you will

find ERCs, the Bill and Melinda Gates Foundation, and many other private funds. The advisory board looks for people who think beyond the mainstream, individuals willing to set up their own research ideas with a small group.

Not through sheer brute force, but through original research. Like most Portuguese institutions, we have not made a major effort to participate in European Consortia to access the previous framework programs of the EU. However, this will have to change regarding the new Horizon 2020.

How does the Institute work with pharma companies?

Gulbenkian is traditionally a basic research institute, and therefore it does not have a tradition of working with pharmaceutical companies. Researchers were recruited to work here because they were pursuing a specific biological problem. However, excellent research gives rise to excellent translation. Several spinoff companies came out of the Institute based on this basic research, including one I am working on myself based on a new type of antibiotic. The Institute has not had a very active role in promoting entrepreneurship, but does help anyone who needs assistance. Individual groups may have their own individual research contracts with pharma companies, but these are merely collaborations. More recently, the Institute has been looking much more towards how to facilitate these translational avenues. Gulbenkian recently established a partnership with Merck Serono, who will help us identify what is valuable within our portfolio of research, and they will also develop certain molecules within the Institute on their own or in collaboration.

Portugal's clinical research needs development, and the Gulbenkian Foundation set up a PhD program for medical doctors that provided months of seminars and workshops on translational and clinical research, and then paid these doctors protected time away from their clinical practice. This time was meant for them to do research in a lab, typically internationally, and then to return to their own institutions and develop clinical research programs there. We have done four generations of those. We expect that these doctors, with an international experience at some of the best centers in the world, will help bring new dynamics to their home institutions in Portugal, and that they will also help us make our research at the IGC more relevant to the bed-side.

What is the competitive advantage of Gulbenkian in comparison to other research institutes?

Our first advantage is our pursuit of interdisciplinary research. Looking at the collaboration network within the Institute, many of the papers and grants that come out of here involve multiple groups, sometimes in a non-obvious way. People come here and end up working on things that they did not expect. For a biological research institute we are quite widespread. We have people working on plants, viruses, bacteria, animals, immunology, evolution, and mathematics. Within the Portuguese landscape, that critical mass combined with multiple foci makes the Institute stand out. We have also outstanding central facilities with the most recent technologies, from imaging to DNA sequencing, that represent a competitive advantage to the groups here.

Your area is focused within computational genomics. What are the developments of your work in genomics, and what is the scene like in Portugal?

At the national level the main current development in the genomics area, in my opinion, relates to infrastructure. Our national funding agency is planning a road map for scientific infrastructures. This is a call for people to organize themselves around specific technology and infrastructures to propose management of this infrastructure. One example is the Portuguese Genomics Network, in which every Portuguese center with high sequencing abilities, the IGC included, has agreed to follow common protocols and modes of engagement with the public. This allows isolated machines and platforms to work together like a distributed sequencing center with considerable capacity. In this regard, the genomics landscape in Portugal is taking its first steps in terms of clinical application. At

the IGC we also already started this infrastructural move on translational genomics by establishing a genotyping facility that allows fast and cheap genotyping of very large numbers of samples. This has enabled a series of human genetics studies on the susceptibility of diseases such as Diabetes, Stroke, Malaria, among others.

Additionally, the IGC proposed the creation of biodata.pt, a national biological information infrastructure, which is an extension of a European infrastructure called ELIXIR. I am the coordinator of that network here in Portugal, and the Institute is now formally integrated into ELIXIR. I would also add that one of the biggest emphases of the Institute has been computational and theoretical biology.

Can Portugal become a hub for genomics, or is it just playing its part in the global development?

We have a very good education system in Portugal that provides us with an outstanding pool of graduates, and compared to other countries that are also now investing in this area, this is a big advantage. Historically, Portuguese is the fifth most spoken language in the world, which in terms of access to samples and markets it is more easily run from here. UNESCO and similar organizations are making an effort to catalyze the creation of an infrastructure to organize human genetic information. UNESCO is currently setting up a research center here to help develop research in Portuguese-speaking Africa. The organization is actually singling out human genetics as an area for which Africa needs help, and the continent should not be left out of the revolution. Rather than thinking in terms of competitive edges, it is more important to consider the individuals with particular ethnic backgrounds covered by the Portuguese language. It is not the 10 million in Portugal at stake, but the hundreds of millions of Portuguese-speaking people who would not be considered for genetic testing we see today. This is a real opportunity for Portugal to stand out.

What is the value proposition of this Institute in the future?

The Gulbenkian Institute produces more and better science per dollar than most institutes in the world, but it cannot compete with the significantly larger markets. We need to change the method and level of funding the Institute, which the Foundation has already started. The Institute recently increased funding by 50 percent, which makes a huge difference since researchers account for most of the budget. But more money is not always the best strategy. We need to ensure we have many sustainable services that are available to others when there is spare capacity. The Institute is also starting a new recruitment drive that involves us actively recruiting and in a more targeted manner, rather than waiting for individuals to apply. This will build more critical mass in specific areas without losing the interdisciplinary nature with which we identify. The issue of understanding translational potential has not been of concern until recently. The Institute's partnership with Merck is part of that focus, particularly with IP. We are in discussion with pharma companies regarding their involvement in our graduate programs to provide insight. We are at a point of consolidation. Researchers will continue to come and stay here based on the excellence of research.

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