Science Funding in Developing Countries

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I am sure that most, if not all, of you agree with me in that science is one of the most fascinating and exciting activities that we, humans, perform. Indeed, thanks to science we have been able to understand our universe, our world, and ourselves. What we know as science and the scientific method is a relatively recent human activity -"born" about 500 years ago- considering that our species is around 100,000 years old. During the last five centuries, science has moved forward, allowing us to improve our lives in many ways. And during the last six decades, science has been moving so fast, that it is really difficult to cope with all the information that is being generated. Every week, if not every day, we read of advances and achievements in different areas, such as physics, chemistry, biology and medicine. New discoveries are being reported at an incredible speed in hundreds of scientific journals. Today, a new galaxy; tomorrow, a new gene; the day after, a new genetic disorder; and next week, the results of a new clinical trial. It is simply amazing!

Now, I am sure that you all have noticed that the vast majority of the great discoveries that we hear and read about come from research groups from developed countries, and only a few come from groups working in developing countries. Why is that? There are, actually, several reasons, but clearly, one of the most important is funding. The amount of money that developing countries spend in science is, in general, dramatically less than that in their developed counterparts. And this makes a great difference.

In order to illustrate the points I want to make here, let's take Mexico, my home country, as an example of a developing country, and the United States of America as an example of a developed one. In 2014, the population in the USA (just over 316 million people) was around 2.70 times larger than the one in Mexico (almost 117 million people). In that year, the Gross Domestic Product (GDP) of the USA was almost 14 times higher than the one of Mexico. Out of the total GDP in each of these two nations, the USA spent 2.71% for science and development, whereas Mexico spent only 0.43%; this means that the USA spent close to 90 times more money in scientific research than Mexico.

Let's now consider the case of cancer research. In 2014, almost 127,000 new cases of cancer were detected in Mexico, whereas just over 1,660,000 cases were detected in the USA; that is a 13-fold difference. In that same year, almost 79,000 people died of cancer in Mexico, and 580,000 people died of cancer in the USA; that is a 7.3-fold difference. Considering these statistics, it would be interesting to know how much money these two countries spent that year for cancer research. Well, according to information from the National Institutes of Health (NIH), in 2014 the US government spent around 5,200 million

US dollars. Unfortunately, there are no official figures for the exact amount of money the Mexican government spent for cancer research, but an estimate –based on the budget of the National Council of Science and Technology (CONACYT), the Research Council of the Mexican Institute for Social Security (IMSS), the National Institute of Cancer (INCan) and the National University of Mexico (UNAM) devoted to cancer research- such an amount would be around 350 million Mexican pesos. Considering that 1 US dollar equals 18 Mexican pesos, roughly. This means that for every single US dollar the Mexican government spent for cancer research, the NIH, alone, spent 250 US dollars.

The above figures consider only the money that comes from federal funding. Let's not forget that in the USA, a great amount of money for medical research comes from the private sector. In Mexico, however, medical research receives very little funding from the private sector, which is even lower than the money coming from the government. Thus, what are the options for a well-established biomedical scientist working on cancer research in Mexico? She/he has to apply for funding through local programs from their own institutions (e.g. IMSS, INCan or UNAM) or from CONACYT, and compete with her/his peers for the small amount of money available. And how much money can she/he get to run her/his project? Well, a standard grant from CONACYT for a two-year project would be around 1.8 million Mexican pesos; that is to say, 100,000 US dollars (50,000 US dollars per year). Numbers and figures for biomedical research funding in other developing countries may be similar.

Considering the limited funding for biomedical research in countries like Mexico, is it possible to perform good-quality research? My answer is a big yes! In my opinion, good quality research is not synonymous with expensive and/or sophisticated research. You can always ask good unanswered questions, you can always design good experimental approaches to respond them, and you can always write good articles. They may not go to the top journals (nowadays, top journals in the biomedical field want innovative manuscripts with mechanistic approaches that may require sophisticated technology), but they will contribute new, relevant information that may bring some light to a particular problem. Of course, a scientist doing research in a developing country can also look for collaborations with colleagues in developed nations. That is always a good option that should be kept in mind. This, indeed, is one of the actions that international scientific societies should promote and favor.

Doing research is not only wonderful, but essential. Science is, in fact, the driving force that has positioned countries like the USA, Great Britain, Germany and Japan, to name a few, as world leading nations. However, getting funding is hard. It is hard in developed countries, and it is even harder in developing ones. All of us doing research in countries in which science is regarded as a low-priority activity, hope that our governments' policies will change in the near future, and scientific research will be regarded as a fundamental activity that will help to move our countries forward. In the meantime, we have to keep working hard and enthusiastically in order to contribute to the generation of new knowledge.

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