

editorial

Biotechnology and Puerto Rico: Promises that must be kept

The articles in this issue provide a sampling of the diverse efforts in the general area of biotechnology carried out in Puerto Rico. Appropriately, given the critical importance of the pharmaceutical industry in the island, I start by mentioning a meeting summary that presents the highlights of symposium entitled “Drug Discovery, Development and Clinical Research in Academia”. This meeting was held on the 95th anniversary of the University of Puerto Rico School of Pharmacy. A major theme of the symposium was the increasing importance of academia in the process of drug discovery, which should lead us to ask some tough questions regarding this trend in Puerto Rico. Are we effectively transferring technology from our universities to industry? What are the appropriate parameters we should use to gauge our strides in this area – number of patents per faculty member or per dollar spent in research? How do we rate compared to others we would like to consider our peers? Are we supporting and remunerating faculty efforts to move in this direction? Whereas I do not have all the answers to these questions I venture that, if we could get the requisite data to answer them, we would conclude that there is much work to be done. Equally, I suspect we should be able to identify specific areas where Puerto Rico has a clear strategic advantage.

One such area may very well be the interface between medicine and engineering, which is addressed by two reviews in this issue. One on Magnetic Fluid Hyperthermia touches on the use of magnetic nanoparticles to specifically deliver anti-cancer drugs to tumors. The other deals with the use of nanoparticles to create imaging sensors of heart failure. Given the widespread and robust effort in medical devices in Puerto Rico, bioengineering represents an opportunity for the academic community.

Another unique strength of the community in Puerto Rico is a strong tradition of marine biology. The review entitled “Biotechnology and Biochemistry of Marine Natural Products” suggests a route to the production of important marine compounds by understanding the enzymes that synthesize them.

Finally, Puerto Rico sits at one of the crossroads between North and South America – a key location for the movement of goods and people. These positive aspects of globalization come hand in hand with a danger: the epidemic spread of disease. An excellent case in point is the rapid spread of the porcine H1N1 influenza of 2009 – the first declared pandemic in over 40 years. Two articles in this issue focus on infectious diseases. The first deals with the important question of pathogen discovery, in this case the authors use DNA sequencing to identify *Mycobacterium mucogenicum* in an autopsy specimen. Pathogen discovery technology and application should be a priority in Puerto Rico since the island due to its location, climate and socioeconomic structure could be an important partner in the global prevention of epidemic diseases. Following pathogen identification a

robust biotechnology industry should carry out investigation and intervention. The second article on infectious diseases highlights one of the more critical unmet needs in global health: the creation of a tetravalent vaccine for dengue. The vicissitudes of the immune response to the four dengue virus serotypes and the phenomenon of antibody dependent enhancement, which explains why subsequent infections with different serotypes can lead to more severe disease, make this a challenge. Are we ready to deal with a new pathogen reaching our shores or even for an old foe like yellow fever, which would have to travel only a few hundred miles to the north?

The sampling seen in this issue leads me to think of two promises that must be kept. Biotechnology promises to protect society from the ailments and threats described in these and many other articles – and we, the members of the biotechnology community, should continue to ask the difficult question: how well are we keeping this promise? Equally, society (represented by our government) promises to protect biotechnology. This can be justified because of the benefits in turn promised by biotechnology, but in the case of Puerto Rico the most important justification is that biotechnology provides us with one of the few viable avenues for economic sustainability.

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