Educating young scientists

Biotechnologists for Export

In the 1970s, when I inquired if a certain publishing house was interested in printing a popular-science text about biotechnology, the response was: "What's biotechnology?" Even though the wider public is commonly familiar with many advanced disciplines at least to a certain extent, biotechnology first made its mark on the public awareness only a decade or two ago. But today biotechnology is already exerting an impact on the world's future – it suffices to recall the new techniques being employed in medicine, agriculture, environmentally-friendly industry, and the search for new energy sources. The above incident in the present author's efforts at trying to popularize biotechnology shows that professors knew about this new field's emergence before ordinary newspaper readers did. And so what does a professor do, when alarmed at the lack of public recognition for what he or she feels are important facts and developments? Together with other professor colleagues, he or she pulls together a Commission. In this case, our Commission decided to write a "Report on the State of the Art," and I was one of its co-authors. This report discussed the state of R&D work in biotechnology, both in the world and in Poland, and it drew conclusions. The Polish Academy of Sciences published the brochure, and established the corresponding Committee, followed by the Polish Biotechnology Federation. Work also began on another task for professors: educating young biotechnologists.

More than 20 years have passed since then. Biotechnology has made incredible progress in the world, and is now said to represent the most crucial challenge of the 21st century, alongside nanotechnology. We have also done extensive, fruitful work in Poland towards training personnel. There are now biotechnology programs at institutions of various profiles: technical and general universities, agricultural colleges, and inter-university programs. Each year such programs take in 1,200 new students, and output a bit fewer than 1,000 graduates. Yet a majority of them come up against a wall: facing no employment prospects in their field of study. At least in Poland, that is, because any number of them are "snapped up" abroad. Foreign companies thus receive finished products (well-educated, bright individuals), without paying for the costs of obtaining them. And biotechnology programs are indeed costly. While this problem does not plague biotechnologists alone, it does seem to me to be particularly acute here.

Biotechnology needs us to educate capable young people with "crazy" ideas (the task of professors is to review these ideas critically), who are capable of understanding and taking risks, and skilled at asking the kind of questions we don't yet have answers to. Yet who are at the same time mindful of the technological challenges, and have their feet firmly planted on the ground! Such predispositions are not tested on entry exams and are not promoted in university programs. And so, do we really produce as many as 1,200 individuals with such traits each year in Poland?

It is evident, therefore, that educating staff is simply not enough. Also crucial is what they are taught, and what place we find for newly-trained, eager young biotechnologists. We definitely do know how to produce excellent scientists who will go on to devote themselves to fundamental research; Poland's achievements in this regard are greater than the meager funding for such research might indicate. Yet in the field of innovations, in the application of developed technologies, we are at the other end of the scale, even falling behind countries that have not yet joined the EU.

A biotechnologist is in a way akin to an artist: the field requires nonstandard ways of thinking, leading to innovative solutions

The development of "practical biotechnology" in Poland is hampered by a research funding mechanism held over from the former regime, favoring fields close to military application. Moreover, our teaching staff is frequently conservative, finding it more convenient to hide behind research work than to risk seeking partners for developing applications. And so, perhaps complaints about inflexible ways of thinking among young people should be addressed to the teachers rather, than to the young people themselves? On the other hand, we should ponder whether the prevalent view in Poland, that research teams are able to implement biotechnology projects on their own, is correct. In my opinion, it is not. Biotechnology firms, in turn, do not want to purchase their good ideas, i.e. "bare" research results, which offer a difficult bases for commercial business. Thus we have a hard-to-leap gap between our level of knowledge (here things are good), the number of application grants and patents (here they are not so good), and getting things moving towards real implementation (here they are very bad). We need companies to invest high-risk capital and university-affiliated business incubators to help scientists make it through the most difficult, initial stages of turning research results into real products.

MAGDALENA FIKUS
Institute of Biochemistry and Biophysics,
Polish Academy of Science,
Warsaw Science Festival
m.fikus@ibb.waw.pl