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Nurturing a viable biotechnology industry

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A BIONIC man, once the subject of a cheesy 1970s TV show, no longer seems impossible now that biotechnology has become a force to reckon with.

With genetic manipulation already creating faster athletes, can scientists one day give a person super-bionic abilities? And can Malaysia hope to develop that kind of biotechnology on its own?

Last week's BioMalaysia 2002, the first international biotechnology conference in the country, showed us that we have a way to go.

At the conference, which drew almost 2,000 scientists, industry players and policy-makers from over 20 countries, participants presented cutting-edge research, debated the ethics of genomic therapies and pleaded for science to prevail over profits.

In the midst of all those fevered discussions was the host country's efforts to be seen as a potential biotechnology player.

It's making a relatively late arrival on the scene, but Malaysia is pitching its hat into the ring with plans to develop its biotechnology infrastructure, the centrepiece of which will be the much-touted BioValley, to be set up in Cyberjaya.

From a scorecard point of view, Malaysia already has a number of advantages over other developing countries that want in on the solutions and enormous profits that biotechnology can provide.

We have an established history of agricultural research, a bonanza in biodiversity resources just begging to be tapped, and, in the BioValley project, a clear demonstration of the political will to see biotechnology emerge as a pillar of the knowledge-based society we're striving to be.

That's the good news. But Bio-Malaysia 2002 also threw into sharp relief some of the challenges that Malaysia must overcome before it can hope to be taken seriously as a biotechnology contributor.

In his opening address, Prime Minister Datuk Seri Dr Mahathir Mohamad zoomed in on the biggest problem: our inability thus far to take advantage of the assets we already possess.

"We've achieved some positive results (in biotechnology research), but they are insufficient compared to the potential," he said. "Our R&D have not yielded a lot of new patents and enterprises, and that reflects our in-adequacies, which don't match our resources."

Biotechnology research is being carried out in a number of centres, including the Malaysian Agricultural Research Development Institute, and in nine universities, particularly Universiti Malaya, Universiti Kebangsaan Malaysia, Universiti Sains Malaysia and Universiti Putra Malaysia.

But Malaysia still lacks a sufficient number of scientists and workers trained in the biotechnology field. There are some 500 biotechnologists now and 3,000 undergraduates every year, though it isn't clear how many of them stay in a field notorious for long research periods that don't always end in satisfactory or commercially viable results.

This manpower shortage is having a very real impact; many local speakers, for example, pointed to the country's status as one of just 12 mega biodiversity countries, which essentially means we're sitting on a potentially huge database of natural resources.

The idea is that biotechnology can tease solutions to some of our biggest health headaches out of our jungles.

But to exploit these resources, they must first be identified and

catalogued, and thanks to an insufficient number of trained people, progress has so far been slow.

According to Mohamad Ikram Mohd Said, UKM's Science and Technology Faculty dean, there are only 40 organic chemists in public universities.

Since 1996, local researchers have only been able to publish 62 papers on biotechnology research based on biodiversity resources. And of the estimated 75,000 fungi associated with flowering plants in Malaysia, only a little over 2,000 strains have been identified. The work has barely begun.

Problems also crop up from a legislative perspective, as no single law governs the country's vast store of flora and fauna.

Researchers also complain of a lack of communication between universities, government agencies and other parties involved in biodiversity R&D.

"Sometimes they don't communicate at all," said Mohamad Ikram. "We tried setting up a co-ordinating committee a year ago, but we had to disband it because no one was listening."

Some local speakers argued that because Malaysia's biodiversity can only be developed over the long term, the country should first focus on the pharmaceutical sector instead.

"It will yield results faster," said Tan Sri Dr Ahmad Zaharuddin Idrus, Science Adviser to the Government.

"In agro-related biotechnology, you only get a percentage of returns but the returns in pharmaceuticals are 100 per cent."

Again however, the country's research into biopharmaceuticals is still in the early stages, and only eight projects have been approved since 2000.

The same can be said for the animal biotechnology, which UPM professor Aini Ideris described as still "in the embryonic stage".

In fact, while other speakers presented some fresh and up-to-date research - from growing redder and more nutritious tomatoes to developing diabetes treatments from Russian tarragon - local speakers were often only able to outline Malaysia's R&D priorities.

That's not to say that some progress hasn't been made. Under the National Biotechnology Programme, which co-ordinates ongoing biotechnology R&D in the public sector, there have been 18 new products, including transgenic rice resistant to disease and diagnostic kits for dengue, malaria and Japanese encephalitis.

The programme has also developed seven new processes, including gene transfer technology and plant regeneration systems for rice and orchids. There have been some commercial results too, such as rapid tests for malaria and typhoid, and diagnostic kits for white spot virus syndrome, which saves the local shrimp industry RM72 million every year.

Some exciting research is also being carried out by Malaysian scientists working outside the public sector; the Cancer Research Initiatives Foundation in Subang Jaya Medical Centre, for example, is using biotechnology to identify the molecular signature of cancer cells and the in-herited risk of cancer among Malaysians, and to plumb local biodiversity for innovative cancer treatments.

Our late start meanwhile, puts us in a position to survey the landscape and see how best to position ourselves in the coming years. The conference certainly showed up some gaps in Western biotechnological progress that we may wish to occupy.

We suffer, for example, from many of the same infectious diseases that afflict other Third World countries, diseases which have been largely ignored by medical researchers in the West.

Tikki Pang, director of research policy and co-operation in the World

Health Organisation, said advances in genomics were not being applied sufficiently to the problems of developing countries. Could we take up the slack and work to provide these solutions?

Such a course would fulfil the vision of altruistic and humane biotechnology that Dr Mahathir argued for in his keynote address. Beneficial science, he said, and not corporate greed, should fuel human endeavours in biotechnology.

For now at least, super-bionic abilities will have to wait. But if the local programmes put in place to nurture a viable biotechnology industry can be pulled off, the future lies wide open.