From de editor Jasmin Kossenjans

An island to be reckoned with: Singapore and the world of biomedical science

The game is on in Asia to attract foreign investors into their portals, to set up shop in the area of biomedical sciences. With various countries offering different incentives to attract companies from the west to use their turf as a "door to the Asian market", few countries in Asia have invested as much as Singapore when it comes to infrastructure and manpower support. Jasmin Kossenjans discusses what this small island has to offer, and whether their investment will pay off.

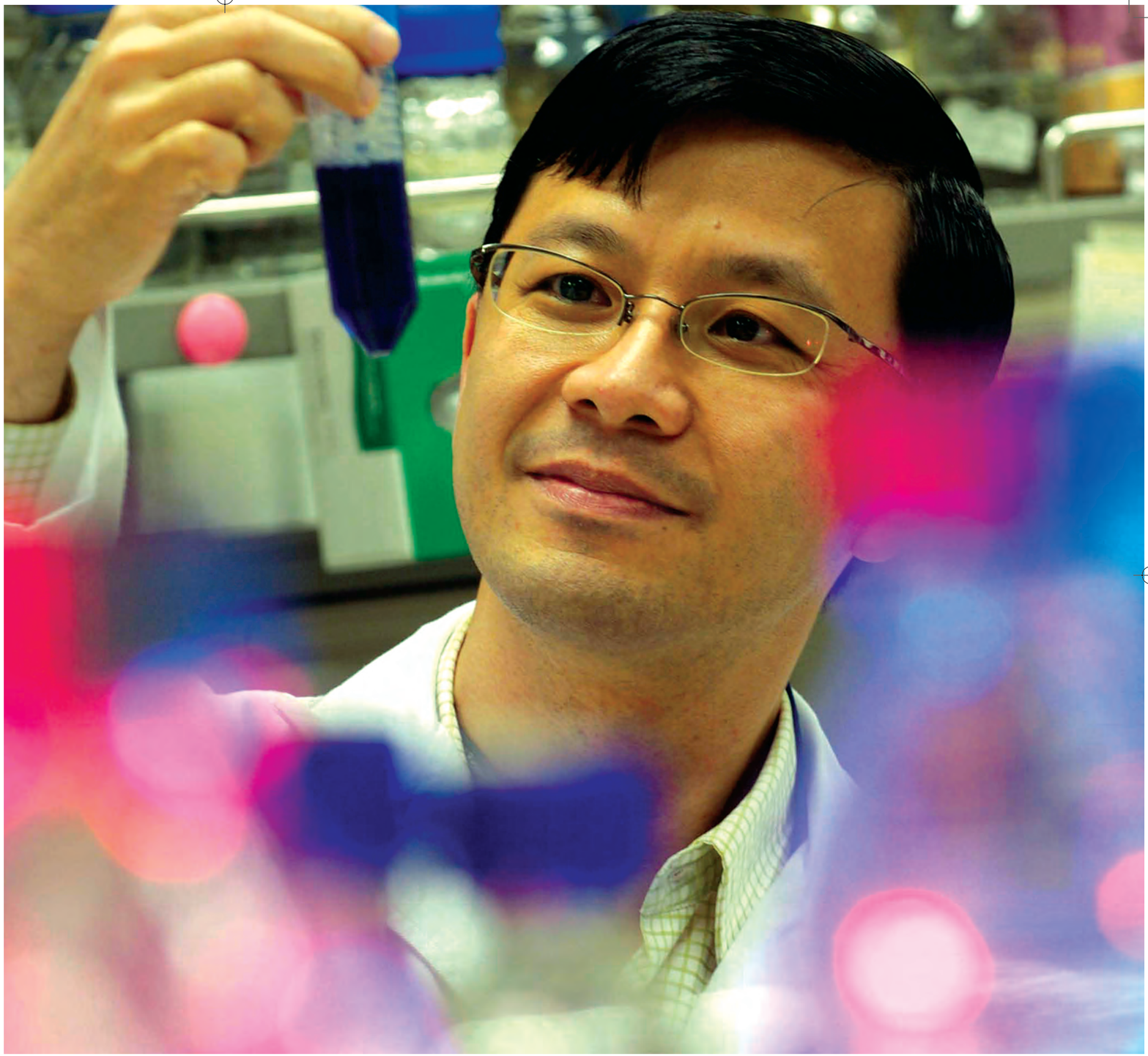
Helios, Chromos, Centros, Nanos, Proteos, Matrix and Genome. All names sounding as if from a science fiction film, but are in reality names of buildings which make up The BIOPOLIS; a cluster of seven glass and steel buildings located in Singapore. Five of them, each dedicated to an area in biomedical research, while the other two for industry. With further developments in housing for researchers and restaurants on the drawing boards, the BIOPOLIS - developed at a cost of S$500 million - will become Singapore's dream of a science-city within a city.

The Idea and A*Star

With the aim to make the biomedical sciences another pillar of Singapore's economy, the focus here is to turn biomedical research into treatments and commercial successes, which clearly influences the types of researchers and industry the country wishes to attract.

As recently as 2004, the Centre for Molecular Medicine (CMM) was established, with a mission to bridge the gap between basic science and clinical medicine by pursuing research that has major relevance to important clinical problems and strategic importance to Singapore.

The financial support given as incentives to foster research, are differentiated between private and public bodies. A*Star, the government's Agency for Science and Technology and Research, finances research done by the public sectors such as hospitals and universities. A separate part of the Singapore Economic Development



Board (EDB) responsible for the development of the Biomedical Sciences industry - The EDB Biomedical Sciences Group (EDB BMSG) - plans and executes strategies to develop Singapore for business and investment, offering financial incentives attracting bio-med companies to set up their offices in the country. Currently Novartis and GlaxoSmithKline are among the big names to be found there. Bio*One Capital is the dedicated Biomedical investment arm of EDB, who manages funds in excess of S$1.2 billion and has strategic investments in over 80 companies worldwide.

"We have created a place, where researchers from both public and private sectors are co-located, and can meet over lunch or a drink, to discuss what they are currently working on," says Associate Professor Lam Kong-Peng, Acting Executive Director of the Biomedical Research Council within A*Star. *"Industry, investors and researchers network easily, by simply crossing the road from one building to the next."* Over 2000 scientists can be housed at the site.

Another novel concept is the sharing of resources, such as conference facilities, and scientific resources. The Biopolis Shared Facilities (BSF) have dedicated resources to manage and provide scientific services, supplies and space to researchers. Core services comprise glassware washing and media preparation which provides in-house production of a variety of the most commonly used tissue culture and bacterial culture media and lab supplies. The lab supplies service stocks a wide range of chemical, plastics and glassware that enable users to reduce both purchasing delays and cost. A *"rent as you use"* idea for tenants, which help keep costs low.

Attracting the best in foreign talents

One of the world's most-cited researchers to recently call Singapore his new home (see info box researchers at the BIOPOLIS) is Professor Axel Ullrich from the famed Max Planck Institute in Germany. He is a visiting scientist and research director at the Centre for Molecular Medicine.

Ullrich has been on the BMRC's International Advisory Council since its launch in 2000, being part of a team of researchers who provided the island with its strategy for turning Singapore into a biomedical hub. It is now chaired by Sir Richard Sykes, rector at Imperial College London.

It was Ullrich; impressed with the speed and dedication Singapore has shown in pursuing the goal of being an important centre for biomedical sciences; who approached the chairman of A*Star in building a lab at the BIOPOLIS. *"I asked*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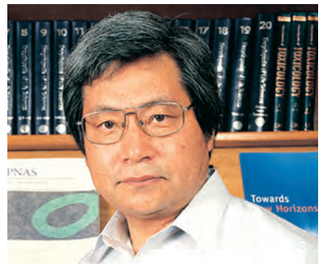

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Key researchers at the BIOPOLIS

The BIOPOLIS has managed to attract perhaps some of the top leaders in biomedical science

1 Professor Sir David Lane is one the most cited scientist worldwide. Originally from the University of Dundee Scotland; he is credited for discovering the cancer gene p53. He is currently the Executive Director of the Institute of Molecular and Cell Biology (IMCB).

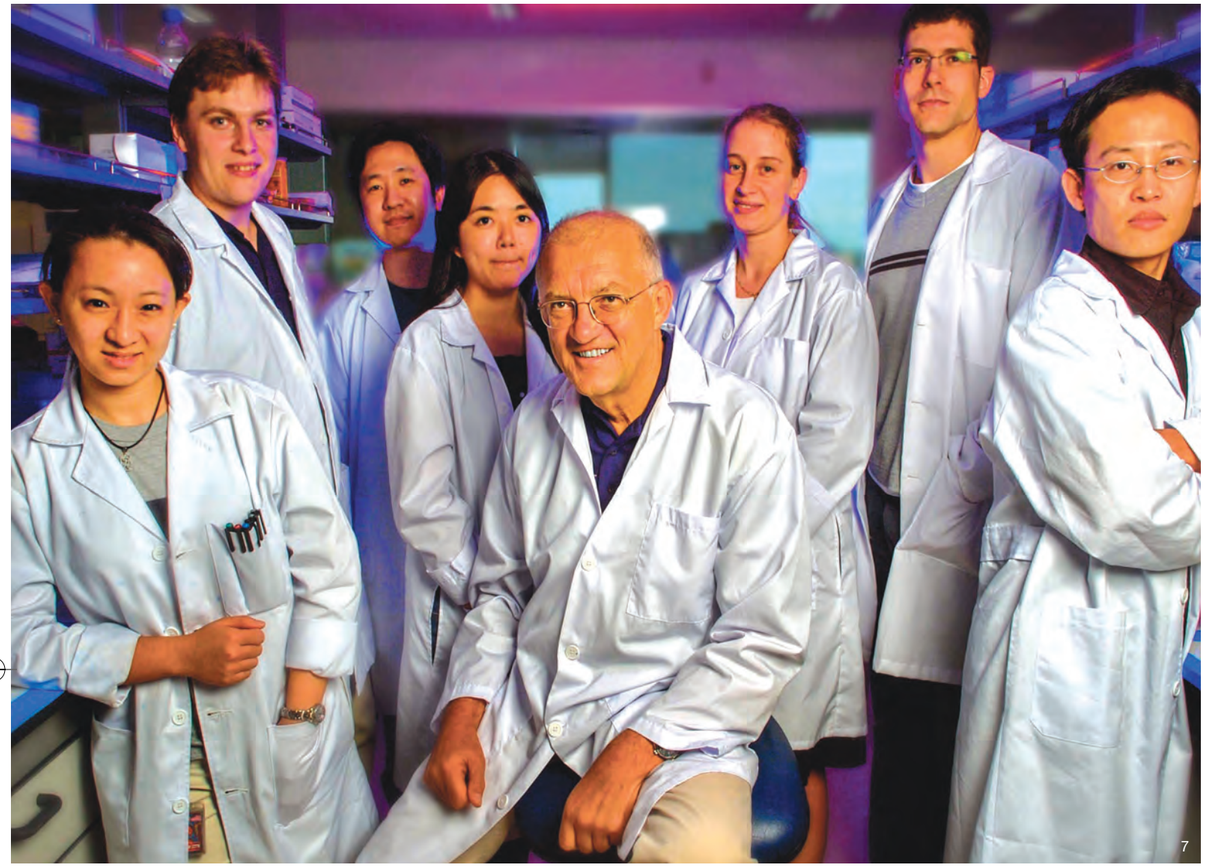
2 Professor Edison Liu former director of clinical sciences at the US National Cancer Institute, has heads the Genome Institute at the BIOPOLIS since 2001.

3 From Japan, Professor Yoshiaki Ito, famous for his research on the RUNX3 gene as a tumour suppressor in gastric cancer, is now located at the Institute of molecular cell and biology.

4 Professor Jackie Ying, a Taiwanese who has spent her childhood in Singapore, was recruited in 2003 from the Massachusetts Institute of Technology to head the A*Star Institute of Bioengineering and Nanotechnology.

5 Professor Axel Ullrich from the Max Planck institute of Biochemistry in Germany, is currently in Singapore as a guest researcher, and heads the Onco Genome Laboratory at the BIOPOLIS – a joint venture between Max Planck Society and A*Star.

6 Professor Ian McNiece from John Hopkins University in Baltimore, Maryland, has moved to Singapore to head the new John Hopkins biomedical division at the BIOPOLIS.



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Philip Yeo one day over drinks, what he thought of the idea." Explained Ullrich, *"His answer was "yes, why not?"*, Ullrich ended up bringing himself and a German research team to Singapore, and establishing a research lab at the BIOPOLIS. *" there was no red tape, no hassle, only genuine and fast support"*. The lab is being co-funded by the Max-Planck Institute and A*Star.

Making money
Naturally, with the huge investments being pumped into the project, the government is encouraging marketing and sales. Exploit Technologies is the commercialisation arm within A*Star, which ensures that the all-important intellectual property rights are watertight, and helps researchers on commercialisation of their discoveries and provides seed financing for new companies.

Approximately 30 biotech companies are found in Singapore, specialising in stem cells, medical technology as well as drug discovery. However, it is early days yet for commercialisation. The biotech industry commands long investment periods, spanning approximately 10 to 15 years. However, some companies are bearing fruit with licensing contracts.

Finding investors to finance expensive R&D is also tricky, especially since such investors who are familiar with this industry tend to be in the US. There are hardly any partners to be found in the region, who have experience in this sector, and hence would wish to enter into such a high-risk business. With Bio*One, the government has temporarily taken over the investor's role, and hopes to change things by committing large funds for home-based companies. The strategy is, to eventually decrease the need for this government support, when over time the returns on investment in the biotech industry become obvious within the private sector.

The future looks bright?
The atmosphere at the BIOPOLIS is one of looking ahead with strong motivation, and above all, support from key stakeholders: the researchers themselves.

"Singapore knows there is a long road ahead" admits Ullrich "but Singapore is determined. And most important of all, committed."

7 Axel Ullrich and his research team at the Biopolis

8 Novartis is among the international pharmaceutical companies at the Biopolis city

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Swiss House

Foreign governmental representations also see the value in being implemented at BIOPOLIS. An example is Switzerland, who has set up the Swiss House Singapore - a platform of the Swiss Embassy -, which acts as a promotional and bridging tool between Singapore and Swiss education, research and innovation. The Swiss House operates in synergy with academic, governmental and economic partners, and provides an integrated knowledge network to its users. By co-hosting and organizing events such as educational fairs, scientific symposia, technology road shows and investors' seminars, The Swiss House offers partnering opportunities to valued stakeholders as well as a state-of-the-art working space in a low risk, low cost, and proximity effective environment.

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