Headline: Testing time for biotech scientist
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BIO-CHIP WONDER

Testing time for biotech scientist

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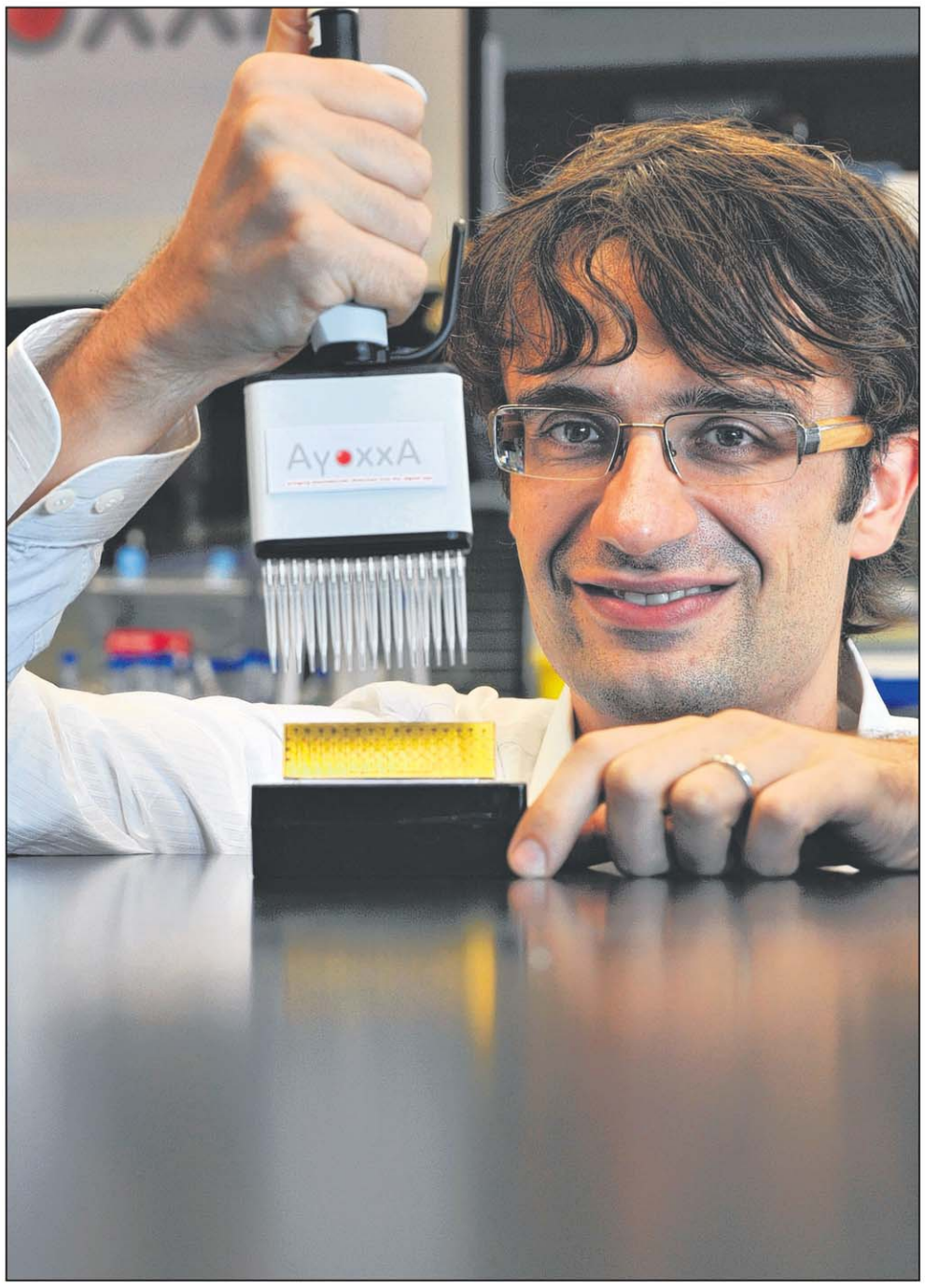

Dr Andreas Schmidt inserting several samples of blood into "wells" or holes in the silicon chip his company plans to market this year. ST PHOTO: DESMOND FOO

CONSIDER two objects: A wooden board game, more than a century old, and a cutting-edge silicon chip that can test and detect hundreds of diseases from a single drop of blood.

In every sense, they seem to have nothing at all in common.

But scientist Andreas Schmidt, who heads a company to market the wonder chip, begs to differ.

As he sits down for an interview on a scientific discovery that has the biotech world abuzz, the 32-year-old clutches the old board game of Chinese checkers.

It is easier to explain the discovery using the game, says the chief executive of AyoxxA Living Health Technologies, a spin-off company from the bioengineering research laboratory at the National University of Singapore (NUS).

This year will bring AyoxxA its toughest task yet: to market and sell the product to firms and research laboratories for commercial use outside the university's labs.

Often in biotech, companies fail not because their technology is no good, but because the "execution" – the process of bringing the product to market – is faulty, says Dr Schmidt, a German who has a PhD in immunology from the University of California, Berkeley.

"A tiny, tiny, tiny number of all scientific discoveries eventually lead to commercially successful applications," he says. "2011 will be the year when we get a good sense of whether ours will succeed or not."

The young scientist's fingers are crossed, but the biotech fraternity already has big hopes for his fledgling firm.

In November last year, it was declared among the world's top 50 most promising start-up companies by the United States-based Kauffman Foundation, often described as the world's largest foundation devoted to entrepreneurship.

Last October, AyoxxA also won the first prize at a Best of Biotech competition in Vienna, which drew entries from 25 companies across the world.

So what is so path-breaking about this technology? And how does it work?

Currently, scientists can test only a handful of diseases in a single drop of blood. AyoxxA's chip can detect hundreds – including infectious and heart diseases and cancer – at one go.

The silicon chip – about the size of a cigarette lighter – contains on its surface dozens of "wells" or holes much like a Chinese checkers board. Each well, in turn, has thousands of smaller wells within it, each measuring about 1/20th the diameter of a single strand of human hair.

Just like the beads which occupy holes on the Chinese checkers board, the wells on AyoxxA's chip are filled with antibodies, which are essentially chemical compounds or proteins used by the body's immune system to fight specific diseases.

Antibodies can be identifying markers for diseases as they typically "bind" themselves to the specific viruses, bacteria and diseased cells they are programmed to fight.

Thus filling the wells with tens of thousands of antibodies will enable them to bind with whichever disease they are programmed to fight, provided the disease is present in the sample of blood or tissue or saliva being tested.

The technology was invented by the company's chief scientific officer, Dr Dieter Trau, an assistant professor of bioengineering from NUS, and further developed by Dr Schmidt and a third collaborator, Dr Stephen Yeung.

Dr Schmidt says the most advanced tests to date are able to identify only up to a handful of diseases at one go.

That means Ayoxxa's invention is a "game changer", he says. "We are looking at a new technology platform, not just a device," he says, comparing the chip – which can detect hundreds of diseases – to the iPhone.

This year will prove whether this technology lives up to its promise. That is when the company begins testing the chip with external partners.

Given that the chip can simultaneously identify hundreds of diseases – and also interactions between them – other research labs are the first target customers.

"Our chip is designed to yield rich data," says the research fellow who has been with NUS since 2009. "And no one likes data more than scientists. Our first big test will be to send it to potential customers and see if they like our product."

Identifying the right strategy and the right investors with business expertise to take the company to the "next stage" of the biotech food chain – to test and sell the product – is also an important task this year, says Dr Schmidt.

Several strategic questions will need to be answered. For instance, do scientists want fewer but more accurate markers or vice versa? Who will supply AyoxxA with the antibodies? Should it partner companies that already have diagnostic tests in the market?

Companies that do have such tests might not be ideal partners, since the AyoxxA test chip could eat into their business.

While he believes the company has a sound technology, whether it will go to market or not is a million dollar question, reiterates Dr Schmidt.

A small German company is believed to have invented the technology of MP3 players. But aside from geeks, no one had heard of MP3s until Apple's iTunes came along.

"A scientific discovery is the beginning of a long journey. And at 2011 we're just at Stage 2," said Dr Schmidt.