

science.

THE STRAITS TIMES SATURDAY, FEBRUARY 21 2009 PAGE D8

# \$150m set aside for new field in cell biology

Called mechanobiology, it offers new insight into diseases such as cancer

BY LIAW WY-CIN

IT IS not just the chemical reactions within cells that lead to diseases such as cancer. Scientists now know that physical attributes like cell elasticity and movement play a critical role as well.

Singapore wants a first bite at an emerging field that looks at the mechanical and physical properties of a cell – called mechanobiology – and it is spending \$150 million to do so.

A centre of excellence has been set up at the National University of Singapore (NUS), one of the first facilities in the world dedicated to such research.

It is funded by the National Research Foundation (NRF), which charts science and technology research in Singapore, and the Ministry of Education, which will

provide the money over 10 years.

The centre will be headed by mechanobiology expert Professor Michael Sheetz, of Columbia University, and Professor Paul Matsudaira, who recently left the Massachusetts Institute of Technology to head NUS' biological sciences department.

Prof Sheetz, who would be spending three-quarters of his time in Singapore, said knowledge of cell mechanics was the missing link that hindered the understanding of how genes and proteins interact – the key to understanding how diseases happen and how to prevent or treat them.

This mechanical component covers forces that affect a cell as it moves, like gravity, friction and adhesive forces, its shape, and its interaction with its physical environment.

For example, stem cells can become any cell the body needs, but what they actually transform into depends on the physical properties of the environment surrounding them.

If they are on soft surfaces, for exam-



Dr Tony Tan (third from left), chairman of the NRF, says the new facility reaffirms the Government's commitment to research. With him are (from left) Prof Sheetz, who will head the centre, NUS president Tan and the Weizmann Institute of Science's Benjamin Geiger. ST PHOTO: SAMUEL HE

ple, they become nerve cells. If they are on hard surfaces, they become bone cells.

Physicists and engineers will be needed to study them, and bringing these people into the field will be very important, said Prof Sheetz.

One of his scientists, Dr Yasuhiro Sawada, discovered how stretching a cell during cell growth exposes its hidden proteins, which interact with other proteins, including those linked to cancer.

Dr Sawada quit his job at Columbia University to join NUS in 2007.

The other director of the new research centre, Prof Matsudaira, called the facility a wonderful opportunity for Singapore.

"With the establishment of the centre, the university will be able to set up undergraduate and graduate programmes in

this new field, and we will be able to compete in the international arena," he said.

This is the fourth research centre of excellence set up by the NRF.

The foundation is aiming to build top-notch research capabilities in important fields in Singapore.

It reaffirms the Government's commitment to funding long-term research and development, even in the current economic downturn, said NRF chairman Tony Tan yesterday.

"We hope that by building up these scientific and technical capabilities, we will strengthen the whole infrastructure of scientific discovery, of research, train a pool of people who are well-versed, up-to-date at the leading edge of work in very important fields," he said.

Agreeing, Prof Sheetz said that United

States President Barack Obama's economic stimulus package included multi-billion-dollar components for the National Institutes of Health, which leads biomedical research in the US.

Research that marries physics, engineering and biology can also yield results for NUS all round, added its president, Professor Tan Chorh Chuan.

"As we understand the biology of cells through these (mechanical) methods, we can also apply some of the lessons that we learn from cells' processes to engineering solutions," he said.

"It is not just applying engineering to biology, but also biology forming the way we think about some of the engineering solutions of the future," said Prof Tan.

wycin@sph.com.sg