

Every cell counts in fine-tuning treatment of cancer

Local team's device analyses single cells in tumour, allowing for personalised care

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A cell-capturing chip that allows researchers to analyse individual cancer cells could pave the way for doctors to better profile and diagnose cancer patients, its creators believe.

The device, measuring 7.5cm by 2.5cm, is called a microfluidic chip, and was developed by researchers from the National University of Singapore (NUS) and Clearbridge mFluidics, a start-up specialising in single-cell research.

The advantage of the device is that it is able to get hold of any of the many diverse cells that make up a tumour.

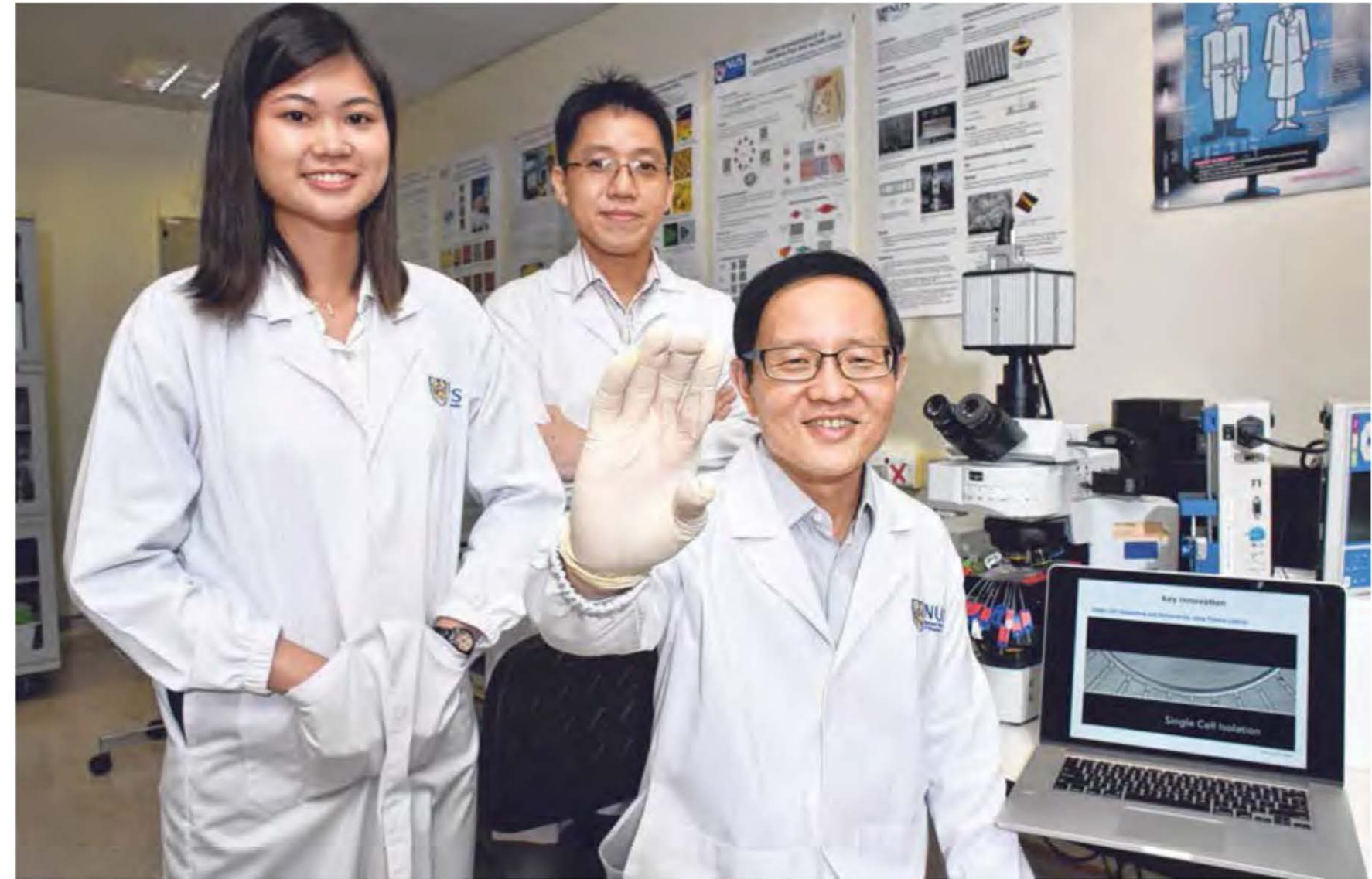
"By being able to detect abnormalities at a single-cell level, we can better understand these differ-

ences and tailor ways to better treat the cancer based on the different population of cells that may exist," said Professor Chng Wee Joo, director and senior consultant at the National University Cancer Institute Singapore, who was not involved in the research.

He added that the sensitivity of single-cell analysis will allow cancer to be detected earlier. After treatment, it could also be used to detect residual cells that might still have to be wiped out.

The procedure starts off with a blood sample of just 7.5ml from a patient. The sample is then stained to tell the different cells apart, before it is inserted into the chip.

The cells entering the device are channelled into a single stream which leads to numerous chambers. Each chamber captures just



Professor Lim, 50, holding up a microfluidic chip that could pave the way for more personalised medicine when treating cancer patients. Ms Trifanny Yeo Zhi Xiang, 26, and Dr Tan, 35, are also part of the research team that designed the device. PHOTO: DIOS VINCOY JR FOR THE STRAITS TIMES

one cell. This allows researchers to single out the cell they want to study and eject it out of its chamber into a recovery port, where it is retrieved for analysis.

In hospitals currently, samples are analysed in bulk, which may result in inaccuracies, said lead researcher **Lim Chwee Teck of the department of biomedical engineering at the university's Faculty of Engineering, who is also co-founder of Clearbridge mFluidics.**

Dr Tan Swee Jin, technical director of Clearbridge mFluidics and one of the researchers involved in

the innovation, describes molecular analysis as the "next frontier in personalised medicine".

"We wanted the purity of the samples to be better and...single-cell analysis allows that...in terms of addressing and profiling the disease," he said.

While two patients may have the same type of cancer, they may not react identically to the same treatment because the type of cancer cells that make up the tumour could be different, said Professor Lim.

By analysing every cancer cell present in a patient's blood sam-

ple, doctors will be able to pick out important information that could lead to more personalised medicine for patients.

"We developed this system to study very rare cancer cells that may affect the way we treat patients.

"Very few mutations are treatable with drugs, but if you can spot a treatable mutation, then you immediately know what drug the patient needs," he explained.

Mutations were previously more difficult to locate, said Dr Tan.

"If the mutation was very rare,

you might not spot it. Through single-cell analysis, we now have the ability to have an accurate and sensitive measure of the patient's change."

Currently, processing of the samples is being handled by the research team.

Clearbridge mFluidics received a \$500,000 grant from Spring Singapore last month to further develop the chip into an automatic system that can handle processing on its own.

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