Lab-on-a-chip makes rapid assessment of immune system

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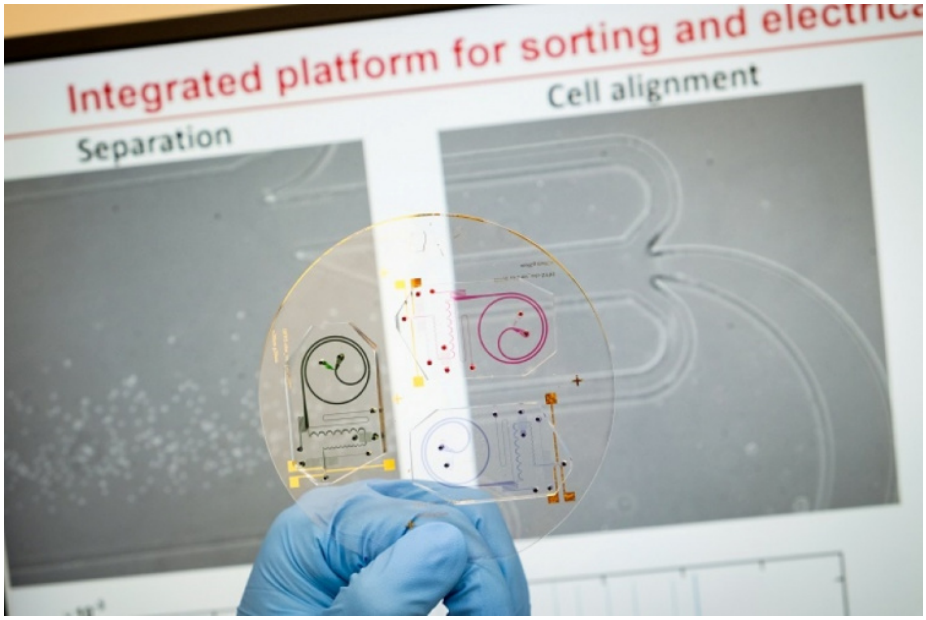
Scientists from Nanyang Technological University, Singapore have developed a lab-on-a-chip system that identifies the health of a person's immune system from a drop of blood within minutes.



Lab-on-a-chip by NTU scientists that can sort out white blood cells and analyse them to find out their health status (Image: NTU Singapore)

Using microfluidics and electrical sensors, the new chip from **NTU Singapore** was able to detect differences in the electrical properties of white blood cells taken from healthy and diabetic patients.

Lab-on-a-chip promises rapid 'superbug' diagnosis

Reusable lab-on-a-chip uses acoustic waves to manipulate fluid droplets

According to NTU, the proof-of-concept device could one day help doctors to quickly gain insights into a person's immune system and spot early signs of inflammation and infection that could signal the need for further in-depth tests. A prototype device and the engineering principles behind it were reported earlier in the year in *Lab on a Chip.*

Designed and built by **Assistant Professor Hou Han Wei** and **Assistant Professor Holden Li** from the **School of Mechanical and Aerospace Engineering**, their device, if successful in further laboratory and clinical assessments, could be turned into a portable device suitable for GP's surgeries and polyclinics.

In a statement, Asst Prof Hou said the chip detects electrical differences between a healthy white blood cell and an unhealthy one. Abnormal white blood cells have been reported as an early biomarker for increased risk of cardiovascular diseases and also suggests an ongoing inflammation.

Using very tiny channels, the chip first physically separates the various blood cells by size into the different outlets. The isolated white blood cells are then run through a special channel where electrical impedance is measured for each cell at hundreds of cells per second.

The electrical impedance of an abnormal cell is usually higher than the impedance of a healthy cell, given an abnormal cell is larger in size and has different membrane properties.