

# New detector for rare cancer cells

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(Medical Xpress) -- Researchers in the US have developed a new detector for measuring rare circulating tumor cells (CTCs) in samples of whole blood.

The research team, led by Hakho Lee of the Massachusetts General Hospital developed a detector that uses the Hall effect, in which a voltage is produced when a [magnetic field](#) is applied perpendicular to the current running through a [conductor](#). The Hall effect is often the basis of [sensors](#) and electronic compasses such as those used in global positioning systems (GPS).

Cells in the untreated samples were fed through channels on the chip on a micro-Hall Detector ( $\mu$ HD), where they were tagged with magnetic nanoparticles (MNPs). The prototype proved to be capable of processing 107 cells per minute.

The chip is a microfluidic/semiconductor hybrid with eight micro-Hall sensors. As the tagged cells pass through the chip they are subjected to a magnetic field, and the magnetic moment each acquires is sensed by at least two of the micro-Hall sensors. This arrangement of overlapping sensors means the channels can be wider and flow rates higher than if each cell was exposed to only one sensor.

The prototype's ability to label and identify several different biomarkers on rare circulating cancer cells was first demonstrated, and then the system was tested on whole blood samples of 1 micro liter volume, with cancer cells added. The results showed the system was able to accurately

detect the cancer cells at a wide range of concentrations, even at very low (

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