# New method to help spot gastric cancer cells

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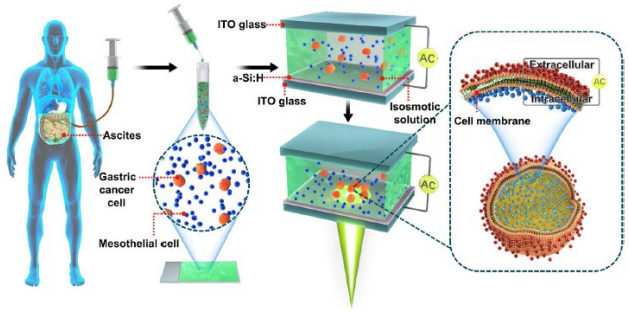


OEK microfluidic chip developed for detecting peritoneal metastasis and cell membrane capacitance. Credit: ZHANG Yuzhao et al.

Gastric cancer is the third leading cause of cancer death worldwide, accounting for over 1,000,000 new cases and nearly 800,000 deaths per year. The poor prognosis of gastric cancer is largely due to the difficulty in early diagnosis of peritoneal metastasis.

Separation and characterization of cancer cells are essential for early diagnosis of peritoneal metastasis. However, due to the low content of cancer cells in patients' peritoneal lavages, traditional detection methods lack sensitivity and cannot satisfy clinical demand.

Researchers from the Shenyang Institute of Automation (SIA) of the Chinese Academy of Science (CAS) and City University of Hong Kong (CityU), in cooperation with doctors from the First Hospital of China Medical University, jointly proposed an optically induced electrokinetics (OEK) microfluidic method for label-free separation and characterization of gastric cancer cells.

Their study was published in *Science Advances* on August 5.

The researchers fabricated a novel OEK-based microfluidic chip to separate live gastric cancer cells from patients' ascites and characterize their electrical properties. They established polymerization model of cells and solution model of cell membrane capacitance.

The sizes and electrical characteristics between the gastric cancer cells and peritoneal lavage cells were significantly different. Thus the OEK method could theoretically separate gastric cancer cells from the ascites and peritoneal lavages.

Through experiments, the researchers separated gastric cancer cells from six patients' ascites with purity up to 71%. Compared with the traditional clinical peritoneal metastasis detection method, this new method solved the problem of low sensitivity.

It is also a label-free, non-destructive and rapid technique. The researchers could separate and collect gastric cancer cells in the OEK microfluidic chip in 5 minutes.

They also obtained the cell membrane capacitances of gastric cancer cells and peritoneal lavage cells. These digital data can be used as a bio-marker, as part of cellular information.

Experimental results in the study demonstrated that the proposed OEK method was capable of detection free cancer cells in ascites and could expedite diagnosis of peritoneal metastasis in gastric cancer.

**More information:** "Detection and isolation of free cancer cells from ascites and peritoneal lavages using optically induced electrokinetics (OEK)" *Science Advances* (2020). DOI: 10.1126/sciadv.aba9628

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