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PANCREATIC CANCER

Tumour-derived EVs for diagnosis

A quick, ultrasensitive, blood-based extracellular vesicle (EV) biomarker assay for the detection of pancreatic cancer is reported in a pilot study published in *Nature Biomedical Engineering*. The test distinguished all stages of pancreatic cancer from pancreatitis, and showed promise in detecting early responses to neoadjuvant therapy. "Our assay can directly quantify tumour-derived EVs in as little as 1 μl of plasma," notes author Tony Y. Hu.

The development of tumour-derived EVs as cancer biomarkers that can be used in the clinic has been challenging. The detection methods can be complex, time-consuming, technically difficult and expensive, making these approaches impractical in a clinical setting. "To address these issues, we developed a nanoparticle-based EV assay," explains Hu. "The strategy uses a synergistic probe system where dual recognition of tumour-derived EVs by nanoparticles with different shapes and specificities creates a local plasmon, shifting the wavelength and increasing the intensity of dark-field microscope light scattering to enhance sensitivity and specificity." Ephrin type-A receptor 2 (EphA2), identified as a pancreatic cancer EV biomarker in this study, was used as the basis of the EV assay.

The investigators tested blood plasma samples from 59 patients with stage I–III pancreatic cancer, 48 patients with chronic pancreatitis and 48 healthy individuals. The assay could differentiate pancreatic cancer from pancreatitis and healthy status with high sensitivities and specificities (>85%), better than carbohydrate antigen 19-9, the only pancreatic cancer biomarker currently used in the clinic. Moreover, in 23 patients before and after neoadjuvant chemotherapy and/or chemoradiation, changes in EphA2 EV levels were strongly associated with treatment response; post-therapy EphA2 EV levels markedly decreased in those with good or partial therapeutic responses, but not in patients with poor response.

The findings need to be validated in a larger, prospective study. In addition, the researchers are working to refine the assay to advance its clinical application, as well as developing point-of-care devices to read assay results.

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ORIGINAL ARTICLE Liang, K. *et al.* Nanoplasmonic quantification of tumour-derived extracellular vesicles in plasma microsamples for diagnosis and treatment monitoring. *Nat. Biomed. Eng.* **1**, 0021 (2017)