Specific cancer-derived exosome detection and analysis

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Technology description

Unmet Need:Translating disease-derived exosome detection to early diagnostic applications
Normal as well as pathological cells constitutively release a group of specific membrane vesicles carrying rich identity information about their cells of origin. These extracellular vesicles (EV) are composed of small exosomes (40~120 nm) and large microvesicles (300-1000 nm); they are distributed in many body fluids such as blood, saliva and urine for intercellular communication. Disease-derived exosomes detected in the blood of cancer patients correlate well with tumor progression, angiogenesis and metastasis. Therefore, higher levels of circulating cancer-derived exosomes and their cargo proteins have a great potential to serve as liquid biopsy tools to achieve a higher diagnostic and prognostic efficiency in the early diagnosis of cancers. Despite their potential clinical significance, translating disease-derived exosome detection to applications for the early diagnosis of cancers has been challenging.
The Technology:Two-dimensional isotachophoretic analysis of specific disease-derived exosomes
Through this invention, WSU inventors present for the first time the application of isotachophoresis (ITP) technology to the rapid isolation and detection of exosomes derived from a prostate cancer cell line and exosomes derived from healthy serum samples in a single assay, followed by isotachophoretic analysis of a selected panel of exosomal protein biomarkers.

Application area

• Differentiating and analyzing the exosomes from a cancer cell line.
• Profiling the protein biomarkers associated with each target exosome population.

Advantages

• An assay technique capable of concentrating samples by orders of magnitude in minutes with minimal sample consumption.
• Integration of ITP with lateral flow assay improves the overall detection limit and sensitivity and achieves multiplex target detection.
• ITP focusing induces a 250-fold enhancement in the level of the target exosomes before immune-capture for analysis.

• ITP based technology is 33-fold more sensitive than current technologies used in research labs for exosome analysis.

Institution

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