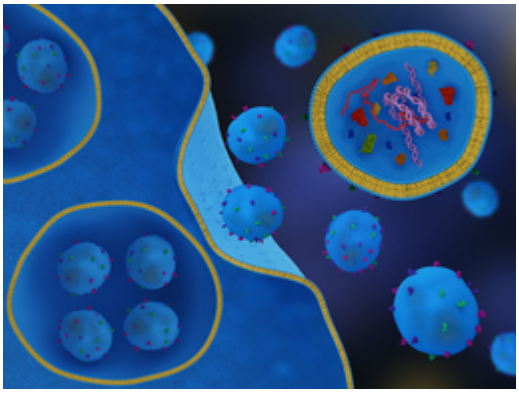
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Fast and Cost-Effective Isolation of Circulating Exosomes using Porous PDMS-Based Microsystem (PorousExoChip)

TECHNOLOGY NUMBER: 2022-135



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Category
Diagnostics
Life Sciences

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OVERVIEW

A new PorousExoChip microsystem that binds exosomal vesicles

- Effective at isolating extracellular vesicles from bulk biological samples
- Superior to ultracentrifugation in isolating cancer-derived exosomal vesicles

BACKGROUND

Exosomes are vesicles released by cells that may contain DNA, RNA, proteins, and lipids. The cellular cargo contained in exosomes are identical to analogous structures in the parent cells. These exosomes may be detected in nearly all bodily fluids by means of a liquid biopsy. The production of exosomes occurs in both healthy and diseased cells, and their contents may serve as a biomarker for illnesses such as Parkinson's disease, liver disease, and neoplasm. Some cancer cells have been shown to produce up to 10 times more exosomes than normal cells from the same lineage. Therefore, a need exists to optimize detection and characterization of exosomal vesicles (EV).

INNOVATION

Researchers have created a porous polydimethylsiloxane (PDMS)-based microsystem which selectively bind EV's based upon immunoaffinity. PDMS is utilized widely in a range of industries and research settings, and it has been shown to exhibit versatile chemical and physical

properties useful for biological and medical applications. While PDMS has previously been limited in biological studies because of its hydrophobic and oleophilic properties, oxidation processes can create a species that is more compatible with aqueous solutions and therefore biological samples. The inventors were able to create cubes which introduced a high surface area template while maintaining PDMS's wide range of functional properties. The resulting (PorousExoChips) are superior in measuring exosomal concentration when compared to existing ultracentrifugation technologies.