

Method and Microfluidic device for isolation of exosomes

Background

Extracellular vesicles (exosomes and microvesicles) are small vesicles (50-1000 nm) produced and secreted by cells in the extracellular medium. These contains molecules (DNA, RNA, Lipids, metabolites, peptides, proteins, etc.) have been directly related to development of many diseases like cancer, cardiovascular diseases and metabolic diseases. Being identified and extracted from many biological fluids (urine, blood, saliva, synovial and cerebrospinal fluids, etc.) make them a non-invasive tool to define and identify biomarkers, as well as to develop therapeutic vehicles. However, major problem is the standardization procedures for their production and isolation.

Current Options. Isolation and purification of exosomes is a tedious multi-step process and some alternative separation methods have been developed: 1) Differential ultracentrifugation (coupled or not to density gradients) is the most extended and standardized procedure; 2) Polymer-based isolation systems; 3) Ultra-filtration and gel-filtration chromatography; 5) Affinity methods by antibodies or magnetic beads technology. These methods have major problem of heterogeneity of isolation procedures and the lack of consensus, scarce reproducibility, yield or types of exosomes, and makes difficult their correct use in clinical applications.

Unmet Technological Need

Difficulty and scarce reproducibility of isolation and production of exosome homogenous enrichment of size-specific vesicles to boost their use in clinical settings and major regulatory concerns to prove quality of system to be used as therapy vehicle.

Technology

Our technology is a method to isolate exosomes based on their size and thermo-properties from eventually diverse biofluids (Urine, serums, blood, and saliva) and obtain homogenous populations of vesicles. The microfluidic device could discriminates the size of vesicles without affecting the quality of the vesicles.

Application

Our technologies could be applied by medical device and diagnostic equipment companies for:

- Isolate specific sub-population of exosomes
- Quality control system of exosomes in drug-delivery production. Quality control of tissue-derived exosomes for regenerative medicine purposes.
- Standardization of vesicles isolated from biofluids for R&D studies.

Advantages

- Fine-tuned separation of size-specific extracellular vesicles
- Fast and safe isolation of exosomes from large amount of biofluids
- No contamination with polymers and isolating materials

Patent Status.

Priority Date: 27 Oct 2016; **Title:** Method and Microfluidic device for isolation of exosomes. Extended. **Inventor:** Juan Manuel Falcón, Felix Elortza

State of the Technology.

Modeling

Need.

Ready for out-licensing, Codeveloper

Contact

CIC bioGUNE Tech Transfer Office.

Donatello Castellana, techtransferoffice@cicbiogune.es, 946572514

Donatello Castellana, techtransferoffice@cicbiogune.es, 946572514

