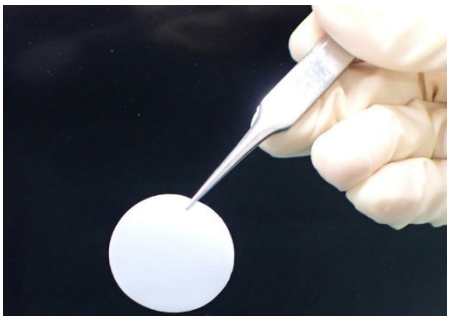
TOYOBO
Beyond Horizons

TOYOBO CO.,LTD.
Head Office
Osaka Umeda Twin Towers South,
1-13-1 Umeda, Kita-ku, Osaka 530-0001, Japan

October 19, 2023

Toyobo succeeds in purifying and recovering circulating exosomes in the body with high efficient
Research results of newly developed separation membrane "CATAROSEV®" to be announced at the 10th Annual Meeting of the Japanese Society for Extracellular Vesicles

Toyobo Co., Ltd. has succeeded in purifying and recovering circulating exosomes in the body with high efficient by using its "CATAROSEV®," a newly developed precision filtration membrane serving as an exosome purification kit[*1] with tiny pores and an ion-exchange function. The detailed results of the research, including the properties of the purified exosomes that Toyobo analyzed, will be unveiled at the 10th Annual Meeting of the Japanese Society for Extracellular Vesicles to be held at Hokkaido University October 23-24.



The exterior of CATAROSEV®, an exosome precision filtration membrane

Exosomes are extracellular vesicles measuring 50 to 150 nanometers that are secreted from cells. They are present in blood, urine and various other bodily fluids. It has been discovered that exosomes contain nucleic acids (microRNA, etc.) and proteins, and that they play an important role in intercellular communication, cell repair and other functions[*2]. In recent years, increasing attention has been paid to exosomes as a next-generation modality that can be applied to a wide range of fields, including regenerative medicine and the diagnosis and treatment of diseases such as cancer[*3]. At present, many researchers around the world are focusing on the application of exosomes.

Research and development on exosomes involve the use of exosomes that are purified and recovered from culture supernatant of stem cells, etc. Currently, a method known as "ultracentrifugation" is mainly used to purify exosomes. But this presents problems: expensive equipment is required, purifying exosomes takes several hours, and the recovered exosomes are low in purity. If low-purity exosomes are used for developing pharmaceuticals, residual impurities can trigger side effects. Also, low-purity exosomes can be identified as a foreign substance, leading to its decomposition and absorption by the liver and thus preventing exosomes from circulating in the body.

CATAROSEV®, newly developed by Toyobo is an exosome purification kit consisting of a purification membrane with tiny pores and an ion-exchange function, a cleaning liquid, eluate and other elements. The separation function using tiny pores is capable of removing large impurities. The ion-exchange function allows exosomes, which have a negative charge on their surface, to be absorbed into the purification membrane, which results in the removal of small impurities such as proteins. The process ensures the high purification and recovery of exosomes at high efficiency.

Toyobo analyzed exosomes purified and recovered from culture supernatant (hereinafter, purified products) for their performance evaluation by using the kit while employing NTA[*4] and WB[*5] methods. As results, Toyobo's purification kit outperformed the ultracentrifugation method in the following three points.

(1) The kit is capable of removing proteins equivalent to those by the ultracentrifugation method, but the time[*6] required for purification is one-sixth of the conventional method.
(2) The number of exosome particles recovered in purified products is more than three times as much as what the conventional method can recover.
(3) In an experiment in which the purified products were injected into mice, it was found that the purified products were distributed to organs in their whole body, showing that they are circulating in the body. (Exosomes purified with the ultracentrifugation method tend to be localized in the liver.)

Toyobo's success in purifying and recovering circulating exosomes in the body while conducting the kit's performance evaluations is expected to contribute to the progress of exosome research for pharmaceuticals, cosmetics and diagnostic agents. At the 10th Annual Meeting of the Japanese Society for Extracellular Vesicles, Toyobo researchers will give a poster presentation that details the results of the latest research.

Toyobo plans to offer samples of this product within this year to corporations and research institutions that are aiming to use exosomes in pharmaceuticals and cosmetics to facilitate its early commercialization. By providing this product, which is capable of recovering exosomes with high efficiency, purity, and yield, Toyobo will do its best to help boost research and development related to exosomes.

Outline of Presentation at the 10th Annual Meeting of the Japanese Society for Extracellular Vesicles

Venue:	Hokkaido University Conference Hall
Dates:	October 23-24, 2023
Poster number:	P54
Poster to be displayed:	October 23
Title:	Purification of EVs (extracellular vesicles) using a precision filtration membrane with an ion-exchange group
Link:	https://ec-mice.com/the10th-jsev/abstracts.html

*1: Press release dated July 13, 2023, and titled "Toyobo develops new purification technology capable of recovering exosomes with high efficiency, purity and yield by using separation membrane; Looking for partner companies to achieve early practical applications for pharmaceuticals and diagnostic agents." This purification technology was achieved as a result of research jointly conducted with Project Associate Professor Naohiro Seo of the Department of Bioengineering, the Graduate School of Engineering, the University of Tokyo.

*2: Research in recent years have revealed that cancerous cells release exosomes to promote metastasis, and that exosomes are related to illness such as dementia and intractable neurological diseases.

*3: Modality means any therapeutic approach such as small-molecule drugs, antibody drugs, nucleic acid drugs, cell therapy, gene and cell therapy and gene therapy.

*4: NTA (Nano Tracking Analysis) method is capable of measuring the size of a given particle.

*5: WB (Western Blot) method is capable of detecting the presence of proteins by using antibodies.

*6: The time required to purify 5 milliliters of culture supernatant (HEK293.2sus). It took about 30 minutes to complete the measurement mentioned.

For more information, contact:
Public Relations Group, Corporate Communication Department, Toyobo Co., Ltd.
E-mail：pr_g@toyobo.jp