EXOSOME ISOLATION

EXODUS

EXODUS

EVs isolation solution for various sample types

Urine

Urinary Exosome Isolation Solutions

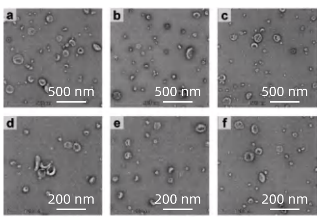
EXODUS

EXODUS enables the rapid purification of high-quality urinary exosomes. These urinary exosomes hold great potential for extensive applications in various fields, such as disease diagnosis, assessment of therapeutic efficacy and prognosis, as well as recurrence monitoring.

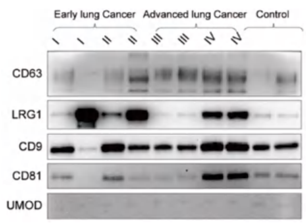
Key features

- Rapid isolation: <10 mins
- Urine sample volume: ≥10 μL
- High purity, high yield: Purity >99%, Yield >90%
- Easy to use: Isolate urinary EVs automatically

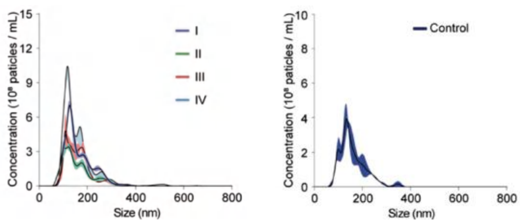
Characterization Results



TEM



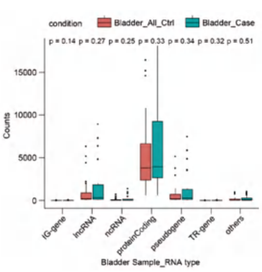
WB



NTA

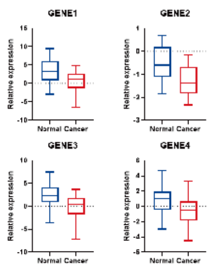
J Nanobiotechnology. 2023, 21(1):153.

a



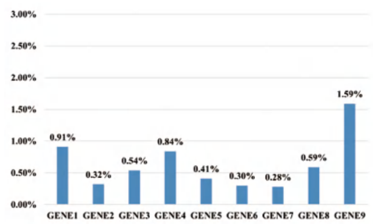
Analysis of RNA types and read distrubutions in urinary exosomes

b



Analysis of differential RNA expression in urinary exosomes: Cancer vs. Non-Cancer Profiles

c



Assessment of coefficient of variation (CV) in RNA targets from urinary Exosomes

Nature Methods. 2021, 18(2):212-218.

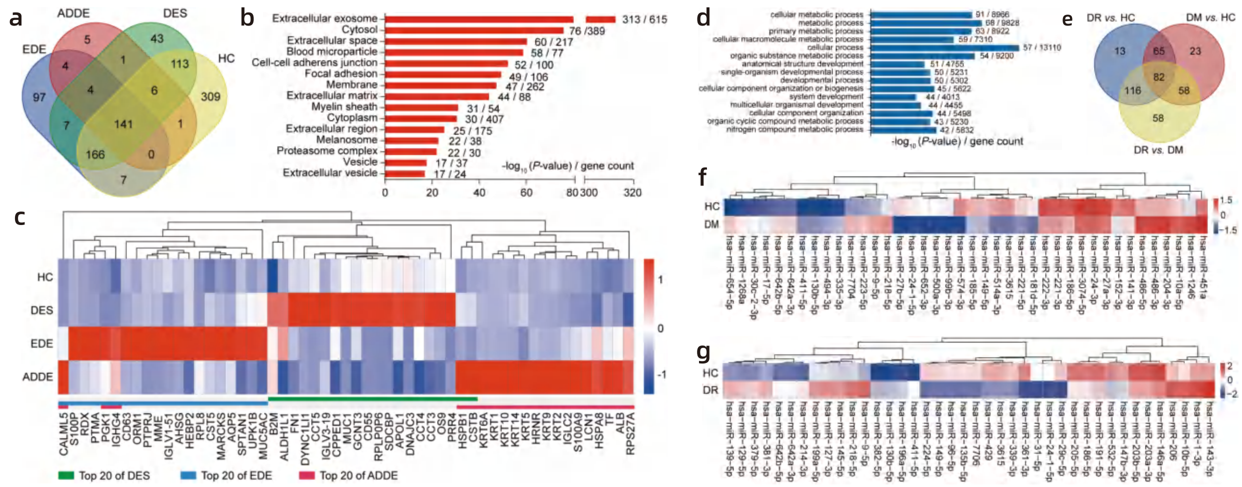
Application

EXODUS

❶ Tear EVs isolated by EXODUS for diagnosis of dry eye and diabetic retinopathy

■ Proteomic profiling of tear EVs for dry eye classification.

■ miRNA profiling of tear EVs for diabetes mellitus and diabetic retinopathy



(a) Venn diagram of proteins identified in EDE, ADDE, DES, and HC groups.

(b) Cellular components of 904 proteins from all groups.

(c) Heat map showing top 20 upregulated proteins (vs. healthy control) in each dry eye group.

(d) The enriched biological processes from the identified exosomal miRNAs.

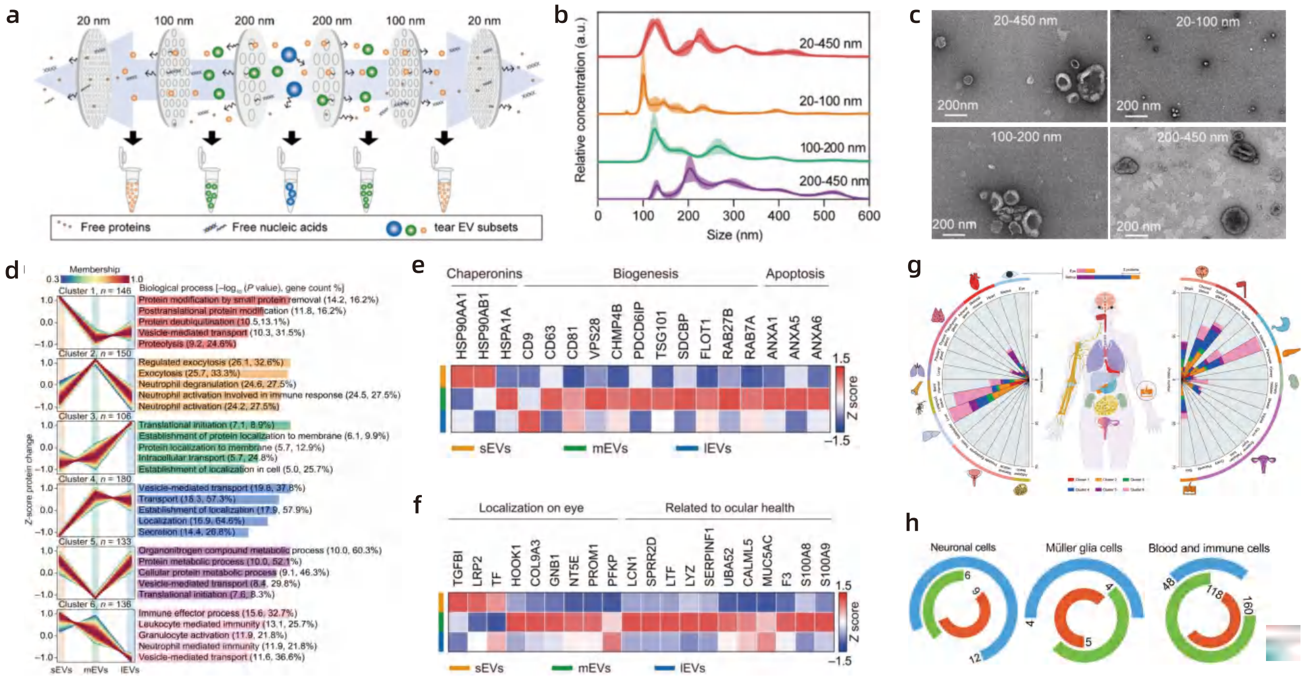
(e) Venn diagram of the DEGs profile when compared with every two groups.

(f) Heat map showing the top 20 upregulated and downregulated DEGs for DM compared to HC.

(g) The comparison of the exosomal miRNA profiles between DR and HC.

ACS Nano. 2022, 16(8):11720-11732.

❷ Isolation of tear EV subtypes by EXODUS for proteomic analysis



(a) EXODUS-sub isolation princeple.

(b) Nanoparticle tracking analysis indicating the size distribution of the tear EV subpopulations (n=6).

(c) Typical transmission electron microscopy images of different-size EV subsets.

(d) Cluster patterns (left) and top 5 biological processes (right) of cluster proteins.

(e) Heatmap of the relative abundance of identified EV proteins among subgroups.

(f) Heatmap of the relative abundance of the visual system-related proteins in tear EV subsets.

(g) Detection of tissue-specific proteins among clusters of differentially abundant proteins.

(h) Distributions of the proteins among the different EV subsets, focusing on those specific to eye-related neuronal cells,müller glial cells, and blood and immune cells.

Sci Adv. 2023, 9(11):1137-1144.

Urine

Urinary EVs Isolation Solutions

EXODUS

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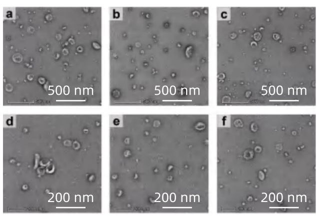
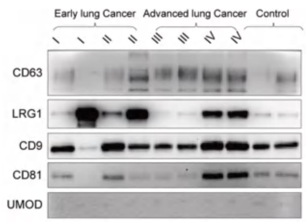
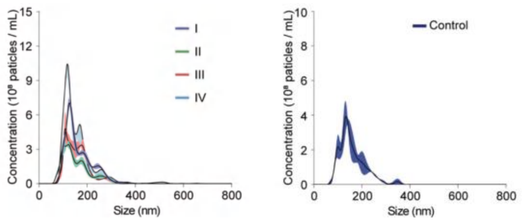
Characterization Results



TEM



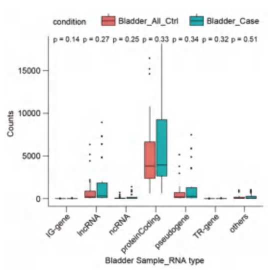
WB



NTA

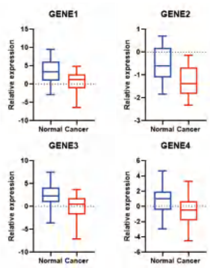
J Nanobiotechnology. 2023, 21(1):153.

a



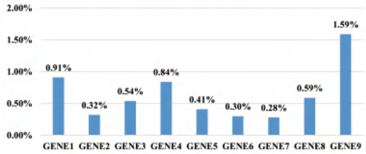
Analysis of RNA types and read distrubutions in urinary exosomes

b



Analysis of differential RNA expression in urinary exosomes: Cancer vs. Non-Cancer Profiles

c



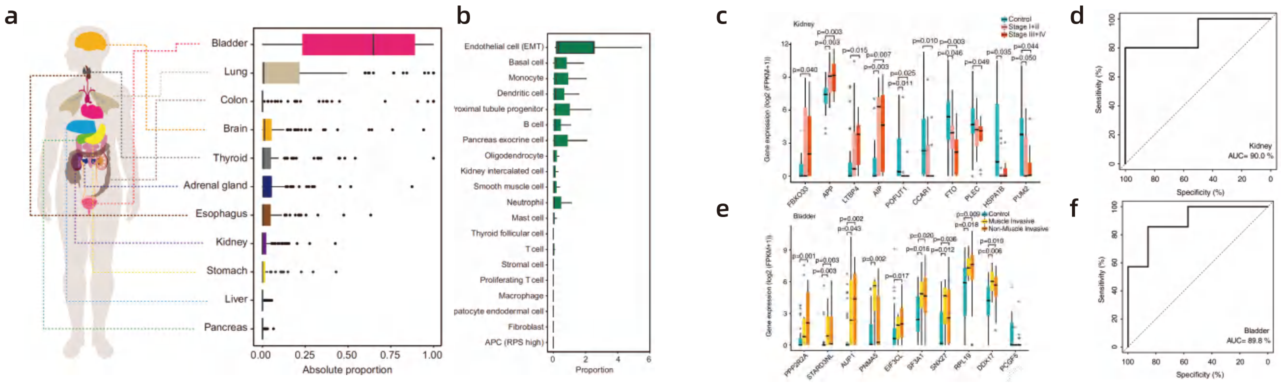
Assessment of coefficient of variation (CV) in RNA targets from urinary Exosomes

Nature Methods. 2021, 18(2):212-218.

EXODUS

Application

❶ The genetic source tracking of urinary exosomes

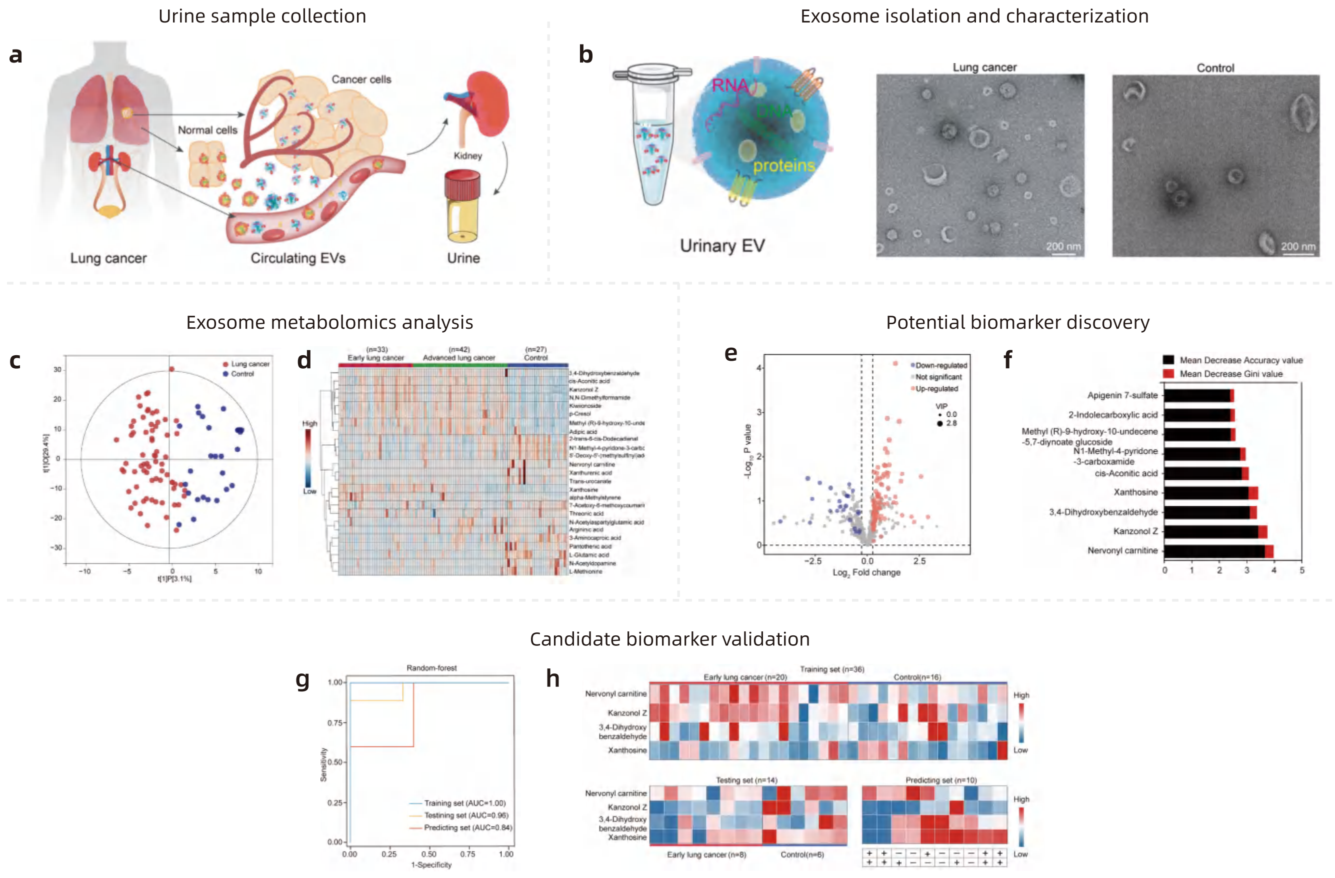


Isolate exosomes and perform RNA sequencing analysis;
trace the origin of urinary exosomes at the tissue and cellular levels

Identification of diagnostic markers for renal and bladder cancers;
verification of biomarker diagnostic performance for renal and bladder cancers

PNAS. 2021, 118(43):e2108876118.

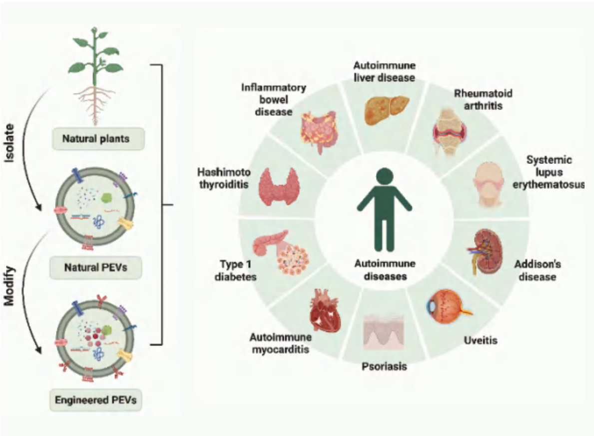
❷ Urinary extracellular vesicle metabolomics research for early detection and screening of lung cancer



J Nanobiotechnology. 2023, 21(1):153.

Plant EVs Isolation Solution

EXODUS



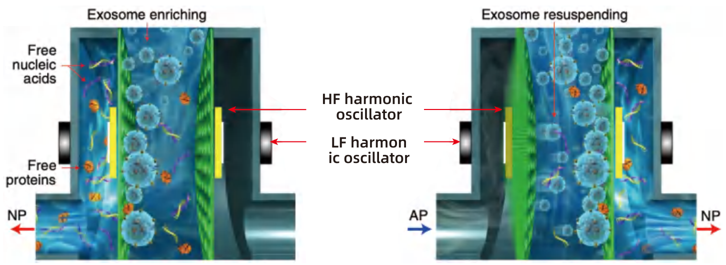
Nano Research. 2024, 17(4): 2857-2873.

Plant-derived Extracellular Vesicles (PDEVs) are nano-sized vesicles sourced from natural plant samples, featuring a typical lipid bilayer structure. In terms of morphology, composition, and function, PDEVs are highly similar to mammalian extracellular vesicles (EVs), being rich in active components such as lipids, proteins, and RNA. They possess the ability to facilitate information transmission and material transport across cells, and even between species.

With advantages such as natural origin, high safety, strong bioactivity, and ease of scalable production, PDEVs show broad application prospects in various fields. Currently, PDEVs are being widely explored for oral drug delivery, cosmetic ingredient development, and health supplement functional components, gradually driving plant-derived exosomes from the laboratory toward practical application.

Isolation Principles

The EXODUS system employs a combination of Negative Pressure Oscillation (NPO) and Dual Coupled Harmonic Oscillation (HO) to work synergistically on a nano-ultrafiltration chip. This effectively removes impurities such as free nucleic acids, proteins, and pigments, while capturing PDEVs for purification and enrichment. The system effectively prevents membrane fouling, uses low shear force treatment, significantly improving purity (particle-to-protein ratio of 5×10^8 particles/μg protein), and preserves the vesicle structure and functional activity.



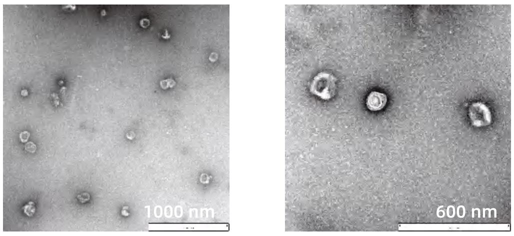
Nature Methods. 2021, 18(2): 212-218.

Examples of plant species

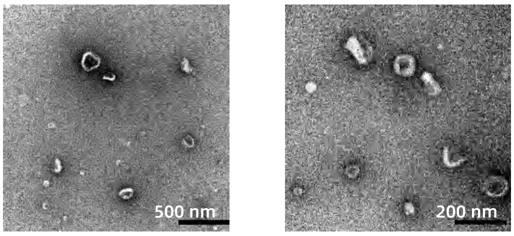
Plant parts	Plant species
Roots/Rhizomes	Ginseng, Turmeric, Ginger, Dendrobium, Astragalus, Licorice, Salvia miltiorrhiza, White Leadwort, Combined Spicebush Beet, Mulberry Root Bark, Kudzu, Polygonatum sibiricum, Garlic
Stems	Bamboo shoots, Gastrodia, Roxburgh's Anoectochilus
Leaves	Dandelion, Perilla, *Artemisia annua*, Purslane, Platycladus, Red Cabbage, Aloe Vera, Hedyotis diffusa, Leycesteria thibetica, Nicotiana tabacum, Centella asiatica, Lindera aggregata
Flowers	Peony, Xinjiang safflower, Selfheal, Honeysuckle, Rose
Fruits	Sea buckthorn, Rosa roxburghii, Bitter melon, Lemon
Seeds	Coix seed, Sorghum, Kidney bean, Hemp seed, White mustard seed

EXODUS

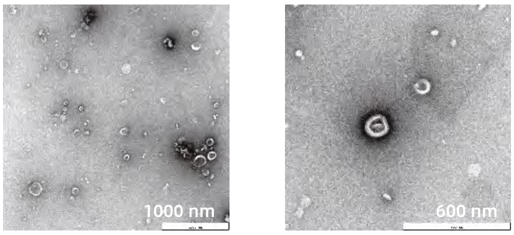
TEM Results



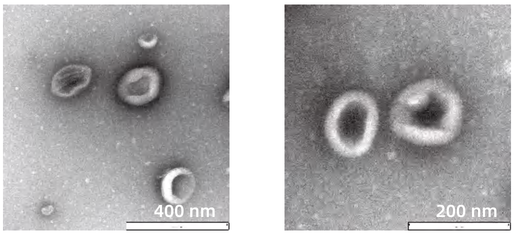
Ginseng EVs



Ginger EVs

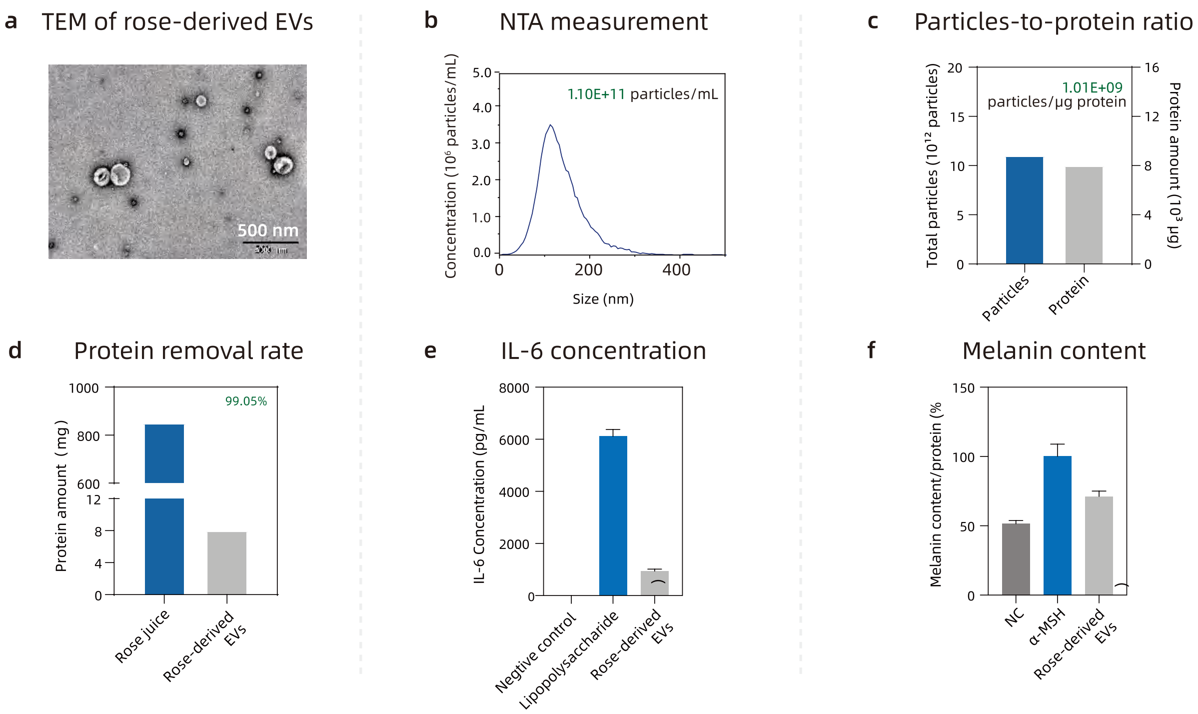


Rosa roxburghii EVs



Perilla EVs

Rose-derived EVs Results



a. TEM results show that rose-derived EVs, showing the characteristic cup and plate shape of exosomes.

b. NTA results show that the average particle size of rose-derived EVs is approximately 120 nm, with a particle concentration of about 1.1×10^{11} particles/mL.

c. Yield and purity analysis results indicate that the total particle number of rose-derived EVs is approximately 1.1×10^{13} particles, with a particle-to-protein ratio of about 1.01×10^{9} particles/μg protein.

d. Protein removal rate results show that the protein removal rate of rose-derived EVs is as high as 99.05%.

e. Inflammatory factor secretion experiment results demonstrate that rose-derived EVs can significantly inhibit IL-6 secretion.

f. Melanin content test results show that rose-derived EVs can significantly inhibit melanin expression.

Cell Culture Medium

Cell Culture Medium EVs Isolation Solution

EXODUS

- EXODUS T-2800 can efficiently isolate high-purity, high-yield, and highly active exosomes from large volume cell culture media;
- Stem cell-derived exosomes isolated by EXODUS T-2800 can be used for the treatment of eye diseases, respiratory disorders, trauma, and so on.

EXODUS T-2800 enabling seamless transitions from laboratory R&D to large-scale GMP manufacturing

EXODUS H-600

Processing volume
10 μL-250 mL

Maximum processing speed
200 mL/h

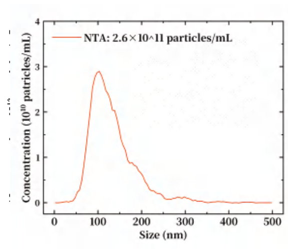
EXODUS T-2800

Processing volume
1-10 L

Maximum processing speed
2 L/h

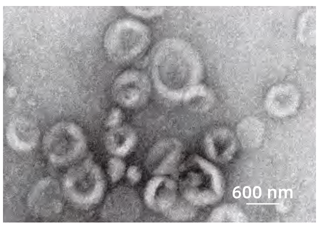
Characterization results of HEK 293F

a



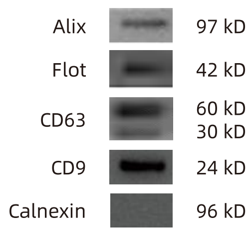
NTA

b



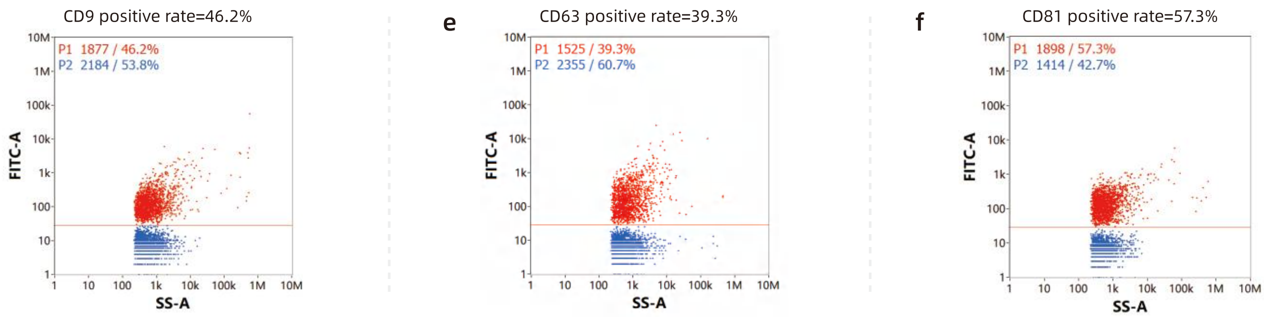
TEM

c



WB

d e f

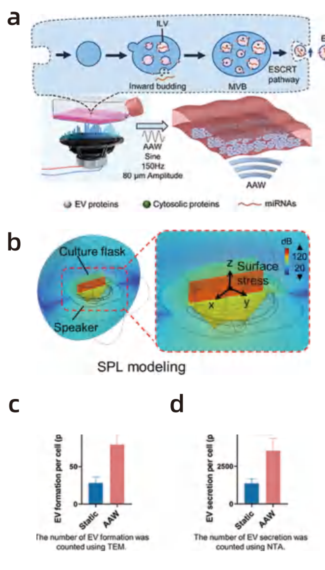


Nano flow cytometry

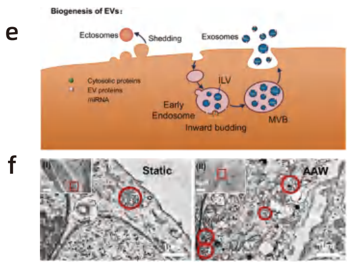
EXODUS

Application

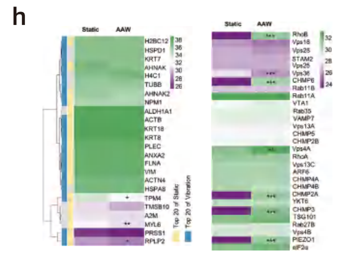
❶ Cell culture medium EVs isolated by EXODUS for the research of EV formation and secretion



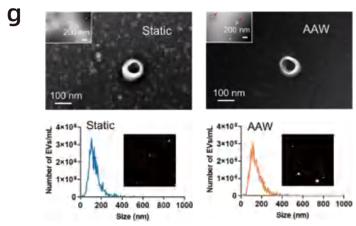
Construct an audible acoustic wave(AAW) model and verify that AAW stimulation can promote the secretion of EVs.



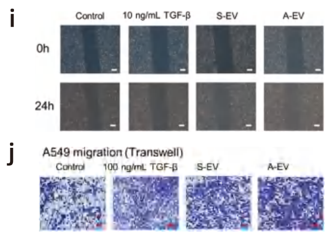
AAW can stimulate the process of intracellular vesicle formation and promote the secretion of EVs.



Explore the potential mechanism by which AAW promotes the formation and secretion of EVs.



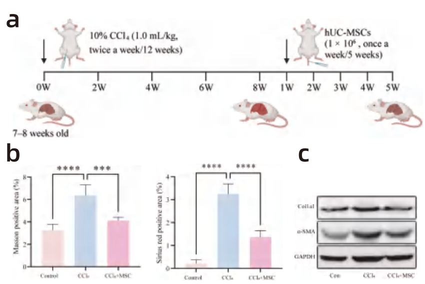
The results of the identification and characterization of EVs produced under static culture are consistent with those under AAW stimulation.



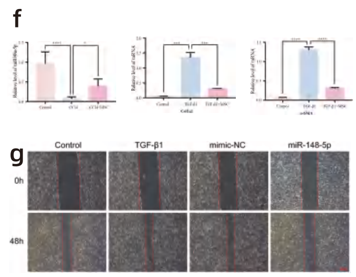
AAW stimulation can preserve the biological functions of EVs.

ACS Appl Mater Interfaces. 2023, 15 (46):53859-53870.

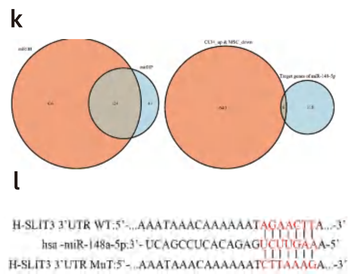
❷ Mesenchymal stem cell EVs isolated by EXODUS for improving liver fibrosis



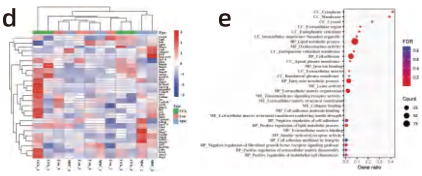
Verify the function of MSCs in improving liver fibrosis in mice.



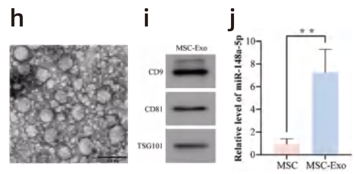
Verify the function of miR-148-5p in inhibiting fibrosis.



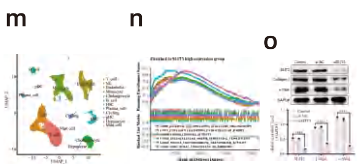
Verify that SLIT3 is a direct target of miR-148-5p.



Screen potential genes for the therapeutic mechanism of MSCs.



Isolation and identification of MSC-EVs.

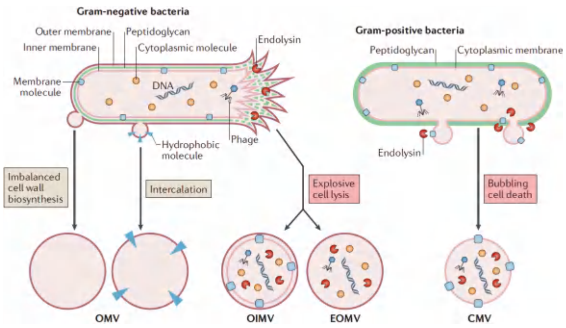


Down-regulating SLIT3 can inhibit the activation of LX2 cells.

Int Immunopharmacol. 2023, 125(Pt A):111134.

Bacterial EVs
Isolation solution

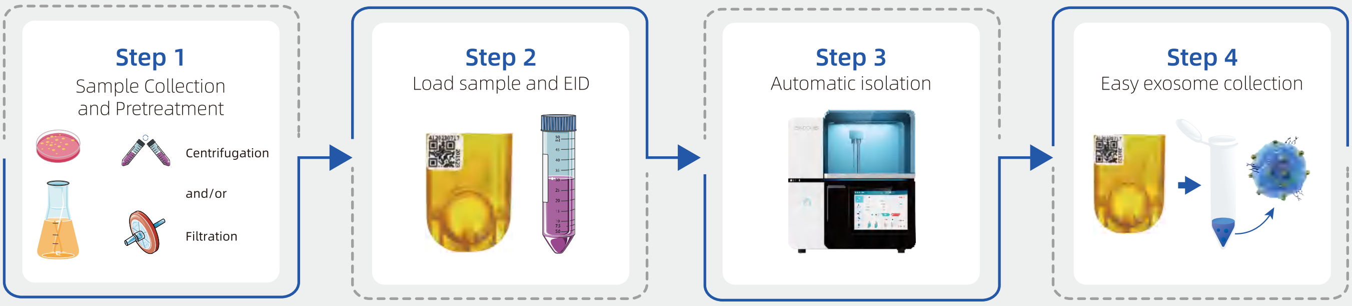
EXODUS



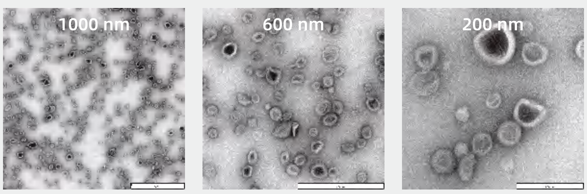
Nat Rev Microbiol. 2019, 17 (1):13-24.

Bacterial extracellular vesicles (BEVs) are vesicular structures with a lipid bilayer secreted by bacteria, and they carry various biomolecules from the parental bacteria, including proteins, lipids, metabolite molecules, nucleic acids, etc. Among them, the bacterial extracellular vesicles secreted by Gram-negative bacteria through the budding of the outer membrane are called outer membrane vesicles (OMVs). These vesicles originate from the bacterial outer membrane and carry components from the cell membrane and the periplasm, with a size of approximately 20-250 nm. The bacterial extracellular vesicles secreted by Gram-positive bacteria are called cytoplasmic membrane vesicles (CMVs). These vesicles originate from the cytoplasmic membrane of bacteria and carry components of the cytoplasm. Their sizes are more extensive, ranging from about 20-400 nm.

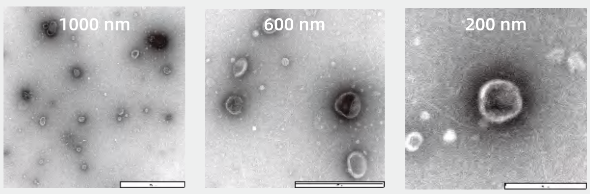
Isolation procedure



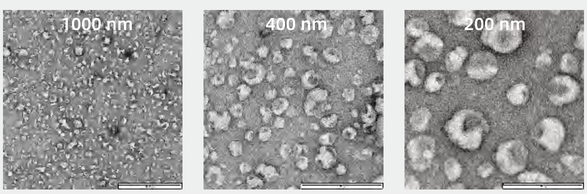
Characterization results



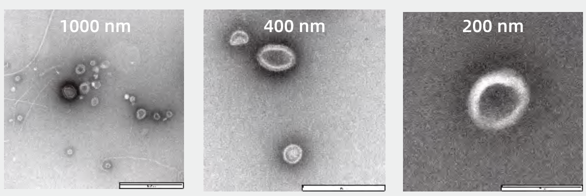
Helicobacter pylori EVs



Escherichia coli EVs



Mycobacterium tuberculosis EVs



Gut microbiota EVs

EXODUS

Research directions

1.Mechanism research: Investigation of bacterial physiological and pathological mechanisms.

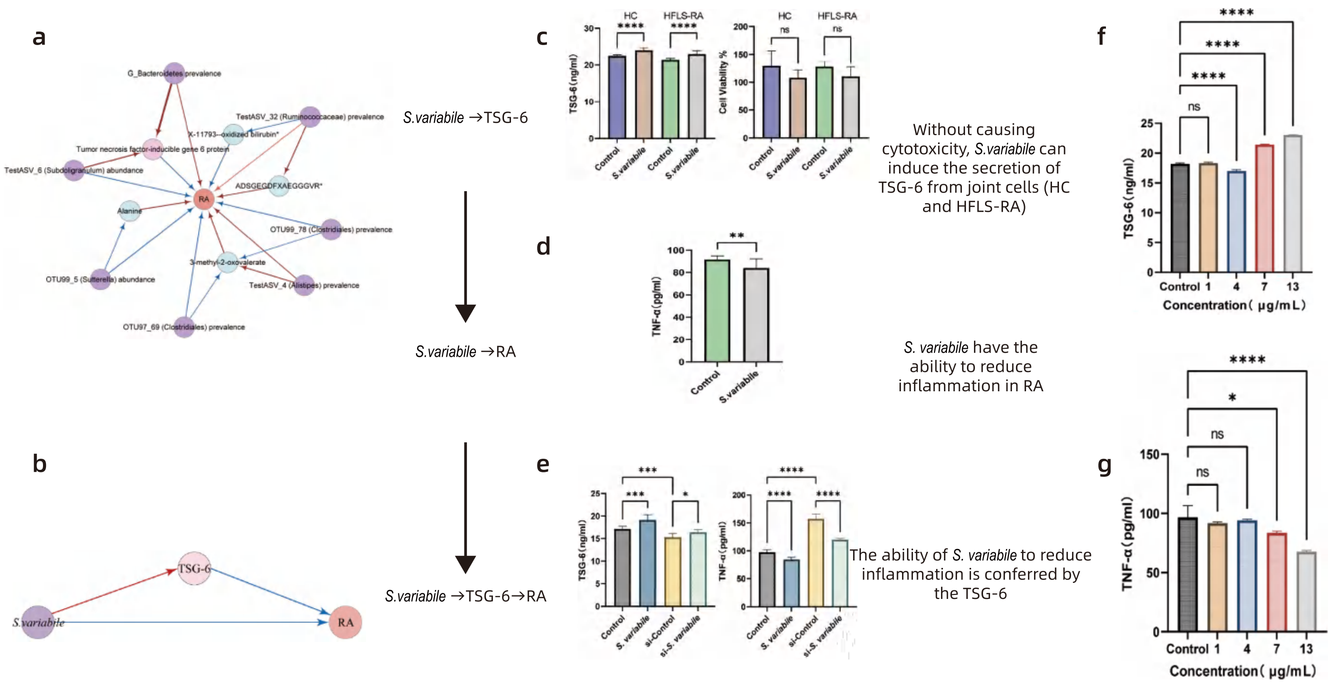
2.Disease prevention and treatment: Develop tumor immunotherapeutic agents, antibacterial drugs, etc. based on BEV.

3.Disease diagnosis: Develop disease diagnostic markers based on multi-omics technologies of BEV.

4.Drug carrier: Exploiting the susceptibility of BEV to engineering modifications for drug loading.

Application

BEVs isolated by EXODUS for the mechanism of improve rheumatoid arthritis



a-b. Use GWAS data and combine bioinformatics analysis methods to clarify the potential regulatory relationships among the microbiota, cytokines, and the disease.

c-e. Simulate the in vivo environment through the Transwell co-culture model and study the effects of *S. variabile* on HC and HFLS-RA.

f-g. Isolate EVs from the culture solution of *S. variabile* and study their effects on the secretion of TSG-6 and the level of TNF-α.

Front Immunol. 2024, 10:15:1418717.

Product specifications may change without notice,
based on the latest technical data and test results.

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