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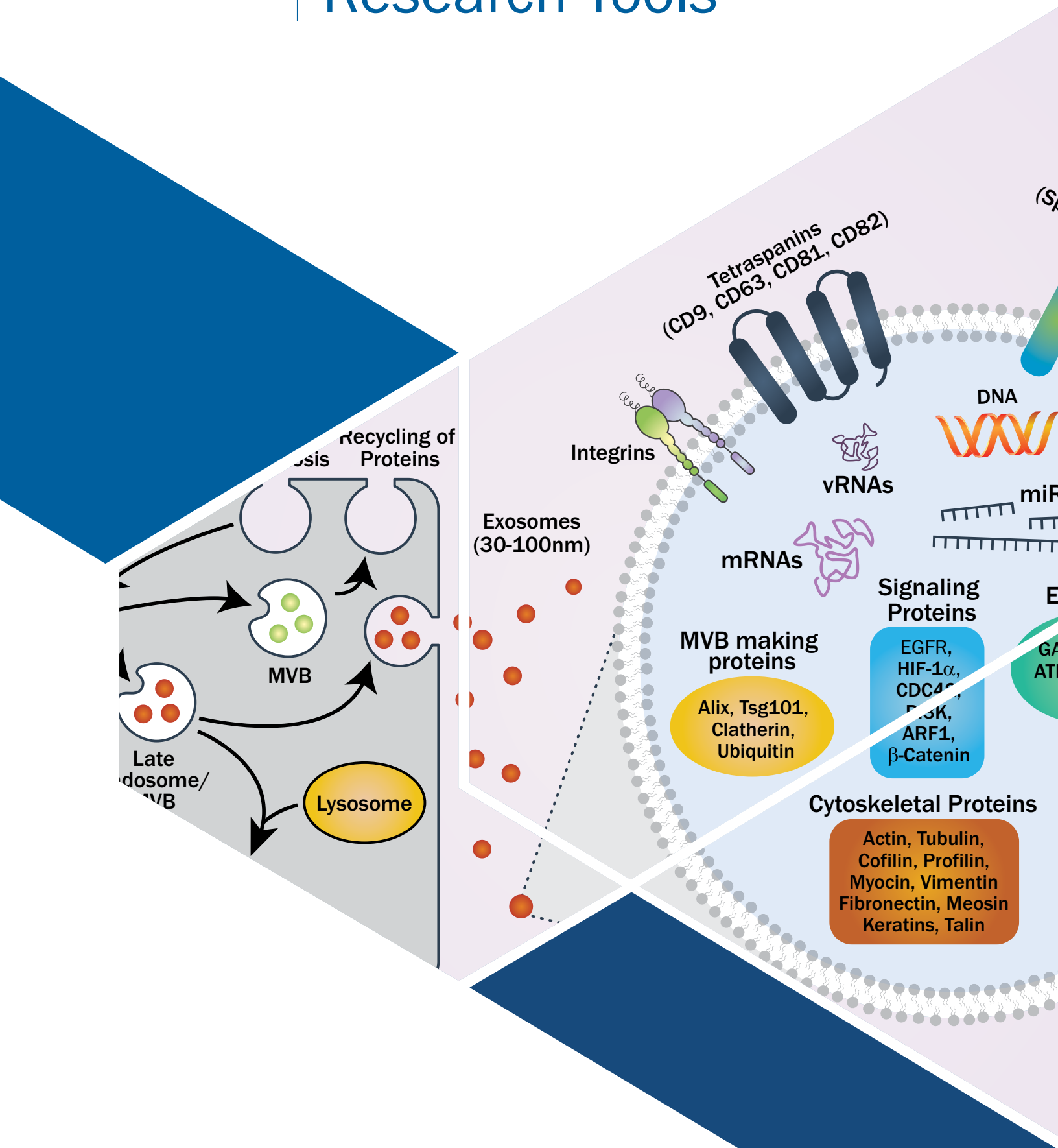
Exosome Research Tools



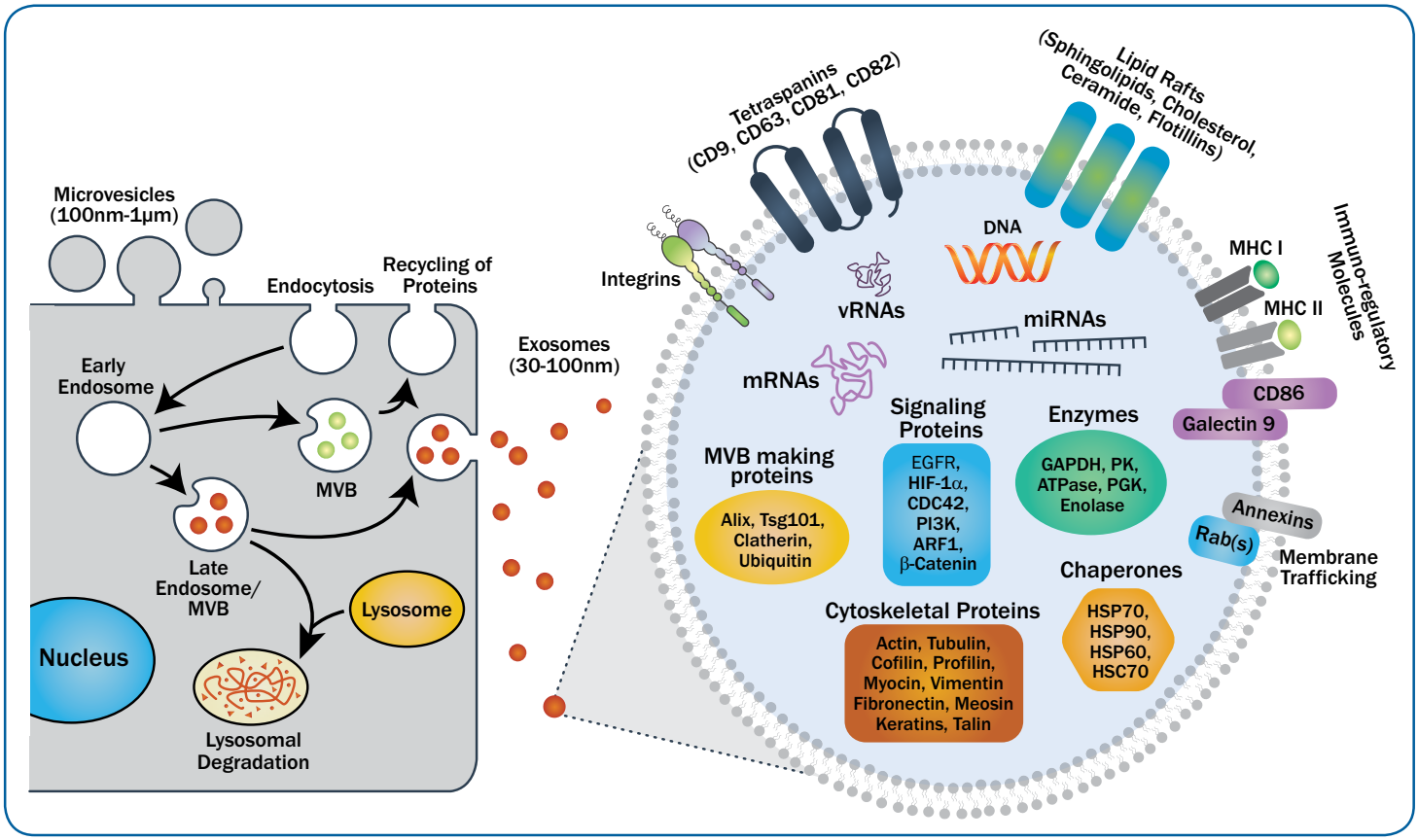
INTRODUCTION

Exosomes are small, spherical to cup-shaped membrane vesicles (30-100 nm in diameter) that are generated in the late endosomal compartment through inward budding of multivesicular bodies (MVBs). It was originally documented that differentiating reticulocytes generated exosomes as a result of MVB fusing with the plasma membrane. However, later studies established that exosomes are actively secreted by nearly all cells via exocytosis either constitutively or through induction, under normal or pathological conditions, and in a dynamic, regulated and functionally relevant manner. In experimental and clinical settings, exosomes have been isolated from a range of cell lines as well as from biological fluids (serum and plasma) and other body fluids. Structurally, exosomes contain multiple proteins, lipids, DNA, RNAs (mRNA, miRNA, ncRNA), and even biomolecules of viruses/prions.

Exosomes have the ability to transfer information in the form of their contents, thus acting as signalosomes, either locally or by travelling to distant tissues, wherein they influence various cellular functions. Some of the biological processes which are regulated by exosomes are:

- Cell metabolism and signaling
- Development and regeneration
- Cell adhesion and motility
- Immune response, inflammation
- Exchange of pathogenic proteins/organisms
- Tumor progression and metastasis
- Stemness and reprogramming
- Cardiovascular diseases
- Nervous system development, homeostasis and neurodiseases (Parkinson's, Alzheimer's and ALS)

Biogenesis and Composition of Exosomes



Exosome Research Tools

Exosome research is an emerging area among scientists from various diciplines of biological sciences. To enable researchers isolate, quantify and analyze exosomes, Novus Biologicals now offers:

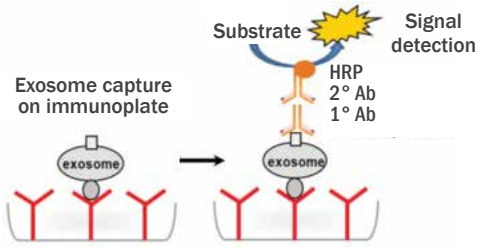
- Exosome Capture/Quantification Kits
- Exosomal Associated RNA Extraction Kits
- Exosome Standards (biofluids and cell lines)
- Immunoplates for Capture of Exosomes
- Immunobeads for Exosome Isolation
- Exosome Marker Antibodies (CD63, CD81 & more).

Exosome Capture & Quantification Kits (Colorimeteric)

Exosome immunocapture and quantification kits enable the detection and quantification of exosomes from several different types of samples. As little as 100 µl of sample can be used for both relative and absolute quantification. These kits come with plates pre-coated with proprietary pan-exosome marker antibodies. Immunocaptured exosomes are then quantified using the double sandwich ELISA method. These kits are good for 100 assays each.

Use of Kit	Sample Type	Catalog No.
Overall Exosome Capture and Quantification	Plasma	NBP2-49782
Overall Exosome Capture and Quantification	Urine	NBP2-49783
Overall Exosome Capture and Quantification	Serum	NBP2-49785
Overall Exosome Capture and Quantification	Cell Media	NBP2-49787
Tumor-derived Exosome Enrichment and Quantification	Biofluids, Cell Media	NBP2-49786

Exosome Capture & Quantification Principle

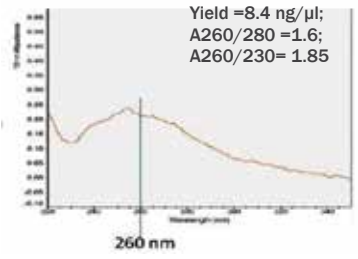


Exosome Associated RNA Extraction Kits

Exosome RNA extraction kits offer an easy and rapid method for the isolation of high quality total RNA, (miRNA and mRNAs), from exosomes captured with immunobeads or from pre-isolated exosomes. These kits yield superior quantity RNA which may be used for their downstream analysis. The kits are offered in 10-30 reaction unit sizes and the exosome control standards are provided along.

Use of Kit	Samples	Catalog No.
Exosome RNA Extraction	Pre-Isolated Exosomes	NBP2-49789
Overall Exosome Capture and RNA Extraction	Biofluids, Cell Media	NBP2-49784
Tumor-derived Exosome Capture & RNA Extraction	Biofluids	NBP2-49788

Nanodrop Profile for Plasma Exosome RNA



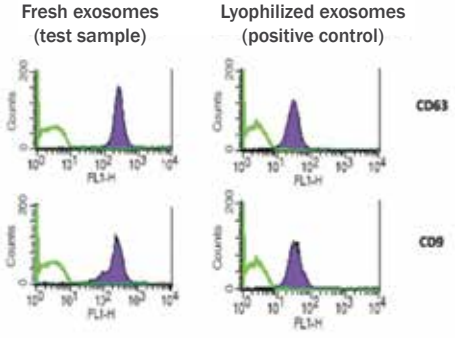
Exosome Standards

Lyophilized exosome standards can be used as positive controls to evaluate the performance of immunocapture assays. The source of exosomes include: culture supernatant from various cell lines, plasma, serum, urine, and saliva. To prepare these standards, exosomes are purified through ultracentrifugation and microfiltration, and then checked for quality by Flow, WB, and ELISA. Available unit sizes for exosome standards are 2-6 vials of 100ug each.

Exosome Source	Catalog No.
Plasma (Human)	NBP2-49838
Saliva (Human)	NBP2-49842
Serum (Human)	NBP2-49827
Urine (Human)	NBP2-49840
A549 Cells (Human)	NBP2-49862
BLCL21 Cells (Human)	NBP2-49849
BPH-1 Cells (Human)	NBP2-49858
COLO1 Cells (Human)	NBP2-49845

Exosome Source	Catalog No.
DAUDI Cells (Human)	NBP2-49860
HCT116 Cells (Human)	NBP2-49854
K562 Cells (Human)	NBP2-49864
MM1 Cells (Human)	NBP2-49847
PC3 Cells (Human)	NBP2-49856
SK-N-SH Cells (Human)	NBP2-49852
U87-MG Cells (Human)	NBP2-49844
B16F10 Cells (Mouse)	NBP2-49866

Flow of Freshly Isolated & Lyophilized Exosomes

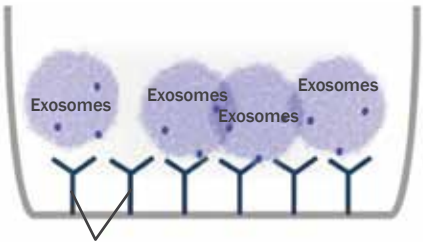


Immunoplates for Exosome Isolation

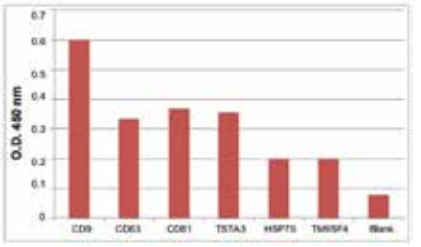
Immunoplates are pre-coated with exosome-marker antibodies for capture/isolation of exosomes from various biofluids. Covalent coating chemistry maximizes exosome immunocapture and reduces non-specific binding of protein complexes/debris. Transparent, White and Black plates (for colorimetric, luminometric and fluorimetric analysis, respectively) are offered for isolation or enrichment of exosome sub-populations. Available options are:

Use of Immunoplate	Compatibility	Catalog No.
Overall Exosome Isolation from Biofluids	Colorimetric	NBP2-49802
Overall Exosome Isolation from Biofluids	Luminometric	NBP2-49803
Overall Exosome Isolation from Biofluids	Fluorometric	NBP2-49804
Overall Exosome Isolation from Serum	Colorimetric	NBP2-49805
Overall Exosome Isolation from Serum	Luminometric	NBP2-49806
Overall Exosome Isolation from Serum	Fluorometric	NBP2-49807
Overall Exosome Isolation from Saliva	Colorimetric	NBP2-49808
Overall Exosome Isolation from Saliva	Luminometric	NBP2-49809
Overall Exosome Isolation from Saliva	Fluorimetric	NBP2-49810
Overall Exosome Isolation from Cell Media	Colorimetric	NBP2-49811
Overall Exosome Isolation from Cell Media	Luminometric	NBP2-49812
Overall Exosome Isolation from Cell Media	Fluorimetric	NBP2-49813
Tumor-derived Exosome Isolation from Plasma	Colorimetric	NBP2-49814
Tumor-derived Exosome Isolation from Plasma	Luminometric	NBP2-49815
Tumor-derived Exosome Isolation from Plasma	Fluorimetric	NBP2-49816
Neural-derived Exosome Isolation from Plasma	Colorimetric	NBP2-49800
Neural-derived Exosome Isolation from Plasma	Luminometric	NBP2-49817
Neural-derived Exosome Isolation from Plasma	Fluorimetric	NBP2-49818
Glial-derived Exosome Isolation from Plasma	Colorimetric	NBP2-49819
Glial-derived Exosome Isolation from Plasma	Luminometric	NBP2-49820
Glial-derived Exosome Isolation from Plasma	Fluorimetric	NBP2-49821
Monocytes/Platelet-derived Exosome Isolation from Plasma	Colorimetric	NBP2-49822
Monocytes/Platelet-derived Exosome Isolation from Plasma	Luminometric	NBP2-49823
Monocytes/Platelet-derived Exosome Isolation from Plasma	Fluorimetric	NBP2-49824

Exosome Capture on Immunoplate



Exosome Markers Analysis in Normal Human Plasma

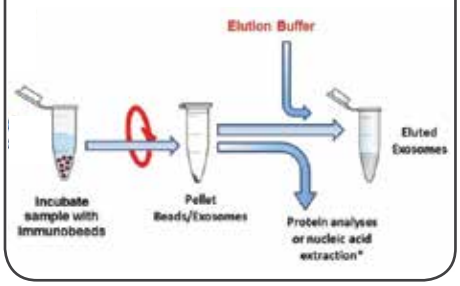


Immunobeads for Exosome Isolation

Latex beads are covalently coupled with exosome marker antibodies for exosome isolation from biofluids and cell media. They do not require ultracentrifuge or pre-purification steps, and are offered with an elution buffer which allows exosome collection for downstream analysis. Beads are provided in two diameters, 0.4 micron (µm) and 1 µm, for the isolation of exosomes from sources with varying sample volumes and/or exosomes quantities.

Size of Beads	Usefulness	Sample	Catalog No.
0.4 µm	Overall Exosome Isolation	Cell media	NBP2-49826
1.0 µm	Overall Exosome Isolation	Cell media	NBP2-49828
0.4 µm	Tumor-Derived Exosome Isolation	Biofluids	NBP2-49829
1.0 µm	Tumor-Derived Exosome Isolation	Biofluids	NBP2-49830
0.4 µm	Overall Exosome Isolation	Biofluids	NBP2-49835
1.0 µm	Overall Exosome Isolation	Biofluids	NBP2-49836
0.4 µm	Overall Exosome Isolation	Mouse biofluids	NBP2-49831
1.0 µm	Overall Exosome Isolation	Mouse biofluids	NBP2-49832
0.4 µm	Overall Exosome Isolation	Mouse cell media	NBP2-49833
1.0 µm	Overall Exosome Isolation	Mouse cell media	NBP2-49834

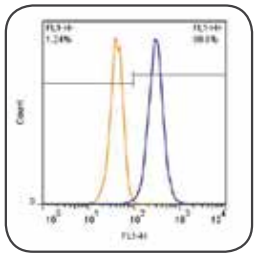
Exosome Isolation with Immunobeads



Antibodies for Exosome Markers

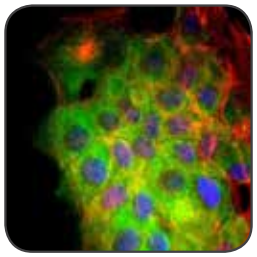
Antibodies specific for exosome associated antigens (CD63, CD9, CD81, etc.) facilitate the characterization and/or quantification of exosomes in cells, tissues or other biological samples. Novus offers high quality multi-assay/species validated antibodies for various exosome markers. Our antibodies are available in several different conjugated formats for flow cytometry or other immunostaining analyses.

CD63 Antibody (H5C6) [NBP2-42225]
(16 Publications)



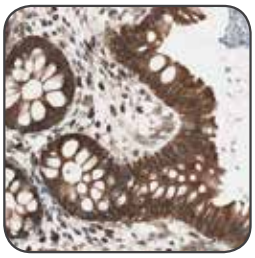
Flow, A431 epidermoid cancer cells

CD81 Antibody (1D6) [NB100-65805]
(12 Publications)



ICC/IF, A431 epidermoid cancer cells

TSG101 Antibody [NBP1-80659]
(3 Publications)



IHC-P, Human rectal tissue

Target Name	Catalog No.	Host/Clonality	Applications	Species
Alix	NBP1-90201	Rb/Poly	WB, ICC/IF, IHC-P	Hu, Mu, Rt
CD24	MAB5248	Mu/Mono	IHC-P	Hu
CD63	NBP2-42225	Mu/Mono	WB, DB, EM, ELISA, Flow, Func, ICC/IF, IP	Hu
CD63	MAB5417	Rt/Mono	Flow, IHC-Fr	Mu
CD63	NBP2-36567	Rt/Mono	WB, Flow	Hu, Mu
CD63	NB100-77913	Mu/Mono	WB, Flow, ICC/IF, IHC-P, IP	Hu
CD81	NB100-65805	Mu/Mono	WB, ELISA, Flow, ICC/IF, IHC-P, IP	Hu, Gt, Pm, Sh
CD81	MAB4865	Rt/Mono	Flow	Mu
CD9	NBP2-22187	Mu/Mono	WB, ELISA, Flow, IHC-P	Hu
CD9	MAB5218	Rt/Mono	Flow, IHC-Fr	Mu
CD9	NB100-77915	Mu/Mono	Flow, ICC/IF	Hu, Bv, Ca, Eq, Rb, Sh
TSG101	NB200-112	Mu/Mono	WB, ELISA, Flow, ICC/IF, IHC-P, IP	Hu, Mu, Rt, Ha, Pm
TSG101	NBP1-80659	Rb/Poly	WB, ICC/IF, IHC-P	Hu, Mu, Rt

Species Key: Bv (Bovine), Ca (Canine), Eq (Equine), Gt (Goat), Ha (Hamster), Hu (Human), Mu (Mouse), Pm (Non-human Primates), Rb (Rabbit), Rt (Rat), Sh (Sheep)

Applications Key: DB (Dot Blot), ELISA (ELISA Capture and/or Detection), EM (Electron Microscopy), Flow (Flow Cytometry), Func (Functional), ICC/IF (Immunocytochemistry/Immunofluorescence), IHC-Fr (Immunohistochemistry-Frozen), IHC-P (Immunohistochemistry-Paraffin), IP (Immunoprecipitation), SW (Simple Western), WB (Western blot)

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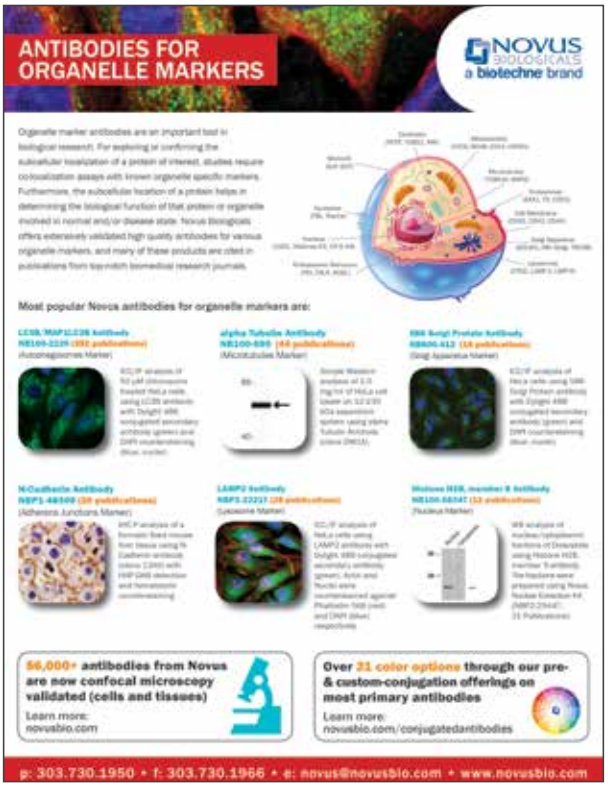
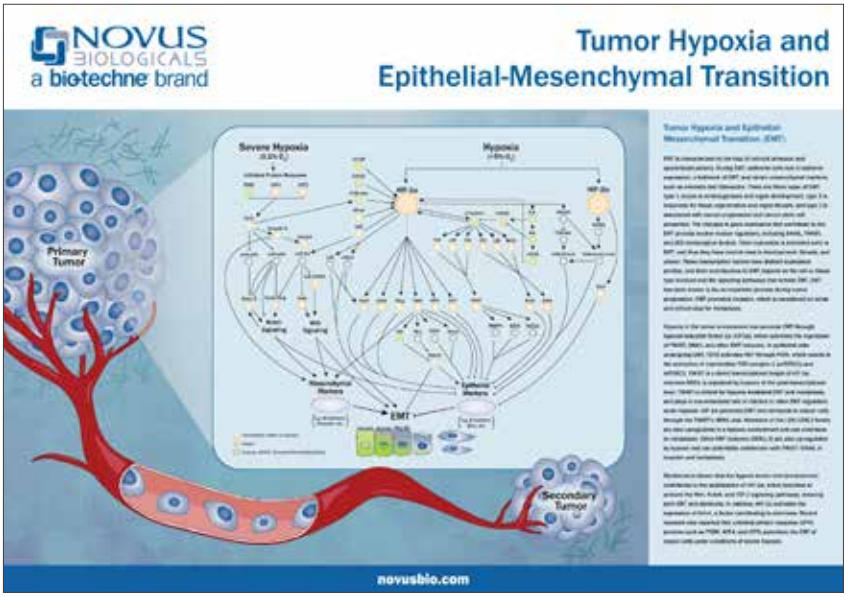
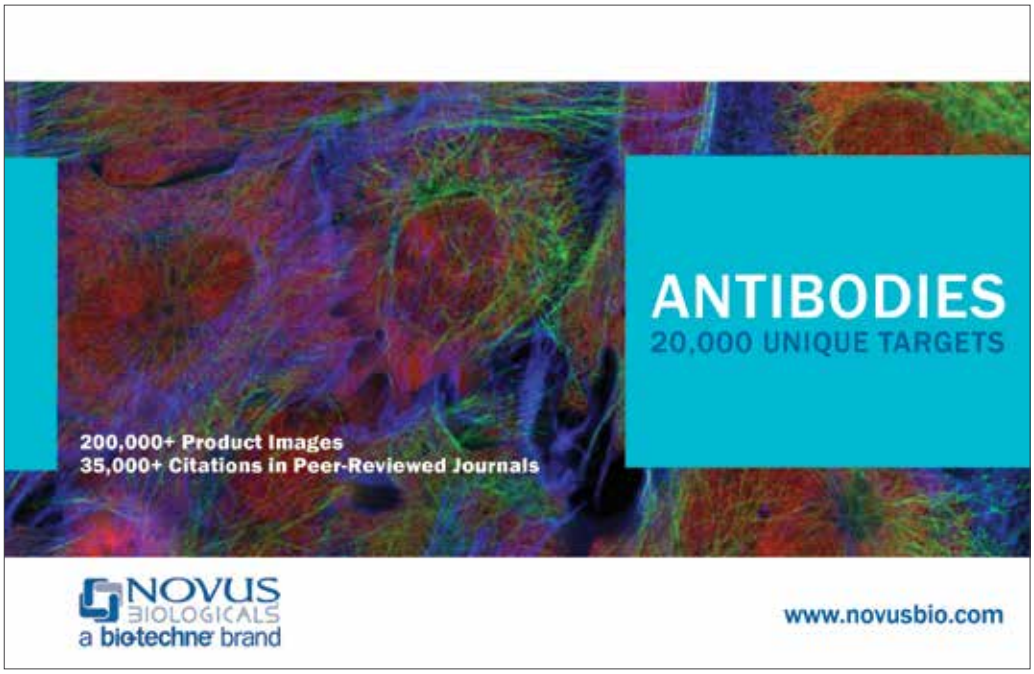
Organelle Markers Flyer



Tumor Hypoxia and EMT Poster



Mini Catalog



R&D Systems develops and manufactures high-quality proteins and serves as a world leader in immunoassays. R&D Systems also produces quality antibodies, antibody arrays, stem cell and cell culture products, and cell selection and detection products, serving the life science and diagnostics industry. rndsystems.com

Novus Biologicals licenses, manufactures, and markets antibodies to over 20,000 unique targets to support a wide array of research areas. Novus is built on honesty, collaboration and strong relationships and continues to provide quality tools that accelerate research. Every product is backed by our 100% guarantee. novusbio.com

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