### PLASMA/SERUM EXOSOME PURIFICATION KITS

(CAT. 57400, 57500, 57600)



Versatile sample input ranging from 50 µL to 10 mL

- No time-consuming ultracentrifugation, filtration nor special syringes required
- No precipitation reagents nor overnight incubation required
- No protease treatment required
- Compatible with plasma/serum from any species
- Pure exosomes are purified and are free-from any other RNA-binding proteins
- Purified exosomes can be analyzed using NanoSight® or Electron Microscopy for assessing the approximate exosome size range and concentration
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## **PURIFICATION AND ENRICHMENT** OF INTACT PLASMA/SERUM EXOSOMES FOR FUNCTIONAL STUDIES

Plasma - 1 mL Input







### **Ordering Information**

Plasma/Serum Exosome Purification Kits	
50 Preps (Mini)	Cat. 57400
25 Preps (Midi)	Cat. 57500
15 Preps (Maxi)	Cat. 57600

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### URINE EXOSOME PURIFICATION KITS

(CAT. 57700, 57800, 57900)



- 🗸 Versatile sample input ranging from 250 μL to 30 mL
- No time-consuming ultracentrifugation, filtration nor special syringes required
- No precipitation reagents nor overnight incubation required
- No protease treatment required
- Compatible with urine from any species
- Pure exosomes are purified and are free-from any other RNA-binding proteins
- Purified exosomes can be analyzed using NanoSight® or Electron Microscopy for assessing the approximate exosome size range and concentration
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## PURIFICATION AND ENRICHMENT OF INTACT URINARY EXOSOMES FOR FUNCTIONAL STUDIES



Figure 1. Intact Exosomes were purified from 10 mL urine using Norgen's Urine Exosome Purification Midi Kit (Cat# 57800) and Ultracentrifugation. Exosomes purified using Norgen's kit or ultracentrifugation, were resuspended in 400  $\mu$ L of Norgen's ExoR buffer, diluted 1:1,000 and visualized on the NanoSight LM10 instrument. The analysis shows that Norgen's kit purified exosomes with sizes ranging from 65 nm to 195 nm, with a total recovery of 7.63 x 10<sup>8</sup> particles/mL. No impurities were found to be contaminating the exosomes purified using Norgen's Urine Exosome Purification Midi Kit as opposed to the exosomes purified using ultracentrifugation, which purified exosomes with larger particle sizes ranging from 125 nm -235 nm with a total recovery of 1.56 x 10<sup>8</sup> particles/ mL.

### **Ordering Information**

Urine Exosome Purification Kits	
50 Preps (Mini)	Cat. 57700
25 Preps (Midi)	Cat. 57800
15 Preps (Maxi)	Cat. 57900





## CELL CULTURE MEDIA EXOSOME PURIFICATION KITS

(CAT. 60400, 60500, 60600)



 Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## **PURIFICATION AND ENRICHMENT** OF INTACT CELL CULTURE MEDIA EXOSOMES FOR FUNCTIONAL STUDIES



Figure 1. Isolation of RNA from exosomes purified from different cell culture media volumes. Norgen's Cell Culture Media Exosome Purification Mini Kit (Cat.60400) was used to isolate exosomal RNA from exosomes purified from different cell culture media volumes using the same kit. Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated exosomal RNA (A) The exosomal miR-26a is linearly decreasing with increasing the sample input volume. (B) The relative amount of the exosomal miR-26a shows excellent linearity with a percentage of recovery of more than 90%

### **Ordering Information**

Cell Culture Media Exosome Purification Kits	
50 Preps (Mini)	Cat. 60400
25 Preps (Midi)	Cat. 60500
15 Preps (Maxi)	Cat. 60600





## SALIVA EXOSOME PURIFICATION KIT

(CAT. 65300)



- Versatile sample input ranging from 0.5 mL to 2 mL
- Process fresh saliva or saliva collected with Norgen's Saliva
  Exosome Collection and Preservation Device (Cat 65400)
- No time-consuming ultracentrifugation, filtration nor special syringes required
- No precipitation reagents or overnight incubation required
- No protease treatment required
- Purify pure exosomes that are free from RNA-binding proteins
- Purified exosomes can be analyzed using NanoSight® or Electron Microscopy for assessing the approximate exosome size range and concentration
- RNA can be isolated from the purified exosomes using Norgen's Exosome RNA Purification kit (Cat. 58000)
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## PURIFICATION AND ENRICHMENT OF INTACT SALIVA EXOSOMES



Preserve High Quality Exosomes, for up to 2 years at room temperature with Norgen's Saliva Exosome Collection and Preservation Device (p. 11)

### **Ordering Information**

Saliva Exosome Purification Kit	
50 Preps	Cat. 65300





## PLASMA/SERUM EXOSOME PURIFICATION AND RNA **ISOLATION KITS** (CAT. 58300, 58500, 58600)



- Bind and elute all RNA irrespective of size or GC content, without bias
- Isolate all sizes of exosomal and extracellular vesicle RNA, including microRNA
- Versatile plasma/serum input volume (50 µL 10 mL)  $\checkmark$
- No phenol extractions, Proteinase K treatment, nor carrier **RNA** required
- No time-consuming ultracentrifugation, filtration nor special  $\checkmark$ syringes required
- No precipitation reagents, nor overnight incubation required
- Compatible with plasma/serum from any species
- $\checkmark$ Pure exosomes are purified and are free from any other RNAbinding proteins
- $\checkmark$ Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## PURIFICATION AND ENRICHMENT OF INTACT **PLASMA/SERUM EXOSOMES** FOR FUNCTIONAL STUDIES

Plasma - 1 mL Input

Plasma - 10 mL Input





Figure 1. Intact exosomes purified from 1 mL and 10 mL plasma. Intact exosomes were purified from 1 mL plasma using Norgen's Plasma/Serum Exosome Purification and RNA Isolation Mini Kit (Cat# 58300) and from 10 mL plasma using the Plasma/Serum Exosome Purification and RNA Isolation Maxi Kit (Cat#56800). Exosomes purified using Norgen's Mini kit were resuspended in 200 µL Norgen's ExoR buffer whereas exosomes purified using Norgen's Maxi kit were resuspended in 600 µL Norgen's ExoR buffer, diluted 1:1,000 and visualized on the NanoSight LM10 instrument. The analysis shows that the purification of exosomes is linear as 4.04 x 1010 particles/ mL were recovered from 1 mL plasma whereas 2.95 x 10<sup>11</sup> particles/mL were recovered from 10 mL plasma.

### **Ordering Information**

Plasma/Serum Exosome Purification and RNA Isolation Kits		
50 Preps (Mini)	Cat. 58300	
25 Preps (Midi)	Cat. 58500	
15 Preps (Maxi)	Cat. 58600	





### URINE EXOSOME PURIFICATION AND RNA ISOLATION KITS (CAT. 58400, 58700, 58800)



- Bind and elute all RNA irrespective of size or GC content, without bias
  - Isolate all sizes of exosomal RNA, including microRNA
- Versatile urine input volume (250 µL to 30 mL)
- No phenol extractions, Proteinase K treatment, nor carrier RNA required
- No time-consuming ultracentrifugation, filtration nor special syringes are required
- No precipitation reagents or overnight incubation required
- Compatible with urine from any species
- Pure exosomes are purified and are free-from any other RNA-binding proteins
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## PURIFICATION AND ENRICHMENT OF INTACT URINARY EXOSOMES FOR FUNCTIONAL STUDIES



Figure 1. Isolation of RNA from exosomes purified from different urine volumes. Norgen's Urine Exosome Purification and RNA Isolation Maxi Kit (Cat# 58800) was used to isolate RNA from exosomes purified from different urine volumes using the same kit. Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated urinary exosomal miR-30a. (A) The urinary exosomal miR-30a is linearly decreasing with increasing the sample input volume. B) The relative amount of the urinary exosomal miR-30a shows excellent linearity with a percentage of recovery of more than 90%.

### **Ordering Information**

Urine Exosome Purification and RNA Isolation Kits	
50 Preps (Mini)	Cat. 58400
25 Preps (Midi)	Cat. 58700
15 Preps (Maxi)	Cat. 58800

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### CELL CULTURE MEDIA EXOSOME PURIFICATION AND RNA ISOLATION KITS (CAT. 60700, 60800, 60900)



- Purification and enrichment of intact cell culture media exosomes for functional studies
  - Bind and elute all RNA irrespective of size or GC content, without bias
  - Versatile cell culture media input volume (5 mL 35 mL)
- No phenol extractions, Proteinase K treatment, nor carrier RNA required
- No time-consuming ultracentrifugation, filtration nor special syringes required
- No precipitation reagents nor overnight incubation required
- Pure exosomes are purified and are free-from any other RNAbinding proteins
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## ISOLATE ALL SIZES OF EXOSOMAL RNA, INCLUDING MICRORNA



Figure 1. Isolation of RNA from exosomes purified from different cell culture media volumes. Norgen's Cell Culture Media Exosome Purification and RNA Isolation Maxi Kit (Cat# 60900) was used to isolate exosomal RNA from different cell culture media volumes from exosomes purified using the same kit. Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated exosomal RNA. (A) The exosomal miR-26a is linearly decreasing with increasing the sample input volume. (B) The relative amount of the exosomal miR-26a shows excellent linearity with a percentage of recovery of more than 90%.

### **Ordering Information**

Cell Culture Media Exosome Purification and RNA Isolation Kits	
50 Preps (Mini)	Cat. 60700
25 Preps (Midi)	Cat. 60800
15 Preps (Maxi)	Cat. 60900

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## PLASMA/SERUM EXOSOME AND FREE-CIRCULATING RNA ISOLATION KITS (CAT. 59500, 59600, 59700)



- Isolate all sizes of exosomal and extracellular vesicle RNA, including microRNA
- Versatile sample input ranging from 50 µL to 10 mL
- Isolate all sizes of free-circulating RNA, including microRNA
- Bind and elute all RNA irrespective of size or GC content, without bias
- The purified exosomal RNA is free from any circulating RNAbinding proteins
- 🔽 No phenol extractions, Proteinase K treatment, nor carrier RNA
- No time-consuming ultracentrifugation, filtration nor special syringes are required
- No precipitation reagents, nor overnight incubation required
- Concentrate isolated exosomal RNA and are free-circulating
- RNA into a flexible elution volume ranging from 50 μL to 100 μL Purify high-quality RNA in 15-20 minutes
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## ISOLATE ALL SIZES OF EXOSOMAL AND EXTRACELLULAR VESICLE RNA, INCLUDING MICRORNA



Figure 1. Isolation of RNA from exosomes purified from different plasma volumes. Norgen's Plasma/ Serum Exosome and Free-Circulating RNA Isolation Mini Kit (Cat# 59500) was used to isolate Exosomal RNA from different plasma volumes ranging from 0.1 mL and up to 1 mL. Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated plasma exosomal miR-26a. (A) The plasma exosomal miR-26a is linearly decreasing with increasing the sample input volume. B) The relative amount of the plasma exosomal miR-26a shows excellent linearity with a percentage of recovery of more than 90%.

### **Ordering Information**

Plasma/Serum Exosome And Free-Circulating RNA Isolation Kits	
50 Preps (Mini)	Cat. 59500
25 Preps (Midi)	Cat. 59600
15 Preps (Maxi)	Cat. 59700





### URINE EXOSOME AND FREE-CIRCULATING RNA ISOLATION KITS (CAT. 59200, 59300, 59400)



- Versatile sample input ranging from 250 µL to 30 mL
- Isolate all sizes of free-circulating RNA, including microRNA
- Bind and elute all RNA irrespective of size or GC content, without bias
- The purified exosomal RNA is free from any circulating RNA-binding proteins
- No phenol extractions, Proteinase K treatment nor carrier RNA required
- No time-consuming ultracentrifugation, filtration nor special syringes are required
- No precipitation reagents nor overnight incubation required
- Concentrate isolated exosomal RNA and free-circulating RNA into a flexible elution volume ranging from 50 μL to 100 μL
- Purify high-quality RNA in 15-20 minutes
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## ISOLATE ALL SIZES OF EXOSOMAL AND EXTRACELLULAR VESICLE RNA, INCLUDING MICRORNA



Figure 1. Isolation of RNA from exosomes purified from different urine volumes. Norgens Urine Exosome and Free-Circulating RNA Isolation Maxi Kit (Cat# 59400) was used to isolate exosomal RNA from different urine volumes ranging from 11 mL to 30 mL. Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated urinary exosomal miR-30a. (A) The urinary exosomal miR-30a is linearly decreasing with increasing the sample input volume. B) The relative amount of the urinary exosomal miR-30a shows excellent linearity with a percentage of recovery of more than 90%.

### **Ordering Information**

Urine Exosome And Free-Circulating RNA Isola- tion Kits	
50 Preps (Mini)	Cat. 59200
25 Preps (Midi)	Cat. 59300
15 Preps (Maxi)	Cat. 59400





From Exosomes purified using Norgen's Technology

## EXOSOMAL RNA ISOLATION KIT

(CAT. 58000)



- ✓ Isolate all sizes of exosomal and extracellular vesicle RNA, including microRNA
- Bind and elute all RNA irrespective of size or GC content, without bias
- No phenol extractions
- ✓ No Proteinase K treatment
- 🗹 No carrier RNA
- Concentrate isolated RNA into a flexible elution volume ranging from 50 μL to 100 μL
- Purify high-quality RNA in 15-20 minutes
- Purified RNA is suitable for a variety of downstream applications, including Small RNA Sequencing. Find out more information on Norgen's NGS services (pg 184)
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

### THIS KIT IS FOR USE WITH NORGEN'S EXOSOME PURIFICATION TECHNOLOGY ONLY



Figure 1. Isolation of RNA from exosomes purified from different urine volumes. Norgen's Exosomal RNA Isolation Kit (Cat# 58000) was used to isolate RNA from exosomes isolated from different urine volumes purified using Norgen's Urine Exosome Purification Kits (Cat# 57700, 57800 and 57900). Two microlitres of the isolated RNA was then used as the template in RT-qPCR reactions to assess the amplification of the isolated urinary exosomal miR-30a. (A) The urinary exosomal miR-30a is linearly decreasing with increasing the sample input volume. B) The relative amount of the urinary exosomal miR-30a shows excellent linearity with a percentage of recovery of more than 90%.

### **Ordering Information**

Exosomal RNA Isolation Kit	
Variable	Cat. 58000





## FBS EXOSOME DEPLETION KITS (SLURRY FORMAT)

(CAT. 61100, 61400)



- Efficient depletion of cow's exosomes from
  Fetal Bovine Serum
- Deplete exosome-sized vesicles from versatile
  FBS volumes of up to 280 mL
- No protease treatment required
- No time-consuming ultracentrifugation
- No precipitation reagents required
- No overnight incubation required
- Depleted FBS has no detectable cow's miRNA
- The depleted FBS provides the same cellular growth rates as the standard FBS
- Purification is based on spin column chromatography that uses Norgen's proprietary resin separation matrix

## EFFICIENT DEPLETION OF COW'S EXOSOMES FROM FETAL BOVINE SERUM



**Figure 1. Growth rates of HeLa cells in media containing Exosome-depleted FBS.** Growth rates of HeLa cells in media containing Exosome-depleted FBS using Norgen's FBS Exosome Depletion Kits (Slurry Format) was compared to that in media containing standard FBS. Simply, HeLa cells were seeded in DMEM with either 10% Exosome-depleted FBS using Norgen's Kits or 10% standard FBS and then cultured under standard conditions at 37°C with 5% CO<sup>2</sup> for 3 days. The cells were imaged using Moticam 480 to observe cellular morphology and growth rate. Similar growth and identical cellular morphology were detected for both the Exosomedepleted FBS using Norgen's FBS Exosome Depletion Kits and the standard FBS.

### **Ordering Information**

FBS Exosome Depletion Kits (Slurry Format)	
Kit I - 6 Preps	Cat. 61100
Kit II - 12 Preps	Cat. 61400



## FBS EXOSOME DEPLETION KITS (COLUMN FORMAT)

(CAT. 61200, 61300)



- Efficient depletion of cow's exosomes from Fetal Bovine Serum
- Deplete exosome-sized vesicles from versatile FBS volumes of up to 240 mL
- No protease treatment required
- No time-consuming ultracentrifugation
- No filtration or special syringes are required
- No precipitation reagents required
- No overnight incubation required
- Depleted FBS has no detectable cow's miRNA
- The depleted FBS provides the same cellular growth rates as the standard FBS
- Purification is based on spin column chromatography that uses Norgen's resin separation matrix

## EFFICIENT DEPLETION OF COW'S EXOSOMES FROM FETAL BOVINE SERUM



Figure 1. Exosome-depleted FBS with Norgen's FBS **Exosome Depletion Kits (Column Format) has undetectable** Bovine miRNA levels. Norgen's FBS Exosome Depletion Kit I (Column Format) (Cat# 61200) was used to deplete bovine miRNA from 5mL FBS. Total RNA/miRNA including exosomal RNA was purified from the depleted FBS, non-depleted FBS and a commercially available ready to go depleted FBS using Norgen's Plasma/Serum Cell-Free Circulating DNA Purification Maxi Kit (Cat# 55800). Five different bovine microRNAs were assessed by RT-qPCR (miR-26a, miR-30a, miR-92a, miR-23a and miR-122). Three out of the five tested miRNA (miR-26a, miR-92a and miR-23a) didn't show any amplification in the FBS depleted using Norgen's FBS Exosome Depletion Kit I (Column Format) whereas the other two miRNAs (miR-30a and miR-122) showed very late Ct. values which appeared to be a primer dimer according to the melt curve.

#### **Ordering Information**

FBS Exosome Depletion Kits	
Kit I - 6 Preps	Cat. 61200
Kit II - 12 Preps	Cat. 61300

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## EXOSOME LABELING AND CLEANING KIT

(CAT. 68400)



- Allows for efficient labelling of exosomes with very low levels of background
- Allows for labelling of exosomes isolated using various methods, including Norgen Biotek
   Corp. proprietary kits, ultracentrifugation and precipitation reagents
- Convenient & fast protocol, which includes both labelling and cleaning procedures
- Excitation at 590 nm/Emission at 617 nm

## ALL-IN-ONE SOLUTION FOR THE FLUORESCENT LABELING AND CLEAN-UP OF EXOSOMES



HELA cells and HELA-derived exosomes

**Figure 1.** While the stain is selective to the exosomes lipidic membrane, the absence of cellular staining in presence of only the labeling molecule shows that the cleaning step is effective and leads to no labeling molecule carryover.

### **Ordering Information**

Exosome Labeling and Cleaning Kit (Slurry Format)	
25 rxns	Cat. 68400

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# SELECT PUBLICATIONS AND APPLICATION NOTES

#### Plasma/Serum Exosome Purification Kits (Cat. 57400, 57500, 57600)

Reale, A., Carmichael, I., Xu, R., Mithraprabhu, S., Khong, T., Chen, M., ... Spencer, A. (2021). **Human** myeloma cell- and plasma-derived extracellular vesicles contribute to functional regulation of stromal cells. *Proteomics (Weinheim), 21(13-14),* e2000119–n/a.

https://doi.org/10.1002/pmic.202000119

### Urine Exosome Purification Kits (Cat. 57700, 57800, 57900)

Peng, Q., Chiu, P. K.-F., Wong, C. Y.-P., Cheng, C. K.-L., Teoh, J. Y.-C., & Ng, C.-F. (2021). Identification of piRNA Targets in Urinary Extracellular Vesicles for the Diagnosis of Prostate Cancer. *Diagnostics (Basel)*, 11(10), 1828–.

https://doi.org/10.3390/diagnostics11101828

### Cell Culture Media Exosome Purification Kits (Cat. 60400, 60500, 60600)

Pane, K., Quintavalle, C., Nuzzo, S., Ingenito, F., Roscigno, G., Affinito, A., ... Condorelli, G. (2022). Comparative Proteomic Profiling of Secreted Extracellular Vesicles from Breast Fibroadenoma and Malignant Lesions: A Pilot Study. International Journal of Molecular Sciences, 23(7), 3989–.

https://doi.org/10.3390/ijms23073989

#### Plasma/Serum Exosome Purification And RNA Isolation Kits (Cat. 58300, 58500, 58600)

Sundar, I. K., Li, D., & Rahman, I. (2019). Small RNA-sequence analysis of plasma-derived extracellular vesicle miRNAs in smokers and patients with chronic obstructive pulmonary disease as circulating biomarkers. *Journal of Extracellular Vesicles*, *8*(1), 1684816–n/a.

https://doi.org/10.1080/20013078.2019.1684816

Urine Exosome Purification And RNA Isolation Kits (Cat. 58400, 58700, 58800)

Herrera-Van Oostdam, A. S., Toro-Ortiz, J. C., Lopez, J. A., Noyola, D. E., Garcia-Lopez, D. A., Duran-Figueroa, N. V., ... Lopez-Hernandez, Y. (2020). **Placental exosomes isolated from urine** of patients with gestational diabetes exhibit a differential profile expression of microRNAs across gestation. International Journal of Molecular Medicine, 46(2), 546–560.

https://doi.org/10.3892/ijmm.2020.4626

### Urine Exosome Purification And RNA Isolation Kits (Cat. 58400, 58700, 58800)

Kuji, T., Sugasawa, T., Fujita, S., Ono, S., Kawakami, Y., & Takekoshi, K. (2021). A Pilot Study of miR-NA Expression Profile as a Liquid Biopsy for Full-Marathon Participants. *Sports (Basel)*, 9(10), 134–.

https://doi.org/10.3390/sports9100134

### Cell Culture Media Exosome Purification And RNA Isolation Kits (Cat. 60700, 60800, 60900)

Sundar, I. K., Li, D., & Rahman, I. (2019). Small RNA-sequence analysis of plasma-derived extracellular vesicle miRNAs in smokers and patients with chronic obstructive pulmonary disease as circulating biomarkers. *Journal of Extracellular Vesicles, 8(1),* 1684816–n/a.

https://doi.org/10.1080/20013078.2019.1684816



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