System Biosciences
A CELLBIO SCIENTIFIC COMPANY

FUELING YOUR INNOVATION

Introduction

Extracellular vesicles (EVs) have emerged as powerful biomarkers and therapeutic tools, but traditional isolation techniques such as ultracentrifugation and size-exclusion chromatography (SEC) often fail to provide both high yield and purity. SBI's ExoQuick® UltraPure (EQ UltraPure) kit is a next-generation hybrid EV isolation kit that combines gentle polymer-based precipitation with advanced mixed-mode chromatography for a workflow that takes less than 20 minutes and can process as little as 100 to 250 µL of serum or plasma. This dual-action workflow delivers superior EV yields, exceptional purity, and consistent reproducibility from small serum or plasma volumes—without ultracentrifugation.

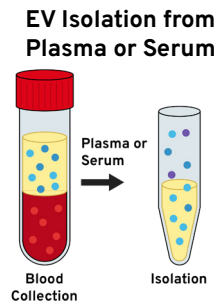


Figure 1. SBI's ExoQuick Ultrapure kit allows for the isolation of EVs from serum or plasma at volumes as low as 100 to 250 uL

Simple 5-Step Dual-Action Workflow

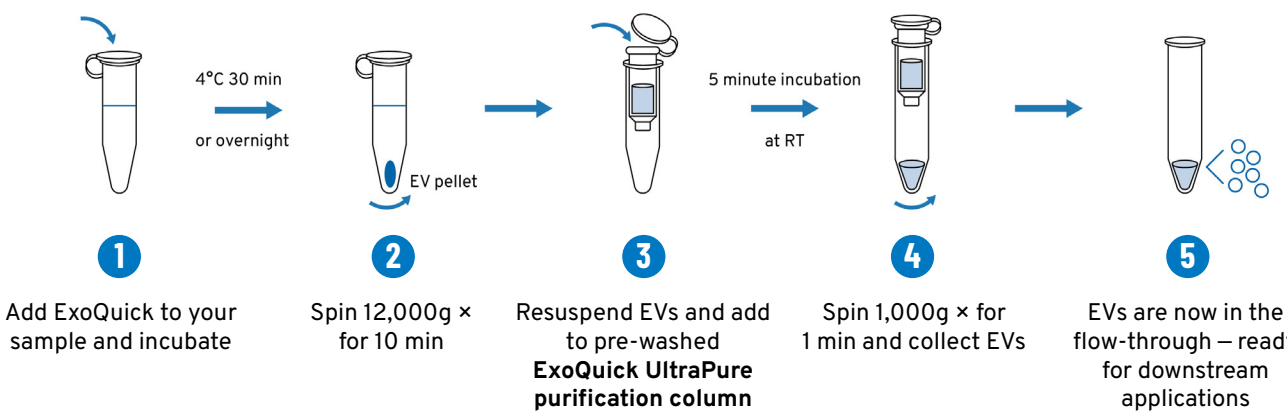


Figure 2. The ExoQuick UltraPure workflow involves three basic steps: precipitation, purification, and collection.

Method Overview

1. **Precipitation:** EVs are first captured from serum or plasma using SBI's ExoQuick® reagent.
2. **Purification:** Pre-enriched EVs are passed through a proprietary mixed-mode affinity column that integrates size-exclusion and lipoprotein depletion.
3. **Collection:** Purified EVs are eluted in minutes, ready for downstream applications.

Workflow Time: <20 minutes hands-on.

Sample Input: as little as 100–250 µL serum/plasma.

Key Advantages

- ✓ **Maximized Recovery:** Significantly higher EV counts compared to SEC and ultracentrifugation.
- ✓ **Exceptional Purity:** Removes up to 96% of ApoB lipoproteins, minimizing non-EV contaminants.
- ✓ **Reproducibility:** Highly consistent EV yield and purity across replicates.
- ✓ **User-Friendly:** No ultracentrifuge, fraction collection, or long spin times required

Performance of the ExoQuick® UltraPure Kit vs. SEC and Ultracentrifugation (UC)

The ExoQuick Ultrapure kit was used to isolate EVs from serum samples, and the results were compared to that from SEC and ultracentrifugation. EV preparations isolated using the ExoQuick UltraPure kit outperform traditional isolation methods across the board, with a higher concentration of EVs, protein yield per ml, and overall yield and purity compared to SEC and ultracentrifugation.

	ExoQuick UltraPure	SEC Columns (e.g. qEV/ExoSpin)	Ultracentrifugation
Purity	✓ High — removes albumin & ApoB	⚠ Moderate — protein/ lipoprotein co-elution	✓ Good, but not complete
Yields	✓ High from 100–250 µL	✗ Lower yield, EV loss in fractions	✗ Losses across multiple spins
Sample Volume	✓ Works with 100–250 µL	⚠ Needs 0.5–1 mL+	✗ Requires ≥5–10 mL
Workflow Time	✓ <30 min	⚠ 1–2 hrs	✗ 4–6+ hrs
Downstream Readiness	✓ Ready for RNA, proteomics, NTA/fNTA, TEM, ELISA, WB, etc.	⚠ Often needs concentration	⚠ May need additional steps
Scalability	✓ Easy (add columns)	⚠ Limited by column size	✗ Poor
Overall Value	★ Best balance for small-volume plasma/serum	Moderate and low yield	Pure but laborious

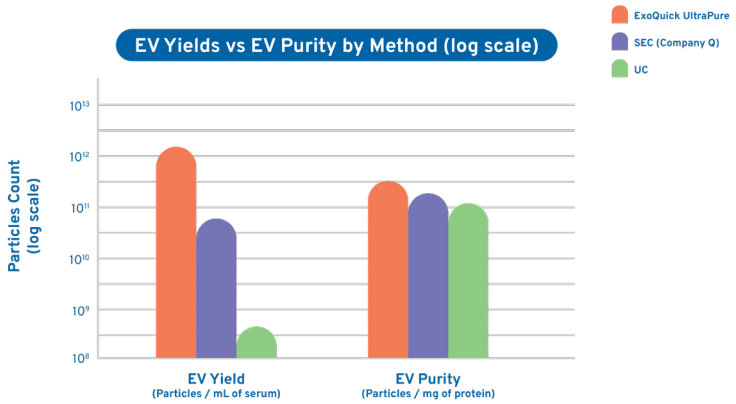
Results

Higher EV Yield with Superior Purity

To determine yield and purity of EVs isolated using the ExoQuick UltraPure kit, Western blot analysis was performed in addition to fluorescent nanoparticle tracking analysis (fNTA).

- ✓ **Western blotting** shows ExoQuick® UltraPure isolates EVs enriched for canonical markers (CD9, CD81, TSG101) with reduced albumin carry-over.
- ✓ **fNTA analysis** confirms higher particle yields versus SEC and ultracentrifugation.
- ✓ **Protein quantification** demonstrates the highest EV recovery per input serum volume.

A



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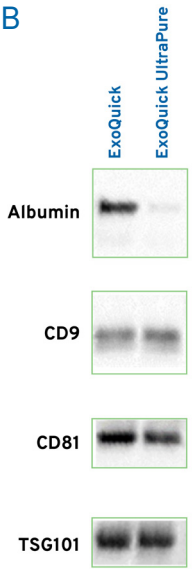


C

	ExoQuick UltraPure	SEC (Company Q)	Ultracentrifugation
Serum sample input	250 µL	500 µL	8 mL
EV elute volume	450 µL	1,000 µL	500µL
Protein concentration (µg/µL)	2.715	0.155	0.056
EV protein yield per mL serum (µg)	4887	310	3.5
EV elute concentration (particles/mL)	8.20E+11	2.85E+10	6.80E+09
Yields (particles/mL serum)	1.48E+12	5.70E+10	4.25E+08
Purity (particles/mg protein)	3.02E+11	1.84E+11	1.21E+11

Figure 3. ExoQuick UltraPure Outperforms Other EV Isolation Methods. EVs were isolated from serum samples using ExoQuick UltraPure, the size-exclusion chromatography (SEC)-based method, and ultracentrifugation (UC). (A) Total EV protein yield per mL of serum input was evaluated across ExoQuick UltraPure, SEC, and UC preparations. EV protein concentration was measured using a NanoDrop spectrophotometer. (B) Western blot analysis shows that ExoQuick UltraPure yields the highest levels of EV-specific markers (CD9, TSG101) and the lowest levels of albumin contamination. Each lane was loaded with an equal amount of EV protein. (C) Fluorescent nanoparticle tracking analysis (fNTA) demonstrates high EV yields delivered by ExoQuick UltraPure compared to ultracentrifugation and the SEC method.

Effective Lipoprotein Removal

For plasma and serum specifically, lipoproteins (ApoB carriers) and abundant soluble proteins remain the dominant confounders for EV omics and phenotyping. Recent work underscores that hybrid workflows such as that of the ExoQuick UltraPure kit that include both enrichment + targeted depletion/size selection can markedly improve EV purity and biomarker detectability, enabling deeper proteomic and lipidomic coverage and more reliable biological interpretation. ELISA analysis of EV preparations made using the ExoQuick UltraPure kit were analyzed for the presence of ApoB lipoproteins and compared to that from SEC and ultracentrifugation.

- **ELISA** data indicate ~96% removal of ApoB lipoproteins.
- SEC and ultracentrifugation preparations show 3–4× higher ApoB contamination compared to ExoQuick UltraPure.

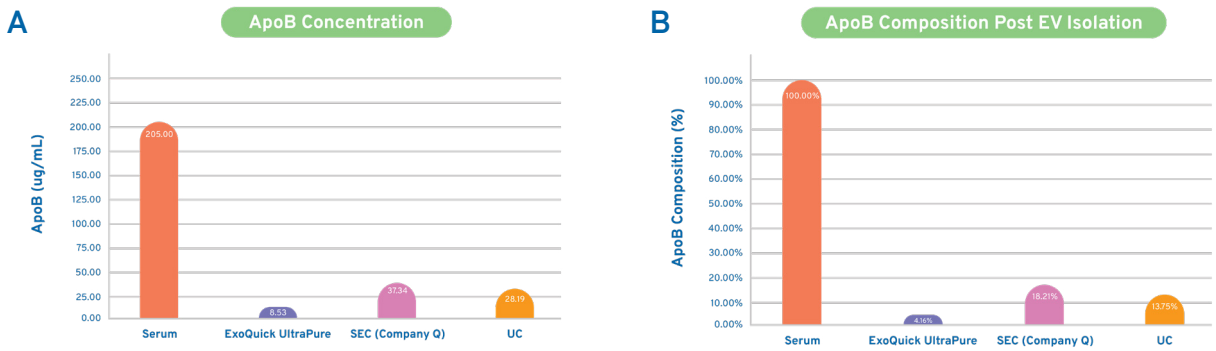
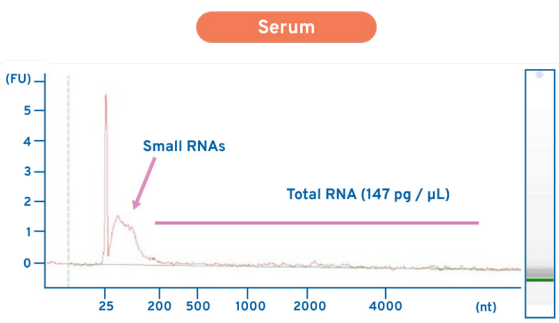


Figure 4. ExoQuick UltraPure Enables More Efficient Removal of Lipoproteins. EVs were isolated from serum samples using the ExoQuick UltraPure kit, size-exclusion chromatography (SEC), and ultracentrifugation. (A and B) ApoB lipoprotein concentrations were measured by ELISA, revealing that ExoQuick UltraPure results in the lowest level of lipoprotein contamination.

High-Quality EV RNA: The Ultrapure Difference

RNA isolated using the ExoQuick UltraPure kit and the EVery EV RNA isolation kit demonstrates excellent quality on Agilent Bioanalyzer profiles, enabling reliable downstream RNA analysis.



Applications

EVs purified using the ExoQuick UltraPure kit can be used for diverse downstream applications such as:

- ✓ EV RNA, DNA, and protein profiling
- ✓ EV biomarker discovery in serum/plasma
- ✓ EV quantification and characterization (NTA, flow cytometry, proteomics)
- ✓ EV engineering and in vivo/ex vivo delivery research
- ✓ Therapeutic EV development

Conclusion

The ExoQuick® UltraPure kit sets a new benchmark for EV isolation from serum and plasma, delivering intact, apoB-depleted vesicles at yields significantly higher than SEC and ultracentrifugation. With its fast, reliable workflow and compatibility with low sample volumes, ExoQuick UltraPure accelerates discovery in EV biomarker research, molecular profiling, and translational applications.

Ordering Information

ExoQuick® UltraPure Kit (Catalog ID: EQ UltraPure)

Related Products:

- **SmartSEC-DeLipo Advanced sEV Isolation Kit:** https://www.systembio.com/smartsec-delipo-tm-advanced-sev-isolation-kit
  Cat#: SSEC-DLP-200A
- **EVery EV RNA Isolation Kit:** https://www.systembio.com/every-ev-rna-isolation-kit
  Cat#: Every100B-1
- **ExoFlow kits for EV phenotyping:** https://www.systembio.com/basic-exo-flow-capture-kit
  Cat#: CSFLOWBASICA-1
- **Exo-Fect transfection kits:** https://www.systembio.com/exo-fect-sirna-mirna-transfection-kit
  Cat#: EXFT200A-1

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