

A new class of universal reference EVs

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TECHNOLOGY

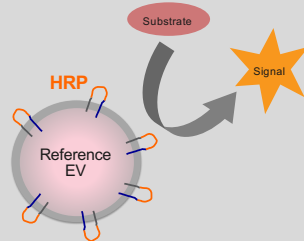
Addressing unsolved problems in EV research & diagnostics

Extracellular vesicles (EVs) hold great promise as circulating biomarkers of disease ("liquid biopsy") but both, their clinical usage as well as scientific progress in the field are significantly hampered by the lack of reliable reference EVs that allow for intra- and inter-experimental normalization and standardization.

A new class of reference EVs with horseradish peroxidase (HRP) on their surface!

HRP⁺ reference EVs are:

- ✓ 100% pure and homogeneous
- ✓ easy to detect
- ✓ easy to quantify: add HRP substrate
- ✓ of superior sensitivity
- ✓ affordable and available
- ✓ stable in complex medical samples
- ✓ free of any serum EVs



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SPECIFICATIONS

HRP⁺ reference EVs allow:

EV TRACING

Trace EVs through various isolation techniques, Quality control

NORMALIZATION

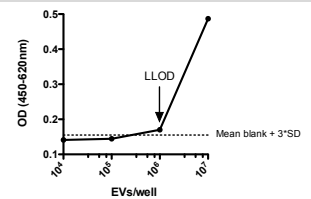
Normalize clinical specimens, compensate technical variation, Back-calculate the total EV numbers in biological samples

PROCESS DEVELOPMENT

Standardize your protocols and SOPs, Calculate the yield after EV purification

Superior sensitivity of detection:

LLOD: ~ 10⁶ EVs*



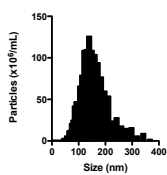
*diluted in PBS or serum

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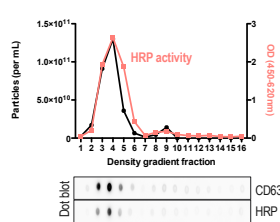
CHARACTERIZATION & EXAMPLES

Characterization of HRP⁺ reference EVs

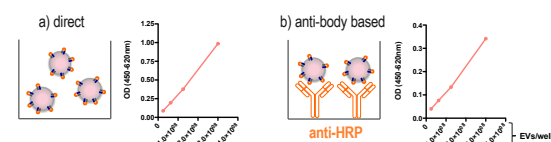
Size distribution (NTA)



EV purification by density gradient centrifugation

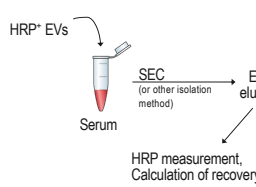


Detection of EV-associated HRP



Example II: Quantification of EV numbers in complex biological samples

Principle



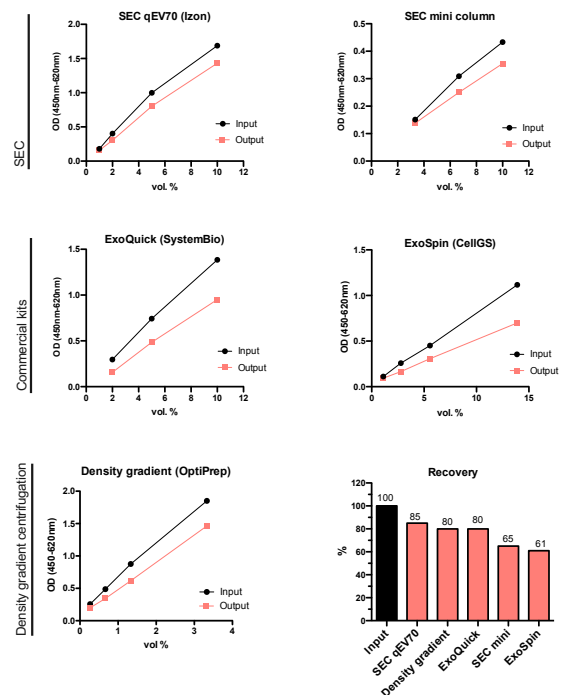
Results

	Eluate	Conc. Input
Donor 1	8.5 x 10 ¹⁰ /mL	1.3 x 10 ¹¹ /mL
Donor 2	1.8 x 10 ¹¹ /mL	2.9 x 10 ¹¹ /mL
Donor 3	2.3 x 10 ¹¹ /mL	2.8 x 10 ¹¹ /mL
Donor 4	1.4 x 10 ¹¹ /mL	2.0 x 10 ¹¹ /mL

Back-calculation of total EV numbers in original serum sample

Example I: EV recovery using different isolation methods

Input: Serum spiked with HRP⁺ EVs (20 mU per mL serum, equals ~3 x 10⁹ EVs)



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SUMMARY

The lack of affordable, well-characterized and easy-to-use universal reference EVs is a significant shortcoming that hampers scientific progress and the development of EV-based diagnostics.

Our newly designed, HRP⁺ reference EVs are a big step towards standardization and harmonization of the field.

HRP⁺ reference EVs

Product Specification:

- ✓ Defined HRP activity (U/mL)
- ✓ Stability
- ✓ Lyophilized storage
- ✓ Distinguishable from sample EVs

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