

Preterm Birth International Collaborative Australasia Workshop 21 March 2023

Enabling EV-based Biomarker Discovery and Diagnostics



Extracellular vesicles have long been a part of placentology and perinatology.



Jones and Fox (1980)

An Ultrastructural and Ultrahistochemical Study of the Human Placenta in Maternal Preeclampsia **Placenta** 1, 61-7

Figure 4. Free surface of the villous syncytiotrophoblast in a placenta from a woman with pre-eclampsia.

There is a marked loss of microvilli and those remaining are deformed. A cytoplasmic protrusion into the intervillous space is present. (x 10000). Smárason, Sargent, Starkey, Redman (1993)

The effect of placental syncytiotrophoblast microvillous membranes from normal and pre-eclamptic women on the growth of endothelial cells in vitro. **Br J Obstet Gynaecol** 100 943-949

"It is therefore possible that syncytiotrophoblast microvillous membranes could be shed into the maternal circulation from the hypoxic placenta in pre-eclampsia."



Knight Redman, Linton, Sargent (1998)

Shedding of syncytiotrophoblast microvilli into the maternal circulation in pre-eclamptic pregnancies **Br J Obstet Gynaecol** 105:632-40.

STBM are shed into the maternal circulation and are present in significantly increased amounts in preeclamptic women. They may contribute to the endothelial dysfunction underlying the maternal syndrome of preeclampsia

Extracellular Vesicle Biogenesis, Function and Heterogeneity





Cells continuously release a diverse population of vesicles (EVs) and nanoparticles in the maintenance of homoeostasis

EVs can be captured from biofluids and their messages "read" to determine the disease or health status of a cell.



Salomon et al., (2022) Extracellular Vesicles and Their Emerging Roles as Cellular Messengers in Endocrinology: An Endocrine Society Scientific Stateme





Jeppesen et al., (2023) Extracellular vesicle and nanoparticles: emerging complexities, Trends in Cell Biology DOI:https://doi.org/10.1016/j.tcb.2023.01.002

EXO-NET Isolates a specific well-defined subpopulation of EVs for biomarker discovery • Magnetic bead-based immunoaffinity EV capture system (10 epitopes) **EXO-NET** On-Bead analysis or On-Bead lysis for downstream RNA, Protein or Lipid analysis ٠ Manual or Fully automated high-throughput isolation Discovery Dein Cerebros Saliva selective isolation of subpopulation Serum, plasma MRM **BioPlex 2200** IS/MS IA IVD Seminal 0 Urine Plasma Digital PCR A Seq <u>x</u> . bioflui containing 450 nm On-bead analysis Automated On bead lysis



EXO-NET plasma lysate contains canonical EV proteins



EXO-NET plasma lysate contains canonical EV miRNAs



Commercial Kits





EVDx | EXO-Ovarian Cancer Classification Model for Early Stage Disease





Enabling EV-based diagnostics - CTA, CDx & Dx





EXO-NET	manual	48 per batch	96 per batch	HT automation
samples/day	40	240	480	1000
	\checkmark	✓	V	



EXO-NET ENABLING YOUR EV RESEARCH

Website: www.inovig.com/



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Products > EXO-NET[®] Pan-Exosome

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Introducing EXO-NET[®] Pan-Exosome Capture

Exosomes are a sub-fraction of a much broader population of extracellular vesicles (EVs). They are 30-150nm particles secreted from most cells, including cancer cells, into biofluids including plasma, urine, saliva, cerebral spinal fluid (CSF), breast milk, serum, amniotic fluid, synovial fluid, and tears. EVs are not only recognised as fundamental elements in intercellular communication between cells but also play important roles in preventing or promoting various diseases including cancer, infectious diseases, neurological disorders, and metabolomic disorders. The content, or cargo, of EVs consist of nucleic acid (microRNAs, mRNAs, and DNA), lipids and proteins. These specific cargos facilitate both normal physiological and pathological (disease) processes. EVs represent valuable sources of critical information, with potential uses in the early diagnosis, prognosis, and potentially treatment of different type of cancers and other chronic disease. That is why exosomes represent an exciting new avenue of diagnosis.

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