Journal of Extracellular Vesicles

ABSTRACT SUPPLEMENT OPEN ACCESS

ISEV2025 Abstract Book

About ISEV

With a membership of nearly 2000 individuals spanning the globe, the International Society for Extracellular Vesicles (ISEV) stands as the premier professional organization for scientists and researchers engaged in the exploration of extracellular vesicles (EVs). Established in 2012 in Sweden, ISEV subsequently relocated its headquarters to New Jersey, USA. ISEV is dedicated to fostering global consistency and robustness in EV research, as underscored by the MISEV guidelines of 2014 and 2018 and the update in 2023. The society facilitates this mission through an array of initiatives, including educational offerings, task forces, special interest groups, workshops, and summer schools, while also managing two peer-reviewed, gold open access journals—the Journal of Extracellular Vesicles and the Journal of Extracellular Biology. A cornerstone of ISEV's activities is its flagship annual gathering, a focal point that provides a crucial avenue for knowledge exchange. By means of its comprehensive programmes and services, ISEV plays an indispensable role in delivering vital training and research prospects for those immersed in the realm of EV research.

Our Mission

To provide global leadership in the extracellular vesicle field through research, education, translation, and fostering partnerships.

Our Vision

Advancing EV research and applications worldwide.

ISEV2025 Annual Meeting

The International Society for Extracellular Vesicles is the premier international conference of extracellular vesicle research, covering the latest in exosomes, microvesicles and more. With more than 1500 attendees, the meeting has achieved a new level of recognition in the global community and features presentations from the top researchers in the field, as well as providing opportunities for talks from students and early-career researchers.

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ISEV2025 Poster Presentations

Poster Session 1 Disease and Therapy

Sub-topic Biomarker 1

PS1.1 | The unreferenced transcriptome as a source of robust biomarkers of prostate cancer in urinary extracellular vesicles

Anna Almeida[1], Marc Gabriel[1], Virginie Firlej[2,3], Nicolas Vogt[1], Lorena Martin-Jaular[1], Matthieu Lejars[1], Marie-Emmanuelle Legrier[1], Katia Le Dudal[2], Damien Destouches[3], Francis Vacherot[3], Raphaele Arrouasse[2], Xavier Paoletti[1], François Rozet[4], Philippe Lecorvoisier[2], Yves Allory[1], Alexandre de la Taille[2], Clotilde Théry[1], Antonin Morillon[1]
Anna Almeida and Marc Gabriel are the co-first authors.

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Introduction: Prostate cancer (PCa) is the second most common cancer in men worldwide nevertheless, current diagnostic tools for PCa are insufficient and invasive. In fact, only biopsies allow us to conclude that there is prostate cancer and not other diseases, such as prostatitis or benign prostatic hyperplasia (BPH). Early and non-invasive diagnosis is therefore necessary. RNAs associated with extracellular vesicles (EVs) have attracted a lot of attention these last few years for being ideal candidates for cancer biomarkers in liquid biopsies. During palpation of the prostate by digital rectal examination (DRE), PCa cells and EVs, can be released from prostatic ducts into the urethra, and end up in urine. Urine containing EVs secreted from prostate tumour could be an excellent source of novel PCa biomarkers.

Methods: Following prostate massage during DRE, we collected urine from two independent cohorts of patients after informed consent was obtained. The discovery cohort named HOPE (70 patients) and the validation cohort (130 patients) were composed of prostate cancer, BHP and healthy patients. We performed stranded total RNA-sequencing on uEVs from all samples. We applied reference-free analysis of differential k-mers, with a 5x5-fold selection following machine learning, to detect all transcriptional events characterizing the PCa condition in contrast with healthy or BPH conditions. We compared this approach to standard annotated gene expression analysis.

Results: We revealed the distinct RNA cargo types present in uEVs of the three groups of patients. Several types of RNAs, including mRNA, circRNA, and lncRNA, were detected in each sample from urine. Additionally, using reference-free analysis of differentially expressed k-mer contigs, we could find a signature to discriminate PCa from healthy and BHP patients.

Summary/Conclusion: In summary, these results highlighted the advantage of the reference-free analysis over the standard analysis in generating a transcriptomic signature that discriminated PCa patients from healthy and BPH patients, based on their urinary EV RNA cargo. These candidate RNA biomarkers could be potentially useful for non-invasive prostate cancer diagnosis and active surveillance.

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Subtopic Biological activity and therapeutic potency of EVs

PS1.2 | Immunomodulatory potential of extracellular vesicles from Trichinella spiralis muscle larvae

Sofija Glamočlija[1], Ljiljana Sabljić[1], Anna Schmid[2], Alisa Gruden-Movsesijan[1], Nataša Radulović[3], Jelena Đokić[4], Irma Schabussova[2], Maja Kosanović[1]
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Introduction: Helminth parasite Trichinella spiralis has evolved to modulate the immune system of the host by its larvae excretory-secretory products (ES L1), that is, reduce hyperreactivity to both allergens and autoantigens. After discovering EVs in ES L1 (TsEVs), we aimed to investigate whether TsEVs exert immunomodulatory properties similar to whole ES L1.

Methods: TsEVs were enriched from ES L1 by a combination of ultracentrifugation and ultrananofiltration and characterized by electron microscopy (TEM), western blot and NTA. Immunomodulatory properties of TsEVs were tested on PBMC, dendritic cells (DCs) and in a murine model of ovalbumin (OVA)-induced allergy. TsEVs interaction with target cells was investigated in DCs and TLR2/4-transfected HEK293 cells. Signalling pathways were investigated by PCR.

Results: Enriched TsEVs were of 30-80 nm and contained two glycoproteins characteristic of muscle larvae of the genus Trichinella. PBMCs treated with TsEVs had elevated production of IL-10 and IL-6, and decreased production of IL-17. DCs treated with TsEVs exhibited a stabile tolerogenic phenotype and increased production of IL-10 and TGF-β. Such DCs polarized the immune response of T cells in co-culture towards Th2 and the regulatory type. In the allergy model, intranasal administration of TsEVs caused a decrease in eosinophils, macrophages and NK cells in the lungs as well as OVA-specific IgE in the sera. In lungs, there was an increase of CD103+ DCs, CD4+Foxp3+ Tregs and IL-10-producing Tregs, while CD11b+Ly6C+ cells were reduced. Cultivated immune cells from lungs and spleens of TsEVs-treated mice exhibited lower production of the Th2 cytokines IL-4, IL-5 and IL-13 and increased production of IL-10. Pattern-recognition receptors, DC-SIGN and TLR2/4, were found to be involved in the interaction of TsEVs with target cells. TsEVs activated multiple signalling pathways in DCs.

Summary/Conclusion: TsEVs exhibit immunomodulatory properties which could be harnessed to design novel therapeutics for inflammatory diseases.

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PS1.3 | Delivery of apelin-loaded extracellular vesicles for the treatment of pulmonary arterial hypertension

Presenter: Jihong Kim
Korea Institute of Science and Technology, Republic of Korea

Introduction: Pulmonary arterial hypertension (PAH) is a rare, life-threatening disease characterized by vascular remodelling and increased pulmonary vascular resistance, leading to right heart hypertrophy. Despite its severity, currently approved drugs for PAH primarily provide symptomatic relief to patients. Apelin, an endogenous ligand for the APJ receptor, is a promising candidate for PAH due to its vasodilatory and pro-angiogenic properties. However, clinical use of apelin in PAH is limited by its lack of selectivity for the pulmonary vasculature and its rapid degradation in blood plasma. To overcome this limitation, we engineered extracellular vesicles (EV) displaying apelin-13 on their surface, which accumulate in the lungs and provide therapeutic effects against PAH.
Methods: EVs were collected from HEK293T cells and isolated following the MISEV2023 guidelines. The vasodilatory and pro-angiogenic effects of Apelin EVs were evaluated in HUVECs. To track lung accumulation, apelin-EVs labelled with Cy5.5 were injected into monocrotaline (MCT)-induced PAH rats, and IVIS imaging was used to monitor EV distribution. The therapeutic potential of apelin-EVs was tested in both the MCT-PAH model and the Sugen5416/hypoxia (Su/Hx) PAH model.
Results: Results showed that apelin-EVs activated endothelial nitric oxide synthase (eNOS) protein and enhanced endothelial cell proliferation and migration in scratch assay. Apelin-EVs accumulated in lungs of MCT-PAH and demonstrated significant therapeutic effects by reducing right ventricle hypertrophy, lowering vascular occlusion and decreasing heart fibrosis. Echocardiographic measurements, including PAT/PET, TAPSE, RV free wall thickness, and cardiac output, were improved as well. Additionally, Apelin EVs lowered mean pulmonary arterial pressure in Su/Hx-PAH mice.
Summary/Conclusion: In conclusion, apelin-loaded EVs successfully accumulated in the lungs and mitigated the effects of pulmonary arterial hypertension, highlighting their therapeutic potential in PAH treatment.

PS1.4 | Extracellular vesicles from second trimester human amniotic fluid as candidate therapeutics against skeletal and cardiac muscle injury

Presenter: Laura Guerricchio
University of Genova, Italy

Abstract unavailable

PS1.5 | Effect of EVs on systemic herpes infection in mice

Presenter: Vitalii Kordium
National Academy of Sciences of Ukraine, Ukraine

Introduction: Despite extensive research on EVs, their effect on viral diseases (except COVID-19) remains unstudied. We have conducted pilot studies of the impact of EVs, secreted by human Wharton's jelly mesenchymal stem cells (MSCs), on systemic damage in mice of the BALB/c line by herpes simplex virus, type 1 (HSV-1).
Methods: Virological, cytological, histological, and cellular methods were used. MSCs were isolated from the umbilical cord taken with the patient's informed consent. Work with animals complied with standards for conducting scientific experiments on animals, approved by the MESU.
Results: Experimental mice were infected by intracranial administration of HSV-1. The next day, EVs were administered in the animals' tail veins in doses equivalent to the number of MSCs, ranging from 50 to 600 thousand per animal. The controls were: (1) mice infected with the HSV-1, without administration of EV; (2) intact animals; (3) intact mice, injected with the maximum dose of EVs simultaneously with the experimental ones. As the disease progressed, the brains and internal organs of sick, dead, and recovered animals were studied. As a result, an inverse relationship was found between the administered EV dose and the mortality/survival of mice. The highest EVs doses led to a mortality increase (compared to the control). Mortality decreased as the EV doses decreased. Low doses showed an almost complete cure effect. In control group 1, the course of the disease and mortality were standard for the HSV-1 infection. In control groups 2 and 3, there were no external negative signs. Virological studies have shown that the highest dose of EVs enhances the reproduction of the HSV-1 in the diseased organism and increases the viral load compared to control 1 and to animals treated with lower doses of EVs. Histological studies have shown that systemic infection of an organism with HSV-1 leads to damage to all internal organs. The administered EVs modify the degree and nature of damage. This is especially pronounced in the brain, lungs, liver, and spleen.
Summary/Conclusion: EVs administration for viral infection treatment causes dose-dependent effects that differ from those in non-infectious pathologies. The mechanisms that determine such differences require detailed study.

PS1.6 | Extracellular vesicles from mesenchymal stem cells reverse neuroinflammation in the cerebellum and restore motor coordination in hyperammonemic rats

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