

# ISEV WORKSHOP – Blood EVs

September 4-6, 2024

Royal Hotel Seoul

(04538) 61, Myeongdong-gil, Jung-gu, Seoul

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## Educational Day

September 4, 2024

### Understanding blood EVs and their clinical applications

Moderators: Rienk Nieuwland (Academic Medical Centre Amsterdam, Netherlands), Moon Jisook (CHA University, South Korea), Minh Le (National University of Singapore)

#### Morning Session

- 9:00 - 9:15** General welcome to the Educational day and Blood EV workshop (Moon Jisook and Minh Le)
- 9:15 - 9:40** Introduction to blood EVs, research activities, and guidelines for the field (Rienk Nieuwland, Academic Medical Centre Amsterdam, Netherlands)
- 9:40 - 10:05** Origin and physiology of blood EVs (Pia Siljander, University of Helsinki, Finland)
- 10:05 - 10:30** Uptake and clearance of EVs in the blood (Buzas Edit, Semmelweis University, Hungary)
- 10:30 - 11:10** Coffee break
- 11:10 - 11:35** Checklist for blood sample collection when developing clinical application of blood EV biomarkers (Juntaro Matsuzaki, Keio University, Japan)
- 11:35 - 12:00** Understanding the variability of blood EVs (Metka Lenassi, University of Ljubljana, Slovenia)
- 12:00 - 13:30** LUNCH

#### Afternoon Session

- 13:30 - 13:55** Transitioning EV isolation from the bench to the bedside (Andreas Moller, The Chinese University of Hong Kong, Hong Kong SAR, China)
- 13:55 - 14:20** New methods for high-throughput detection of EV-based biomarkers in clinical blood samples (Judy Yam, The University of Hong Kong, Hong Kong SAR, China)
- 14:20 - 14:45** Advanced characterization methods for blood EVs (Tijana Jovanovic-Talisman, City of Hope, USA)
- 14:45 - 15:10** Profiling EVs and mining EV databases (Jinhwan Eugene Lee, Korea Research Institute of Standards and Science, South Korea)
- 15:10 - 15:40** Coffee break
- 15:40 - 16:05** EV cargo and delivery in the blood (Brian Dobosh, Emory University, USA)
- 16:05 - 16:30** Engineering blood EVs for therapeutic usage (Saara Laitinen, Finnish Red Cross Blood Service, Finland)
- 16:30 - 17:30** Summary and discussion (Rienk Nieuwland, Jisook Moon, and Minh Le)

#### Evening Program

- 19:00** Welcome dinner (TBD)

# DAY 1. Technologies for EV isolation, characterization, and EV-based biomarkers

Sep 5 - 2024

## Session 1. Methods for isolation and characterization of EVs

Moderators: Jaesung Park (Postech, South Korea) and Metka Lenassi (University of Ljubljana, Slovenia)

**9:00 - 9:05** Introduction to working in the workshop (Jaesung Park and Metka Lenassi)

**9:05 - 9:30** Introduction to the topic – Keynote speaker: Hubert Yin (Tsinghua University, China)  
“Methodologies for identification of potential cancer/neurodegenerative biomarkers in blood EVs

**9:30 - 10:00** 10-minute talks selected by abstracts

- Achille Anselmo (IRCCS Ospedale San Raffaele & Università Vita-Salute San Raffaele, Italy) “High-dimensional immunophenotyping and quantification of circulating blood-derived extracellular vesicles by spectral flow cytometry”
- Huaqi Su (The University of Melbourne, Australia) “Multi-omics characterization of highly enriched human plasma small extracellular vesicles”
- Se-Hwan Paek (Korea University, South Korea) “Reversible immuno-isolation technique offering entryways of biomarker discovery”

**10:00 - 10:10** Questions (for all speakers)

**10:10 - 10:30** Coffee break

**10:30 - 11:00** 10-minute talks selected by abstracts

- Britta Bettin (Amsterdam UMC, Netherlands) “From research to clinical reality: methodological strategies for blood EV biomarker studies”
- John Nolan (Scintillon Institute & Cellarcus Biosciences, USA) “Single vesicle measurement of abundant and rare EVs in plasma”
- Gold Sponsor: Bay Sie Lim (Acoerela, Singapore) “The applications of conjugated oligoelectrolytes as advanced fluorogenic dyes”

**11:00 - 11:10** Questions (for all speakers)

**11:10 - 11:15** Break and organizing into 3-4 roundtables

**11:15 - 12:30** Roundtable discussions (60’+ 15’ wrap-up in writing by moderators)

- Table 1 – Moderators: Saara Laitinen, Hubert Yin – Topic: EV purification methods at small and large scales
- Table 2 – Moderators: Moon Jisook, Achille Anselmo – Topic: EV characterization methods
- Table 3 – Moderators: Judy Yam, Britta Bettin – Topic: Proteomics and sequencing methods for EVs

**12:30 - 14:00** LUNCH

**14:00 - 14:30** Highlights from the morning discussions by roundtable moderators (5 minutes each & audience)

## Session 2. Biomarker discovery and application in clinical diagnosis

Moderators: Moon Jisook (CHA University, South Korea) and Judy Yam (The University of Hong Kong, Hong Kong SAR, China)

**14:30 - 14:55** Introduction to the topic - Keynote speaker: Dolores Di Vizio (Cedars-Sinai Medical Center, USA) “Extracellular vesicles through the lens of multiomics”

**14:55 - 15:35 10-minute talks selected by abstracts**

- Daniel Kim (University of California, Santa Cruz, USA) “Leveraging repetitive RNAs in extracellular vesicles for cancer diagnosis”
- Ok Hee Jeon (Korea University College of Medicine, South Korea) “Discovering new sarcopenia biomarkers in humans through proteomic analysis of circulating plasma extracellular vesicles”
- Yusuke Yoshioka (Tokyo Medical University, Japan) “Extracellular vesicles-associated GPRC5C and EPS8 as early detection and recurrence biomarkers for pancreatic ductal adenocarcinoma”
- Ghazal Narimanfar (University of Bologna, Italy) “Insights into inflammatory pathways and biomarker discovery utilizing plasma-derived extracellular vesicles in myeloproliferative neoplasms through differential isolation techniques”

**15:35 - 15:50** Questions (for all speakers)

**15:50 - 16:10** Coffee break and moving to roundtables

**16:10 - 17:25** Roundtable discussions (60’+ 15’ wrap-up in writing by moderators)

- Table 1 – Moderators: Takahiro Ochiya, Dolores Di Vizio – Topic: Sample preparation and collection
- Table 2 – Moderators: Moon Jisook, Andreas Moller – Topic: EV databases and data mining
- Table 3 – Moderators: Judy Yam, Daniel Kim – Topic: High throughput detection of EV-based biomarkers

**17:25 - 17:30** Break and moving to the main room

**17:30 - 18:00** Highlights from the afternoon discussions by roundtable moderators (5 minutes each & audience)

## DAY 2. Functionality and therapeutic potential of blood EVs

Sep 6 – 2024

### Session 1. Functional characterization of blood EVs and applications of their native therapeutic potential

Moderators: Takahiro Ochiya (Tokyo Medical University, Japan) & Pia Siljander (Helsinki University, Finland)

**9:00 - 9:05** Introduction to working in the workshops (Takahiro Ochiya and Pia Siljander)

**9.00 - 9.25** Introduction to topics – Keynote speaker: Naohiro Seo (Tokyo University, Japan) “The inhibitory effects of killer T cell EVs on tumor invasion and metastasis are mediated by exosome population”

**9.25 - 10.15** 10-minute talks selected by abstracts

- Olesia Gololobova (Johns Hopkins University, USA) “Exploring the targeting potential of red blood cell-derived extracellular vesicles across species”
- Ricardo Natoli (The Australian National University, Australia) “Therapeutic potential of RBC-EVs in alleviating retinal degeneration: insights from animal models of age-related macular degeneration”
- Joanne Tan (Australian Red Cross Lifeblood & The University of Sydney, Australia) “Characterisation and enumeration of microvesicles in RBC components and cold-stored whole blood for transfusion”
- Leandra Figuero (Laureate Institute for Brain Research, USA) “TLR4 pathway proteins elevated in astrocyte-enriched extracellular vesicles”
- Charles Ramassamy (INRS-Centre Armand-Frappier Santé-Biotechnologie, Canada) “Challenges to study the permeability of extracellular vesicles and outer membrane vesicles through the BBB”

**10:15 - 10:30** Questions (for all speakers)

**10:30 - 11:00** Break and organizing into 3 roundtables

**11:15 - 12:30** Roundtable discussions (60’+ 15’ wrap-up in writing by moderators)

- Table 1 – Moderators: Metka Lenassi, Edit Buzas – Topic: EVs from immune cells
- Table 2 - Moderators: Minh Le, Riccardo Natoli – Topic: EVs from RBCs
- Table 3 – Moderators: Pia Siljander, Saara Laitinen – Topic: EVs from platelets

**12:30 - 13:30** LUNCH

**13:30 - 14:00** Highlights from the morning discussions by roundtable moderators (5 minutes each & audience)

### Session 2. Engineering blood EVs for drug delivery

Moderators: Minh Le (National University of Singapore) & Saara Laitinen (Finnish Red Cross Blood Service, Finland)

**14:00 - 14:25** Introduction to the topic – Keynote speaker: Wenwei Tu (The University of Hong Kong, Hong Kong SAR, China) “Human gamma delta T cells-derived extracellular vesicles-based cancer immunotherapy”

**14:25 - 15:15** 10-minute talks selected by abstracts

- Phuong Nguyen (National University of Singapore) “Engineering bispecific extracellular vesicles for immunotherapy”
- Fawad Ur Rehman (The Aga Khan University, Pakistan) “Exosome-Mediated CRISPR Cas9 Delivery

Enhances Fetal Hemoglobin Production in Hematopoietic Stem Cells for Beta-Thalassemia Therapy”

- Qiubai Li (Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, China) “Utilizing modified extracellular vesicles with CD38 peptide to target tumor cells in transdermal microneedles for treating extramedullary plasmacytoma”
- Revadee Liam-Or (The University of Hong Kong, Hong Kong SAR, China) “Exploiting the plasma protein corona: engineering extracellular vesicles for liver fibrosis therapeutics”
- Miriam Romano (Italian Center for Colloid and Interface Science & University of Brescia, Italy) “Cisplatin delivery by functionalized Red Blood Cell-derived Extracellular Vesicles: balancing anti-tumoral activity, chemoresistance and side effects for triple-negative breast cancer treatment”

**15:15 - 15:30** Questions (for all speakers)

**15:30 - 16:00** Coffee break and moving to roundtables

**16:00 - 17:15** Roundtable discussions (60’+ 15’ wrap-up in writing by moderators)

- Table 1 – Moderators: Minh Le, Phuong Nguyen – Topic: Post-purification engineering methods
- Table 2 – Moderators: Saara Laitinen, Wenwei Tu – Topic: Regulatory requirements for EV therapeutics
- Table 3 – Moderators: Takahiro Ochiya, Fawad Ur Rehman – Topic: Cell engineering for EV therapeutics

**17:15 - 17:25** Break and moving to the main room

**17:25 - 17:55** Highlights from the afternoon discussions by roundtable moderators (5 minutes each & audience)

**17:55 - 18:25** Summary of Workshop Days 1 & 2 (Moderators for each day)

**18:25 – 18: 45** Future perspectives – Yong Song Gho

**18:45 – 18:55** Closing: Wrap up the three days into deliverables & Acknowledgement (Moon Jisook & Minh Le & Metka Lenassi)

**18:55 – 19:00** Photo time

**19:00** Night tour/dinner: TBD