NEURO GLOBAL
Seminar

Date & Time

Tuesday, October 14, 2025
16:30~18:00

Speaker

Ayuko Hoshino, PhD

Professor
Research Center for Advanced Science and Technology (RCAST),
The University of Tokyo

Title

Exosome-mediated organ-brain crosstalk in development and disease

Venue

Lecture Room, Graduate School of Life Sciences,
/ Life Sciences Project Research Laboratory [D04] 1F, Katahira Campus
生命科学研究科講義室 (生命科学プロジェクト総合研究棟 [D04] 1F 片平キャンパス)
https://www.tohoku.ac.jp/map/ja/?f=KH_D04

Format On-site

Registration Please contact NGP Office (neuroglobal@grp.tohoku.ac.jp)

Related website https://hoshinolab-edu.com/research/

【Neuro Global生・[先進] 脳科学セミナーシリーズEx】【NGP students, [Advanced] brain science seminar series Ex】1 point
【医学系研究科・医学履修課程】国際交流セミナー【Medical Science Doctoral Course】 International Interchange Seminar 1回分
【生命科学研究科・イノベーションセミナー（留学生）、単位認定セミナー】【Innovation seminar, Credit-granted seminar】2 points

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Title

Exosome-mediated organ-brain crosstalk in development and disease

Abstract

Exosomes are 30–150 nm extracellular vesicles secreted by all cells, carrying proteins, nucleic acids, and lipids that reflect the state of their cells of origin. We have previously demonstrated that plasma-derived exosomal proteins supports discrimination between cancer patients and healthy individuals, as well as classification of cancer subtypes. Our studies also introduced the concept of *organotropism*, showing that exosomes selectively target specific cells in metastatic organs, guided by surface “zip code” molecules such as integrins (lung, liver) and CEMIP (brain). Similarly, placenta-derived exosomes contribute to preeclampsia by targeting glomeruli, highlighting the importance of identifying both exosome source and destination in disease. We recently observed that maternal exosomes show selective uptake in the yolk sac during early development, suggesting a mechanism by which maternal signals can influence neurodevelopmental trajectories and later behavior. In neuropsychiatric disorders, including autism spectrum disorder (ASD), we have identified distinct exosomal protein and miRNA signatures in plasma, suggesting potential as early, noninvasive biomarkers. Parallel studies in ASD model mice revealed characteristic alterations in circulating exosome profiles and candidate molecules linked to pathophysiology. Ongoing work aims to trace the tissue origins and cellular targets of these vesicles, clarifying how organ-derived exosomes influence brain function and disease progression. In this presentation, I will share our most recent findings on how exosome-mediated crosstalk contributes to disease mechanisms and opens new avenues for diagnostics and therapy.

References

Bojmar, L., et al. Protocol for cross-platform characterization of human. ***STAR Protocols*** 5(1):102754 (2023). *(Corresponding author)*

Bojmar, L. et al. Extracellular vesicle and particle isolation from human and murine cell lines, tissues, and bodily fluids. ***STAR Protocols*** 2(1):100225 (2020). *(Corresponding author)*

Hoshino A. et al. Extracellular vesicle and particle biomarkers define multiple human cancers. ***Cell*** 182, 1044-1061, (2020). *(First and corresponding author)*

Rodrigues, G., **Hoshino A**. et al. Tumour exosomal CEMIP protein promotes cancer cell colonization in brain metastasis. ***Nature Cell Biology*** 21, 1403-1412, (2019). *(Co-first author)*

Hoshino A. et al. Tumour exosome integrins determine organotropic metastasis. ***Nature*** 527, 329-35, (2015).

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