

69th IRCMS Seminar

Date: **October 27, 2020 (Tuesday)**

15:00-16:00

Time: * To prevent the spread of COVID-19,
it will be a Zoom-based online seminar.

Speaker: Ayuko Hoshino, PhD

Associate Professor,
Department of Life Science and Technology,
Tokyo Institute of Technology

Title: **Cancer exosomal proteins: Roles in pre-metastatic
niche formation and biomarker potential**

Abstract:

For over 130 years, metastatic organotropism remained as one of the greatest mysteries in cancer biology. Experimental evidence indicates that tumor-derived microvesicles, referred to as exosomes, released by lung-, liver- and brain-tropic tumor cells fuse with cells at their future metastatic sites preparing the pre-metastatic niche. Proteomic profiling of exosomes revealed integrin expression patterns associated with lung and liver metastasis, whereas CEMIP in brain tropic exosomes enhanced metastasis in the brain. To gain a more comprehensive understanding of the exosomal protein cargo and tumor progression, we investigated the proteomic profile of exosomes in 426 human samples from tissue explants, plasma and other bodily fluids. Machine learning classification of plasma-derived exosome (n=120) proteomes revealed 95% sensitivity/90% specificity in identifying cancer-associated exosomes. We found that the protein signatures that determine cancer types were derived from a variety of sources, including tumor tissue, distant organs, as well as the immune system, emphasizing the importance of using non-cancer cell-derived exosomal signatures to identify cancer-associated alterations and define tumor-associated biomarkers. Finally, we defined a panel of tumor-type specific exosomal proteins in plasma, which may help classify tumors of unknown primary origin. These data suggest that tumor-associated exosomal proteins could be used as biomarkers for early-stage cancer detection and potentially for diagnosing tumors of unknown primary origin.

Reference:

1. Hoshino, A., Costa-Silva, B., Shen, T. et al. Tumour exosome integrins determine organotropic metastasis. *Nature* **527**, 329–335 (2015). <https://doi.org/10.1038/nature15756>
2. Rodrigues, G., Hoshino, A., Kenific, C.M. et al. Tumour exosomal CEMIP protein promotes cancer cell colonization in brain metastasis. *Nat Cell Biol* **21**, 1403–1412 (2019). <https://doi.org/10.1038/s41556-019-0404-4>
3. Hoshino, A., Kim, H.S., Bojmar, L. et al. Extracellular Vesicle and Particle Biomarkers Define Multiple Human Cancers. *Cell*, **Volume 182**, Issue 4, Pages 1044-1061.e18 (2020). ISSN 0092-8674, <https://doi.org/10.1016/j.cell.2020.07.009>

- Anyone in Kumamoto Univ. who wants to join is welcome, but please pre-register by the following URL to receive the Zoom meeting information.
http://ircms.kumamoto-u.ac.jp/symposium_reserve/symposium/reservation/

