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TEMASEK LIFESCIENCES LABORATORY

23 October 2018 (Tuesday), 3.30pm
The Auditorium (Level 1)
Hosted by: Dr Fumio MOTEGI

Cell competition between normal and transformed epithelial cells

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Dr. Yasuyuki Fujita obtained his M.D. Ph. D. from Kyoto University, and had postdoctoral training at Max-Delbru"ck-Center. He was appointed as a Group Leader, MRC Laboratory of Molecular Cell Biology, UCL in 2002, and then moved to Hokkaido University as a Professor in 2010.

At the initial step of carcinogenesis, transformation occurs in a single cell within an epithelial sheet, and the emerging transformed cells grow while being surrounded by normal epithelial cells. However, it was not clear what happens at the boundary between normal and transformed cells. Using newly established cell culture and mouse model systems, we have shown that various phenomena can occur at the interface between normal and transformed epithelial cells. For example, when Ras- or Src-transformed cells are surrounded by normal epithelial cells, various signaling pathways are activated in the transformed cells and they are often eliminated from the apical surface of the epithelial monolayer. These phenomena are not observed when transformed cells alone are present, suggesting that the presence of surrounding normal cells affects the signaling pathways and fate of transformed cells. Furthermore, we have demonstrated that normal epithelial cells can recognize and actively eliminate neighboring transformed cells and named this process EDAC (Epithelial Defense Against Cancer).

In this seminar, I will present our recent findings and propose how this study can lead to the prevention of invasive cancer and establishment of novel types of cancer treatment: enhancing the ability of surrounding normal cells to fight against cancer cells.

Recent Publications:

1. Maruyama, T. and **Fujita, Y**. Cell competition in mammals ¾novel homeostatic machinery for embryonic development and cancer prevention. Current Opinion in Cell Biology, 15;48:106-112, 2017.
2. Kon, S., Ishibashi, K., Katoh, H., Kitamoto, S., Shirai, T., Tanaka, S., Kajita, M., Ishikawa, S., Yamauchi, H., Yako, Y., Kamasaki, T., Matsumoto, T., Watanabe, H., Egami, R., Sasaki, A., Nishikawa, A., Kameda, I., Maruyama, T., Narumi, R., Morita, T., Sasaki, Y., Enoki, R., Honma, S., Imamura, H., Oshima, M., Soga, T., Miyazaki, J., Duchen, M. R., Nam, J.-M., Onodera, Y., Yoshioka, S., Kikuta, J., Ishii, M., Imajo, M., Nishida, E., Fujioka, Y., Ohba, Y., Sato, T., and **Fujita, Y**. Cell competition with normal epithelial cells promotes apical extrusion of transformed cells through metabolic changes. Nature Cell Biology, 19(5):530-541, 2017.
3. Saitoh, S., Maruyama, T., Yako, Y., Kajita, M., Fujioka, Y., Ohba, Y., Kasai, N., Sugama, N., Kon, S., Ishikawa, S., Hayashi, T., Yamazaki, T., Tada, M., and **Fujita, Y**. Rab5-regulated endocytosis plays a crucial role in apical extrusion of transformed cells. Proceedings of the National Academy of Sciences of the USA, 114 (12), E2327-E2336, 2017.