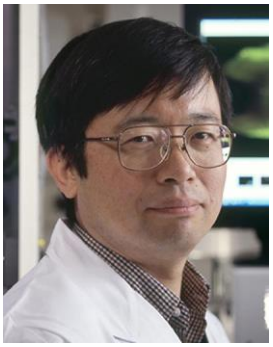
14:00-15:00, 20-Mar-2018
A119, KPSI, Kyoto, Japan
The 34th KPSI Seminar, KPSI-QST

Title: Near Infrared Photoimmunotherapy for Cancer



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Near infrared (NIR) photoimmunotherapy (PIT) is a newly developed, molecularly-targeted cancer photo-theranostic technology based on conjugating a near infrared silica-phthalocyanine dye, IRdye700DX (IR700) to a monoclonal antibody (MAb) thereby targeting specific cell-surface molecules. A first-in-human Phase 1 clinical trial of NIR-PIT with the cetuximab-IR700 (RM1929) targeting EGFR in patients with inoperable head and neck cancer started May 2015. The Phase 2 trial has completed in October 2017, and is now in transition to designated fast-track Phase 3 in January 2018 (https://clinicaltrials.gov/ct2/show/NCT02422979). When exposed to NIR light, the conjugate rapidly induces a highly-selective, necrotic/immunogenic cell death (ICD) only in antigen-positive, MAb-IR700-bound cancer cells. ICD occurs as early as 1 minute after exposure to NIR light and results in irreversible morphologic changes only on target-expressing cells. Meanwhile, immediately adjacent receptor-negative cells are totally unharmed. Dynamic 3D observation of tumor cells undergoing NIR-PIT along with novel live cell microscopies showed rapidly swelling in treated cells immediately after light exposure suggesting rapid water influx into cells. Cell biological analysis showed that ICD induced by NIR-PIT rapidly maturates immature dendritic cells adjacent to dying cancer cells that leads to initiate a host anti-cancer immune response. Furthermore, NIT-PIT targeting immuno-suppressor cells, such as Treg, in a local tumor, can enhance tumor cell-selective, systemic host-immunity leading to significant responses in distant metastatic tumors. Due to it highly targeted cancer cell-selective cytotoxicity, NIR-PIT carries few side effects and healing is rapid. NIR-PIT induces ICD on cancer cells that initiates host immunity. Moreover, NIR-PIT can locally deplete Tregs and other immune suppressor cells infiltrating in tumor beds, thus, activating systemic anti-cancer cellular immunity without potential autoimmune adverse effects.