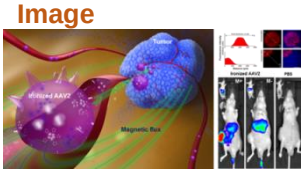
Remote Control of Light-Triggered Virotherapy

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Abstract (300 word limit)

Clinical virotherapy has been successfully approved for use in cancer treatment by the US Food and Drug Administration (FDA), however a number of improvements are still sought to more broadly develop virotherapy. A particular challenge is to administer viral therapy systemically and overcome limitations in intra-tumoral injection, especially for complex tumor within sensitive organs. To achieve this however, a technique is required that delivers the virus to tumor before the body's natural self defense eradicates the virus prematurely. Here we show that recombinant adeno-associated virus serotype 2 (AAV2) chemically conjugated with iron oxide nanoparticles (~5 nm) have remarkable ability to be remotely guided under magnetic field. Transduction is achieved with micro-scale precision. Furthermore, a gene for production of the photosensitive protein KillerRed was introduced into the AAV2 genome to enable photo-dynamic therapy (PDT); or light-triggered virotherapy. In vivo experiments revealed that magnetic guidance of "ironized" AAV2-KillerRed injected by tail vein in conjunction with PDT significantly decreases the tumor growth via apoptosis. This proof-of-principle demonstrates guided and highly localized micro-scale, light-triggered virotherapy.

Image



Recent Publications (minimum 5)

1. Wang YT, Chen J, Chang CW, Jen J, Huang TY, Chen CM, Shen R, Liang SY, Cheng IC, Yang SC, Lai WW, Cheng KH, Hsieh TS, Lai MZ, Cheng HC, Wang YC, Chen RH.
Ubiquitination of tumor suppressor PML regulates prometastatic and immunosuppressive tumor microenvironment.
J Clin Invest. 2017 Aug 1;127(8):2982-2997

2. Wang TH, Lin YH, Yang SC, Chang PC, Wang TC, Chen CY. Tid1-S regulates the mitochondrial localization of EGFR in non-small cell lung carcinoma. Oncogenesis. 2017 Jul 17;6(7):e361.

3. Lin CW, Wang LK, Wang SP, Chang YL, Wu YY, Chen HY, Hsiao TH, Lai WY, Lu HH, Chang YH, Yang SC, Lin MW, Chen CY, Hong TM, Yang PC.
Corrigendum: Daxx inhibits hypoxia-induced lung cancer cell metastasis by suppressing the HIF-1α/HDAC1/Slug axis. Nat Commun. 2017 Feb 7;8:14502

4. Lin CW, Wang LK, Wang SP, Chang YL, Wu YY, Chen HY, Hsiao TH, Lai WY, Lu HH, Chang YH, Yang SC, Lin MW, Chen CY, Hong TM, Yang PC. Daxx inhibits hypoxia-induced lung cancer cell metastasis by suppressing the HIF-1α/HDAC1/Slug axis. Nat Commun. 2016 Dec 22;7:13867.

5. Tseng SJ, Huang KY, Kempson IM, Kao SH, Liu MC, Yang SC, Liao ZX, Yang PC. Remote Control of Light-Triggered Virotherapy ACS Nano. 2016 Nov 22;10(11):10339-10346

Photograph



Biography (150 word limit)

Ms. Yang she is working as a research assistant at Prof. Pan-Chyr Yang's Lab in the Institute of BioMedical Sciences at Academia Sinica, Her main job is to assist in the experimental project to explore the molecular mechanism of lung carcinogenesis and personalized therapy of lung cancer, which is the most important and endemic cancer in 'Taiwan.

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Notes/Comments: