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Antigen-coupled immune cells serve as antigen-delivery carriers for cancer vaccine

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Cancer immunotherapy has achieved extraordinary clinical outcomes over the last several years, particularly, chimeric antigen receptor (CAR) T cell therapy and immune checkpoint blockade therapy. An additional promising approach is to develop effective tumor vaccines for cancer prevention and treatment. The most common vaccine approach is inoculation of soluble antigens combined with adjuvants. Although this vaccine approach is most commonly employed worldwide, it has several disadvantages such as, a relatively large dose of antigen is required, an adjuvant is usually required, and only antigen-specific T cells in the local draining lymph nodes can be activated even if multiple injection sites are chosen. In this report, we took advantage of the lymphoid tissue homing property of immune cells to develop high-efficient antigen-delivery system to stimulate all antigen-specific T cells in the body. We wisely employed "click" chemistry method to efficiently couple the antigens to mouse spleen cells, then intravenously injected those antigen-coupled spleen cells into recipient mice and potently induced antigen specific CD4 and CD8 T cell response with heightened IFN-g producing capability. When we tested tumor antigen-coupled spleen cells in triggering anti-tumor immunity in melanoma and hepatocyte cancer mouse models, we found that this approach induced very strong anti-tumor immunity in both prophylactic and therapeutic experimental settings, and the animal survival was significantly improved. Immunological investigation showed that this approach induced both enhanced humoral and cellular immunity against tumor. Recently, we found that antigen-coupled allogeneic spleen cell injection induced equivalent, if not stronger, antigen-specific immune responses in contrast to injection of antigen-coupled syngeneic spleen cells, which could lead to off-the-shelf cell products for tumor vaccine. Our novel and unique approach is utilizing the homing nature of immune cells to distribute tumor antigens throughout the entire immune system and subsequently elicit strong anti-cancer immunity. Additional advantages over other vaccine approaches are minimal number of antigens required (only the antigens coupled to the cell membrane) and no adjuvant needed. Therefore, our approach holds high potential for clinical translation just like blood transfusion but without concerning about red blood cell type.

Biography

Chang Qing Xia received his MD and PhD degree in China, and have been working at US for almost two decades. He is currently an Assistant Professor in the Department of Pathology, Immunology and Laboratory Medicine at University of Florida. His research is focused on dendritic cells and development of antigen-specific immunotherapies for autoimmune diseases and malignant tumors.

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