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Colon cancer stem cell-based vaccine reduces efficiently both tumour growth and cancer stem cell subpopulation in a mouse colon carcinoma model

Colon cancer is the most common malignant gastrointestinal cancers that are still the most frequent cause of cancer-related mortality in China. Colon cancer stem cells (CCSCs) are the main reasons that result in the drug and radiation resistance, invasive growth, metastasis, and cancer relapse. Though many factors involving immunosurveillance and immunosuppression were recently validated as important for patient prognosis, a lot of experimental immunotherapies to fight unresectable metastatic colorectal cancer, only few cases have successfully induced antitumor immune response against malignancies. The goal of this work was to investigate the effects on the inhibition of colon cancer growth by vaccination of CCSC vaccines. The $CD133^+$CSCs were isolated from human LOVO and mouse CT26 cell lines by using a magnetic-activated cell sorting system, respectively. The xenograft or syngeneic mice were subcutaneously inoculated with the LOVO or CT26 $CD133^+$CSC vaccine inactivated with again and again freeze thawing three times before the mice were challenged subcutaneously with LOVO or CT26 cells. The inhibition tumor efficacy was assessed by the tumorigenicity, immune efficient analysis by flow cytometer, and enzyme-linked immunosorbent assays, respectively. The results showed that, compared with the non-CSC vaccine, the inhibition tumor growth efficacy of LOVO or CT26 CSC vaccine was significantly increased in the xenograft or syngeneic mice. Vaccination of LOVO or CT26 $CD133^+$CSC vaccine resulted in increasing cytotoxic activity of natural killer cells, enhancing serum IFN-γ, and decreasing TGF-β levels in the mice. The LOVO and CT26 $CD133^+$CSC vaccines significantly reduced the CSC subpopulations in the colon cancer tissues. The data provided the first evidence that the human LOVO or mouse CT26 $CD133^+$CSC-based vaccine may be an attractive therapeutic approach to excitation of anti-tumor immunity for treatment of colon cancer.

Speaker Biography

Jun Dou now is a Director, Professor of Department of Pathogenic Biology and Immunology, School of Medicine, Southeast University. He got his Medicine Doctor degree (MD, PhD) in 1997 at Zhejiang University of China. He has visited the Ulm University School of Medicine, Germany as a Visiting Scholar from Jun 1999 to Sept. 1999, and then visited the CDC, USA as a Senior Visiting Fellow from Oct. 2001 to Feb. 2004. Also, he visited the Georgia State University, USA as a Visiting Fellow from Sept. 2006 to Dec. 2006. Recently, he visited the Yale University School of Medicine, USA twice as a Senior Visiting Fellow in 2014 and in 2015. Currently his research has focused on the cancer stem cells (CSCs), the targeted CSCs by manipulation of nc-RNAs to treat breast, ovarian, colon cancers, and melanoma, as well as the CSC vaccines and CSC nanotheranostics.

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