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The immune-activation properties of cationic polymers PEIs to dendritic cells and the possible mechanisms

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Cationic polymer polyethylenimine (PEI) possesses strong hydrophilic cationic properties, and has been widely used as nucleotides transfection reagents. However, recently some reports revealed the potential of PEIs to activate immunity. We systematically tested the ability of branched PEIs of different molecular weights and different concentrations as immunostimulants to dendritic cells, and further explored the possible mechanisms of such immune-activation properties. We found that BPEIs of 25K, 70K, 100K did have some immunoactivation properties to BMDCs in 24h stimulation under certain ranges of concentrations, especially for 10 ug/ml 25KBPEI, 10 ug/ml 70KBPEI and 1 ug/ml 100KBPEI. Associated with the cytotoxicity effects to BMDCs, we found that the best stimulating BPEIs somehow all possess toxicity to some extent. However, BPEIs with excess toxicity, such as 100 ug/ml 25KBPEIs, also seriously damaged the maturation states of BMDCs, as well as all the uptake function and cellular morphology. So we postulated the underlying correlation between the immunoactivation performance and the cytotoxicity from the BPEIs. The PEGylation modification of all the corresponding BPEIs were found to reduce the toxicity to cells, but altered the maturation states of BMDCs at the same time. Here we further speculated that “danger signal” of proper extent is beneficial and essential in stimulating BMDCs, and ROS generation promises to be one of the forms. Exploring the adjuvanticity of BPEIs is rather challenging and encouraging in developing new effective vaccines, especially for treating immunity-related tumors, such as melanoma.

Biography

Chen Shen is in her last year of studies working for her MD from Department of Dermatology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology (HUST), China. She was once the regional chairperson of mainland China in the Asia-Pacific Medical Students' Association during 2014 and 2015. Her research field is referred to the biomaterial-based immuno-therapy to skin tumors, especially to melanoma.

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