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Pertussis resurgence in vaccinated populations

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Pertussis or whooping cough is a highly infectious, vaccine preventable disease. The incidence of the diseases has greatly been reduced since the introduction of whole cell DTP vaccine in many countries of both developing as well developed world. Pertussis resurgence has been observed in highly vaccinated populations of Western countries since 1990s. Poor vaccine quality, waning vaccine induced immunity, pathogen adaptation and enhanced surveillance as well as advancements in diagnostic facilities are some of the reasons considered responsible for the return of pertussis. Furthermore, a shift of pertussis has been witnessed from infants and children to adolescent and adults. Pertussis may have been ignored and went unnoticed due to its atypical manifestations in partially immunized population or people with waning immunity. Author reviews the reports of pertussis resurgence from different countries and attempts to investigate reasons behind this come back of the disease. He also emphasizes on the fact that pertussis is still an under reported disease and the available data from the developing countries is not a true picture of the story. Underdeveloped countries of Asian and African continents need to improve their surveillance systems so that a targeted global effort towards control of this vaccine preventable disease may be made.

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Ubiquitinated proteins enriched from tumor cells by a ubiquitin binding protein Vx3(A7) as a potent cancer vaccine

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Background: Our previous studies have demonstrated that autophagosome-enriched vaccine (named DRibbles: DRiPs-containing blebs) induce a potent anti-tumor efficacy in different murine tumor models, in which DRibble-containing ubiquitinated proteins are efficient tumor-specific antigen source for the cross-presentation after being loaded onto dendritic cells. In this study, we sought to detect whether ubiquitinated proteins enriched from tumor cell could be used directly as a novel cancer vaccine.

Methods: The ubiquitin binding protein Vx3(A7) was used to isolate ubiquitinated proteins from EL4 and B16-F10 tumor cells after blocking their proteasomal degradation pathway. C57BL/6 mice were vaccinated with different doses of Ub-enriched proteins via inguinal lymph nodes or subcutaneous injection and with DRibbles, Ub-depleted proteins and whole cell lysate as comparison groups, respectively. The lymphocytes from the vaccinated mice were re-stimulated with inactivated tumor cells and the levels of IFN-γ in the supernatant were detected by ELISA. Anti-tumor efficacy of Ub-enriched proteins vaccine was evaluated by monitoring tumor growth in established tumor mice models. Graphpad Prism 5.0 was used for all statistical analysis.

Results: We found that after stimulation with inactivated tumor cells, the lymphocytes from the Ub-enriched proteins-vaccinated mice secreted high level of IFN-γ in dose dependent manner, in which the priming vaccination via inguinal lymph nodes injection induced higher IFN-γ level than that via subcutaneous injection. Moreover, the level of secreted IFN-γ in the Ub-enriched proteins group was markedly higher than that in whole cell lysate and Ub-depleted proteins. Interestingly, the lymphocytes from mice vaccinated with Ub-enriched proteins, but not Ub-depleted proteins and whole cell lysates, isolated from EL4 or B16-F10 tumor cells also produced an obvious level of IFN-γ when stimulated alternately with inactivated B16-F10 or EL4 tumor cells. Furthermore, Ub-enriched proteins vaccine showed a significant inhibitory effect on in vivo growth of homologous tumor, as well as allogeneic tumor, compared with Ub-depleted proteins and tumor cell lysate. Tumor growth was regressed after three times of vaccination with Ub-enriched proteins in contrast to other groups.

Conclusion: These results indicated that Ub-enriched proteins isolated from tumor cells may have a potential as a potent vaccine for immunotherapy against cancer.

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