

## Production of nano-dendrimer containing HPV E 16d candidate vaccine and evaluation of its immune responses in laboratory murine model

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Cervical cancer is the second most common cancer in women worldwide. More than 99% of cervical cancers contain human papillomavirus (HPV) and HPV type 16 is the most common type in all countries. Papillomavirus-induced carcinogenesis is mainly related to two proteins E6 and E7 that are consistently expressed in HPV positive cervical carcinomas and are considered substantially for therapeutic implications.

Although the size of these proteins is small, they can attach to the regulatory proteins in host cells, eliminate cell-mediated immunity, and causes malignancy in the target tissue. Up to now, different methods have been used for production of therapeutic vaccines against human papillomavirus. These vaccines have some advantages and disadvantages.

Today, researchers are seeking for carriers that can be loaded with vaccines and enhance the therapeutic effectiveness of the vaccine, so they have gone into production of dendrimers and nanotechnology.

Due to their interesting abilities for carrying DNA, passing through the membrane and their appropriate size, dendrimers have been used extensively in vaccine delivery. In terms of size, shape, length and functional surface groups, nano-dendrimers are very similar. They can place the molecules among their branches and protect them against external factors and release them in target tissues.

In this study, nano-dendrimer based E7d protein as a vaccine candidate was made and then at the dose of 10mg was administered to the experimental groups. Two groups were vaccinated with Ed proteins; frond and alum adjuvant and controls were injected with PBS buffer and dendrimer.

Mice were vaccinated subcutaneously three times at two weeks interval. Two weeks after the last injection the immune responses were evaluated. Lymphocyte proliferative responses by BrdU method and the cytokines IL-4, IFN- $\gamma$ , and total antibody IgG1, IgG2a were evaluated with ELISA. Finally, the results are shown that dendrimer nano vaccine candidate based on E7d - protein provoke the cellular and humeral immune responses and could be a good candidate for study in humans.

**Keywords:** Human papillomavirus, E7d protein.

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