Computational designing of poly-epitopic vaccine by Targeting E6 Protein Sequences

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Abstract: Cervical cancer is theforth common type of cancer among women worldwide. Human papillomavirus (HPV) is responsible for all cases of cervical cancer.Human papillomavirus (HPV) is a DNA virus that belongs to the papillomavirus family and is capable of infectingthe basal cells of humanepithelia. Currently, commercial prophylactic HPV vaccines are availableto prevent infection by HPV, but unfortunately these vaccines have no therapeutic effect against established HPV infections and provide little benefit towomen who have already been infected with HPV. According to WHO report every year 527,624 women are diagnosed with cervical cancer and every year 265,672 die from the disease. In order to accelerate the control of cervical cancer and treat established HPV infections, it is essential to develop therapeutic vaccines to eradicate HPV by generating cell-mediated immunity against HPV infected cells. The aim of this study was to design epitope-based vaccines of HPV16 by targeting E6 protein of HPV16. To design the vaccine, we assembled a database containing 1449 different sequences of HPV-16 E6 identified worldwide. We then predicted 20 poteintial HPV-16 E6 epitope using bioinformatics approaches. On the other, we exracted experimental epitopes from IEDB database. Using combination of predicted (theoretical) and experimental epitopes, we achived potent epitopic construct that can induce both CD 4^+ and CD 8^+ T cells efficiently. To increase the magnitude and quality ofE6-specific immune response, linkers were inserted between epitopes (AAY used between CD 8+ epitopes and GPGPG used between CD 4+ epitope). Finally, we developed a therapeutic vaccine candidate employing a recombinant protein consisting of a string of multi-immunogenic T cell epitopes of E6.It seem that epitope-focused peptide vaccine designing opens up a new skyline that holds a prospective future in HPV research.

Keywords: Human Papilloma virus; Therapeutic vaccine E6

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