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Strong systemic and mucosal immune responses to surface modified PLGA microparticles containing HPV antigen administered intranasally

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Cervical cancer in India is the second most frequent cancer in women and third most common cancer among women worldwide. Human Papilloma Virus (HPV) is a cause of cervical cancer and other anogenital cancers. The currently available prophylactic vaccines for cervical cancer will not provide complete protection against all HPV types. Moreover, the available vaccines are administered via parenteral route and having poor patient compliance. Nasal delivery is a promising method for vaccine administration to give better immunogenicity and patient compliance when compared to conventional parenteral administration. Our objective of the study was to develop a needle free nasal vaccine to prevent the cervical cancer. The HPV antigen loaded PLGA [poly (lactic-co-glycolic acid)] and Glycol Chitosan coated PLGA microparticles were prepared. The prepared microparticles were characterized for its antigen entrapment efficiency, antigen integrity, In vitro release rate, particle size, zeta potential. The immunogenicity of the vaccines was studied with suitable animal models. PLGA microparticles shows negative zeta potential while surface modified microparticles shows higher positive zeta potential. The protein loading efficiency was found more than 80%. Both the coated and uncoated particles exhibited the size range in between 4-10 microns. Surface modified PLGA microparticles shows better immunogenicity as compared to PLGA particles. Surface modified PLGA microparticles proved great potential as a nasal delivery system for infections where systemic and mucosal immune responses are necessary.

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