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Bio-physical characterization of HPV L1 protein and Virus-like particles

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Abstract

The human papillomavirus vaccine is based on recombinant L1 protein produced in yeast or insect cells. Human papillomavirus-like particles (HPV VLP) result from assembly of L1 protein into VLPs either in vivo (in case of yeast) or in vetro (in case of insect cell). Analytical techniques currently used to characterize HPV-VLP, such as SDS-PAGE, Western blot, ELISA, are time-consuming and semi-quantitative. In this study, high-throughput techniques such as Capillary electrophoresis and size exclusion chromatography multi-angle light scattering (SEC MALS) were evaluated for analysis of intact HPV VLPs produced in *Pichia pastoris*. In addition, a reverse phase chromatography method was developed for L1 titer estimation and purity of samples; and structure integrity of VLPs was studied by dynamic light scattering (DLS), fourier infrared (FTIR) , circular dichroism (CD), fluorescence and Raman spectroscopy. These analytical methods together form a robust platform to study critical quality attributes of virus-like particles. Consequently, the analytical methods developed here can ease process optimization for production and purification of recombinant virus-like particles.