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Production of Virus-Like Particles for Vaccines

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Highlights

- Virus-Like Particles (VLPs) present several advantages over conventional vaccines which make them attractive for vaccination.
- Interest in VLP design and production has been increasing in recent years.
- Mammalian cell production approach can produce more immunogenic VLPs due to the post-translation modifications accessed.
- VLP vaccines against several infectious diseases are already on the market, with others in preclinical and clinical trials.

ABSTRACT

Virus-like particles (VLPs) are nanostructures that resemble the structures of viruses. They are composed of one or more structural proteins that can be arranged in several layers and can also contain a lipid outer envelope. VLPs trigger a high humoral and cellular immune response due to their repetitive structures. A key factor regarding VLP safety is the lack of viral genomic material, which enhances safety during both manufacture and administration. Contemporary VLP production may take advantage of several systems, including bacterial, yeast, insect and mammalian cells. The choice of production platform depends on several factors, including cost and the need for post-translational modifications (PTMs), which can be essential in generating an optimal immune response. Some VLP-based vaccines designed to prevent several infectious diseases are already approved and on the market, with many others at the clinical trial or research stage. Interest in this technology has recently increased due to its advantages over classical vaccines. This paper reviews the state-of-the-art of VLP production systems and the newest generation of VLP-based vaccines now available.

Abbreviations: VLP: virus-like particle; B/IC: baculovirus-insect cell expression system.

Introduction: Viral Vaccines