Virus-like Particles Based Vaccine Development Services

Virus-like Particles (VLPs) Based Vaccine, an approach that fights viruses with its own weapon, is one of the most exciting emerging vaccine technologies for generating effective and long-lasting protection. In the process of VLP based vaccines design, development, and manufacturing, working with partners who understand the challenges can dramatically improve efficiency. Creative Biolabs' proven application experience can help you overcome the challenges in the VLP vaccines development process.

Expression Systems Advantages

<table>
<thead>
<tr>
<th>Expression Systems</th>
<th>Advantages</th>
</tr>
</thead>
</table>
| E. coli            | • Ease of expression  
|                     | • Ability to scale-up  
|                     | • Low production cost |
| Yeast              | • Ease of expression  
|                     | • Ability to scale-up  
|                     | • Low production cost |
| Insect cells       | • Producing large amounts of correctly folded VLP in high-density cell culture conditions  
|                     | • Ability to scale-up  
|                     | • Safe  
|                     | • Act as vaccine adjuvants, help trigger a more effective immune response |
| Vaccination cells  | • Produce cells more closely related to the natural host  
|                     | • Appropriate PTMs and authentic assembly of VLPs |
| Plants             | • Ease of expression  
|                     | • Ability to scale-up  
|                     | • No human-derived virus contamination |

Chimeric VLP Based Vaccines

The chimeric VLPs consist of viral proteins while envelope proteins are from the natural virus. The envelope protein can serve as a signal for a particular tissue receptor so that VLP can be targeted to particular tissues with the capsid protein conjugated with the targeting component. Chimeric VLPs pave the way for the development of vaccine candidates with a broader, more powerful and comprehensive protection against diseases.

Creative Biolabs is professional in a wide range of vaccine technologies including chimeric VLP based vaccines. We are confident in providing the best services for our clients all over the world.

Enveloped Virus-like Particle Based Vaccines

Like parental viruses, virus-like particles can be either enveloped or non-enveloped and can be produced in different expression systems depending on their complexity. Enveloped virus-like particles (eVLPs) have the same size and structure as enveloped viruses and present antigens in their natural state for an improved immune response. With years of experience for VLP assemblies and advanced technologies, Creative Biolabs will help you develop novel, stable and efficient eVLP-based vaccine candidates. Our clients can count on us to help address your challenges and move your process forward.

Optimization Services

- Stability: eVLPs are more sensitive to the external environment than the protein-only VLPs, which further leads to the reduction in immunogenicity of eVLPs. Creative Biolabs provides chemical modification services for eVLPs to improve the particle thermostability.
- Expression level: Creative Biolabs provides a range of optimization services to improve the secretion potential for eVLPs.
- Purification: Numerous impurities co-purified with eVLPs pose a daunting challenge. Diverse purification methods have been developed at Creative Biolabs such as centrifugation, precipitation, ultrafiltration and chromatography.

Services

| Different types of VLPs for vaccine development  
| • VLPs of structurally simple viruses  
| • VLPs and lipid envelope  
| • VLPs with multiple protein layers |
| Different culture modes for VLP production  
| • Batch  
| • Continuous  
| • Fed-batch  
| • Perfusion |
| Downstream processing of VLPs  
| • Bacteria  
| • Insect cells  
| • Yeast  
| Quality monitor & control  
| www.creative-biolabs.com