

## Technology Offer

# Virus-Like Particles for Gene Therapy, Vaccine and Diagnostical Applications

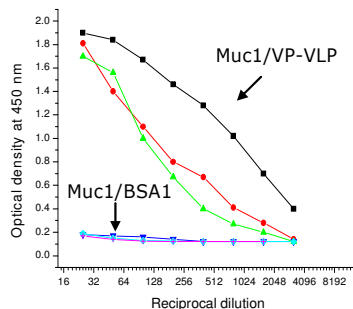
Reference Number  
TO 03-0039

## The Challenge

Single or multiple gene defects are the cause of many diseases. So far, these diseases were not treatable, due to the underlying genetic defect. Thus, only the symptoms, but not the causes were addressed. The modern medicine has been trying to overcome these problems through gene therapy for a long time, where therapeutic genes are induced into the affected organ or cells. However, there are still many difficulties in the practice and gene therapy is not applicable yet. One major practical problem is the successful delivery of the therapeutic gene into appropriate cells. Viruses, the delivery system used mostly, may cause many adverse effects. Therefore, there is a strong demand to develop appropriate, non-infectious delivery systems to make gene therapy an adequate tool for the modern medicine in future. These systems are also a very important tool for vaccine and diagnostical applications.

## The Technology

Recently scientists were able to produce virus-like particles (VLPs) on the basis of polyomaviruses in a highly-efficient yeast expression system. Most importantly these VLPs do not contain any viral nucleic acids and are endotoxin-free. In vitro encapsidation of plasmid DNA into such VLPs demonstrates their potential as gene delivery system. They tolerate the insertion of foreign protein segments/peptides at certain sites. In addition these particles are highly immunogenic, which has been demonstrated in a murine model recently.



IgG titers by ELISA in mice immunized either with Muc1/VP1-VLPs chimeric protein or Muc1/BSA1 (control group). Blood samples were collected on day 14<sup>th</sup> after third immunization with adjuvants. Source: Zvirbliene et al.

In conclusion, these VLPs are suitable for human applications not only in the field of gene therapy, but also in vaccine development. This technology harbours a great potential for the development of vaccines and gene delivery systems as well as diagnostical tools for veterinary medicine.

## Commercial Opportunity

- In-licensing opportunity
- Development of gene delivery, gene therapy and genetic immunization

## Patent Situation

A European patent was filed.

## Further Reading

Sasnauskas et al., 1999, Biol. Chem., 380, 381-386.  
Gedvilaite et al., 2000, Virology, 273, 21-35.  
Gedvilaite et al., 2004, Viral Immunol., 17, 51-68.

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