

## Oligomeric vaccines

### Problem to be solved

Immunization is an important tool to fight diseases caused by viral, bacterial or fungal pathogens. There is an ongoing need to develop effective vaccines. Since many pathogens can easily spread from animal hosts to humans – the most prominent example being influenza - it has also to be considered to protect animals by vaccination. Most vaccines can however not be supplied in appropriate quantities in a short time and are too expensive for the application.

### Novel approach

The invention provides a new approach for the generation of oligomeric vaccines. The underlying principle is the high affinity interaction between S-protein and S-tag of bovine pancreatic RNase A which is applied to hemagglutinin (H5). H5-Oligomers are generated by co-expression of H5-S-tag fusions and of a modified S-protein in a transient plant expression system. The obtained high molecular structures show a very high hemagglutination titer. The activity could clearly be related to these structures. It was shown that a specific immune response could be raised in mice after immunization. The oligomeric structures are stable in the plant extract for 1 week at 4° C with no loss of activity.

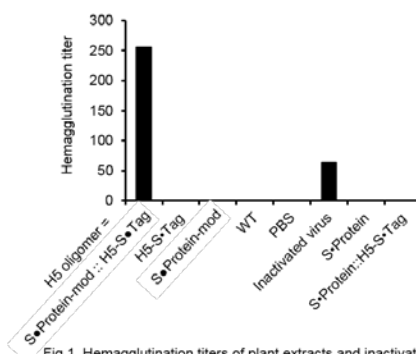


Fig. 1. Hemagglutination titers of plant extracts and inactivated virus rg A/swan/Germany/R65/2006(H5N1). WT: wildtype N. benthamiana; PBS: phosphate buffered saline; S\*Protein-mod: modified S\*Protein

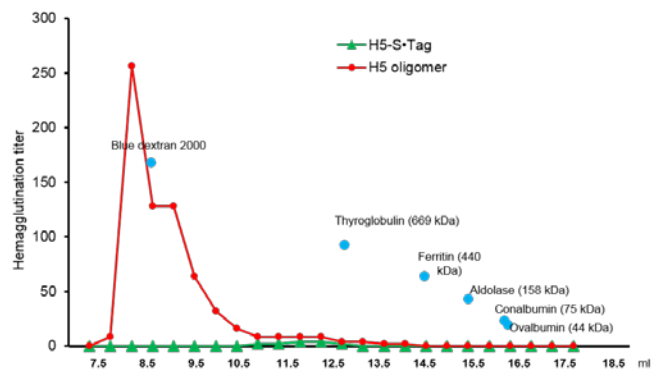


Fig. 2 Hemagglutination titer of size exclusion chromatography fractions of H5 oligomers and H5-S-Tag (H5-S-Tag with unmodified S\*Protein)

### Applications

The technology can be applied to produce high molecular vaccines. They have many advantages compared to recently used vaccines. The high molecular structures generated using the described novel approach:

- are highly immunogenic
- are highly stable
- can be applied in the crude extract saving costs and time for downstream processing
- can be produced in a short period of time
- can be applied for broad immunization in veterinary medicine e.g. for poultry have an unlimited scalability.

We are seeking partners for developing specific vaccines based on the technology, or alternatively a licensee for the technology as a whole.

### Patent situation

In case of interest, we will be pleased to inform you about the current status.

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