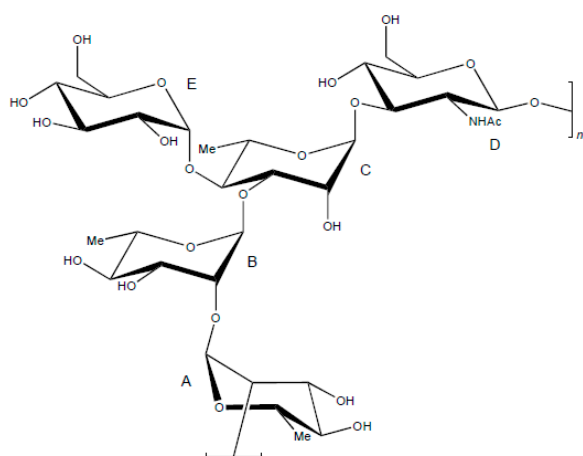
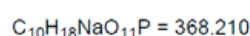
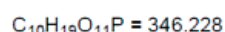
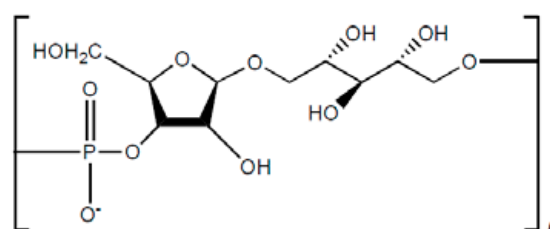


## Polysaccharide conjugate vaccines



Shigella flexneri SF2a



Haemophilus influenzae type b

A conjugate vaccine is created by covalently attaching a bacterial polysaccharide, which by itself is not able to induce immunological memory, to a protein carrier antigen, thereby eliciting a stronger immunological response to the poor antigen.

Conjugate vaccines have been extremely successful in preventing disease and death caused by bacterial infections. Moreover, conjugate vaccines have a superb safety record with very few serious adverse events following immunization. Intravacc has a 20-year track record in designing, developing and characterizing conjugate vaccines.

### Benefits

Intravacc offers unique capabilities and services in the scope of conjugate vaccines:

- **Seeds:** Fully defined seed lots for R&D and GMP (*Haemophilus influenzae type B*).
- **USP:** State-of-the-art bioreactors for biomass production ranging from 0.5 to 70 L.
- **DSP:** State-of-the-art chromatography (AKTA) for different purification processes. In-depth knowledge on differential precipitations for purification.
- **Quality Control:** Full array of HPLC, mass spectrometry, NMR and colorimetric assays to evaluate all production process steps.
- **Technology transfer:** Extensive, world-wide, experience in technology transfer of conjugate vaccines. Possibility of tailoring Technology Transfer package to needs and wishes of partners (e.g. on-site training, facility set-up, support during production runs and QC).
- **GMP certified:** intermediatescale batch production, QC, QA and release of clinical trial material.
- **Clinical development:** providing support in early clinical development up to phase 2.

## Track record

Intravacc has a significant expertise in the design, development and characterization of conjugate vaccines. With our state-of-the-art equipment, dedicated staff and years of technology transfer experience, Intravacc is your ideal partner for product and process development including scaling to large scale manufacturing in order to help you bring your conjugate vaccines to market. Our track record includes creating effective conjugate vaccine designs utilizing extracted capsular polysaccharides from *Streptococcus pneumoniae*, *Meningococcus A, C, W* and *Y* as well as *Haemophilus influenzae* type *b (Hib)*. The *Hib* conjugate vaccine developed at Intravacc has been laid down in a patented manufacturing process. This technology was successfully transferred to multiple international partners world-wide and has resulted in marketed products.

Our most recent success is the co-development of a *Shigella flexneri* 2a conjugate vaccine. Intravacc provided the process development, scale-up and GMP manufacturing including fill and finish of this vaccine that was successfully tested in a phase I clinical trial and now is readied for Phase IIa/b studies. The vaccine is a fully synthetic carbohydrate conjugated to tetanus toxoid.

## Carriers

To create effective conjugate vaccines, Intravacc has utilized many carriers. These include often used tetanus toxoid but also diphtheria toxoid (CRM197) and outer membrane vesicles (OMVs). OMVs are of particular interest as Intravacc has developed them into a production platform for vaccines. This includes the unique ability to produce and purify these for many bacteria under GMP conditions. In addition, we are also strong in both the homologous and heterologous expression of specific immunological active proteins on OMVs.

## Partnering opportunity

Consider Intravacc to help you develop and produce the next generation conjugate vaccines.

We provide contract-based process development and are available to consult you on your conjugate vaccine design, development and GMP production. Banking on years of experience we apply a Quality by Design (QbD) and Design of Experiments (DoE) approach that enables us to minimize costs, development time and risks as a result maximizing efficiency of conjugate vaccine development.

### Intravacc

Intravacc is a renowned, not-for-profit R&D organization. With our unique capabilities and infrastructure, we are able to optimize vaccines, vaccine processes and vaccine technologies. Our aim is to increase equality in access to vaccines throughout the world in order to contribute to public health. We achieve this by transferring our knowledge and technologies to public and private partners worldwide and collaborative R&D. A team of 150 professionals is at your disposal at Utrecht Science Park Bilthoven in The Netherlands.

### Contact

**Mark Geels, PhD**

Program Manager  
T: +31 (0)30 7920 482  
Mark.Geels@intravacc.nl

**Ivo Ploemen, PhD**

Business Development Manager  
T: +31 (0)30 7920 482  
Ivo.Ploemen@intravacc.nl

**Intravacc**

Antonie van Leeuwenhoeklaan 9  
T: +31 (0) 30 7920 496  
P.O. Box 450  
3720 AL BILTHOVEN  
The Netherlands  
info@intravacc.nl www.intravacc.nl