Intravacc.
Innovating vaccines

Press Release

Intranasal immunization with Intravacc's experimental whooping cough vaccine confers broad protection

- Need for improved whooping cough vaccines
- Outer membrane vesicles from *Bordetella pertussis* bacteria are potent immunogens
- Intranasal immunization shows both excellent systemic and immune responses
- Needle free immunization possible
- Data published in medical journal Scientific Reports

Bilthoven, The Netherlands, 22 June 2020 – Intravacc, one of the leading translational research and development vaccine institutes with an extensive track record in developing viral and bacterial vaccines, today announced promising results of a preclinical study with its experimental whooping cough vaccine in mice. Published in Scientific Reports (2020) 10:7396, the study shows that intranasal immunization induced both excellent systemic and local immune responses, but also prevented colonization of the lung, trachea and nose.

Current vaccines against whooping cough have serious disadvantages. Inactivated whole cell vaccines are relatively reactogenic resulting in reduced use in vaccination programs. Subunit vaccines on the other hand, have limited efficacy. This results in outbreaks of whooping cough, even in vaccinated populations. There are indications that an effective whooping cough vaccine should prevent colonization of the upper respiratory tract. Asymptomatic carriage facilitates spreading of the bacteria and a vaccine that prevents this could contribute to herd protection.

Intravacc scientists used a vaccine consisting of outer membrane vesicles (Intravacc's OMV vaccine delivery platform) to immunized mice via the subcutaneous or intranasal route. Whereas subcutaneous immunization resulted in robust systemic immune responses of high quality, it could not prevent colonization of the nasal cavity. Intranasal immunization did not only induce excellent systemic responses but also strong local immune responses. Most importantly, intranasal administration prevented colonization of the lung, trachea and nose. Further testing, preferably in humans is needed to confirm these findings..

Prof. Dr. Gideon Kersten, CSO of Intravacc, commented:

> *"'Intravacc's vaccine concept has several potential advantages. Because of its composition outer membrane vesicles reduce the risk of vaccination induced selection of strains not matching with the vaccine, it induces immunity at the port of entry and it is needle free, allowing easy administration and flexible incorporation in immunization programs."*

Whooping cough, or pertussis, is a highly contagious respiratory disease that is caused by the gram-negative bacterium *Bordetella pertussis* and transmitted through Flügges droplets. It is a strictly human pathogen and all age groups can be infected. However, infants are the main risk group. Diagnosis of pertussis is often difficult in the early stage with only a mild cough, and fever is uncommon. Later, the severity of the disease increases with pneumonia, vomiting and increased coughing that in infants can lead to death.

Dr. Jan Groen, CEO of Intravacc, stated:

> *"This study, showing full protection against whooping cough after intranasal immunization with our OMV based pertussis vaccine, provides us with a lot of comfort towards the development of our Covid-19 intranasal vaccine based on OMV's"*

=== E N D S ===

About OMV technology

For vaccine development, Intravacc has designed a vaccine delivery platform based on outer membrane vesicles (OMVs) - spherical vesicles with strong immunogenic properties. These vesicles are naturally secreted by so-called gram-negative bacteria and contain proteins that play a role in the survival of bacteria in the body. Due to their immunogenic properties, they are also very suitable for use as a vaccine. OMVs can be rigged with immunogenic proteins and peptides from other pathogens. This can be done by allowing the OMV-producing bacteria to produce these proteins or by chemically linking them to OMVs. Heterologous OMV vaccines make manipulation with the pathogen from which the vaccine is produced unnecessary. This is a great advantage if there are strict isolation measures or if the pathogen is difficult to cultivate. Intravacc has also developed genetic tools to increase the yield of OMVs, reduce toxicity and achieve the desired antigenic composition. Intravacc's OMV platform is fully scalable.

About Intravacc

Intravacc is one of the world's leading institutes for translational vaccinology. As an established independent R&D organization with over 100 years' experience in the development and optimization of vaccines and vaccine technologies, Intravacc has transferred its technology all over the globe, including oral polio vaccines, measles vaccines, and DPT, Hib and influenza vaccines. Intravacc offers a wide range of expertise to independently develop vaccines from lead concept to clinical phase I/II studies for partners worldwide such as academia, public health organizations (WHO, BMGF), and biotech and pharmaceutical companies.
Intravacc also has its own proprietary vaccine platform, and established state-of-the-art research and production (GMP) facilities. Its aim is to substantially reduce development risks and costs of new vaccines in order to contribute to global health and equity in access to vaccines worldwide.
For more information, see www.intravacc.nl

Contact info

Intravacc
Dr. Jan Groen, CEO
P: +31 30 7920 454

Mirjam Hartman, Media relations
P: +31 6 115 969 94
E: press.office@intravacc.nl

LifeSpring Life Sciences Communication, Amsterdam
Leon Melens
P: +31 6 538 16427
E: lmelens@lifespring.nl