RNActive® – CureVac’s Innovative Approach for Prophylactic Vaccination

RNActive® vaccines are a novel technology for the generation and production of safe, efficacious and cost-effective vaccines on basis of Messenger RNA (mRNA). In comparison with other, already established vaccines, CureVac’s RNActive® vaccines offer significant advantages. The technology allows for the very rapid production of innovative and efficacious prophylactic vaccines within a few weeks and for the delivery of them worldwide without the need for a cold chain.

Excellent Conditions for Rapid and Cost-Effective Production

Particularly during pandemics each day that a vaccine is available earlier counts. CureVac is able to provide an RNActive® vaccine within a few weeks of the identification of the pathogen.

CureVac has operated its own multi-product GMP facility already for several years. It has a production capacity of up to 3.5 million doses. The facility allows the rapid and cost-effective production of all RNActive® vaccines from one common platform. CureVac’s vaccine production process can be adapted to the manufacture of a novel RNActive® vaccine within a few days with minimal investments required. Alternatively, multiple RNActive® vaccines can be produced in parallel.

Core Feature for Worldwide Distribution: Thermal Stability

The cold chain is a critical but vulnerable component of current global vaccine distribution and storage. CureVac’s RNActive® vaccines display exceptional storability and thermal stability. They are completely protected against high temperature as well as low, freezing temperatures. RNActive® vaccines eliminate the necessity of cold chain logistics thus ensuring easy distribution throughout the world.

mRNA – Promising Basis for Prophylactic Vaccines

mRNA is a very promising molecule for prophylactic vaccines. Its physiological role is to transfer genetic, protein-building information from the cell’s nucleus to the cytoplasm where this information is translated into the corresponding protein. CureVac embraces this natural mechanism in order to enable the patient’s body to produce its own therapy or vaccine. RNActive® is thus a “minimal” vaccine – only the mRNA molecules encoding the relevant protein antigens are injected into the patients. Immunization with several antigens as well as antigen engineering is feasible and can serve as the basis for optimized and broadly protective vaccines.

RNActive® Vaccines Lead to Optimal Immune Responses

RNActive® vaccines have self-adjuvanting properties and allow for the robust and transient expression of the relevant protein antigen. Thereby RNActive® vaccines stimulate the adaptive and innate immune systems leading to a very balanced humoral as well as cell-mediated immune response.
Nature Biotechnology Publication: Effective Protection Against Infectious Diseases

In vivo data published by CureVac and the Friedrich-Loeffler-Institute in Nature Biotechnology (Dec 2012) showed that RNActive® prophylactic vaccines induced balanced, long-lived and protective immunity to influenza A virus infections in various animal models including large domestic pigs. The mRNA vaccine was immunogenic and provided long-term protection in newborn as well as in aged mice. Additional data revealed that full protection can be achieved upon single-dose immunization.

Clinical Trial Against Rabies

CureVac is currently evaluating an RNActive® based rabies vaccine in a clinical trial with healthy volunteers. This phase I clinical trial is designed to assess safety and tolerability, to determine an efficacious dose and to evaluate various routes of delivery. The rabies vaccine is based on CureVac’s proprietary RNActive® technology and has demonstrated excellent immunogenicity and complete protection against this inexorably lethal viral infection in several preclinical studies.

"Accessing CureVac’s innovative mRNA technology may allow Sanofi Pasteur to exploit a platform that can be more broadly applicable across indications."

Nicolas Burdin, Head of Discovery Research at Sanofi Pasteur

In May 2014, CureVac and Sanofi Pasteur signed an exclusive license agreement to develop and commercialize an mRNA-based vaccine against an undisclosed pathogen. In 2011, CureVac and Sanofi Pasteur signed a collaboration and license option agreement for several pre-defined pathogens. CureVac met all pre-agreed milestones and acceptance criteria relating to these agreements, and therefore Sanofi Pasteur exercised its first option and extended its exclusive and non-exclusive options on all five pathogens.

Collaborations in the Field of RNActive® Prophylactic Vaccines

- Sanofi Pasteur, DARPA and In-Cell-Art (Start 2011)
- Development of prophylactic vaccines for use against several infectious diseases
- Janssen Pharmaceuticals (Johnson & Johnson) (Start 2013)
- Development of an influenza vaccine
- Bill & Melinda Gates Foundation (Start 2014)
- Joint development of vaccines against various infectious diseases; initial project: rotavirus

CureVac’s RNActive® Vaccine Technology Meets the Requirements for Modern Prophylactic Vaccines

- Induction of antibodies & antigen-specific T cells
- Induction of long-term protection
- Protection feasible after single vaccination
- Antigen design for increased efficacy
- Applicable as multivalent vaccines
- Smart production process adaptable to novel vaccines within hours
- Good safety and tolerability
- Stable at extreme temperatures
- Flexible in administration (different routes and techniques)
- One-for-all standardized and scalable production process
- GMP-grade vaccines can be produced within a few weeks

For more information about our company and our RNA technology, please visit our website at www.curevac.com or contact us:

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