

Press Release

Publication in *EMBO Molecular Medicine* Demonstrates CureVac's Proprietary mRNA Technology Enables Antibody Mediated Therapies Against Infectious Agents, Toxins and Tumors

Data validate the strength of CureVac's RNAntibody® technology to produce high and sustained levels of antibody production in a variety of disease indications

TÜBINGEN, Germany / BOSTON, MA, August 15, 2017 – CureVac AG, a fully-integrated biotechnology company pioneering mRNA-based drugs, today announced the publication of a study in the peer-reviewed journal *EMBO Molecular Medicine*, demonstrating the utility of CureVac's RNAntibody® technology as a potent novel approach for passive immunization and a potentially ideal platform for applications where a combination of both passive and active immunization is advantageous or required.

The paper, titled "*mRNA mediates passive vaccination against infectious agents, toxins and tumors*," by Thran et al., reported results of a multifaceted research program that was designed to explore whether CureVac's RNAntibody® technology, based on chemically unmodified mRNA, is suitable for passive immunization. The results further build on the data included in CureVac's granted RNAntibody® patent (see [press release](#) of July 20, 2017). Investigators from CureVac and Tufts Cummings School of Veterinary Medicine tested various antibodies using different designs to determine expression and characterization *in vitro* and *in vivo* in the fields of viral infections, toxin exposure and cancer immunotherapies.

Results indicated that single injections of mRNA formulated in lipid nanoparticles (LNPs) provided by Acuitas Therapeutics were sufficient to establish rapid, strong and long-lasting serum antibody titers *in vivo*, thereby enabling both prophylactic and therapeutic protection against lethal rabies infection or botulinum intoxication. Additionally, therapeutic mRNA-mediated antibody expression allowed mice to survive an otherwise lethal tumor challenge. Based on this evidence, the researchers concluded that the utility of formulated mRNA could present a novel armamentarium for the development of competitive passive immunization therapies.

Mariola Fotin-Mleczek, Ph.D., Chief Scientific Officer of CureVac and a co-author of the paper, commented, "Multiple experiments have demonstrated the wide-ranging therapeutic applicability of our technology platform using chemically unmodified mRNA. The research published in *EMBO Molecular Medicine* now adds passive immunization as another potential therapeutic application for mRNA. Using diverse disease models, mRNA-mediated antibody expression, for up to 28 days, proved capable of providing therapeutic benefit, conferring full protection against intoxication and virus challenge while eradicating neoplastic cells in a mouse tumor model. This suggests that mRNA may be the ideal platform for applications requiring antibody-mediated protection. We are very excited to see that our RNAntibody® technology can provide attractive solutions for different kind of antibodies, including functional IgG, single chain camelid and bi-specific antibodies demonstrating that our non-immunogenic mRNA can be used to deliver any

protein molecule. Our sequence-engineered mRNA has the potential to revolutionize human protein therapies with a lower cost of goods and streamlined manufacturing in our state-of-the-art production facilities that are currently being expanded to meet clinical and commercial demands.”

Charles B. Shoemaker, Ph.D., Professor in the Department of Infectious Disease and Global Health (IDGH) at Tufts Cummings School of Veterinary Medicine and a co-author of the paper, stated, “The study in *EMBO Molecular Medicine* is very promising and suggests that mRNA may offer an attractive alternative to passive immunization given that mRNA technology appears to enable the *in vivo* synthesis of antibodies displaying favorable pharmacokinetics in which substantial antibody titers are induced in blood as early as two hours after treatment of mice. Today, passive immunization by antibody injection currently fills only a small niche in preventing or treating infectious diseases and has significant drawbacks. Nevertheless, there is renewed interest in passive immunization due to the emergence of microbial resistance to antibiotics and this has created a demand for alternative therapies. mRNA seems likely to provide a viable new option for meeting this growing need.”

The full study in *EMBO Molecular Medicine* can be found [here](#).

About RNAntibody®

CureVac’s RNAntibody® technology can be applied in many disease indications including cancer, cardiovascular diseases, infectious diseases and autoimmune diseases.

RNAntibody® is a component of CureVac’s RnArt® portfolio of mRNA-based molecular therapeutics that give the body the information required to produce its own functional proteins. Patent No. EP2101823 from the European Patent Office provides broad patent protection for the Company’s RNAntibody® technology.

About *EMBO Molecular Medicine*

EMBO Molecular Medicine is a peer-reviewed, online open access journal dedicated to a new research discipline at the interface between clinical research and basic biology. It offers clinicians and researchers in this area the opportunity to publish their best work in a broadly distributed and highly visible forum, thereby lending a strong impetus to this important and rapidly developing field and helping to forge new links between clinicians and molecular biologists. Studies based on model organisms also fall within the scope of the journal, provided that the results presented are evidently and directly relevant to human disease. *EMBO Molecular Medicine* is an open access online journal published by [EMBO Press](#).

About CureVac AG

CureVac is a leading company in the field of messenger RNA (mRNA) technology with more than 17 years’ expertise in handling and optimizing this versatile molecule for medical purposes. The principle of CureVac’s proprietary technology is the use of mRNA as a data carrier to instruct the human body to produce its own proteins capable of fighting a wide range of diseases. The company applies its technologies for the development of cancer therapies, prophylactic vaccines and molecular therapies.

To date, CureVac has received approximately \$370 million (€355 million) in equity investments including significant investments from SAP founder Dietmar Hopp’s dievini and an investment of \$52 million from the Bill & Melinda Gates Foundation. CureVac has

also entered into collaborations with multinational corporations and organizations, including Boehringer Ingelheim, Sanofi Pasteur, the Bill & Melinda Gates Foundation and IAVI. For more information, please visit www.curevac.com

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