

## Healthcare industry BW

# CureVac GmbH: RNA-based vaccines and immunotherapies

**CureVac GmbH, a biopharmaceutical company based in Tübingen, develops immunotherapies for cancer along with prophylactic vaccines based on its proprietary messenger RNA (mRNA) technology platform. CureVac also uses RNA for developing adjuvants. Two clinical trials, a Phase I trial in non-small cell lung cancer (NSCLC) and a Phase IIb trial in prostate cancer, are currently underway to test the efficiency of mRNA-based drugs in treating cancer and protecting against infectious diseases.**



Dr. Ingmar Hoerr, founder and CEO of CureVac, and the company's 110 employees are focussed on the development of innovative RNA technologies for application in oncology and infectiology.

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CureVac is managed by Dr. Ingmar Hoerr who founded the company in 2000 together with colleagues from the laboratories of Prof. Dr. Hans-Georg Rammensee and Prof. Dr. Günther Jung. What began with three ambitious scientists 13 years ago, has now become a biotechnology company with a workforce of over 110 people and company sites in Tübingen and Frankfurt.

CureVac develops drugs for treating cancer and protecting against infectious diseases. The company has promising drug candidates in (pre-)clinical research and development, and uses its RNActive® product for different applications. On the one hand, CureVac focusses on the development of mRNA-based drugs against solid tumours such as prostate and lung cancers, and on the other on the development of prophylactic and therapeutic mRNA vaccines against infectious diseases such as influenza.

Thanks to its approach that involves using RNA technologies for treating cancer and protecting against infectious diseases, CureVac was able to bring SAP founder Dietmar Hopp on board as the main investor. CureVac recently received an 80-million-euro injection to advance the development of its RNA-based vaccines. This financing round is one of the largest ever for private biotech companies in Germany.

## Targeting prostate cancer with mRNA

One of CureVac's clinical stage mRNA vaccines targets prostate cancer, the most frequent cancer in men with around 60,000 newly diagnosed cases per year. Cancer, including prostate cancer, can be treated effectively when detected early. Early prostate cancer usually has no symptoms, which is why



In a Phase I/IIa clinical trial, Curevac's specifically formulated and optimised mRNA was used to treat prostate cancer patients. In March 2013, the prostate cancer mRNA vaccine entered clinical Phase IIb.  
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it is often only detected when the cancer has spread beyond the prostate gland. This requires therapies that offer effective treatment in advanced cancer stages.

In 2011/2012, Phase I/IIa clinical trials were carried out in several countries (Germany, USA, Italy and Switzerland) with prostate cancer patients who were treated with one of CureVac's optimised mRNA vaccines. In March 2013, the company commenced a multicentre, randomised clinical Phase IIb prostate cancer trial and expects to be able to publish the outcome of the study by 2017 at the latest.

## RNA-based therapies in cancer and infectious disease research

With the development of RNA-based therapies, CureVac is charting new biotechnological territory that has become a new beacon of hope. At the same time, the company is employing a translational approach in that its research in the domain of medicine has a clear focus on application. CureVac takes a holistic, entirely unique approach to the development of drugs for the treatment of cancers. "We do not want to provide patients with an off-the-shelf drug. In fact, our experience shows that this is not possible as every patient reacts differently. Our intention is to provide each patient with the constituents he or she specifically needs and leave it up to the patient's body to produce a drug that is tailored to its individual requirements. These drugs are superior to any synthetic drug," said Ingmar Hoerr.

This is why CureVac is specifically interested in RNA, the most primordial type of hereditary material and, as CureVac sees it, "the mother of DNA". Increasing the understanding as to how RNA mediates information and how it interacts with other molecules is a major prerequisite for developing RNA-

based drugs, including those that are able to fight off aggressive tumour cells.

## CureVac overcomes technical hurdles



CureVac was able to show that RNAActive® induced an immune response (Nature Biotechnology, 2012). The company is now enhancing its efforts to expand its prophylactic vaccine portfolio.

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CureVac has been able to show that its RNAActive® vaccine could induce an immune response (Nature Biotechnology, 2012), and, as a result, the company is now specifically working on enhancing the development of prophylactic vaccines. The company has also succeeded in converting unstable RNA into stable forms (RNAActive®). The optimisation of the production process now enables CureVac to store the mRNA vaccines at room temperature, something that is immensely useful when samples are being shipped across the world. Own GMP production facilities in Tübingen enable CureVac to produce up to 3.5 million RNAActive® vaccine doses per year.

### CureVac works with partners to improve patient treatment

Over recent years, CureVac has joined forces with cooperation partners with the aim of developing effective vaccine candidates for application in oncology and infectiology. The company is working with the world's largest vaccine producer, Sanofi-Pasteur, and the French company In-Cell-Art. Each company supplements the other's expertise, and they are convinced that this will help them reach their goal of being able to optimally treat severely sick people in the near future.

In 2013, CureVac will organise the first "International mRNA Health Conference" which will then subsequently be held annually.

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Boosting the immune system can improve cancer prevention and treatment