CureVac’s RNActive® cancer immunotherapy represents an unparalleled approach for next generation tumor vaccines. The mRNA-based technology platform is designed to mobilize the patient’s immune system to fight the disease. Cancer immunotherapy was named Science Magazine’s ‘2013 Breakthrough of the Year’.

CureVac is developing immunotherapies against oncologic diseases with a current clinical focus on treatments for prostate cancer and non-small cell lung cancer (NSCLC). CureVac is running a number of clinical trials, including a large randomized phase Ib clinical trial in castration-resistant prostate cancer.

mRNA – Promising Basis for Therapeutic Cancer Immunotherapy
mRNA is a novel and promising basis for therapeutic cancer immunotherapy. The physiological role of the molecule is to transfer genetic, protein-building information from the nucleus to the cytoplasm where this information is translated by the cellular ribosomal machinery into the corresponding protein. CureVac has developed a unique mRNA platform technology in RNActive® that generates a minimal vaccine: the ‘naked’ mRNA molecules which encode desired tumor antigens are delivered intradermally. RNActive® products express and thereby target one or several antigens that are selectively expressed or over-expressed by cancer cells versus healthy cells.

How Does RNActive® Work?
RNActive® cancer immunotherapy is designed to trigger the patient’s own immune system to attack cancer cells. CureVac’s RNActive® technology is a smart combination of specially formulated mRNA molecules, capable of conferring an additional stimulus to the immune system. RNActive® immunotherapy supports both antigen expression and immune stimulation, mediated by Toll-like receptor 7 (TLR7).

RNActive® immunotherapy can be designed to target a variety of different antigens by combining different mRNA molecules that encode different antigens. Additionally, combining RNActive® cancer immunotherapy with other approaches, including chemotherapy, radiotherapy or targeted therapies, such as checkpoint inhibitors or kinase inhibitors, is promising and currently being evaluated.

Collaboration with the Cancer Research Institute and the Ludwig Cancer Research
The collaboration involves up to five clinical studies of cancer immunotherapy combinations through the CVC Trials Network using CureVac’s CV9202, combined with other priority agents available to CRI and Ludwig from their internal portfolios or accessed through additional industry partnerships.

Advantages of RNActive® cancer immunotherapy
• Excellent safety profile with no risk of genomic integration or vector immunity
• Induction of a strong, balanced, long-lasting cellular immune response
• Positive clinical safety and immunogenicity experiences in several trials
• Self-adjuvanticity contributes to excellent performance
• Effective in elderly patients
• Can be combined with other anti-tumor therapies
Defining a new class of drugs

Principle of the RNActive® Technology

After identification of the target molecule(s) of virus or tumor diseases, CureVac uses a sophisticated sequence optimization process. RNA is produced and purified by a proprietary manufacturing process platform resulting in a thermally stable drug product.

After administration, RNActive® mRNA molecules are taken up by different cell types and subsequently translated into proteins. Thus antigenic fragments are presented to lymphocytes, and a specific immune response against the target is generated.

Because RNActive® vaccines encode antigens and simultaneously stimulate the innate immune system they induce both humoral and cellular immune responses. Therefore the powerful therapeutic or prophylactic effect is triggered.

Clinical Studies in Prostate Cancer
The first-in-human phase I/IIa clinical trial in patients with castration-resistant, non-metastatic or mildly symptomatic metastatic prostate carcinoma investigated CV9103 RNAActive® immunotherapy, which comprises four tumor-associated antigens: PSA (prostate specific antigen), PSCA (prostate stem cell antigen), PSMA (prostate specific membrane antigen) and STEAP1 (six transmembrane epithelial antigen of the prostate 1). CV9103 was well tolerated and induced immune responses against all of four antigens, and about two-thirds of responding patients responded to multiple antigens. Data was presented at the 28th Annual SITC Meeting in Washington in November 2013.

CV9104 RNAActive® immunotherapy is currently being evaluated in a phase Ib clinical trial in patients with asymptomatic or minimally symptomatic metastatic castration-resistant prostate carcinoma. The double-blind, placebo-controlled, randomized trial is fully enrolled with almost 200 patients in eight European countries.

Clinical Studies in Lung Cancer
The RNAActive® immunotherapy CV9201 was investigated in a phase I/IIa study in patients with stage IIIB/IV non-small cell lung cancer (NSCLC) who were at least stable after first-line platinum-based chemotherapy. CV9201 consists of mRNAs encoding five tumor-associated antigens; MAGE-C1, MAGE-C2, NY-ESO-1, Survivin and 5T4. CV9201 was well tolerated and induced immune responses against all five antigens, with about 60% of patients responding to multiple antigens. The data were presented at the 26th Annual SITC Meeting in Washington in November 2011 and at the ASCO meeting 2012.

CV9202, the next generation of CV9201 immunotherapy, consists of mRNAs encoding the five antigens of CV9201 and one additional mRNA encoding the antigen MUC1. CV9202 is currently being tested in a phase Ib trial in combination with local tumor radiation in patients with metastatic NSCLC.

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