



Moderna Announces Progress Across Broad Portfolio and all Three Clinical Stage Therapeutic Areas at 2020 R&D Day

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Positive interim analysis from Phase 2 study of CMV vaccine candidate (mRNA-1647); Phase 3 study to begin in 2021

Phase 3 COVE study of COVID vaccine candidate (mRNA-1273) has enrolled 25,296 participants to date; Phase 3 protocol now available online

Moderna to enter seasonal flu business given the high medical need for more effective flu vaccine

Two-dose regimen of Chikungunya antibody (mRNA-1944) demonstrates the platform's ability for safe repeat dosing

Next generation MMA candidate (mRNA-3705) announced

CAMBRIDGE, Mass.--(BUSINESS WIRE)--Sep. 17, 2020-- Moderna, Inc. (Nasdaq: MRNA), a biotechnology company pioneering messenger RNA (mRNA) therapeutics and vaccines to create a new generation of transformative medicines for patients, announced progress across its portfolio of pipeline assets being presented at the Company's annual R&D Day today.

"The Moderna team has made significant progress since our last R&D Day 12 months ago. The pipeline has matured with our COVID-19 vaccine in a Phase 3 study and four candidates in Phase 2 studies. We are actively preparing for a potential commercial launch of mRNA-1273, our COVID-19 vaccine, and we continue to expand the breadth of Moderna's platform," said Stéphane Bancel, Moderna's Chief Executive Officer. "We are announcing that we are increasing our investment in vaccines and we will develop a seasonal flu vaccine given the unmet need for highly effective vaccines. In our systemic secreted & cell surface therapeutics core modality, we are sharing positive interim data for repeat dosing of our systemic mRNA therapeutic against chikungunya, which is important progress for our therapeutics modalities, particularly in rare diseases. With our second collaboration with Vertex, we are entering the field of gene editing using Moderna's technology. As we continue to scale for commercialization, we are more committed than ever to our mission to deliver on the promise of mRNA medicines to treat or prevent serious diseases."

Presentation highlights from Moderna's R&D Day include:

Infectious Diseases

- COVID vaccine candidate (mRNA-1273) Phase 3 COVE study of 30,000 volunteers in the U.S. being conducted with NIH and BARDA has enrolled 25,296 participants as of September 16, 2020; 10,025 participants have received their second vaccination to date; to provide additional transparency in context of pandemic, Phase 3 protocol now available [online](#)
- Positive interim analysis from Phase 2 study of CMV vaccine candidate (mRNA-1647); Phase 3 study of mRNA-1647 to begin in 2021 at 100 µg dose
- The U.S. Food and Drug Administration (FDA) has completed its review of the Investigational New Drug (IND) application for the Company's pediatric RSV vaccine (mRNA-1345) and allowed it to proceed to the clinic
- First 10 pediatric patients dosed in Phase 1 study of hMPV/PIV3 vaccine (mRNA-1653)
- Moderna plans to enter the seasonal flu business

Oncology

- Data from Phase 1 study of OX40L(mRNA-2416) as a monotherapy were presented at the [American Association for Cancer Research Annual Meeting](#); first patients dosed in Phase 2 dose expansion study of mRNA-2416 in combination with durvalumab for ovarian cancer

Rare Diseases

- Positive data from additional cohorts of Phase 1 study evaluating escalating doses of antibody against the chikungunya virus (mRNA-1944) administered via intravenous infusion in healthy adults
- New next generation MMA candidate (mRNA-3705) protocol revision to enhance operational performance and improve outreach to the patient community
- New protocol amendment for Phase 1/2 study of propionic acidemia (PA) candidate (mRNA-3927)

Moderna currently has 23 mRNA development candidates in its portfolio with 14 in clinical studies. Across Moderna's pipeline, more than 27,000 healthy volunteers and patients have been enrolled in clinical studies including the Phase 3 study of mRNA-1273. The Company's updated pipeline can be found at www.modernatx.com/pipeline. Moderna and collaborators have published more than 50 peer-reviewed papers.

About Moderna's R&D Day Presentation

Core Modalities

Prophylactic Vaccines: Moderna is developing vaccines against viral diseases where there is unmet medical need – including complex vaccines with multiple antigens for common diseases, as well as vaccines against threats to global public health. The Company's global public health portfolio is focused on epidemic and pandemic diseases for which funding has been sought from governments and non-profit organizations.

- **Cytomegalovirus (CMV) vaccine (mRNA-1647):** Positive interim data from Phase 2 study assessing the safety, reactogenicity, and immunogenicity of different dose levels of mRNA-1647 are now available. mRNA-1647 was generally safe and well tolerated. After the first vaccination, injection site pain was the most commonly reported solicited local adverse reaction (AR). The most common solicited systemic ARs were headache, fatigue, and myalgia in both CMV-seronegative and CMV-seropositive mRNA-1647 treatment groups. No serious adverse events (SAEs) were reported and no unsolicited events leading to study discontinuation occurred. After the 2nd vaccination, the rate and severity distribution of solicited ARs in the CMV-seronegative and CMV-seropositive mRNA-1647 treatment groups were generally similar. In CMV-seronegative participants, neutralizing antibody titers against epithelial cell infection were boosted to at least 12-fold over the baseline geometric mean titer (GMT) of CMV-seropositive participants. Neutralizing antibody titers against fibroblast infection were generally equivalent to the baseline GMT in CMV-seropositive participants. In CMV-seropositive participants, neutralizing antibody titers in the epithelial cell infection were boosted to GMTs at least 20-fold to greater than 32-fold over the respective baseline GMT after the 2nd vaccination. Neutralizing antibody titers against fibroblast infection boosted to levels at least 2-fold over the respective baseline GMT. Based on the interim analysis of the Phase 2 study, the 100 µg dose has been chosen for the Phase 3 pivotal study, expected to begin in 2021. Moderna owns worldwide commercial rights for mRNA-1647.
- **COVID-19 vaccine (mRNA-1273):** As of Wednesday, September 16, 2020, 25,296 participants have been enrolled in the Phase 3 COVE study and approximately 28% of participants enrolled cumulatively are from diverse communities. 10,025 participants have received their second vaccination. The protocol for the study being conducted in collaboration with the NIH and BARDA is [now publicly available](#). On July 14, an interim analysis of the original cohorts in the NIH-led Phase 1 study evaluating a two-dose vaccination schedule of mRNA-1273 across three dose levels (25, 100, 250 µg) in 45 healthy adults ages 18-55 years was [published](#) in *The New England Journal of Medicine* and shows mRNA-1273 induced rapid and strong immune responses against SARS-CoV-2. mRNA-1273 was generally safe and well tolerated with no SAEs reported through Day 57. BARDA, part of the Office of the Assistant Secretary for Preparedness and Response (ASPR) within the U.S. Department of Health and Human Services (HHS), partially supported the research and development of mRNA-1273 with federal funding under Contract no. 75A50120C00034. A summary of the Company's work to date on COVID-19 can be found [here](#).
- **Human metapneumovirus (hMPV) and parainfluenza type 3 (PIV3) vaccine (mRNA-1653):** The first 10 seropositive pediatric participants (12-36 months of age) in the Phase 1 study of hMPV/PIV3 study (mRNA-1653) were dosed prior to the COVID-19 related study disruption. Sites have re-opened and are actively recruiting participants. Moderna owns worldwide commercial rights to mRNA-1653.
- **Pediatric respiratory syncytial virus (RSV) vaccine (mRNA-1345):** The FDA has completed its review of the Investigational New Drug (IND) application for mRNA-1345 and allowed it to proceed to clinic. mRNA-1345 is a vaccine against RSV in young children encoding for a prefusion F glycoprotein, which elicits a superior neutralizing antibody response compared to the postfusion state. The Company intends to combine mRNA-1345 with mRNA-1653, its vaccine against hMPV and PIV3, to create a combination vaccine against RSV, hMPV and PIV3. There is no approved vaccine for RSV. Moderna owns worldwide commercial rights to the combined mRNA-1345/mRNA-1653 vaccine.
- **Seasonal influenza (flu):** Moderna is entering the seasonal flu business. Seasonal flu (type A and type B) epidemics occur seasonally and vary in severity each year, causing respiratory illnesses and placing substantial burden on healthcare systems. Currently approved vaccines are ~40-60% effective and face significant challenges from strain mismatch¹; high-risk groups would benefit from higher efficacy, which the Company believes its mRNA platform may be capable of delivering.

Systemic Secreted & Cell Surface Therapeutics: *In this modality, mRNA is delivered systemically to create proteins that are either secreted or expressed on the cell surface.*

- **Antibody against the chikungunya virus (mRNA-1944):** Positive interim data from the Phase 1 study evaluating escalating doses of mRNA-1944 in the 0.6 mg/kg dose with steroid premedication cohort and two doses of 0.3 mg/kg (without steroid premedication) given one week apart cohort are now available. mRNA-1944 was generally safe and well tolerated. No SAEs were reported; the most common adverse events were headache, nausea, myalgia, dizziness and chills. Administration of mRNA-1944 resulted in dose-dependent increases in levels of antibody against chikungunya (CHKV-24). Neutralizing antibodies were observed at all dose levels, indicating functional antibody production by mRNA-1944. Safety and increased CHKV-IgG production in the two-dose regimen shows the platform's ability for repeat dosing.

Exploratory Modalities

Intratumoral Immuno-Oncology: *These programs aim to drive anti-cancer T cell responses by injecting mRNA therapies directly into tumors.*

- **OX40L (mRNA-2416):** The Phase 1/2 study of mRNA-2416 alone and in combination with durvalumab (IMFINZI®) is ongoing. The Phase 2 dose expansion study of mRNA-2416 in combination with durvalumab in ovarian cancer patients is enrolling and the first patients have been dosed. Data from the Phase 1 study evaluating mRNA-2416 as a monotherapy

were presented at the [American Association for Cancer Research Annual Meeting](#) and show mRNA-2416 is well tolerated when given as monotherapy at all dose levels studied with no dose-limiting toxicities reported. The observations of broad pro-inflammatory activity and beneficial changes in the tumor microenvironment with upregulation of PD-L1 support the evaluation of combination intratumoral mRNA-2416 with the anti-PD-L1 inhibitor durvalumab in solid tumors, which is ongoing in Part B of this study with a focus on advanced ovarian carcinoma. Moderna owns worldwide commercial rights to mRNA-2416.

Systemic Intracellular Therapeutics: *These programs aim to deliver mRNA into cells within target organs as a therapeutic approach for diseases caused by a missing or defective protein.*

- **Methylmalonic acidemia (MMA) (mRNA-3704):** Due to the COVID-19 pandemic, Moderna paused new enrollment and new site initiation for the Phase 1/2 study of mRNA-3704 to ensure the safety of these pediatric patients and their caregivers. During the pause, the Company implemented changes that the Company believes will ultimately help to accelerate clinical development including the introduction of a new drug product with better pharmacology (designated mRNA-3705) as well as a protocol revision to enhance operational performance and reflecting input from the patient and caregiver community. The Company plans to file new IND and CTA applications for mRNA-3705 and will focus development efforts on that candidate going forward. mRNA-3705 uses the same LNP formulation as mRNA-1944. Moderna owns worldwide commercial rights to mRNA-3705.
- **Propionic acidemia (PA) (mRNA-3927):** Due to the COVID-19 pandemic, Moderna paused new enrollment and new site initiation for its Phase 1/2 study of mRNA-3927 to ensure the safety of these pediatric patients and their caregivers. During the pause, the Company implemented changes that the Company believes will ultimately help to accelerate clinical development including a protocol amendment implementing a novel design to identify the optimal dose in the most efficient manner and to make the study less burdensome on patients, their families and clinical partners. mRNA-3927 uses the same LNP formulation as mRNA-1944. Moderna owns worldwide commercial rights to mRNA-3927.

Corporate Updates

- Moderna announced a new research [collaboration](#) with Vertex to discover potential treatment of cystic fibrosis using gene editing enabled by Moderna's mRNA and lipid technologies
- Moderna announced a [collaboration](#) with Chiesi Group to discover and develop mRNA therapeutics for pulmonary arterial hypertension (PAH)

Investor Call and Webcast Information

Moderna will host the virtual R&D Day beginning at 8:00 a.m. ET on Thursday, September 17, 2020. A live webcast will be available under "Events and Presentations" in the Investors section of the Moderna website at investors.modernatx.com. A replay of the webcast will be archived on Moderna's website for one year following the presentation.

About Moderna

Moderna is advancing messenger RNA (mRNA) science to create a new class of transformative medicines for patients. mRNA medicines are designed to direct the body's cells to produce intracellular, membrane or secreted proteins that can have a therapeutic or preventive benefit and have the potential to address a broad spectrum of diseases. Moderna's platform builds on continuous advances in basic and applied mRNA science, delivery technology and manufacturing, providing the Company the capability to pursue in parallel a robust pipeline of new development candidates. Moderna is developing therapeutics and vaccines for infectious diseases, immuno-oncology, rare diseases, cardiovascular diseases, and autoimmune and inflammatory diseases, independently and with strategic collaborators.

Headquartered in Cambridge, Mass., Moderna currently has strategic alliances for development programs with AstraZeneca PLC and Merck & Co., Inc., as well as the Defense Advanced Research Projects Agency (DARPA), an agency of the U.S. Department of Defense; the Biomedical Advanced Research and Development Authority (BARDA), a division of the Office of the Assistant Secretary for Preparedness and Response (ASPR) within the U.S. Department of Health and Human Services (HHS) and the Coalition for Epidemic Preparedness Innovations (CEPI). Moderna has been named a top biopharmaceutical employer by *Science* for the past five years. To learn more, visit www.modernatx.com.

Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including statements regarding: expected timing of enrollment completion for the Phase 3 study of mRNA-1273; the timing and design of the Phase 3 study of mRNA-1647; the Company's intention to create a combination therapy with mRNA-1345 and mRNA-1653 against RSV, hMPV and PIV3; the Company's plans to file new IND and CTA applications for mRNA-3705; the Company's intentions regarding resumption of enrollment and the implementation of changes for paused clinical studies; the probability of success of the Company's vaccines individually and as a portfolio; the Company's intention to enter the seasonal flu business; the Company's development of mRNA-3705 as a next generation MMA candidate; and the ability of the Company to accelerate the research and development timeline for any individual product or the platform as a whole. In some cases, forward-looking statements can be identified by terminology such as "will," "may," "should," "could," "expects," "intends," "plans," "aims," "anticipates," "believes," "estimates," "predicts," "potential," "continue," or the negative of these terms or other comparable terminology, although not all forward-looking statements contain these words. The forward-looking statements in this press release are neither promises nor guarantees, and you should not place undue reliance on these forward-looking statements because they involve known and unknown risks, uncertainties, and other factors, many of which are beyond Moderna's control and which could cause actual results to differ materially from those expressed or implied by these forward-looking statements. These risks, uncertainties, and other factors include, among others: preclinical and clinical development is lengthy and uncertain, especially for a new class of medicines such as mRNA, and therefore our preclinical programs or development candidates may be delayed,

terminated, or may never advance to or in the clinic; no commercial product using mRNA technology has been approved and may never be approved; mRNA drug development has substantial clinical development and regulatory risks due to the novel and unprecedented nature of this new class of medicines; despite having ongoing interactions with the FDA or other regulatory agencies, the FDA or such other regulatory agencies may not agree with the Company's regulatory approval strategies, components of our filings, such as clinical trial designs, conduct and methodologies, or the sufficiency of data submitted; the fact that the rapid response technology in use by Moderna is still being developed and implemented; the fact that the safety and efficacy of mRNA-1273 has not yet been established; potential adverse impacts due to the global COVID-19 pandemic such as delays in clinical trials, preclinical work, overall operations, regulatory review, manufacturing and supply chain interruptions, adverse effects on healthcare systems and disruption of the global economy; and those risks and uncertainties described under the heading "Risk Factors" in Moderna's most recent Quarterly Report on Form 10-Q filed with the U.S. Securities and Exchange Commission (SEC) and in subsequent filings made by Moderna with the SEC, which are available on the SEC's website at www.sec.gov. Except as required by law, Moderna disclaims any intention or responsibility for updating or revising any forward-looking statements contained in this press release in the event of new information, future developments or otherwise. These forward-looking statements are based on Moderna's current expectations and speak only as of the date hereof.

¹ Centers for Disease Control and Prevention. Vaccine Effectiveness: How Well Do the Flu Vaccines Work? Available at: <https://www.cdc.gov/flu/vaccines-work/vaccineeffect.htm>.

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