



NEWS RELEASE

Merck and Ridgeback's Molnupiravir Receives U.S. FDA Emergency Use Authorization for the Treatment of High-Risk Adults With Mild to Moderate COVID-19

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The Companies Are Committed To Providing Timely Access to Molnupiravir Through Comprehensive Supply and Access Approach

KENILWORTH, N.J. & MIAMI--(BUSINESS WIRE)-- Merck (NYSE: MRK), known as MSD outside the United States and Canada, and Ridgeback Biotherapeutics today announced that the U.S. Food and Drug Administration (FDA) has granted Emergency Use Authorization (EUA) for molnupiravir, an investigational oral antiviral (MK-4482, EIDD-2801). Molnupiravir has not been approved, but has been authorized for emergency use by the FDA under an EUA to treat mild to moderate coronavirus disease 2019 (COVID-19) in adults with positive results of direct SARS-CoV-2 viral testing, and who are at high risk for progression to severe COVID-19, including hospitalization or death, and for whom alternative COVID-19 treatment options authorized by the FDA are not accessible or clinically appropriate. Molnupiravir is not authorized for use in patients who are less than 18 years of age, for initiation of treatment in patients hospitalized due to COVID-19, for use for longer than five consecutive days, or for pre-exposure or post-exposure prophylaxis for prevention of COVID-19.

This press release features multimedia. View the full release here:

<https://www.businesswire.com/news/home/20211223005322/en/>

"The FDA Emergency Use Authorization of molnupiravir is an important milestone in the fight against COVID-19, and adds to Merck's legacy of bringing forward innovative medicines that both address the world's greatest health threats and help save lives. Because we recognized the promise of molnupiravir early, Merck invested at risk and

we are executing an unprecedented global access strategy so that molnupiravir, now authorized, can be available to patients here in the U.S. and all around the world more quickly and more equitably than has ever been accomplished before,” said Robert M. Davis, chief executive officer and president, Merck.

Molnupiravir should be administered as soon as possible after a diagnosis of COVID-19 has been made, and within five days of symptom onset. The recommended dose for molnupiravir is 800 mg (four 200 mg capsules) taken orally every 12 hours for five days, with or without food. Completion of the full five-day treatment course is important to maximize viral clearance and minimize transmission of SARS-CoV-2.

Molnupiravir is not recommended for use in patients who are pregnant. Based on findings from animal reproduction studies, molnupiravir may cause fetal harm when administered to pregnant individuals. There are no available human data on the use of molnupiravir in pregnant individuals to evaluate the risk of major birth defects, miscarriage or adverse maternal or fetal outcomes. Before initiating treatment with molnupiravir, it should be assessed whether an individual of childbearing potential is pregnant or not, if clinically indicated. Females of childbearing potential should use a reliable method of contraception correctly and consistently, as applicable, for the duration of treatment and for four days after the last dose of molnupiravir. Males of reproductive potential who are sexually active with females of childbearing potential should use a reliable method of contraception correctly and consistently during treatment and for at least three months after the last dose. There is a pregnancy surveillance program that monitors pregnancy outcomes in individuals exposed to molnupiravir during pregnancy. Patients exposed to molnupiravir during pregnancy should report the exposure by contacting Merck by phone at 1-877-888-4231, or online at pregnancyreporting.msd.com. For more information, see “Selected Safety Information” below.

The authorization is based on the Phase 3 MOVE-OUT trial, which evaluated molnupiravir 800 mg twice-daily in non-hospitalized adult patients who were unvaccinated against SARS-CoV-2, had laboratory-confirmed SARS-CoV-2 infection, symptom onset within five days of study randomization, and at least one risk factor associated with poor disease outcomes (e.g., heart disease, diabetes).

In **analyses** from all randomized patients (n=1433), molnupiravir reduced the risk of hospitalization or death: 9.7% (68/699) of patients in the placebo group were hospitalized or died compared to 6.8% (48/709) of patients who received molnupiravir, for an absolute risk reduction of 3.0% (95% confidence interval [CI]: 0.1, 5.9). Nine deaths were reported in the placebo group, and one in the molnupiravir group.

The determination of primary efficacy was based on a planned **interim analysis** of 762 subjects. At the interim analysis, treatment with molnupiravir significantly reduced hospitalizations and death through Day 29 following randomization: 14.1% (53/377) of patients in the placebo group were hospitalized or died, compared to 7.3% (28/385) of patients who received molnupiravir. The absolute risk reduction between the molnupiravir and the

placebo arm was 6.8 percentage points (95% CI: 2.4, 11.3; p=0.0024).

In the clinical study, the most common adverse reactions for molnupiravir (incidence $\geq 1\%$) were diarrhea (2% for molnupiravir, 2% for placebo), nausea (1% for molnupiravir, 1% for placebo) and dizziness (1% for molnupiravir, 1% for placebo). Discontinuation of study intervention due to an adverse event (AE) occurred in 1% of subjects receiving molnupiravir and 3% of subjects receiving placebo. Serious AEs occurred in 7% of subjects receiving molnupiravir and 10% receiving placebo; most serious AEs were COVID-19 related.

“Based on the strong science behind molnupiravir – a single oral medicine that interrupts replication of the SARS-CoV-2 virus, with data demonstrating a significant reduction in the risk of hospitalizations and deaths – molnupiravir has the potential to become an important tool for healthcare professionals and appropriate patients,” said Dr. Dean Y. Li, president, Merck Research Laboratories. “We are immensely grateful to all of our collaborators, including trial patients and clinical investigators, for their important contributions to this milestone.”

Merck anticipates that it will begin shipping molnupiravir to AmerisourceBergen, the sole distributor of molnupiravir, within days. As previously announced, Merck **entered** into a procurement agreement with the U.S. Government under which, to date, the company has agreed to supply approximately 3.1 million courses of molnupiravir to the U.S. Government, upon EUA from the FDA.

“Before the virus that caused this tragic pandemic had a name, the team at Ridgeback saw the need for urgent action. We joined with George Painter, Drug Research Innovations at Emory (DRIVE) and Merck with the hope of taking molnupiravir from a dream to the reality we see today,” said Wendy Holman, chief executive officer, Ridgeback Biotherapeutics. “There is now a prescription oral antiviral, molnupiravir, for use by appropriate high-risk patients, that can be taken at home, as soon as possible after an appropriate patient tests positive for COVID-19, to help reduce the risk of hospitalization or death. It’s an oral therapeutic option with no known drug-drug interactions and without required dose modifications for those with impaired kidney or liver function. We are thrilled this tremendous global collaboration between Ridgeback, Merck and DRIVE has fulfilled our hopes of bringing forward an oral medicine to help keep people out of the hospital and alive.”

Molnupiravir is also being evaluated for post-exposure prophylaxis in MOVE-AHEAD, a global, multicenter, randomized, double-blind, placebo-controlled Phase 3 study, which is evaluating the efficacy and safety of molnupiravir in preventing the spread of COVID-19 within households. Molnupiravir is not authorized for pre-exposure or post-exposure prophylaxis for prevention of COVID-19.

An EUA is an FDA authorization for the emergency use of an unapproved product or unapproved use of an approved product in the U.S. under certain circumstances, including a public health emergency. Molnupiravir is an investigational treatment and is still under review by the FDA.

Recently, the FDA Antimicrobial Drugs Advisory Committee (AMDAC) **voted** that the known and potential benefits of molnupiravir outweigh its known and potential risks for the treatment of mild to moderate COVID-19 in high risk adult patients who are within five days of symptom onset. Molnupiravir has received **conditional marketing authorization** in the United Kingdom for the treatment of mild to moderate COVID-19 in adults with a positive SARS-CoV-2 diagnostic test and who have at least one risk factor for developing severe illness. The European Medicines Agency (EMA) issued a positive scientific opinion for molnupiravir under Article 5.3 Regulation 726/2004, which is intended to support national decision-making on the possible use of molnupiravir prior to marketing authorization. Applications to other regulatory bodies worldwide are underway.

About Merck's Global Efforts to Accelerate Access to Molnupiravir Following Regulatory Authorizations or Approvals

Global access has been a priority for Merck and Ridgeback since the inception of their molnupiravir collaboration. The companies are committed to providing timely access to molnupiravir globally through our comprehensive supply and access approach, which includes investing at risk to produce millions of courses of therapy; tiered pricing based on the ability of governments to finance health care; entering into supply agreements with governments; and granting voluntary licenses to generic manufacturers and to the Medicines Patent Pool to make generic molnupiravir available in more than 100 low- and middle-income countries following local regulatory authorizations or approvals.

Supply: In anticipation of the results from MOVE-OUT and the potential for regulatory authorization or approval, Merck has been producing molnupiravir at risk and expects to produce 10 million courses of treatment by the end of 2021, with at least 20 million courses to be produced in 2022.

Supply agreements: Merck **entered** into a procurement agreement with the U.S. Government under which the company will supply approximately 3.1 million courses of molnupiravir to the U.S. Government, upon Emergency Use Authorization or approval from the U.S. Food and Drug Administration. Merck has entered into advance purchase and supply agreements for molnupiravir with the governments of over 30 **countries** worldwide, including Australia, Canada, Korea, Japan, Thailand, United Kingdom and United States, pending regulatory authorizations, and is currently in discussions with additional governments. Merck plans to implement a tiered pricing approach based on World Bank country income criteria to reflect countries' relative ability to finance their health response to the pandemic. In the United States, the purchase was funded with federal funds from the Biomedical Advanced Research and Development Authority, part of the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response, under contract number W911QY-21-C-0031.

Voluntary licenses: As part of its commitment to widespread global access, Merck previously **announced** that it has entered into a licensing agreement with the Medicines Patent Pool to increase broad access for molnupiravir in low- and middle-income countries. Additionally, Merck previously **announced** that the company has entered into non-exclusive voluntary licensing agreements for molnupiravir with established generic manufacturers to accelerate availability of molnupiravir in more than 100 low- and middle-income countries following approvals or emergency authorization by local regulatory agencies.

Merck continues to discuss additional measures and collaborations to accelerate broad, global access to molnupiravir.

Authorized Use of Molnupiravir

The U.S. Food and Drug Administration (FDA) has issued an EUA for the emergency use of the unapproved molnupiravir, a nucleoside analogue that inhibits SARS-CoV-2 replication by viral mutagenesis, for the treatment of mild to moderate coronavirus disease 2019 (COVID-19) in adults with positive results of direct SARS-CoV-2 viral testing, and who are at high risk for progression to severe COVID-19, including hospitalization or death, and for whom alternative COVID-19 treatment options authorized by FDA are not accessible or clinically appropriate. Molnupiravir is not FDA-approved for any use including for use for the treatment of COVID-19. Prior to initiating treatment with molnupiravir, carefully consider the known and potential risks and benefits.

Molnupiravir is authorized only for the duration of the declaration that circumstances exist justifying the authorization of the emergency use of molnupiravir under section 564(b)(1) of the Federal, Food, Drug, and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the authorization is terminated or revoked sooner.

Molnupiravir is not authorized for use in patients less than 18 years of age or who are hospitalized due to COVID-19. Benefit of treatment with molnupiravir has not been observed in subjects when treatment was initiated after hospitalization due to COVID-19. Molnupiravir is not authorized for use for longer than five consecutive days. Molnupiravir is not authorized for pre-exposure or post-exposure prophylaxis for prevention of COVID-19. Molnupiravir may only be prescribed for an individual patient by physicians, advanced practice registered nurses, and physician assistants that are licensed or authorized under state law to prescribe drugs in the therapeutic class to which molnupiravir belongs (i.e., anti-infectives).

Selected Safety Information for Molnupiravir

Contraindications

No contraindications have been identified based on the limited available data on the emergency use of

molnupiravir authorized under this EUA.

Warnings and Precautions

There are limited clinical data available for molnupiravir. Serious and unexpected adverse events may occur that have not been previously reported with molnupiravir use.

Molnupiravir is not recommended for use during pregnancy. Based on findings from animal reproduction studies, molnupiravir may cause fetal harm when administered to pregnant individuals. There are no available human data on the use of molnupiravir in pregnant individuals to evaluate the risk of major birth defects, miscarriage or adverse maternal or fetal outcomes.

Molnupiravir is authorized to be prescribed to a pregnant individual only after the healthcare provider has determined that the benefits would outweigh the risks for that individual patient. If the decision is made to use molnupiravir during pregnancy, the prescribing healthcare provider must document that the that the known and potential benefits and the potential risks of using molnupiravir during pregnancy were communicated to the pregnant individual.

There is a pregnancy surveillance program that monitors pregnancy outcomes in individuals exposed to molnupiravir during pregnancy. The prescribing healthcare provider must document that a pregnant individual was made aware of Merck's pregnancy surveillance program at 1-877-888-4231 or **[pregnancyreporting.msd.com](https://www.merck.com/pregnancyreporting)**. If the pregnant individual agrees to participate in the pregnancy surveillance program and allows the prescribing healthcare provider to disclose patient specific information to Merck, the prescribing healthcare provider must provide the patient's name and contact information to Merck. Pregnant individuals exposed to molnupiravir can also report the exposure by contacting Merck at 1-877-888-4231 or **[pregnancyreporting.msd.com](https://www.merck.com/pregnancyreporting)**.

Advise individuals of childbearing potential of the potential risk to a fetus and to use an effective method of contraception correctly and consistently during treatment with molnupiravir and for 4 days after the final dose.

Prior to initiating treatment with molnupiravir, assess whether an individual of childbearing potential is pregnant or not, if clinically indicated.

Molnupiravir is not authorized for use in patients less than 18 years of age because it may affect bone and cartilage growth. The safety and efficacy of molnupiravir have not been established in pediatric patients.

Adverse Reactions

The most common adverse reactions occurring in $\geq 1\%$ of subjects in the molnupiravir treatment group in the Phase 3 double-blind MOVE-OUT study were diarrhea (2% versus placebo at 2%), nausea (1% versus placebo at 1%), and dizziness (1% versus placebo at 1%) all of which were Grade 1 (mild) or Grade 2 (moderate).

Serious adverse events occurred in 7% of subjects receiving molnupiravir and 10% receiving placebo; most serious adverse events were COVID-19 related. Adverse events leading to death occurred in 2 (<1%) of the subjects receiving molnupiravir and 12 (2%) of subjects receiving placebo.

Drug Interactions

No drug interactions have been identified based on the limited available data on the emergency use of molnupiravir. No clinical drug-drug interaction trials of molnupiravir with concomitant medications, including other treatments for mild to moderate COVID-19, have been conducted.

Pregnancy/Breastfeeding

There are no data on the presence of molnupiravir or its metabolites in human milk. It is unknown whether molnupiravir has an effect on the breastfed infant or effects on milk production. Based on the potential for adverse reactions in the infant from molnupiravir, breastfeeding is not recommended during treatment with molnupiravir and for 4 days after the final dose. A lactating individual may consider interrupting breastfeeding and may consider pumping and discarding breast milk during treatment and for 4 days after the last dose of molnupiravir.

Males of Reproductive Potential

Nonclinical studies to fully assess the potential for molnupiravir to affect offspring of treated males have not been completed. Advise sexually active individuals with partners of childbearing potential to use a reliable method of contraception correctly and consistently during treatment and for at least 3 months after last dose of molnupiravir. The risk beyond three months after the last dose of molnupiravir is unknown.

Required Reporting for Serious Adverse Events and Medication Errors

The prescribing healthcare provider and/or the provider's designee are/is responsible for mandatory reporting of all serious adverse events and medication errors potentially related to molnupiravir within 7 calendar days from the healthcare provider's awareness of the event.

Submit adverse event and medication error reports, using FDA Form 3500, to FDA MedWatch using one of the following methods:

- Complete and submit the report online: www.fda.gov/medwatch/report.htm
- Complete and submit a postage-paid FDA Form 3500 (<https://www.fda.gov/media/76299/download>) and return by:
 - Mail to MedWatch, 5600 Fishers Lane, Rockville, MD 20852-9787, or
 - Fax to 1-800-FDA-0178
- Call 1-800-FDA-1088 to request a reporting form

In addition, please provide a copy of all FDA MedWatch forms to:

Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ USA by:

Fax: 215-616-5677

E-mail: dpoc.usa@merck.com

About Molnupiravir

Molnupiravir (MK-4482 and EIDD-2801) is an investigational, orally administered nucleoside analogue that inhibits replication of SARS-CoV-2, the causative agent of COVID-19. Merck and Ridgeback's "orange COVID-19 pill" is a Swedish Orange opaque capsule with the Merck corporate logo and "82" printed in white ink, available in certain markets outside of the U.S. as LAGEVRIO®.

Results from the Phase 3 MOVE-OUT study demonstrated the efficacy benefit of molnupiravir treatment was generally consistent across patients infected with SARS-CoV-2 variants of concern, Delta, Gamma and Mu. Preliminary preclinical data has shown that molnupiravir has antiviral activity against the newly identified variant, Omicron (B.1.1.529). Molnupiravir has yet to be evaluated against Omicron in clinical studies.

Molnupiravir was invented at Emory University. Drug Innovation Ventures at Emory (DRIVE), LLC, which was formed by Emory to develop early-stage drug candidates for viral diseases of global concern, advanced molnupiravir through IND submission. Emory/DRIVE received some research funding from the U.S. Department of Defense and the U.S. National Institutes of Health. Molnupiravir is being developed by Merck in collaboration with Ridgeback Biotherapeutics. Ridgeback received an upfront payment from Merck and also is eligible to receive contingent payments dependent upon the achievement of certain developmental and regulatory approval milestones. Any profits from the collaboration will be split between the partners equally. Since licensed by Ridgeback, all funds used for the development of molnupiravir have been provided by Merck and Ridgeback.

Please visit the Merck **media library** for molnupiravir images and b-roll.

About Ridgeback Biotherapeutics

Headquartered in Miami, Florida, Ridgeback Biotherapeutics LP is a biotechnology company focused on emerging infectious diseases. Ridgeback markets Ebanga™ for the treatment of Ebola and has a late-stage development pipeline which includes molnupiravir for the treatment of COVID-19. The team at Ridgeback is dedicated to developing life-saving and life-changing solutions for patients and diseases that need champions as well as providing global access to these medicines. In line with Ridgeback's mission for equitable global access, all Ridgeback services and treatment for Ebola patients in Africa are delivered free of charge.

About Merck

For over 130 years, Merck, known as MSD outside the United States and Canada, has been inventing for life, bringing forward medicines and vaccines for many of the world's most challenging diseases in pursuit of our mission to save and improve lives. We demonstrate our commitment to patients and population health by increasing access to health care through far-reaching policies, programs and partnerships. Today, Merck continues to be at the forefront of research to prevent and treat diseases that threaten people and animals – including cancer, infectious diseases such as HIV and Ebola, and emerging animal diseases – as we aspire to be the premier research-intensive biopharmaceutical company in the world. For more information, visit www.merck.com and connect with us on **Twitter**, **Facebook**, **Instagram**, **YouTube** and **LinkedIn**.

Forward-Looking Statement of Merck & Co., Inc., Kenilworth, N.J., USA.

This news release of Merck & Co., Inc., Kenilworth, N.J., USA (the “company”) includes “forward-looking statements” within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. These statements are based upon the current beliefs and expectations of the company's management and are subject to significant risks and uncertainties. There can be no guarantees with respect to pipeline candidates that the candidates will receive the necessary regulatory approvals or that they will prove to be commercially successful. If underlying assumptions prove inaccurate or risks or uncertainties materialize, actual results may differ materially from those set forth in the forward-looking statements.

Risks and uncertainties include but are not limited to, general industry conditions and competition; general economic factors, including interest rate and currency exchange rate fluctuations; the impact of the global outbreak of novel coronavirus disease (COVID-19); the impact of pharmaceutical industry regulation and health care legislation in the United States and internationally; global trends toward health care cost containment; technological advances, new products and patents attained by competitors; challenges inherent in new product development, including obtaining regulatory approval; the company's ability to accurately predict future market conditions; manufacturing difficulties or delays; financial instability of international economies and sovereign risk; dependence on the effectiveness of the company's patents and other protections for innovative products; and the

exposure to litigation, including patent litigation, and/or regulatory actions.

The company undertakes no obligation to publicly update any forward-looking statement, whether as a result of new information, future events or otherwise. Additional factors that could cause results to differ materially from those described in the forward-looking statements can be found in the company's 2020 Annual Report on Form 10-K and the company's other filings with the Securities and Exchange Commission (SEC) available at the SEC's Internet site (www.sec.gov).

Please see the Molnupiravir FDA Letter of Authorization at <https://www.merck.com/eua/Merck-EUA-letter.pdf>, Fact Sheet for Healthcare Providers, including Mandatory Requirements for Administration of Molnupiravir under Emergency Use Authorization, at <https://www.merck.com/eua/molnupiravir-hcp-fact-sheet.pdf> and Fact Sheet for Patients and Caregivers at <https://www.merck.com/eua/molnupiravir-patient-fact-sheet-english.pdf>.

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