Pfizer Logo

Pfizer and BioNTech Publish Data from Two Laboratory Studies on COVID-19 Vaccine-induced Antibodies Ability to Neutralize SARS-CoV-2 Omicron Variant

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NEW YORK and MAINZ, GERMANY, January 24, 2022 — Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) today announced the publication of new results from two laboratory studies demonstrating that three doses of the Pfizer-BioNTech COVID-19 Vaccine (BNT162b2) elicited antibodies that neutralize the Omicron variant (B.1.1.529).

Data published in the peer-reviewed journal *Science*, includes readouts of sera data from 51 vaccinated individuals that received two or three doses of BNT162b2 as well as a study evaluating the neutralization potential of serum antibodies from a subset of vaccinated individuals against the live virus. Both data sets confirm previously announced initial study results demonstrating that serum antibodies induced by BNT162b2 neutralize the SARS-CoV-2 Omicron variant after immunization with three doses. In comparison, sera from individuals who received two doses of the COVID-19 vaccine revealed limited neutralization titers against the Omicron variant in both data sets, indicating that two doses of BNT162b2 may not be sufficient to protect against infection with the new variant. However, based on observations that around 85% of epitopes in the spike protein recognized by CD8+ T cells are not affected by the mutations in the Omicron variant, the companies believe two doses may still induce protection against severe disease.

Separately, data from a live virus laboratory study conducted with the University of Texas Medical Branch (UTMB) that support and further extend these findings were posted on the preprint server bioRxiv. Sera taken 1-month following a third dose showed a 22-fold increase in neutralization titers against Omicron compared to titers just prior to the third dose (7.9 to 8.8 months after second dose), suggesting more robust protection against the new variant may be achieved with the current COVID-19 vaccine series plus a booster dose. Additionally, the neutralizing titer levels against Omicron after immunization with three doses were similar to antibody titer levels after two doses against wild-type and other variants that emerged before Omicron. Further, from 1 to 4 months after a third dose, neutralization titers against wild-type and Omicron decreased by 1.6 and 2.0 times, respectively, suggesting similar waning for both variants. All sera effectively neutralized Omicron at 4 months following a third dose.

Pfizer and BioNTech have put into place a robust booster research program to help ensure that the vaccine continues to offer a high degree of protection. Moving forward, the companies will be evaluating the immunogenicity and efficacy of an additional dose of both the current formulation and an Omicron based vaccine in the clinical setting. The companies have previously announced that they expect to produce four billion doses of the Pfizer-BioNTech COVID-19 Vaccine in 2022, and this capacity is not expected to change if an adapted vaccine is required.

About the Pfizer-BioNTech Laboratory Study
To evaluate the effectiveness of BNT162b2 against the Omicron variant, Pfizer and BioNTech immediately tested a panel of 51 human immune sera obtained from the blood of individuals that received two or three 30-µg doses of the current Pfizer-BioNTech COVID-19 Vaccine, using a pseudovirus neutralization test (pVNT). Each serum was tested simultaneously for its neutralizing antibody titer against pseudovirus bearing the wild-type SARS-CoV-2 spike protein as well as the Beta, Delta and Omicron spike variant. The third dose significantly increased the neutralizing antibody titers against the Omicron pseudovirus by 23-fold. Neutralization against the Omicron pseudovirus after three doses of BNT162b2 was comparable to the neutralization against the wild-type SARS-CoV-2 pseudovirus observed in sera from individuals who received two doses of the companies' COVID-19 vaccine. The geometric mean titer (GMT) of neutralizing antibodies against the Omicron pseudovirus measured in the samples was 164 (after three doses), compared to 413 against the Delta pseudovirus (after three doses) and 160 against the ancestral strain (after two doses). The requirement of a third dose to effectively neutralize Omicron was confirmed using a replicating live SARS-CoV-2 virus neutralization assay in a subset of participants suggesting that three doses of BNT162b2 may protect against Omicron-mediated COVID-19. Following a third dose the neutralizing GMT against the Omicron variant was 106 after 1 month compared to a GMT of 368 against the ancestral strain 21 days after the second dose. Data on the persistence of neutralizing titers over time after a booster dose of BNT162b2 against the Omicron variant will be collected.

About the Pfizer and University of Texas Medical Branch (UTMB) Study
The study utilized four panels that included human immune sera from the blood of individuals who had received two or three 30-µg doses of the BNT162b2 vaccine. The first panel included sera from 20 individuals, collected 2 or 4 weeks after the second dose. The second panel included sera from 22 individuals collected on the day of administration of a booster dose. The third and fourth panels were collected 1 and 4 months after the third dose, respectively. This study did not measure other immune indicators, including T cells and non-neutralizing antibodies.

The Pfizer-BioNTech COVID-19 Vaccine, which is based on BioNTech's proprietary mRNA technology, was developed by both BioNTech and Pfizer. BioNTech is the Marketing Authorization Holder in the United States, the European Union, the United Kingdom, Canada and other countries, and the holder of emergency use authorizations or equivalents in the United States (jointly with Pfizer) and other countries. Submissions to pursue regulatory approvals in those countries where emergency use authorizations or equivalent were initially granted are planned.

U.S. Indication & Authorized Use
HOW IS THE VACCINE GIVEN?

The vaccine will be given as an injection into the muscle.

Primary Series:
In individuals 5 years of age and older, the vaccine is administered as a 2-dose series, 3 weeks apart. In individuals 5 years of age and older, a third primary series dose may be administered at least 28 days after the second dose to individuals who are determined to have certain kinds of immunocompromise.

Booster Dose:

- A single booster dose of the vaccine may be administered at least 5 months after completion of a primary series of the Pfizer-BioNTech COVID-19 Vaccine or COMIRNATY® (COVID-19 Vaccine, mRNA) to individuals 12 years of age and older
- A single booster dose of the vaccine may be administered to individuals 18 years of age and older who have completed primary vaccination with a different authorized COVID-19 vaccine. Individuals should

check with their healthcare provider regarding timing of the booster dose

WHAT IS THE INDICATION AND AUTHORIZED USE?
The Pfizer-BioNTech COVID-19 Vaccine has received EUA from FDA to provide:

- a 2-dose primary series to individuals 5 years of age and older
- a third primary series dose to individuals 5 years of age and older who have been determined to have certain kinds of immunocompromise
- a single booster dose to individuals 12 years of age and older who have completed a primary series with Pfizer-BioNTech COVID-19 Vaccine or COMIRNATY® (COVID-19 Vaccine, mRNA)
- a single booster dose to individuals 18 years of age and older who have completed primary vaccination with a different authorized COVID-19 vaccine. The booster schedule is based on the labeling information of the vaccine used for the primary series

COMIRNATY® (COVID-19 Vaccine, mRNA) is an FDA-approved COVID-19 vaccine made by Pfizer for BioNTech.

- It is approved as a 2-dose series for prevention of COVID-19 in individuals 16 years of age and older
- It is also authorized under EUA to provide:
    - a 2-dose primary series to individuals 12 through 15 years of age
    - a third primary series dose to individuals 12 years of age and older who have been determined to have certain kinds of immunocompromise
    - a single booster dose to individuals 12 years of age and older who have completed a primary series with Pfizer-BioNTech COVID-19 Vaccine or COMIRNATY® (COVID-19 Vaccine, mRNA)
    - a single booster dose to individuals 18 years of age and older who have completed primary vaccination with a different authorized COVID-19 vaccine. The booster schedule is based on the labeling information of the vaccine used for the primary series

EUA Statement
Emergency uses of the vaccine have not been approved or licensed by FDA, but have been authorized by FDA, under an Emergency Use Authorization (EUA) to prevent Coronavirus Disease 2019 (COVID-19) in individuals 5 years of age and older. The emergency uses are only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of the medical product under Section 564(b)(1) of the FD&C Act unless the declaration is terminated or authorization revoked sooner. Please see EUA Fact Sheets at www.cvdvaccine-us.com.

IMPORTANT SAFETY INFORMATION
Individuals should **not** get the vaccine if they:

- had a severe allergic reaction after a previous dose of this vaccine
- had a severe allergic reaction to any ingredient of this vaccine

Individuals should tell the vaccination provider about all of their medical conditions, including if they:

- have any allergies
- have had myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining outside the heart)
- have a fever
- have a bleeding disorder or are on a blood thinner
- are immunocompromised or are on a medicine that affects the immune system

- are pregnant, plan to become pregnant, or are breastfeeding
- have received another COVID-19 vaccine
- have ever fainted in association with an injection

The vaccine may not protect everyone.

Side effects reported with the vaccine include:

- There is a remote chance that the vaccine could cause a severe allergic reaction
    - A severe allergic reaction would usually occur within a few minutes to 1 hour after getting a dose of the vaccine. For this reason, vaccination providers may ask individuals to stay at the place where they received the vaccine for monitoring after vaccination
    - Signs of a severe allergic reaction can include difficulty breathing, swelling of the face and throat, a fast heartbeat, a bad rash all over the body, dizziness, and weakness
    - If an individual experiences a severe allergic reaction, they should call 9-1-1 or go to the nearest hospital
- Myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining outside the heart) have occurred in some people who have received the vaccine, more commonly in males under 40 years of age than among females and older males. In most of these people, symptoms began within a few days following receipt of the second dose of the vaccine. The chance of having this occur is very low. Individuals should seek medical attention right away if they have any of the following symptoms after receiving the vaccine:
    - chest pain
    - shortness of breath
    - feelings of having a fast-beating, fluttering, or pounding heart
- Additional side effects that have been reported with the vaccine include:
    - severe allergic reactions; non-severe allergic reactions such as rash, itching, hives, or swelling of the face; myocarditis (inflammation of the heart muscle); pericarditis (inflammation of the lining outside the heart); injection site pain; tiredness; headache; muscle pain; chills; joint pain; fever; injection site swelling; injection site redness; nausea; feeling unwell; swollen lymph nodes (lymphadenopathy); decreased appetite; diarrhea; vomiting; arm pain; fainting in association with injection of the vaccine
- These may not be all the possible side effects of the vaccine. Serious and unexpected side effects may occur. The possible side effects of the vaccine are still being studied in clinical trials. Call the vaccination provider or healthcare provider about bothersome side effects or side effects that do not go away

Data on administration of this vaccine at the same time as other vaccines have not yet been submitted to FDA. Individuals considering receiving this vaccine with other vaccines, should discuss their options with their healthcare provider.

Patients should always ask their healthcare providers for medical advice about adverse events. Individuals are encouraged to report negative side effects of vaccines to the US Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC). Visit https://www.vaers.hhs.gov or call 1?800?822?7967. In addition, side effects can be reported to Pfizer Inc. at www.pfizersafetyreporting.com or by calling 1-800-438-1985.

Click for

Fact Sheets and Prescribing Information for individuals 12 years of age and older

Full Prescribing Information (16 years of age and older) DILUTE BEFORE USE, Purple Cap
Full Prescribing Information (16 years of age and older) DO NOT DILUTE, Gray Cap
EUA Fact Sheet for Vaccination Providers (12 years of age and older), Purple Cap
EUA Fact Sheet for Vaccination Providers (12 years of age and older), Gray Cap
Recipients and Caregivers Fact Sheet (12 years of age and older)

Fact Sheets for individuals 5 through 11 years of age

EUA Fact Sheet for Vaccination Providers (5 through 11 years of age), Orange Cap
Recipients and Caregivers Fact Sheet (5 through 11 years of age)

About Pfizer: Breakthroughs That Change Patients' Lives
At Pfizer, we apply science and our global resources to bring therapies to people that extend and significantly improve their lives. We strive to set the standard for quality, safety and value in the discovery, development and manufacture of health care products, including innovative medicines and vaccines. Every day, Pfizer colleagues work across developed and emerging markets to advance wellness, prevention, treatments and cures that challenge the most feared diseases of our time. Consistent with our responsibility as one of the world's premier innovative biopharmaceutical companies, we collaborate with health care providers, governments and local communities to support and expand access to reliable, affordable health care around the world. For more than 170 years, we have worked to make a difference for all who rely on us. We routinely post information that may be important to investors on our website at www.Pfizer.com. In addition, to learn more, please visit us on www.Pfizer.com and follow us on Twitter at @Pfizer and @Pfizer News, LinkedIn, YouTube and like us on Facebook at Facebook.com/Pfizer.

Pfizer Disclosure Notice
The information contained in this release is as of January 24, 2022. Pfizer assumes no obligation to update forward-looking statements contained in this release as the result of new information or future events or developments.

This release contains forward-looking information about Pfizer's efforts to combat COVID-19, the collaboration between BioNTech and Pfizer to develop a COVID-19 vaccine, the BNT162b2 mRNA vaccine program, and the Pfizer-BioNTech COVID-19 Vaccine, also known as COMIRNATY (COVID-19 Vaccine, mRNA) (BNT162b2) (including its potential against the Omicron variant, a potential variant-specific vaccine for Omicron, qualitative assessments of available data, potential benefits, expectations for clinical trials, the anticipated timing of data readouts, regulatory submissions, regulatory approvals or authorizations and anticipated manufacturing, distribution and supply) involving substantial risks and uncertainties that could cause actual results to differ materially from those expressed or implied by such statements. Risks and uncertainties include, among other things, the uncertainties inherent in research and development, including the ability to meet anticipated clinical endpoints, commencement and/or completion dates for clinical trials, regulatory submission dates, regulatory approval dates and/or launch dates, as well as risks associated with preclinical and clinical data (including the laboratory study data discussed in this release), including the possibility of unfavorable new preclinical, clinical or safety data and further analyses of existing preclinical, clinical or safety data; the ability to produce comparable clinical or other results, including the rate of vaccine effectiveness and safety and tolerability profile observed to date, in additional analyses of the Phase 3 trial and additional studies or in larger, more diverse populations following commercialization; the ability of BNT162b2 to prevent COVID-19 caused by emerging virus variants; the risk that more widespread use of the vaccine will lead to new information about efficacy, safety, or other developments, including the risk of additional adverse reactions, some of which may be serious; the risk that preclinical and clinical trial data are subject to differing interpretations and assessments, including during the peer review/publication process, in the scientific community generally, and by regulatory

authorities; whether and when additional data from the BNT162 mRNA vaccine program will be published in scientific journal publications and, if so, when and with what modifications and interpretations; whether regulatory authorities will be satisfied with the design of and results from these and any future preclinical and clinical studies; whether and when submissions to request emergency use or conditional marketing authorizations for a potential booster dose, pediatric populations and/or other biologics license and/or emergency use authorization applications or amendments to any such applications may be filed in particular jurisdictions for BNT162b2 or any other potential vaccines that may arise from the BNT162 program, including a potential variant-specific vaccine, and if obtained, whether or when such emergency use authorizations or licenses will expire or terminate; whether and when any applications that may be pending or filed for BNT162b2 (including any requested amendments to the emergency use or conditional marketing authorizations) or other vaccines that may result from the BNT162 program may be approved by particular regulatory authorities, which will depend on myriad factors, including making a determination as to whether the vaccine's benefits outweigh its known risks and determination of the vaccine's efficacy and, if approved, whether it will be commercially successful; decisions by regulatory authorities impacting labeling or marketing, manufacturing processes, safety and/or other matters that could affect the availability or commercial potential of a vaccine, including development of products or therapies by other companies; disruptions in the relationships between us and our collaboration partners, clinical trial sites or third-party suppliers; the risk that demand for any products may be reduced or no longer exist; risks related to the availability of raw materials to manufacture a vaccine; challenges related to our vaccine's formulation, schedule and attendant storage, distribution and administration requirements, including risks related to storage and handling after delivery by Pfizer; the risk that we may not be able to successfully develop other vaccine formulations, booster doses or new variant-specific vaccines; the risk that we may not be able to create or scale up manufacturing capacity on a timely basis or maintain access to logistics or supply channels commensurate with global demand for our vaccine, which would negatively impact our ability to supply the estimated numbers of doses of our vaccine within the projected time periods as previously indicated; whether and when additional supply agreements will be reached; uncertainties regarding the ability to obtain recommendations from vaccine advisory or technical committees and other public health authorities and uncertainties regarding the commercial impact of any such recommendations; challenges related to public vaccine confidence or awareness; uncertainties regarding the impact of COVID-19 on Pfizer's business, operations and financial results; and competitive developments.

A further description of risks and uncertainties can be found in Pfizer's Annual Report on Form 10-K for the fiscal year ended December 31, 2020 and in its subsequent reports on Form 10-Q, including in the sections thereof captioned "Risk Factors" and "Forward-Looking Information and Factors That May Affect Future Results", as well as in its subsequent reports on Form 8-K, all of which are filed with the U.S. Securities and Exchange Commission and available at www.sec.gov and www.pfizer.com.

About BioNTech

Biopharmaceutical New Technologies is a next generation immunotherapy company pioneering novel therapies for cancer and other serious diseases. The Company exploits a wide array of computational discovery and therapeutic drug platforms for the rapid development of novel biopharmaceuticals. Its broad portfolio of oncology product candidates includes individualized and off-the-shelf mRNA-based therapies, innovative chimeric antigen receptor T cells, bi-specific checkpoint immuno-modulators, targeted cancer antibodies and small molecules. Based on its deep expertise in mRNA vaccine development and in-house manufacturing capabilities, BioNTech and its collaborators are developing multiple mRNA vaccine candidates for a range of infectious diseases alongside its diverse oncology pipeline. BioNTech has established a broad set of relationships with multiple global pharmaceutical collaborators, including Genmab, Sanofi, Bayer Animal Health, Genentech, a member of the Roche Group, Regeneron, Genevant, Fosun Pharma, and Pfizer. For more information, please visit www.BioNTech.de.

BioNTech Forward-looking Statements
This press release contains "forward-looking statements" of BioNTech within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements may include, but may not be limited to, statements concerning: BioNTech's efforts to combat COVID-19; the collaboration between BioNTech and Pfizer including the program to develop a COVID-19 vaccine and COMIRNATY (COVID-19 Vaccine, mRNA) (BNT162b2) (including the potential of a Omicron-based COVID-19 vaccine candidate, the potential timing for the development of a Omicron-based COVID-19 vaccine candidate, the testing of BNT162b2 against the Omicron variant, the effectiveness of a third booster dose of BNT162b2 to induce protection against Omicron-induced COVID-19 disease, and the timing for assessment of the effectiveness of a variant-specific COVID-19 vaccine, qualitative assessments of available data, potential benefits, expectations for clinical trials, the anticipated timing of regulatory submissions, regulatory approvals or authorizations and anticipated manufacturing, distribution and supply); our expectations regarding the potential characteristics of BNT162b2 or variant-specific COVID-19 vaccine candidates in our clinical trials and/or in commercial use based on data observations to date; the ability of BNT162b2 to prevent COVID-19 caused by the Omicron and other emerging virus variants; the expected time point for additional readouts on efficacy data of BNT162b2 in our clinical trials; the nature of the clinical data, which is subject to ongoing peer review, regulatory review and market interpretation; the risk of further widespread use of our vaccine will lead to new information about efficacy, safety, or other developments, including the risk of additional adverse reactions, some of which may be serious; decisions by regulatory authorities that may impact labeling or marketing, manufacturing processes, safety and/or other matters that could affect the availability or commercial potential of our vaccine, including development of products or therapies by other companies; the timing for submission of data for, or receipt of, any marketing authorization or Emergency Use Authorization; our contemplated shipping and storage plan, including our estimated product shelf life at various temperatures; disruptions in the relationships between us and our collaboration partners, clinical trial sites or other third-parties; risks related to the availability of raw materials to manufacture a vaccine; challenges related to our vaccine's formulation, two-dose and booster schedule and attendant storage, distribution and administration requirements, including risks related to storage and handling after delivery by BioNTech and third-party providers; and the ability of BioNTech to supply the quantities of BNT162 or variant-specific COVID-19 vaccine candidates to support clinical development and market demand, including our production estimates for 2021. Any forward-looking statements in this press release are based on BioNTech current expectations and beliefs of future events, and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements.

For a discussion of these and other risks and uncertainties, see the section entitled "Risk Factors" in BioNTech's Annual Report on Form 20-F for the Year Ended December 31, 2020, filed with the SEC on March 30, 2021, which is available on the SEC's website at www.sec.gov. All information in this press release is as of the date of the release, and BioNTech undertakes no duty to update this information unless required by law.

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