



Second Positive Phase 3 Dupixent® (dupilumab) Trial Confirms Significant Improvements for Patients with Prurigo Nodularis

January 19, 2022

TARRYTOWN, N.Y. and PARIS, Jan. 19, 2022 /PRNewswire/ --

Dupixent is the first and only medicine to demonstrate positive Phase 3 results in prurigo nodularis, confirming the potential benefit of targeting IL-4 and IL-13, central drivers of type 2 inflammation, to address itch and skin lesions

Data confirm results from first Phase 3 trial, with 60% of Dupixent patients meeting the primary endpoint of itch reduction compared to 18% of placebo patients at 24 weeks

Additionally, nearly three times as many Dupixent patients experienced reduced skin lesions

Data continue to support well-established safety profile of Dupixent

Regeneron Pharmaceuticals, Inc. (NASDAQ: REGN) and Sanofi today announced positive pivotal results from a second Phase 3 trial, PRIME, evaluating Dupixent® (dupilumab) in adults with uncontrolled prurigo nodularis, a chronic type 2 inflammatory skin disease. The trial met its primary and key secondary endpoints, showing that Dupixent significantly reduced itch and skin lesions compared to placebo at 24 weeks in this investigational setting. These data confirm the positive results that were [previously reported](#) from the Phase 3 PRIME2 trial, and are expected to be submitted to regulatory authorities around the world starting in the first half of this year.

"Prurigo nodularis is a highly burdensome disease involving dozens, if not hundreds of incessantly itchy and burning skin lesions, and the potential for complications such as skin infections," said George D. Yancopoulos, M.D., Ph.D., President and Chief Scientific Officer at Regeneron. "The results of this trial once again show that Dupixent is able to significantly address the hallmark symptoms of this disease while maintaining a consistent safety profile, including a numerically lower rate of skin infections. We are encouraged by the progress of our extensive Dupixent development program that continually reinforces IL-4 and IL-13 as key drivers of the type 2 inflammation underlying a number of diseases, including dermatological diseases such as prurigo nodularis and atopic dermatitis, respiratory diseases such as asthma and chronic rhinosinusitis with nasal polyps, and gastrointestinal diseases such as eosinophilic esophagitis."

People with prurigo nodularis experience intense, persistent itch, with thick skin lesions (called nodules) that can cover most of the body. Prurigo nodularis is often described as painful with burning, stinging and tingling of the skin. The impact of uncontrolled prurigo nodularis on quality of life is one of the highest among inflammatory skin diseases due to the extreme itch, and comparable to other debilitating chronic diseases that can negatively affect mental health, activities of daily living and social interactions. High-potency topical steroids are commonly prescribed, but are associated with safety risks if used long-term. There are approximately 75,000 people in the U.S. who are unable to control their disease with topical steroids and otherwise do not have an approved treatment option.

"These results strengthen our understanding of the underlying biology of prurigo nodularis and are encouraging as we seek to help patients severely impacted by symptoms like unbearable itch, skin lesions, stinging and burning," says Naimish Patel, M.D, Head of Global Development, Immunology and Inflammation at Sanofi. "We are committed to researching the science behind type 2 inflammation to advance and shift perceptions in a number of inflammatory skin diseases that are not well-understood. The decision to accelerate directly into a Phase 3 clinical trial for prurigo nodularis was driven by our conviction that type 2 inflammation is a key driver of this highly pruritic disease and underscores our commitment to quickly bring novel treatments to patients who are in urgent need of new options."

In the Phase 3 PRIME trial, topline results comparing Dupixent (n=75) to placebo (n=76) showed at week 24:

- More than three times as many Dupixent patients experienced a clinically meaningful reduction in itch from baseline, the primary endpoint: 60% of Dupixent patients compared to 18% of placebo patients (p<0.0001).
- Nearly three times as many Dupixent patients achieved clear or almost clear skin, a key secondary endpoint: 48% of Dupixent patients compared to 18% of placebo patients (p=0.0004).
- Dupixent patients experienced significantly greater improvements in measures of health-related quality of life, skin pain and symptoms of anxiety and depression.

The safety results of the trial were consistent what was observed in PRIME2, and were also generally consistent with the known safety profile of Dupixent in its approved indications. For the 24-week treatment period, overall rates of treatment-emergent adverse events were 71% for Dupixent and 63% for placebo. Adverse events most commonly observed with Dupixent included nasopharyngitis (5% Dupixent, 4% placebo) and headache (5% Dupixent, 5% placebo). Additionally, 0% of Dupixent patients and 4% of placebo patients discontinued treatment due to adverse events prior to week 24. Consistent with published literature for the atopic dermatitis trials, numerically lower rates of skin infections were seen with Dupixent in this trial (4% Dupixent, 9% placebo).

Detailed results from this trial will be presented at an upcoming medical congress. The potential use of Dupixent in prurigo nodularis is currently under clinical development, and the safety and efficacy have not been fully evaluated by any regulatory authority.

About the Trial

PRIME, part of the LIBERTY-PN PRIME clinical program, is a randomized, Phase 3, double-blind, placebo-controlled trial that evaluated the efficacy

and safety of Dupixent in 151 adults with prurigo nodularis inadequately controlled with topical prescription therapies or with whom those therapies were not advisable. During the 24-week treatment period, patients received Dupixent or placebo every two weeks with or without topical treatments (low- or medium-dose topical corticosteroids or topical calcineurin inhibitors were continued if patients were using these treatments at randomization).

The primary endpoint evaluated the proportion of patients with clinically meaningful improvement in itch at 24 weeks (measured by a ≥ 4 -point reduction in Worst-Itch Numeric Rating Scale [WI-NRS] of 0-10). A key secondary endpoint was the proportion of patients with clear or almost clear skin at 24 weeks (measured by a score of 0 or 1 on the Investigator's Global Assessment PN-Stage [IGA PN-S] 0-4 scale).

About Dupixent

Dupixent, which was invented using Regeneron's proprietary *VelocImmune*[®] technology, is a fully human monoclonal antibody that inhibits the signaling of the interleukin-4 (IL-4) and interleukin-13 (IL-13) pathways and is not an immunosuppressant. IL-4 and IL-13 are key and central drivers of the type 2 inflammation that plays a major role in atopic dermatitis, asthma and chronic rhinosinusitis with nasal polyposis (CRSwNP).

Dupixent is currently approved in the U.S., Europe, Japan and other countries around the world for use in specific patients with moderate-to-severe atopic dermatitis, as well as certain patients with asthma or CRSwNP in different age populations. Dupixent is also approved in one or more of these indications in more than 60 countries around the world, and more than 350,000 patients have been treated globally.

About Regeneron's *VelocImmune* Technology

Regeneron's *VelocImmune* technology utilizes a proprietary genetically engineered mouse platform endowed with a genetically humanized immune system to produce optimized fully human antibodies. When Regeneron's President and Chief Scientific Officer George D. Yancopoulos was a graduate student with his mentor Frederick W. Alt in 1985, they were the first to [envision](#) making such a genetically humanized mouse, and Regeneron has spent decades inventing and developing *VelocImmune* and related *VelociSuite*[®] technologies. Dr. Yancopoulos and his team have used *VelocImmune* technology to create approximately a quarter of all original, FDA-approved or authorized fully human monoclonal antibodies currently available. This includes Dupixent, REGEN-COV[®] (casirivimab and imdevimab), Libtayo[®] (cemiplimab-rwlc), Praluent[®] (alirocumab), Kevzara[®] (sarilumab), Evkeeza[®] (evinacumab-dgnb) and Inmazeb[™] (atoltivimab, maftivimab and odesivimab-ebgn).

Dupilumab Development Program

Dupilumab is being jointly developed by Regeneron and Sanofi under a global collaboration agreement. To date, dupilumab has been studied across 60 clinical trials involving more than 10,000 patients with various chronic diseases driven in part by type 2 inflammation.

In addition to the currently approved indications, Regeneron and Sanofi are studying dupilumab in a broad range of diseases driven by type 2 inflammation or other allergic processes, including prurigo nodularis (Phase 3), chronic obstructive pulmonary disease with evidence of type 2 inflammation (Phase 3), pediatric atopic dermatitis (6 months to 5 years of age, Phase 3), eosinophilic esophagitis (Phase 3), bullous pemphigoid (Phase 3), chronic spontaneous urticaria (Phase 3), chronic inducible urticaria-cold (Phase 3), chronic rhinosinusitis without nasal polyposis (Phase 3), allergic fungal rhinosinusitis (Phase 3), allergic bronchopulmonary aspergillosis (Phase 3) and peanut allergy (Phase 2). These potential uses of dupilumab are currently under clinical investigation, and the safety and efficacy in these conditions have not been fully evaluated by any regulatory authority.

U.S. Indications

DUPIXENT is a prescription medicine used:

- to treat people aged 6 years and older with moderate-to-severe atopic dermatitis (eczema) that is not well controlled with prescription therapies used on the skin (topical), or who cannot use topical therapies. DUPIXENT can be used with or without topical corticosteroids. It is not known if DUPIXENT is safe and effective in children with atopic dermatitis under 6 years of age.
- with other asthma medicines for the maintenance treatment of moderate-to-severe eosinophilic or oral steroid dependent asthma in people aged 6 years and older whose asthma is not controlled with their current asthma medicines. DUPIXENT helps prevent severe asthma attacks (exacerbations) and can improve your breathing. DUPIXENT may also help reduce the amount of oral corticosteroids you need while preventing severe asthma attacks and improving your breathing. DUPIXENT is not used to treat sudden breathing problems. It is not known if DUPIXENT is safe and effective in children with asthma under 6 years of age.
- with other medicines for the maintenance treatment of chronic rhinosinusitis with nasal polyposis (CRSwNP) in adults whose disease is not controlled. It is not known if DUPIXENT is safe and effective in children with chronic rhinosinusitis with nasal polyposis under 18 years of age.

IMPORTANT SAFETY INFORMATION FOR U.S. PATIENTS

Do not use if you are allergic to dupilumab or to any of the ingredients in DUPIXENT[®].

Before using DUPIXENT, tell your healthcare provider about all your medical conditions, including if you:

- have eye problems
- have a parasitic (helminth) infection
- are scheduled to receive any vaccinations. You should not receive a "live vaccine" right before and during treatment with DUPIXENT.
- are pregnant or plan to become pregnant. It is not known whether DUPIXENT will harm your unborn baby.
 - A pregnancy registry for women who take DUPIXENT during pregnancy collects information about the health of you and your baby. To enroll or get more information call 1-877-311-8972 or go to <https://mothertobaby.org/ongoing->

[study/dupixent/](#).

- are breastfeeding or plan to breastfeed. It is not known whether DUPIXENT passes into your breast milk.

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins and herbal supplements.

Especially tell your healthcare provider if you are taking oral, topical, or inhaled corticosteroid medicines; have asthma and use an asthma medicine; or have atopic dermatitis or CRSwNP, and also have asthma. **Do not** change or stop your corticosteroid medicine or other asthma medicine without talking to your healthcare provider. This may cause other symptoms that were controlled by the corticosteroid medicine or other asthma medicine to come back.

DUPIXENT can cause serious side effects, including:

- **Allergic reactions. DUPIXENT can cause allergic reactions that can sometimes be severe.** Stop using DUPIXENT and tell your healthcare provider or get emergency help right away if you get any of the following signs or symptoms: breathing problems or wheezing, swelling of the face, lips, mouth, tongue or throat, fainting, dizziness, feeling lightheaded, fast pulse, fever, hives, joint pain, general ill feeling, itching, skin rash, swollen lymph nodes, nausea or vomiting, or cramps in your stomach-area.
- **Eye problems.** Tell your healthcare provider if you have any new or worsening eye problems, including eye pain or changes in vision, such as blurred vision. Your healthcare provider may send you to an ophthalmologist for an exam if needed.
- **Inflammation of your blood vessels.** Rarely, this can happen in people with asthma who receive DUPIXENT. This may happen in people who also take a steroid medicine by mouth that is being stopped or the dose is being lowered. It is not known whether this is caused by DUPIXENT. Tell your healthcare provider right away if you have: rash, chest pain, worsening shortness of breath, a feeling of pins and needles or numbness of your arms or legs, or persistent fever.
- **Joint aches and pain.** Some people who use DUPIXENT have had trouble walking or moving due to their joint symptoms, and in some cases needed to be hospitalized. Tell your healthcare provider about any new or worsening joint symptoms. Your healthcare provider may stop DUPIXENT if you develop joint symptoms.

The most common side effects include:

- **Atopic dermatitis:** injection site reactions, eye and eyelid inflammation, including redness, swelling, and itching, sometimes with blurred vision, and cold sores in your mouth or on your lips.
- **Asthma:** injection site reactions, pain in the throat (oropharyngeal pain), high count of a certain white blood cell (eosinophilia), and parasitic (helminth) infections.
- **Chronic rhinosinusitis with nasal polyposis:** injection site reactions, eye and eyelid inflammation, including redness, swelling, and itching, sometimes with blurred vision, high count of a certain white blood cell (eosinophilia), trouble sleeping (insomnia), toothache, gastritis, and joint pain (arthralgia).

Tell your healthcare provider if you have any side effect that bothers you or that does not go away.

These are not all the possible side effects of DUPIXENT. Call your doctor for medical advice about side effects. You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

Use DUPIXENT exactly as prescribed by your healthcare provider. It's an injection given under the skin (subcutaneous injection). Your healthcare provider will decide if you or your caregiver can inject DUPIXENT. **Do not** try to prepare and inject DUPIXENT until you or your caregiver have been trained by your healthcare provider. In children 12 years of age and older, it's recommended DUPIXENT be administered by or under supervision of an adult. In children under 12 years of age, DUPIXENT should be given by a caregiver.

Please see accompanying full [Prescribing Information](#) including Patient Information.

About Regeneron

Regeneron (NASDAQ: REGN) is a leading biotechnology company that invents life-transforming medicines for people with serious diseases. Founded and led for over 30 years by physician-scientists, our unique ability to repeatedly and consistently translate science into medicine has led to nine FDA-approved treatments and numerous product candidates in development, almost all of which were homegrown in our laboratories. Our medicines and pipeline are designed to help patients with eye diseases, allergic and inflammatory diseases, cancer, cardiovascular and metabolic diseases, pain, hematologic conditions, infectious diseases and rare diseases.

Regeneron is accelerating and improving the traditional drug development process through our proprietary *VelociSuite* technologies, such as *VelocImmune*, which uses unique genetically humanized mice to produce optimized fully human antibodies and bispecific antibodies, and through ambitious research initiatives such as the Regeneron Genetics Center, which is conducting one of the largest genetics sequencing efforts in the world.

For additional information about the company, please visit www.regeneron.com or follow @Regeneron on Twitter.

About Sanofi

Sanofi is dedicated to supporting people through their health challenges. We are a global biopharmaceutical company focused on human health. We prevent illness with vaccines, provide innovative treatments to fight pain and ease suffering. We stand by the few who suffer from rare diseases and the millions with long-term chronic conditions.

With more than 100,000 people in 100 countries, Sanofi is transforming scientific innovation into healthcare solutions around the globe.

Regeneron Forward-Looking Statements and Use of Digital Media

This press release includes forward-looking statements that involve risks and uncertainties relating to future events and the future performance of Regeneron Pharmaceuticals, Inc. ("Regeneron" or the "Company"), and actual events or results may differ materially from these forward-looking statements. Words such as "anticipate," "expect," "intend," "plan," "believe," "seek," "estimate," variations of such words, and similar expressions are intended to identify such forward-looking statements, although not all forward-looking statements contain these identifying words. These statements concern, and these risks and uncertainties include, among others, the impact of SARS-CoV-2 (the virus that has caused the COVID-19 pandemic) on Regeneron's business and its employees, collaborators, and suppliers and other third parties on which Regeneron relies, Regeneron's and its collaborators' ability to continue to conduct research and clinical programs, Regeneron's ability to manage its supply chain, net product sales of products marketed or otherwise commercialized by Regeneron and/or its collaborators or licensees (collectively, "Regeneron's Products"), and the global economy; the nature, timing, and possible success and therapeutic applications of Regeneron's Products and product candidates being developed by Regeneron and/or its collaborators or licensees (collectively, "Regeneron's Product Candidates") and research and clinical programs now underway or planned, including without limitation Dupixent[®] (dupilumab) for the treatment of prurigo nodularis; the likelihood, timing, and scope of possible regulatory approval and commercial launch of Regeneron's Product Candidates and new indications for Regeneron's Products, such as Dupixent for the treatment of prurigo nodularis, chronic obstructive pulmonary disease with evidence of type 2 inflammation, pediatric atopic dermatitis, eosinophilic esophagitis, bullous pemphigoid, chronic spontaneous urticaria, chronic inducible urticaria-cold, chronic rhinosinusitis without nasal polyposis, allergic fungal rhinosinusitis, allergic bronchopulmonary aspergillosis, peanut allergy, and other potential indications; uncertainty of the utilization, market acceptance, and commercial success of Regeneron's Products and Regeneron's Product Candidates and the impact of studies (whether conducted by Regeneron or others and whether mandated or voluntary), including the study discussed in this press release, on any of the foregoing or any potential regulatory approval of Regeneron's Products (such as Dupixent) and Regeneron's Product Candidates; the ability of Regeneron's collaborators, licensees, suppliers, or other third parties (as applicable) to perform manufacturing, filling, finishing, packaging, labeling, distribution, and other steps related to Regeneron's Products and Regeneron's Product Candidates; the ability of Regeneron to manage supply chains for multiple products and product candidates; safety issues resulting from the administration of Regeneron's Products (such as Dupixent) and Regeneron's Product Candidates in patients, including serious complications or side effects in connection with the use of Regeneron's Products and Regeneron's Product Candidates in clinical trials; determinations by regulatory and administrative governmental authorities which may delay or restrict Regeneron's ability to continue to develop or commercialize Regeneron's Products and Regeneron's Product Candidates, including without limitation Dupixent; ongoing regulatory obligations and oversight impacting Regeneron's Products, research and clinical programs, and business, including those relating to patient privacy; the availability and extent of reimbursement of Regeneron's Products from third-party payers, including private payer healthcare and insurance programs, health maintenance organizations, pharmacy benefit management companies, and government programs such as Medicare and Medicaid; coverage and reimbursement determinations by such payers and new policies and procedures adopted by such payers; competing drugs and product candidates that may be superior to, or more cost effective than, Regeneron's Products and Regeneron's Product Candidates; the extent to which the results from the research and development programs conducted by Regeneron and/or its collaborators or licensees may be replicated in other studies and/or lead to advancement of product candidates to clinical trials, therapeutic applications, or regulatory approval; unanticipated expenses; the costs of developing, producing, and selling products; the ability of Regeneron to meet any of its financial projections or guidance and changes to the assumptions underlying those projections or guidance; the potential for any license, collaboration, or supply agreement, including Regeneron's agreements with Sanofi, Bayer, and Teva Pharmaceutical Industries Ltd. (or their respective affiliated companies, as applicable) to be cancelled or terminated; and risks associated with intellectual property of other parties and pending or future litigation relating thereto (including without limitation the patent litigation and other related proceedings relating to EYLEA[®] (afibercept) Injection, Dupixent, Praluent[®] (alirocumab), and REGEN-COV[®] (casirivimab and imdevimab)), other litigation and other proceedings and government investigations relating to the Company and/or its operations, the ultimate outcome of any such proceedings and investigations, and the impact any of the foregoing may have on Regeneron's business, prospects, operating results, and financial condition. A more complete description of these and other material risks can be found in Regeneron's filings with the U.S. Securities and Exchange Commission, including its Form 10-K for the year ended December 31, 2020 and its Form 10-Q for the quarterly period ended September 30, 2021. Any forward-looking statements are made based on management's current beliefs and judgment, and the reader is cautioned not to rely on any forward-looking statements made by Regeneron. Regeneron does not undertake any obligation to update (publicly or otherwise) any forward-looking statement, including without limitation any financial projection or guidance, whether as a result of new information, future events, or otherwise.

Regeneron uses its media and investor relations website and social media outlets to publish important information about the Company, including information that may be deemed material to investors. Financial and other information about Regeneron is routinely posted and is accessible on Regeneron's media and investor relations website (<http://newsroom.regeneron.com>) and its Twitter feed (<http://twitter.com/regeneron>).

Sanofi Forward-Looking Statements

This press release contains forward-looking statements as defined in the Private Securities Litigation Reform Act of 1995, as amended. Forward-looking statements are statements that are not historical facts. These statements include projections and estimates regarding the marketing and other potential of the product, or regarding potential future revenues from the product. Forward-looking statements are generally identified by the words "expects", "anticipates", "believes", "intends", "estimates", "plans" and similar expressions. Although Sanofi's management believes that the expectations reflected in such forward-looking statements are reasonable, investors are cautioned that forward-looking information and statements are subject to various risks and uncertainties, many of which are difficult to predict and generally beyond the control of Sanofi, that could cause actual results and developments to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements. These risks and uncertainties include among other things, unexpected regulatory actions or delays, or government regulation generally, that could affect the availability or commercial potential of the product, the fact that product may not be commercially successful, the uncertainties inherent in research and development, including future clinical data and analysis of existing clinical data relating to the product, including post marketing, unexpected safety, quality or manufacturing issues, competition in general, risks associated with intellectual property and any related future litigation and the ultimate outcome of such litigation, and volatile economic and market conditions, and the impact that COVID-19 will have on us, our customers, suppliers, vendors, and other business partners, and the financial condition of any one of them, as well as on our employees and on the global economy as a whole. Any material effect of COVID-19 on any of the foregoing could also adversely impact us. This situation is changing rapidly and additional impacts may arise of which we are not currently aware and may exacerbate other previously identified risks. The risks and uncertainties also include the uncertainties discussed or identified in the public filings with the SEC and the AMF made by Sanofi, including those listed under "Risk Factors" and "Cautionary Statement Regarding Forward-Looking Statements" in Sanofi's annual report on Form 20-F for the year ended December 31, 2020. Other than as required by applicable law, Sanofi does not undertake any obligation to update or revise any forward-looking information or statements

Regeneron Contacts:

Media Relations**Hannah Kwagh**

Tel: +1 914-847-6314

Hannah.Kwagh@regeneron.com**Investor Relations****Vesna Tosic**

Tel: +1 914-847-5443

Vesna.Tosic@regeneron.com**Sanofi Contacts:****Media Relations****Sally Bain**

Tel: +1 781-264-1091

Sally.Bain@sanofi.com**Investor Relations****Sanofi Investor Relations – Contacts Paris**

Eva Schaefer-Jansen

Arnaud Delepine

Nathalie Pham

Sanofi Investor Relations – Contact North America

Felix Lauscher

Sanofi IR main line:

Tel: +33 (0)1 53 77 45 45

investor.relations@sanofi.com<https://www.sanofi.com/en/investors/contact>

 View original content: <https://www.prnewswire.com/news-releases/second-positive-phase-3-dupixent-dupilumab-trial-confirms-significant-improvements-for-patients-with-prurigo-nodularis-301463476.html>

SOURCE Regeneron Pharmaceuticals, Inc.