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Novartis to highlight extensive long-term safety and efficacy data of Aimovig® across the spectrum of migraine at AAN

- *After long-term Aimovig (erenumab) treatment, two-thirds of chronic migraine patients converted to episodic migraine, experiencing 11 fewer migraine days per month on average*

- *Separate study showed that the majority of episodic migraine patients on Aimovig reported at least a 50% reduction in monthly migraine days at one year, with one in five being completely migraine free*

- *With more than 200,000 patients treated with Aimovig since launch, the results support Aimovig's unique position as the most prescribed anti-CGRP worldwide, with the longest clinical trial experience*[1]

Basel, May 02, 2019 – Novartis today announced that it will present new long-term data of Aimovig® (erenumab) across the migraine spectrum at the 2019 American Academy of Neurology (AAN) Annual Meeting in Philadelphia. Data from a one-year open-label extension (OLE) trial following a three-month double blind study in patients with chronic migraine (15 or more headache days per month) showed sustained efficacy and safety in this patient population, including a potential for conversion to episodic migraine (4-14 headache days a month). Additionally, one year results of the Phase III STRIVE study reinforced the sustained efficacy and safety profile of Aimovig in patients with episodic migraine, including patients who had tried and failed prior preventive treatments.

Migraine is a highly debilitating disease that has a profound and limiting impact on peoples' lives, including time spent with family and friends, or at work[2,3]. Aimovig is the first and only fully-human monoclonal antibody that prevents migraine by targeting the calcitonin gene-related peptide (CGRP) receptor. It is self-administered once monthly via the SureClick® autoinjector, does not require a loading dose and is easy to use.[1]

"The results presented at AAN confirm that Aimovig consistently reduced the burden of migraine across patient types over one year, with a sustained and positive tolerability profile," said Danny Bar-Zohar, Global Head, Neuroscience Development for Novartis Pharmaceuticals. "These data are complemented by the most extensive real world experience of any anti-CGRP treatment. With Aimovig, Novartis is reimagining migraine care and we are glad that more and more patients are able to get their lives back."

Data in Chronic Migraine

An exploratory analysis of one-year open-label extension (OLE) data from the pivotal study evaluating the efficacy and safety of Aimovig in chronic migraine prevention assessed the conversion rate from chronic to episodic migraine.[4] Over 20% of chronic migraine sufferers are disabled and their overall quality of life is greatly diminished. Additionally, 88% of chronic migraine sufferers have at least one additional chronic comorbid condition such as depression, anxiety or sleep disturbances.[5] The results at 52 weeks showed more than two-

thirds of patients with chronic migraine on Aimovig converted to episodic migraine by the last dose received. Patients converting to episodic migraine showed a reduction of 11 monthly migraine days (MMD) at week 52, from a baseline of 17 MMD. Both doses had high conversion rates, with the 140 mg dose numerically higher (76%) compared to Aimovig 70 mg (69%).

“Millions of people with chronic migraine spend at least half of each month living with the debilitating symptoms of this disease," said Stewart Tepper, M.D., Neurology Professor at the Geisel School of Medicine at Dartmouth Medical School. “We are encouraged by these new findings, which show that long-term erenumab treatment increases the likelihood that a patient with chronic migraine will experience a meaningful reduction in migraine days.”

Further data from the study evaluating the long-term efficacy and safety results of Aimovig in patients with chronic migraine during open-label treatment are also being presented at AAN.

Data in Episodic Migraine

One-year results of the Phase III STRIVE study (including 24-week double-blind phase and 28-week active treatment phase [ATP]) showed Aimovig provided sustained efficacy in the prevention of episodic migraine and a safety profile comparable to that observed in prior studies.[6]

At Week 52, patients receiving Aimovig 70 mg or 140 mg from Week 24 onward had an average of 4.2 and 4.6 fewer MMD, respectively, compared to study baseline (8.3 MMD). They also continued to experience improvements during the ATP (1.1 and 1.8 fewer MMD, respectively). In addition, an analysis of responder rates from baseline showed more than six out of 10 patients on either dose of Aimovig had 50% fewer MMD; around four out of 10 had 75 percent fewer MMD; and one in five were migraine-free at week 52.

Additional data from STRIVE and the open-label extension phase of the LIBERTY study in patients taking Aimovig with episodic migraine who had failed prior preventive treatments are being presented at AAN.

About the Open-Label Extension Study in Chronic Migraine

The open-label extension of the pivotal parent study (NCT02066415) was a 52-week, multicenter study (OLE, NCT02174861) evaluating the long-term efficacy and safety of Aimovig in chronic migraine prevention in patients taking Aimovig 70 mg and 140 mg. Patients initially enrolled received 70 mg of Aimovig monthly. The protocol was amended for patients to receive 140 mg of Aimovig. Patients who had completed the week-28 visit at the time of the amendment continued to receive Aimovig 70 mg, and patients who had enrolled but had not completed the week-28 visit at the time of the amendment increased from 70 mg to 140 mg of Aimovig at the next visit such that these patients would have the opportunity to receive at least 6 months of Aimovig 140 mg during the 52-week study. All patients who enrolled after the amendment received Aimovig 140 mg throughout the study.

Proportions of episodic migraine converters/nonconverters based on observed data were summarized throughout the OLE (overall population) and by last dose received (70 mg or 140 mg). Efficacy data were collected at weeks 1 – 12, 21 – 24, 37 – 40, and 49 – 52; endpoints included change from parent study baseline in monthly migraine days (MMD) and proportion of patients with ⩾50% reduction from parent study baseline in MMD.

About STRIVE

STRIVE (Study to Evaluate the Efficacy and Safety of Erenumab in Migraine Prevention, NCT02456740) is a global Phase III, multicenter, randomized 24-week, double-blind, placebo-controlled study evaluating the safety and efficacy of Aimovig in episodic migraine (characterized in this study as ⩾4 to <15 migraine days per month and <15 headache days per month on average across the three months before screening) prevention. In the study,

955 patients were randomized to receive once-monthly subcutaneous placebo, or Aimovig (70 mg or 140 mg) in a 1:1:1 ratio. Patients experienced between four and 14 migraine days each month, with an average of 8.3 migraine days per month at baseline. The primary endpoint was change in mean monthly migraine days from baseline over the last three months of the double-blind treatment phase of the study (months 4, 5 and 6). Secondary study endpoints assessed included reduction of at least 50% from baseline in mean MMD, change from baseline in mean monthly acute migraine-specific medication days, and changes from baseline in both mean impact on everyday activities domain and mean physical impairment domain scores on the Migraine Physical Function Impact Diary (MPFID).

At week-24 (ATP baseline), 845 patients were re-randomized (1:1) to Aimovig 70 mg or 140 mg for the subsequent 28-week dose-blinded ATP. Assessments included MMD; monthly acute migraine specific medication days (MSMD); proportion of patients achieving a ≥50%, ≥75%, and 100% reduction in MMD (responder rates: RR); and safety.

About Aimovig (erenumab)
Aimovig is the first EMA, Swissmedic, Australian TGA and FDA-approved migraine prevention treatment designed specifically to block the calcitonin gene related peptide receptor (CGRP-R), which plays a critical role in migraine. Aimovig has been studied in several large, global, randomized, double-blind, placebo-controlled studies to assess its safety and efficacy in migraine prevention. More than 3,000 patients have participated in our overall clinical trial program. This includes 2,600 participants across the four placebo-controlled pivotal Phase II and Phase III clinical studies as well as participants in further studies such as LIBERTY, a dedicated study in a difficult-to-treat treatment failure population. The most common side effects in the clinical program to date have been viral upper respiratory tract infection, upper respiratory tract infection, sinusitis, influenza, and back pain.

Novartis and Amgen are co-commercializing Aimovig in the US. Amgen has exclusive commercialization rights to the drug in Japan and Novartis has exclusive rights to commercialize in the rest of the world.

About Migraine
Migraine is a distinct neurological disease[7]. It involves recurrent attacks of moderate to severe head pain that is typically pulsating, often unilateral and associated with nausea, vomiting and sensitivity to light, sound and odors[8]. Migraine is associated with personal pain, disability and reduced quality of life, and financial cost to society[9]. It has a profound and limiting impact on an individual's abilities to carry out everyday tasks and was reported by the World Health Organization to be one of the top 10 causes of years lived with disability for men and women[9]. It remains under-recognized and under-treated[9,11]. Existing preventive therapies have been repurposed from other indications and are often associated with poor tolerability and lack of efficacy, with high discontinuation rates among patients[12].

About Amgen and Novartis Neuroscience Collaboration
In August 2015, Amgen entered into a global collaboration with Novartis to develop and commercialize pioneering treatments in the field of migraine and Alzheimer's disease. The collaboration focuses on investigational Amgen drugs in the migraine field, including Aimovig (approved by the FDA in May 2018 for the preventive treatment of migraine in adults). In April 2017, the collaboration was expanded to include co-commercialization of Aimovig in the U.S. For the migraine programs, Amgen retains exclusive commercialization rights in the U.S. (other than for Aimovig as described above) and Japan, and Novartis has exclusive commercialization rights in Europe, Canada and rest of world. Also, the companies are collaborating in the development and commercialization of a beta-secretase 1 (BACE) inhibitor program in Alzheimer's disease. The oral therapy CNP520 (currently in Phase III for Alzheimer's disease) is the lead molecule and further compounds from both companies' pre-clinical BACE inhibitor programs may be considered as follow-on molecules. At the center of the Amgen and Novartis neuroscience collaboration is the shared mission to fight migraine and the stereotypes and misperceptions surrounding this debilitating disease.

Disclaimer

This press release contains forward-looking statements within the meaning of the United States Private Securities Litigation Reform Act of 1995. Forward-looking statements can generally be identified by words such as “potential,” “can,” “will,” “plan,” “expect,” “anticipate,” “look forward,” “believe,” “committed,” “investigational,” “pipeline,” “launch,” or similar terms, or by express or implied discussions regarding potential marketing approvals, new indications or labeling for the investigational or approved products described in this press release, or regarding potential future revenues from such products or the collaboration with Amgen. You should not place undue reliance on these statements. Such forward-looking statements are based on our current beliefs and expectations regarding future events, and are subject to significant known and unknown risks and uncertainties. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those set forth in the forward-looking statements. There can be no guarantee that the investigational or approved products described in this press release will be submitted or approved for sale or for any additional indications or labeling in any market, or at any particular time. Neither can there be any guarantee that the collaboration with Amgen will achieve any or all of its intended goals, or within any particular time frame. Nor can there be any guarantee that such products or the collaboration with Amgen will be commercially successful in the future. In particular, our expectations regarding such products and the collaboration with Amgen could be affected by, among other things, the uncertainties inherent in research and development, including clinical trial results and additional analysis of existing clinical data; regulatory actions or delays or government regulation generally; global trends toward health care cost containment, including government, payor and general public pricing and reimbursement pressures and requirements for increased pricing transparency; our ability to obtain or maintain proprietary intellectual property protection; the outcome of litigation and legal disputes, including the legal dispute with Amgen regarding our collaboration agreements in the field of migraine; the particular prescribing preferences of physicians and patients; general political and economic conditions; safety, quality or manufacturing issues; potential or actual data security and data privacy breaches, or disruptions of our information technology systems, and other risks and factors referred to in Novartis AG’s current Form 20-F on file with the US Securities and Exchange Commission. Novartis is providing the information in this press release as of this date and does not undertake any obligation to update any forward-looking statements contained in this press release as a result of new information, future events or otherwise.

About Novartis

Novartis is reimagining medicine to improve and extend people’s lives. As a leading global medicines company, we use innovative science and digital technologies to create transformative treatments in areas of great medical need. In our quest to find new medicines, we consistently rank among the world’s top companies investing in research and development. Novartis products reach more than 750 million people globally and we are finding innovative ways to expand access to our latest treatments. About 105 000 people of more than 140 nationalities work at Novartis around the world. Find out more at www.novartis.com.

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