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News Release

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Sunovion and PsychoGenics Announce that SEP-363856 Has Received FDA Breakthrough Therapy Designation for the Treatment of People with Schizophrenia

— SEP-363856 offers an innovative approach to the treatment of schizophrenia including the potential to be the first agent for the treatment of schizophrenia that does not bind to dopamine 2 (D2) receptors —
— Schizophrenia affects more than 2 million people in the United States —

Marlborough, Mass. and Paramus, NJ, May 10, 2019 – [Sunovion Pharmaceuticals Inc.](#) (Sunovion) and [PsychoGenics Inc.](#) (PsychoGenics), today announced that the U.S. Food and Drug Administration (FDA) has granted Breakthrough Therapy Designation for SEP-363856, a novel agent for the treatment of people with schizophrenia.

Breakthrough Therapy Designation is intended to expedite the development and review of drugs for serious or life-threatening conditions when preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over available therapy on one or more clinically significant endpoints.¹

“Schizophrenia is a major public health challenge associated with persistent abnormalities in thinking, perception and behavior, as well as impairments in quality of life and functional skills, that affects approximately 2.4 million people in the U.S.,”² said Antony Loebel, M.D., President and Chief Executive Officer at Sunovion. “Breakthrough Therapy Designation underscores the potential of SEP-363856 as a novel treatment for patients with schizophrenia, for whom few major advances in treatment have occurred since the advent of antipsychotic pharmacotherapy in the 1950s. Investigational studies to further evaluate the clinical benefit of SEP-363856 are in progress, and we look forward to working closely with the FDA on this important potential new therapy.”

SEP-363856 does not bind to dopamine 2 (D2) or serotonin 2A (5-HT2A) receptors, which are thought to mediate the effects of currently available antipsychotic medicines. Although the exact mechanism of

action is unknown, SEP-363856 is believed to activate TAAR1 (trace amine-associated receptor 1) in addition to 5-HT1A (serotonin 1A) receptors.

The FDA granted Breakthrough Therapy Designation for SEP-363856 based on pivotal, Phase 2 data from Study SEP361-201, which were presented by Sunovion at the 57th Annual Meeting of the American College of Neuropsychopharmacology (ACNP) in December 2018, as well as data from Study SEP361-202, a six-month, open-label, safety and tolerability extension study.

With this Breakthrough Therapy Designation SEP-363856 is eligible for intensive guidance from the FDA on the drug development program and priority review.¹

About SEP 361-201

SEP 361-201, a randomized, placebo-controlled, double-blind, registration study, met its primary endpoint, demonstrating that hospitalized patients with acute exacerbation (worsening) of schizophrenia treated with SEP-363856 showed statistically significant and clinically meaningful improvement in the Positive and Negative Syndrome Scale (PANSS) total score compared to placebo after four weeks of treatment (-17.2 vs. -9.7, respectively; $p=0.001$). Patients treated with SEP-363856 also showed improvement in the overall severity of illness as assessed by the Clinical Global Impression Scale - Severity (CGI-S) ($p<0.001$). In addition, improvement was found in all major PANSS (positive, negative and general psychopathology) subscales ($p<0.02$).

SEP-363856 was found to be generally well tolerated with notable similarities to placebo treatment in discontinuation rates; proportion of patients experiencing extrapyramidal symptoms or akathisia (restlessness); and change in metabolic parameters such as weight, lipids, glucose and prolactin.

About SEP-363856

SEP-363856 is a psychotropic agent with a novel, non-D2 mechanism of action, distinct from currently marketed antipsychotics. Sunovion discovered SEP-363856 in collaboration with PsychoGenics based in part on a mechanism-independent approach using the in vivo phenotypic SmartCube[®] platform and associated artificial intelligence algorithms. SEP-363856 was optimized for antipsychotic activity by Sunovion medicinal chemists based on quantitative structure-activity relationship analysis, in collaboration with PsychoGenics. SEP-363856 is jointly owned by Sunovion and PsychoGenics. Sunovion has exclusive rights to develop and commercialize SEP-363856 globally.

SEP-363856 is being studied in a global development program for schizophrenia as well as for Parkinson's disease psychosis, with additional indications under consideration. Clinical trial results to date demonstrate a predictable pharmacokinetic (PK) profile suitable for once daily use.

About Schizophrenia

Schizophrenia is a chronic, serious and often severely disabling brain disorder that affects more than 23 million people worldwide² and approximately one in 100 adults (about 2.4 million people) in the United States.³ It is characterized by positive symptoms, such as hallucinations, delusions and disorganized thinking as well as negative symptoms, such as lack of emotion, social withdrawal, lack of spontaneity and cognitive impairment that includes problems with memory, attention and the ability to plan, organize and make decisions.³

About Sunovion Pharmaceuticals Inc. (Sunovion)

Sunovion is a global biopharmaceutical company focused on the innovative application of science and medicine to help people with serious medical conditions. Sunovion's vision is to lead the way to a healthier world. The company's spirit of innovation is driven by the conviction that scientific excellence paired with meaningful advocacy and relevant education can improve lives. With patients at the center of everything it does, Sunovion has charted new paths to life-transforming treatments that reflect ongoing investments in research and development and an unwavering commitment to support people with psychiatric, neurological and respiratory conditions.

Headquartered in Marlborough, Mass., Sunovion is an indirect, wholly-owned subsidiary of Sumitomo Dainippon Pharma Co., Ltd. Sunovion Pharmaceuticals Europe Ltd., based in London, England, and Sunovion Pharmaceuticals Canada Inc., based in Mississauga, Ontario, are wholly-owned direct subsidiaries of Sunovion Pharmaceuticals Inc. Additional information can be found on the company's websites: www.sunovion.com, www.sunovion.eu and www.sunovion.ca. Connect with Sunovion on [Twitter](#), [LinkedIn](#), [Facebook](#) and [YouTube](#).

About PGI Drug Discovery LLC and PsychoGenics Inc. (collectively PsychoGenics)

PsychoGenics Inc. and its discovery arm PGI Drug Discovery LLC (collectively known as PsychoGenics) have pioneered the translation of rodent behavioral and physiological responses into robust, high-throughput and high-content phenotyping. PsychoGenics' drug discovery platforms, SmartCube[®], NeuroCube[®] and PhenoCube[®], have been used in shared-risk partnerships with major pharmaceutical companies, resulting in the discovery of several novel compounds now in clinical trials or advanced preclinical development.

PsychoGenics' capabilities also include standard behavioral testing, electrophysiology, translational electroencephalogram (EEG), molecular biology, microdialysis and quantitative immunohistochemistry. In addition, the company offers a variety of in-licensed transgenic mouse models that support research in areas such as Huntington's disease, autism spectrum disorders, psychosis/schizophrenia, depression/ post-traumatic stress disorder (PTSD), Alzheimer's disease, Parkinson's disease, muscular dystrophy, amyotrophic lateral sclerosis (ALS) and seizure disorders. For more information on PsychoGenics Inc., visit www.psychogenics.com.

About Sumitomo Dainippon Pharma Co., Ltd.

Sumitomo Dainippon Pharma is among the top-ten listed pharmaceutical companies in Japan, operating globally in major pharmaceutical markets, including Japan, the U.S., China and the European Union. Sumitomo Dainippon Pharma aims to create innovative pharmaceutical products in the Psychiatry & Neurology area, the Oncology area and Regenerative medicine/Cell therapy field, which have been designated as the focus therapeutic areas. Sumitomo Dainippon Pharma is based on the merger in 2005 between Dainippon Pharmaceutical Co., Ltd., and Sumitomo Pharmaceuticals Co., Ltd. Today, Sumitomo Dainippon Pharma has more than 6,000 employees worldwide. Additional information about Sumitomo Dainippon Pharma is available through its corporate website at <https://www.ds-pharma.com>.

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For a copy of this release, visit Sunovion's web site at www.sunovion.com

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¹ U.S. Food and Drug Administration. Breakthrough Therapy. [Internet]. Available from:

<https://www.fda.gov/ForPatients/Approvals/Fast/ucm405397.htm>. Accessed February 2019.

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³ National Institute of Mental Health. Schizophrenia. [Internet]. Available from:

<https://www.nimh.nih.gov/health/topics/schizophrenia/index.shtml>. Accessed September 2018.