Sumitomo Dainippon Pharma

News Release

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Sumitomo Dainippon Pharma Co., Ltd.

# Results of Phase 3 Studies Evaluating Patch Formulation of Atypical Antipsychotic LONASEN® Presented at Congress

Sumitomo Dainippon Pharma Co., Ltd. (Head Office: Osaka, Japan; Representative Director, President and CEO: Hiroshi Nomura hereinafter called "Sumitomo Dainippon Pharma") announces that the results of Phase 3 studies (a confirmatory study and a long-term administration study) that evaluated a transdermal patch formulation of LONASEN® (generic name: blonanserin, hereinafter, "blonanserin"), an atypical antipsychotic agent, were presented in a poster presentation at WFSPB 2018 KOBE (WFSBP Asia Pacific Regional Congress of Biological Psychiatry; held September 7 – 9). The patch formulation is being jointly developed with Nitto Denko Corporation (Head Office: Osaka, Japan, Representative Director, President and CEO: Hideo Takasaki; hereinafter, "Nitto") and a new drug application has been submitted in Japan.

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| Title | The transdermal patch formulation of blonanserin (DSP-5423P) in the treatment of schizophrenia: a 6-week, randomized, placebo-controlled study |
| Presenter | Nakao Iwata (Professor, Department of Psychiatry, Fujita Health University School of Medicine) |
| Study design | Randomized, placebo-controlled, double-blind, international, multi-center clinical study to evaluate the efficacy of DSP-5423P when applied once daily at a dose of 40 mg or 80 mg for 6 weeks in patients with acute schizophrenia. |
| Efficacy | Of the 580 patients (DSP-5423P 40 mg/day group, 196 patients; DSP-5423P 80 mg/day group, 194 patients; and placebo group, 190 patients) randomized in the study, 577 patients were included in the primary analysis population (modified ITT). For change from the baseline to week 6 in the PANSS (Positive and Negative Syndrome Scale) total score (primary endpoint), both DSP-5423P 40 mg/day and 80 mg/day groups showed significant reductions compared with the placebo group in the population (Changes in PANSS total score: DSP-5423P 40 mg/day group, -16.4 [adjusted p=0.007]; DSP-5423P 80 mg/day group, -21.3 [adjusted p<0.001]; and placebo group, -10.8). |
| Safety | Adverse events, including skin-related events, that occurred in the DSP-5423P groups were generally mild. The incidence of adverse events that led to discontinuation was 8.7% in the DSP-5423P 40 mg/day group, 6.2% in the DSP-5423P 80 mg/day group, and 8.9% in the placebo group. |
| Conclusion | DSP-5423P dosing of 40 mg and 80 mg once daily was effective in patients with acute schizophrenia and demonstrated significant separation from placebo in 6-week double-blinded randomized trial. DSP-5423P was safe and tolerated in patients with acute schizophrenia. |

Note: The preliminary results of the confirmatory study were announced in a press release dated February 14, 2018.

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| Title | Long-term study of a transdermal patch formulation of blonanserin (DSP-5423P) in patients with schizophrenia |
| Presenter | Nakao Iwata (Professor, Department of Psychiatry, Fujita Health University School of Medicine) |
| Study design | The safety of blonanserin applied once daily at 40 to 80 mg (flexible dose) in a patch for 52 weeks was evaluated in Japanese patients with schizophrenia in a single-arm, open-label multicenter study. The efficacy and pharmacokinetics were also studied. The study was composed of two cohorts in a realistic clinical setting: patients in cohort 1 ceased the prior antipsychotic treatments and were started with LONASEN® tablets for 6 weeks, and then were switched to DSP-5423P with the comparable dose level of tablet treatment, and patients in cohort 2 ceased the prior antipsychotic treatments, and then were directly started with DSP-5423P 40 mg/day. |
| Efficacy | The mean PANSS total score was generally stable during the treatment period compared to the baseline and no deterioration was observed for psychological symptoms. The plasma concentration of blonanserin was dose-dependently increased (at blood collection), and the correlation between dose and plasma concentration was constant while applying DSP-5423P. |
| Safety | The incidence of adverse events in 200 patients (cohort 1, 97 patients; cohort 2, 103 patients) who were applied DSP-5423P was 87.0% (174 of 200 patients, 748 events). The incidence of serious adverse events and adverse events leading to discontinuation were 6.0% (12 of 200 patients, 13 events) and 14.0% (28 of 200 patients, 34 events), respectively. The incidence of adverse event was similar in cohort 1 and cohort 2. |
| Conclusion | DSP-5423P (40 to 80 mg/day) was generally safe and well-tolerated during the long-term treatment period and the incidence of adverse event was similar in the two cohorts. In addition, the efficacy and plasma concentration were maintained. |

Based on the favorable efficacy and safety of the blonanserin patch demonstrated by these clinical studies, Sumitomo Dainippon Pharma submitted a new drug application on July 31, 2018. If DSP-5423P is approved, we will be able to provide patients affected by schizophrenia with a treatment option that has a novel administration route. This new option is expected to help promote shared decision-making (SDM: approach where patients and healthcare professionals make therapeutic strategy decisions together) as well as improve medication adherence.

Note: The submission of a new drug application for the blonanserin patch was announced in a press release dated July 31, 2018.

Reference:

**PANSS: Positive and Negative Syndrome Scale**
The main purpose of this scale is to make a general evaluation of the mental state in schizophrenia. The scale has a total of 30 assessment items consisting of 7 positive items, 7 negative items, and 16 general psychopathology items; and each item is scored on a scale of 1 (no symptom) to 7

(greatest severity).

**Details of LONASEN® Patch Formulation**

LONASEN® is an oral, atypical antipsychotic agent discovered by Sumitomo Dainippon Pharma, which was launched in Japan for the indication of schizophrenia in April 2008. Having affinity for dopamine $D_2$ and $D_3$ receptors and serotonin 5-$HT_{2A}$ receptors, this drug showed efficacy for both the positive symptoms (such as hallucinations or delusions) and negative symptoms (such as flat affect or hypobulia) of schizophrenia in clinical studies.

In order to further stabilize the pharmacokinetics of LONASEN®, since 2010 Sumitomo Dainippon Pharma has been involved in joint development with Nitto Denko Corporation, a company that has the technology required for designing transdermal patch formulations. A new drug application for transdermal patch formulation was submitted in Japan in July 2018.

Because once-daily application of blonanserin to the skin maintains a stable drug concentration in the blood for 24 hours, high efficacy and safety can be expected. Blonanserin also has the beneficial characteristics of patch formulations—namely, it is easy to check medication status visually and susceptibility to the effects of food is low. This is very helpful to patients with irregular eating habits or for whom oral administration can be problematic (e.g., due to difficulty in swallowing).

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