

Santhera Announces Completion of First 6-Month Period of Pivotal VISION-DMD Trial with Vamorolone in Duchenne Muscular Dystrophy

Pratteln, Switzerland, March 3, 2021 – Santhera Pharmaceuticals (SIX: SANN) announces that the last patient has completed the last visit for the first period of the placebo-controlled pivotal VISION-DMD study with vamorolone in patients with Duchenne muscular dystrophy (DMD), conducted by partner ReveraGen Biopharma Inc. Subject to a positive 6-month topline data readout of this first study phase, this could allow for a regulatory submission to the US FDA in Q1-2022 with the potential to offer an alternative to current standard of care in DMD.

The 48-week Phase 2b VISION-DMD study is designed as a pivotal trial to demonstrate efficacy and safety of vamorolone administered orally at doses of 2.0 mg/kg/day and 6.0 mg/kg/day versus prednisone 0.75 mg/kg/day and placebo in ambulant boys aged 4 to <7 years with DMD [1]. Efficacy outcome measures are motor function and strength outcomes with Time to Stand test (TTSTAND) as the primary study endpoint. Additional analyses compare safety and tolerability between the vamorolone dose groups, placebo and prednisone. In the now completed 24-week, placebo- and active-controlled treatment period, patients were randomized to receive vamorolone 2.0 mg/kg/day, vamorolone 6.0 mg/kg/day, prednisone 0.75 mg/kg/day or matching placebo. For the second treatment period of another 24 weeks of continued study conduct, patients who previously received prednisone or placebo have been randomized and will be switched to one of two doses of vamorolone (2.0 or 6.0 mg/kg/day). This treatment period where all patients receive vamorolone is evaluating the persistence of effect in the longer term. In addition to efficacy, the study aims to confirm the differentiated safety and favorable tolerability profile of vamorolone with the potential to offer an alternative to current standard of care. Although glucocorticoids are part of the current care recommendations for DMD, their adverse effect profile limits their use as a chronic therapy.

“We are delighted about having achieved this important milestone and are looking forward to announcing the topline 6-month results of this pivotal study together with Santhera,” said **Eric Hoffman, PhD, President and CEO at ReveraGen BioPharma**. “The use of glucocorticoids, despite having proven benefits in the treatment of DMD, is severely limited due to side effects and poor tolerability. Our expectation is that vamorolone will have the benefits but avoids many of the tolerability issues that limit the use of this standard of care. Our thanks go out to the study participants, their families and healthcare professionals who, in the midst of the COVID-19 pandemic, are enabling us to advance this pivotal study as intended.”

“Based on previously established data, we believe that vamorolone has the potential to become a foundational therapy in DMD for patients irrespective of the underlying gene mutation and a promising alternative to existing corticosteroids,” noted **Dario Eklund, CEO of Santhera**. “Our organization is whole heartedly dedicated to bringing this novel therapy to patients who are hoping for a DMD therapy with fewer treatment limiting side effects, making it suitable for longer term administration and also improving quality of life.”

In the currently completed studies, a total of 48 patients have received various doses of vamorolone; of which 41 patients have been treated and evaluated for a period of 2.5 years. Aggregate clinical data from these open label studies in DMD published to date showed sustained efficacy and clinical improvement with vamorolone across multiple endpoints [2]. Additionally, vamorolone did not show stunting of growth seen with deflazacort and prednisone, and also showed fewer physician-reported adverse events such as mood disturbance, excessive hair growth, and Cushingoid appearance [2].

About Vamorolone

Vamorolone is a first-in-class drug candidate that binds to the same receptor as corticosteroids but modifies its downstream activity and as such is a dissociative partial agonist [3-6]. This mechanism has the potential to ‘dissociate’ efficacy from typical steroid safety concerns and therefore vamorolone could emerge as a promising alternative to existing corticosteroids, the current standard of care in children and adolescent patients with DMD. There is substantial unmet medical need in this patient group as high-dose corticosteroids have significant systemic side effects that diminish patient quality of life. In the pivotal Phase 2b VISION-DMD trial [1], the last patient has completed the last visit of the 24-week, placebo- and active-controlled treatment period and topline 6-month data are expected in Q2-2021, paving the way for a US NDA submission in Q1-2022. Vamorolone has been granted Orphan Drug status in the US and in Europe, and has received Fast Track and Rare Pediatric Disease designations by the US FDA and Promising Innovative Medicine (PIM) status from the UK MHRA.

Vamorolone was discovered by US-based ReveraGen BioPharma, Inc. and is being developed in collaboration with Santhera, which owns worldwide rights to the drug candidate in all indications. The vamorolone development program has received funding from several international non-profit foundations and patient organizations, the US National Institutes of Health, the US Department of Defense and the European Commission’s Horizon 2020 program.

References:

- [1] VISION-DMD (VBP15-004) study information at [ClinicalTrials.gov](https://clinicaltrials.gov) Identifier: NCT03439670 and study website <https://vision-dmd.info/2b-trial-information>
- [2] Smith E, et al. (2020). PLOS Medicine, [Link](#)
- [3] Heier CR et al. (2013). VBP15, a novel anti-inflammatory and membrane-stabilizer, improves muscular dystrophy without side effects. *EMBO Mol Med* 5: 1569–1585.
- [4] Reeves EKM, et al (2013) VBP15: preclinical characterization of a novel anti-inflammatory delta 9,11 steroid. *Bioorg Med Chem* 21(8):2241-2249
- [5] Heier CR et al. (2019). Vamorolone targets dual nuclear receptors to treat inflammation and dystrophic cardiomyopathy. *Life Science Alliance* DOI 10.26508/lsa.201800186.
- [6] Liu X et al. (2020). Disruption of a key ligand-H-bond network drives dissociative properties in vamorolone for Duchenne muscular dystrophy treatment. *Proc Natl Acad Sci USA*. [Link](#)

About Santhera

Santhera Pharmaceuticals (SIX: SANN) is a Swiss specialty pharmaceutical company focused on the development and commercialization of innovative medicines for rare neuromuscular and pulmonary diseases with high unmet medical need. Santhera has an exclusive license for all indications worldwide to vamorolone, a first-in-class dissociative steroid with novel mode of action, currently investigated in a pivotal study in patients with DMD as an alternative to standard corticosteroids. The clinical stage pipeline also includes lonodelestat (POL6014) to treat cystic fibrosis (CF) and other neutrophilic pulmonary diseases as well as an exploratory gene therapy approach targeting congenital muscular dystrophies. Santhera out-licensed ex-North American rights to its first approved product, Raxone®

(idebenone), for the treatment of Leber's hereditary optic neuropathy (LHON) to Chiesi Group. For further information, please visit www.santhera.com.

Raxone® is a trademark of Santhera Pharmaceuticals.

About ReveraGen BioPharma

ReveraGen was founded in 2008 to develop first-in-class dissociative steroidal drugs for Duchenne muscular dystrophy and other chronic inflammatory disorders. The development of ReveraGen's lead compound, vamorolone, has also been supported through partnerships with foundations worldwide, including Muscular Dystrophy Association USA, Parent Project Muscular Dystrophy, Foundation to Eradicate Duchenne, Save Our Sons, JoiningJack, Action Duchenne, CureDuchenne, Ryan's Quest, Alex's Wish, DuchenneUK, Pietro's Fight, Michael's Cause, and Duchenne Research Fund. ReveraGen has also received generous support from the US Department of Defense CDMRP, National Institutes of Health (NCATS, NINDS, NIAMS), and European Commission (Horizons 2020). www.reveragen.com

For further information please contact:

Santhera

Santhera Pharmaceuticals Holding AG, Hohenrainstrasse 24, CH-4133 Pratteln
public-relations@santhera.com or

Eva Kalias, Head External Communications

Phone: +41 79 875 27 80

eva.kalias@santhera.com

ReveraGen BioPharma

Eric Hoffman, PhD, President and CEO

Phone: + 1 240-672-0295

eric.hoffman@reveragen.com

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