SWISS BIOTECH DAY 2018
Basel, 3 May 2018
Thomas Meier, CEO
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Our mission

We are focusing on the development of treatments for neuro-ophthalmological, neuromuscular and pulmonary diseases that have a high unmet medical need.

Focus on rare diseases

- Neuro-ophthalmological
- Neuromuscular
- Pulmonary

THEIR FUTURE – OUR FOCUS
Our product pipeline

**Three different drug candidates covering three therapeutic areas:**

- Neuro-ophthalmological diseases
- Neuromuscular diseases
- Pulmonary diseases

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*Raxone® (Santhera Pharmaceuticals) is the tradename for idebenone. Raxone (150 mg idebenone) is currently approved for the treatment of visual impairment in adolescent and adult patients with LHON GC: glucocorticoid.*
Raxone® in Leber’s Hereditary Optic Neuropathy (LHON)
Neuro-ophthalmological Diseases
Raxone® is the first and only approved treatment for LHON

- LHON, a rare mitochondrial disease resulting in progressive and severe vision loss
- Most common in males with a disease onset between 15 – 35 years of age
- Within 1 year > 90% of patients experience vision loss in both eyes

Raxone® can lead to stabilization or recovery of vision
Raxone® improves vision in patients with LHON

Prevention of further vision loss by **clinically relevant stabilization** (CRS) and improvement of visual acuity by a **clinically relevant recovery** (CRR) are important and meaningful outcomes for patients with LHON.

Clinical data have shown:

1 in 2 patients who received idebenone experienced a CRS, with vision remaining below logMAR 1.0**

1 in 3 patients who have lived with LHON for up to 5 years before treatment achieved a CRR after 6 month idebenone treatment

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* ETDRS: early treatment diabetic retinopathy study; **logMAR: logarithm of the minimum angle of resolution
Raxone® sales in LHON since marketing authorization

- Raxone® is fully reimbursed in 8 European countries
- In an additional 12 European countries, Raxone® is currently available by special reimbursement schemes
- In 2017, Israel was granted first approval of Raxone® outside the EU
- **Sales guidance for 2018: CHF 28-30 million**
LEROS: An open-label, interventional Phase 4 study to assess the long-term efficacy and safety of Raxone® in LHON

External natural history controlled, open-label intervention study to assess the efficacy and safety of long-term treatment with idebenone in LHON

Population: Males and females with LHON ≥ 12 years of age
Onset of symptoms ≤ 5 years at baseline

Study design: Open-label, interventional Phase 4

Treatment: Single group assignment of idebenone
300mg orally, 3 times daily

Treatment duration: 24 months

Key endpoint: Clinically relevant recovery (CRR) of visual acuity

Status: Recruiting

Centers and locations:

Countries:
- Austria
- Belgium
- Germany
- Italy
- Portugal
- Spain
- UK
- Poland
- Bulgaria
- U.S.
Outlook Neuro-ophthalmology business

- Raxone® approved in Europe for LHON
- Projected sales for 2018 reach profitability for neuro-ophthalmology business (including post approval studies)
- Anticipated peak sales potential for Europe: CHF ~50 million p.a.
- Protection through Orphan Drug Status in Europe until 4Q 2025
- Expansion of marketing authorizations to countries outside Europe
Our product pipeline

**Three different drug candidates covering three therapeutic areas:**

- Neuro-ophthalmological diseases
- Neurmuscular diseases
- Pulmonary diseases

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Raxone® in Duchenne Muscular Dystrophy
Neuromuscular Diseases
Urgent medical need for new therapies in DMD

- Increasing respiratory muscle weakness in DMD leads to:
  - Decreased lung volumes and flow rates
  - Decreased ability to cough effectively and clear airways from mucus
  - Increased risk of airway infections
- There are no approved pharmacological therapies for treating respiratory decline
- ~35,000 patients combined in US and Europe
Santhera studies in DMD – Patient eligibility

40% of patients 10 years and older are not using glucocorticoids and were eligible for the DELOS study:

The DELOS study (Phase 3)

- Treatment duration: 52 weeks
- Completed

Patients with DMD not using glucocorticoids

Patients with DMD using glucocorticoids

Patients who are currently using glucocorticoids are eligible to enter the SIDEROS study:

The SIDEROS study (Phase 3)

- Treatment duration: 78 weeks
- Ongoing

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<th>Placebo</th>
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# Regulatory strategy

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**Patients with DMD not using glucocorticoids**

- Successful Phase 3 DELOS trial as basis for regulatory dossier
- Additional natural history data to establish clinical relevance of treatment effect
- Additional open-label data with idebenone
- Best approval pathway in EU and US under consideration

**Patients with DMD using glucocorticoids**

- Positive SIDEROS Study allows expansion of label to all patients irrespective of GC use status
- Top-line data available 2H 2020

GC: Glucocorticoid
A Phase 3 double-blind study with idebenone in patients with DMD taking glucocorticoid steroids (SIDEROS)

<table>
<thead>
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<th>Population</th>
<th>Patients ≥ 10 y in respiratory function decline</th>
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<tr>
<td>Study design</td>
<td>Intervventional, placebo controlled, Phase 3, RCT</td>
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<tr>
<td>Treatments</td>
<td>Parallel group assignment to idebenone 300mg orally 3 time daily, or placebo</td>
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<td>Treatment duration</td>
<td>18 months</td>
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<td>Key endpoint</td>
<td>Change from baseline in forced vital capacity percent predicted (FVC %p) at 18 months</td>
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<td>Status</td>
<td>Recruiting</td>
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>60 sites across the EU, U.S. and Israel

- 10 EU countries
- 1 non-EU country
- 18 states across US

Status: March 2018

FVC: forced vital capacity; GC: glucocorticoid; RCT: randomized controlled trial
US Expanded Access Program: BreatheDMD

A US Expanded Access Program (EAP) in patients with DMD

Population
DMD patients ≥ 10 years in respiratory decline

Objective
Provide access to treatment with idebenone for patients with DMD in the US

Treatment
Idebenone 300mg orally 3 times daily

Key endpoints
Safety, tolerability, effectiveness and QoL data

Status
Enrolling

Centers and locations
Up to 35 sites across the US

Supported by:

Please visit www.breathedmd.com for more information
Santhera’s disease awareness campaigns in DMD

Dedicated website providing information on respiratory function care

- US website: www.takeabreathdmd.com
- European website: www.breatheduchenne.com
Omidapil in Congenital Muscular Dystrophy (CMD)
Neuromuscular Diseases
CMD is a group of inherited neuromuscular diseases

CMD is characterized by **progressive** and potentially life-threatening **muscle weakness**

Affected patients experience **weakness in upper and lower extremities** and **decline in respiratory function**

Affects both boys and girls **equally**, with a disease onset frequently at **birth or early childhood**

Prevalence is estimated as ~**1 – 4 per 100,000**
CALLISTO: Safety and pharmacokinetics of omigapil in CMD

Ascending, multiple dose cohort study evaluating the pharmacokinetic profile, safety and tolerability of oral omigapil in pediatric and adolescent patients with CMD

- **Population**: 5 - 16 year-old males and females with a CMD (clinical picture: Ullrich CMD or MDC1A)
- **Study design**: Phase 1, open-label, sequential group study
- **Treatment**: 5 groups with different omigapil doses
- **Treatment duration**: 12 weeks
- **Centers**: Single center in the US (NINDS, NIH)
- **Key objectives**: Establish the pharmacokinetic profile, safety and tolerability of omigapil in children and adolescents with CMD
- **Status**: Complete
Santhera Announces Successful Completion of First Clinical Trial with Omigapil in Patients with Congenital Muscular Dystrophy

Pratteln, Switzerland, April 5, 2018 – Santhera Pharmaceuticals (SIX: SANN) reports the successful completion of the first clinical trial with omigapil in patients with two forms of congenital muscular dystrophy (CMD) conducted in the US at the National Institutes of Health (NIH). The ascending multiple dose cohort study (CALLISTO) met its primary objective to establish a favorable pharmacokinetic profile of omigapil and demonstrated that the study drug was safe and well tolerated in children and adolescents with CMD. Following further data analysis, the Company will discuss these results with clinical experts and regulatory authorities to prepare for a pivotal trial in patients with CMD.
Outlook: Neuromuscular diseases pipeline

**Idebenone in DMD**
- Roll-out Expanded Access Program in US
- Prepare for EU and US regulatory filing, initially for patients not using GCs
- Continue SIDEROS study in GC users; expected high level readout 2H 2020

**Omigapil in CMD**
- Discuss new study design with clinical expert team
- Obtain input from US and EU regulators on development plan for 2 CMD subtypes

GCs: glucocorticoids
Our product pipeline

Three different drug candidates covering three therapeutic areas:

- Neuro-ophthalmological diseases
- Neuromuscular diseases
- Pulmonary diseases

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POL6014 in Cystic Fibrosis (CF)
Pulmonary Diseases
Cystic Fibrosis, a rare inherited lung disease

- CF is a progressive, genetic disease leading to thick mucus in the lung (airway obstruction)
- This results in persistent lung infections, chronic inflammation and loss of respiratory function

- The disease is diagnosed in young children, about 70,000 patients live in US & EU
- Current treatments do not specifically address the chronic, underlying inflammation
Targeting elastase for chronic lung inflammation

- Inflammation causes excessive production of human neutrophil elastase (hNE)
- Elevated hNE levels play a central role in lung tissue damage

- POL6014, a cyclic peptide, is a reversible, competitive and selective inhibitor of hNE
- The compound has been rationally designed for potency and selectivity
- The drug is administered via inhalation to achieve high concentrations in the lung

- Chronic inflammation is also present in other so-called neutrophilic lung diseases
- POL6014 presents an opportunity for a pipeline in a product
Outlook: POL6014 Development Plan

POL6014 in CF

• Start multiple ascending dose trial in CF patients (3Q 2018)
• Apply for Orphan Drug Designations for CF in EU and US (2H 2018)
• Prepare for Phase II efficacy trial (2019)

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<td>Phase 2 Efficacy Study in CF patients</td>
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POL6014 in other pulmonary diseases

• Explore opportunities in other pulmonary diseases with clear rationale for elastase inhibition
Summary

• Continue to establish Santhera as specialty pharma company with focus on orphan drugs
• Successfully expanded pipeline to three therapeutic focus areas of orphan diseases
• First product (Raxone®) successfully launched in rare neuro-ophthalmological disease (LHON)
• Positive data from Phase 3 trial as basis for regulatory filing strategy in subset of DMD patients
• Company adequately funded to execute development and commercial plans
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