FLEXPharma

Novel Treatments for Neuromuscular Conditions

June 2015

NASDAQ: FLKS
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clinical studies; the uncertainties inherent in conducting clinical studies; results from our ongoing and planned
preclinical development; expectations of our ability to make regulatory filings and obtain and maintain regulatory
approvals, our ability to develop and commercialize our consumer products; anticipated positioning and product
attributes of our consumer products; results of early clinical studies as indicative of the results of future trials;
availability of funding sufficient for the company’s foreseeable and unforeseeable operating expenses and capital
expenditure requirements; other matters that could affect the availability or commercial potential of the company’s
consumer or drug product candidates; the inherent uncertainties associated with intellectual property; and other
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statements at some point in the future, we have no current intention of doing so except to the extent required by
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This presentation also contains estimates and other statistical data made by independent parties and by the
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number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. In
addition, projections, assumptions and estimates of the company’s future performance and the future performance
of the markets in which the company operates are necessarily subject to a high degree of uncertainty and risk.
Company Overview

Novel Treatments for Severe Neuromuscular Conditions

• Developing innovative and proprietary treatments for nocturnal leg cramps and spasms associated with severe neuromuscular conditions

• Novel insights regarding neuromuscular physiology from our co-founders (ion channels and TRP biology, MacKinnon Nobel Prize 2003; NAS members) form the basis of our development efforts

• Demonstrated statistically significant reduction in the intensity of muscle cramps in 3 randomized, blinded, placebo-controlled cross-over studies of healthy normal volunteers (p<0.0001)

• Flex Pharma developing:
  • Prescription Drug – initial focus in nocturnal leg cramps where we estimate ~4 million U.S. adults over 65 suffer daily
    • Future opportunities: MS spasticity, cervical dystonia, SCI spasticity
  • Consumer Product – for exercise-associated muscle cramps
**Company Pipeline**

<table>
<thead>
<tr>
<th>Target Market</th>
<th>Efficacy Testing</th>
<th>Taste Formulation</th>
<th>Stability Testing / Brand Development</th>
<th>Product Launch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise-Associated Muscle Cramps</td>
<td>Completed</td>
<td>Ongoing</td>
<td></td>
<td>H1 2016</td>
</tr>
</tbody>
</table>

*Combination of TRP activators as consumer goods opportunity*

<table>
<thead>
<tr>
<th>Prescription Drug Target Indication</th>
<th>Healthy Normal Volunteers</th>
<th>Human Proof-of-Principle</th>
<th>Phase II Registration-Directed&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nocturnal Leg Cramps</td>
<td>Completed</td>
<td>Initiated Q2 2015 with proprietary treatment</td>
<td>If drug formulation efforts and POC studies are successful</td>
</tr>
<tr>
<td>MS, Spinal Spasticity, and/or CD</td>
<td></td>
<td>Evaluating initiation for one or more indications</td>
<td></td>
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</tbody>
</table>

*Drug product candidates in development will include purified TRP activators in proprietary treatment*

*Randomized, blinded, placebo-controlled cross-over studies*

*Initiating at least 1 NLC human proof-of-concept study of our treatment in Q2 2015*

<sup>1</sup> Does not apply to MS, cervical dystonia, or SCI
Management Team and Board of Directors

Management Team

Christoph Westphal, MD PhD, CEO; Cofounder/Lead investor ALNY MNTA XLRN SIRT VSTM OVAS
Jennifer Cermak, PhD, Cofounder, VP R&D; SIRT, GSK, UTHR, PFE
Rob Hadfield, General Counsel; Cooley LLP, Kiva Systems, SG Cowen
Marina Hahn, President, Consumer Goods; Spirits Marque One (SVEDKA vodka), William Morris, Pepsi
John McCabe, VP Finance; ARIA, CRAI, BIIB, Arthur Andersen
Thomas Wessel, MD PhD, CMO; JNJ (Razadyne®), SEPR (Lunesta®), ACOR (Ampyra®)
Elizabeth Woo, SVP, Investor Relations; Biogen, Ironwood Pharmaceuticals, Cubist

Board of Directors

Jeff Capello, CFO Ortho-Clinical Diagnostics; BOD OVAS, former BSX CFO, PKI, PWC
Peter Barton Hutt, Former Chief Counsel FDA; SIRT, MNTA, CNCE, Covington and Burling
Marc Kozin, LEK Consulting, former President of North American practice; BOD OVAS, ECYT, DYAX, UFPT
Rod MacKinnon, MD, Cofounder, Chair, SAB; Nobel Prize 2003, ion channels; Professor, Rockefeller; NAS
Stuart Randle, former CEO GI Dynamics, former CEO ACT Medical, Baxter
John Sculley, former CEO Pepsi (current owner of Gatorade), former CEO Apple
Scientific Advisory Board

Rod MacKinnon, MD, Cofounder, Chair, SAB; Nobel Prize 2003, ion channels; Professor, Rockefeller; NAS

Bruce Bean, PhD, Cofounder, Chair, SAB; Winthrop Professor, Harvard Med; Neurophysiology; NAS

David Julius, PhD, SAB; Professor and Chair, Department of Physiology, UCSF; Discoverer TRP; NAS

Roger Tung, PhD, SAB; Medicinal chemist, Vertex, Merck (inventor multiple drugs); CEO, CNCE

Chris Walsh, PhD, SAB; Professor Emeritus, Harvard Med; Genzyme, Verastem, Sirtris; NAS

John Winkelman, MD, PhD, SAB; Chief Sleep Disorders, MGH; BWH, RLS clinical development
Pre-IPO Investors and Advisors

**Institutional Investors**
- Longwood Fund
- Bessemer Venture Partners
- EcoR1 Capital
- Jennison Associates
- Lightstone Ventures
- Alexandria Equities
- CD-Venture (Christoph Boehringer)
- City Hill Venture Partners (Jonathan Lim, CEO Ignyta)

**Investors & Advisors**
- **Rick Beleson**, retired SVP, Capital Research Company
- **Todd Dagres**, Spark Capital General Partner; Investor Oculus, Twitter, Akamai
- **Dan Gold**, Founder/CEO/Managing Partner, QVT Financial LP
- **Wyc Grousbeck**, Managing Partner, Governor, CEO Boston Celtics
- **Robert S. Kaplan**, Harvard Business School Professor and Senior Associate Dean
- **KPC Venture Capital (Kraft family)**, Owner New England Patriots, New England Revolution
- **Peter Lynch**, Trustee, The Lynch Foundation
- **John Maraganore**, PhD, Biogen, MLNM, CEO Alnylam
- **PagsGroup (Steve Pagliuca)**, Managing Partner, Bain Capital; Managing Partner, Boston Celtics
- **Bill Sahlman**, Harvard Business School Professor
- **Jonathan Seelig**, Cofounder Akamai Technologies
- **Lawrence Summers**, former U.S. Treasury Secretary, President Emeritus of Harvard University
- **Mark Wan**, Causeway Partners; Minority Owner: Boston Celtics, SF 49ers
Large and Diverse Market Opportunities

Prescription Drug

**Nocturnal Leg Cramps**
Sudden painful contraction reducing sleep quality
No drug approved in the U.S.

**Spasticity in Severe Neuromuscular Conditions**
Spinal Cord Spasticity, Dystonias, Multiple Sclerosis

U.S. Patient Population
- 37% prevalence for 50+ yo
- ~4M over 65 yo suffer daily

U.S. Market
- Initial target: athletes engaging in high-intensity sports
- Potential future targets: casual sports participants

Consumer Brand

**Exercise Associate Muscle Cramps (EAMCs)**

U.S. Patient Population
- Cervical dystonia: 90K patients
- Spinal spasticity: 150K patients
- MS: 250K – 350K patients

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2 Management estimates based on third party survey results
3 National Spasmodic Torticollis Association
4 Management estimates
5 National Institute of Neurological Disorders and Stroke
Causes of Muscle Cramping and Spasticity

- Cramps and spasms are generally NOT caused by dehydration, lactic acid buildup or electrolyte imbalances affecting the muscle.
- Muscle cramping is caused by excessive firing of alpha-motor neurons in the spinal cord, which trigger a painful contraction of the muscle.
- Repetitive muscle use induces hyperexcitability of alpha-motor neurons, causing them to fire excessively and trigger cramping.

Hyperexcitability of alpha-motor neurons is also a likely basis for spasticity and spasms.
Cryo-EM structures: Transient Receptor Potential (TRP) Ion Channels

TRPV1


TRPA1

Company Approach – Ion Channel Activation

1. Flex proprietary treatment, taken orally, topically stimulates primary sensory neurons in the gastrointestinal tract by activating TRPV1 and TRPA1 ion channels.

2. Stimulated neurons send impulses to spinal cord.

3. With enhanced inhibitory tone, excessive firing of the alpha motor neurons is reduced. This reduces repetitive signals to and from the muscle and reduces the cramp/spasm.

4. Our Hypothesis


Human Proof of Concept

- Flex Pharma assays muscle cramping in human subjects using published procedures to induce muscle cramping by repeated electrical stimulation
  - Previous studies have shown a correlation between electrically induced cramping and individual susceptibility to naturally occurring cramping

- To quantify cramping, Flex Pharma employs surface electromyography (EMG) recording

- Initial experiments conducted on calf muscle

- Cramping of calf muscle is very painful; subsequent healthy normal volunteer studies: big toe flexor muscle
Standardized Testing Protocol

1. Stimulating electrodes and recording sensors are attached to the big toe flexor muscle.

2. Electric stimulation induces a cramp. Quantitative EMG measures cramp intensity and duration to establish a baseline.

3. Subject ingests Flex proprietary treatment. This is time point zero.

4. Electrical induction of cramps at various time points after subject takes Flex proprietary treatment. EMG compared to baseline.

Ex: duration of baseline cramp is 80 seconds

Ex: minimal cramp 1 hour post Flex product
Flex-001, -002 & -003 Study Designs

To evaluate efficacy in preventing cramps the following time points were studied with and without the Flex treatment:

<table>
<thead>
<tr>
<th>Flex Study</th>
<th>0 min</th>
<th>15 min</th>
<th>1 hr</th>
<th>2 hr</th>
<th>4 hr</th>
<th>6 hr</th>
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<tr>
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<tr>
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<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Objective: Evaluate the efficacy of the proprietary treatment in preventing muscle cramps

Design: Randomized, blinded, placebo-controlled cross-over design
Tested under dietary supplement guidelines

Subjects: Completed 3 studies with 37 healthy normal volunteers (n=6, Flex-001; n=16, Flex-002; n=15, Flex-003)

Endpoint: Cramp reduction with and without proprietary treatment
Flex treatment and vehicle data were compiled across Flex-001, -002, and -003. Statistically significant overall treatment effect of Flex product in reducing muscle cramps across 37 healthy normal volunteers (ANOVA, p<0.0001)

Statistically significant difference between Flex proprietary treatment and vehicle observed at multiple time points; Effect appears at 15 minutes, lasting for 6 – 8 hours

Flex product was well-tolerated with no serious adverse events
Help for People with Muscle Cramps?

MINNEAPOLIS – A new treatment may bring hope for people who suffer from muscle cramps or spasms from neuromuscular disorders, diseases such as multiple sclerosis or simply from nocturnal leg cramps that keep people from sleeping, according to a study released today that will be presented at the American Academy of Neurology's 67th Annual Meeting in Washington, DC, April 18 to 25, 2015.

“These results support our belief that this treatment has significant potential as a solution for people suffering from muscle cramping and possibly spasms from a broad range of neuromuscular disorders, nocturnal leg cramps, multiple sclerosis, spinal spasticity and cervical dystonia. Cramps can impact even the world’s fittest athletes at critical times,” said co-author Dr. Rod MacKinnon, M.D., Nobel laureate and co-founder of Flex Pharma in Cambridge, MA, which is developing the treatment.

The treatment is based on research showing that cramps are caused by excessive firing of neurons in the spinal cord that control muscle contraction. The treatment is designed to stop the firing of the neurons by stimulating the transient receptor potential (TRP) ion channels.

For the study, the researchers used an electrical neurostimulator to induce muscle cramps in the feet of 37 healthy people. In the randomized, blinded study, half of the participants received the treatment while half received a placebo. Then they received the other treatment.

When participants received the treatment, which was taken by mouth, their cramps were three times less intense than when they received the placebo. The treatment took effect within minutes and lasted up to six to eight hours.

“Nocturnal leg cramps can cause distress, interrupted sleep, reduced quality of life and interference with activities of daily living,” said Dr. Rod MacKinnon, M.D. “We estimate that approximately four million U.S. adults over the age of 65 suffer daily from nocturnal leg cramps, a condition for which there is significant unmet need since there are no approved treatments.”

The study was supported by Flex Pharma.

To learn more, please visit www.aan.com.

The American Academy of Neurology, an association of more than 28,000 neurologists and neuroscience professionals, is dedicated to promoting the highest quality patient-centered neurologic care. A neurologist is a doctor with specialized training in diagnosing, treating and managing disorders of the brain and nervous system such as Alzheimer’s disease, stroke, migraine, multiple sclerosis, brain injury, Parkinson’s disease and epilepsy.
Planned Human Efficacy Studies

- In NLC, initiated human efficacy study in Q2 2015
  - Randomized, blinded, placebo-controlled, cross-over designs
  - Conducted in the U.S.
  - ~40 subjects with NLC at least 4 nights/week
- 6 week study period:
  - 2 week placebo run-in to eliminate placebo effects
  - 2 week treatment or placebo
  - 2 week cross-over
- Estimated 12-15 months to complete
- Evaluating second study ex-US
- Potential to initiate 1 or more human efficacy studies in patients that suffer from MS spasticity, cervical dystonia, or SCI spasticity
• Prosecuting three patent applications
  • Methods and compositions for preventing, treating or ameliorating muscle cramping and/or accelerating nerve-muscle recovery from exercise fatigue
  • Compositions of ion channel activators and methods of preparation, formulation, and the medical use of these compositions
  • Compositions of capsaicinoids and capsinoids, and methods of preparation, formulation, and the medical use of these compositions

• One provisional patent applications has been filed in the U.S.
  • Methods of diagnosing and selecting a patient for treatment
Flex Pharma Consumer Brand
Introducing a groundbreaking category-defining product that solves an unsolved medical mystery.
The Equation

Breakthrough, Efficacious PRODUCT

+ 

Culturally Relevant, magnetic LIFESTYLE BRAND

HUGE OPPORTUNITY
The Road TO UNSTOPPABLE

It all starts with Rod MacKinnon

Nobel Prize winning neuroscientist

Endurance Athlete

Alpha Achiever
While sea kayaking he suffered debilitating muscle cramps
Rod the athlete was frustrated
Rod the scientist set out to find a solution

He soon discovered that all existing “remedies” – that claim to treat the muscle – do not work

hydration  potassium  rest
Then Rod had a major breakthrough:

“It’s not about treating the muscle, it’s about treating the nerve”

#ITSTHENERVE
Applying his expertise in neuroscience
Rod’s 4 year exploration led him to a genius solution

The first sports beverage clinically proven
to prevent & treat muscle cramps
That can help millions of athletes become unstoppable
Our Product: Powerful

- Efficacious, proven to prevent and treat muscle cramps
- Invented by a Nobel Prize winning endurance athlete
- Precisely calibrated formulation of ingredients
- Communicates with nerve receptors and calms the nerve
- Works in minutes, lasts for hours
- Has a real spicy kick to it that tells you it’s working
- Backed by hard science
- 2 oz shot
- Organic

The First Clinically Proven Product that Treats and Prevents Exercise Associated Muscle Cramps (EAMC)
Our Target Transcends Demographics

“Alpha Humans”
Our Target: Endurance Athletes

Who can be our evangelists?

Endurance Athletes
47% experience EAMC

Regular “Intense” Exercisers
26% experience EAMC

Adults (18+)
17% experience EAMC

Source: Toluna Custom Survey, 1,000 online respondents

- Percentages include the portion of respondents in each category who say they experience muscle cramps during or after exercise.
- Regular “Intense” Exercisers include adults that engage in intense physical activity on a regular basis (e.g. long workouts, endurance competitions, etc.)
- Endurance Athletes include adults who consider themselves a runner, tri-athlete, cyclist or endurance athlete and participate in intense physical activity on a regular basis
A loss of *power*, *achievement*, and *control* for people who are obsessed with all three - and, perhaps, further humiliation since cramps are (falsely) associated with failure to train properly.

**Potential for a high level of emotional engagement**

<table>
<thead>
<tr>
<th>THE TARGET</th>
<th>THE MUSCLE CRAMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>over achieves</td>
<td>achievement prevention</td>
</tr>
<tr>
<td>want to be immortal</td>
<td>body betrays them</td>
</tr>
<tr>
<td>are control freaks</td>
<td>loss of control</td>
</tr>
<tr>
<td>is defined by their sport</td>
<td>loss of identity</td>
</tr>
<tr>
<td>is uber confident</td>
<td>humiliation</td>
</tr>
</tbody>
</table>
The Cultural Context

Rise of Endurance Sports  Smart is Cool  Always in Control

Hot is Hot  Organic Rules  Small is the New Big
Our Brand Positioning: “The Sweet Spot”

Target
Alpha Humans for whom EAMC can mean a humiliating loss of power, achievement and control

Cultural Context
Interest in endurance sports and smart, effective, natural products

Product
Efficacious solution brought to you by a Nobel-Prize winning endurance athlete

Whitespace
Existing consumer products have not been shown to be clinically effective

Brand Positioning:
The genius solution that lets true achievers control the cramp and achieve their full potential
**Objective:**
To establish “Project Alpha” as a cult-lifestyle brand among Alpha Humans, that represents a true scientific breakthrough in sports.

**Strategic Approach:**
Community-Centric, Word-of-Mouth, Social, PR

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**Soft-Launch: Seed the Discovery (2015)**

- **Q3**
  - Establish Endurance Sports Credibility

- **Q4**
  - Educate, Evangelize & Build Demand

**Launch: Seed the Product (2016)**

- **Q1-Q2**
  - Activate Strategic Partners

- **Q3-Q4**
  - Expand Distribution
Financial Profile

- $110.5 M = Cash balance as of 3/31/15
  - $79.9 M = Net Proceeds raised in IPO
  - 5,491,191 shares of common stock @ $16/share
- Cash through mid-2018 based on current operating plan
- Post IPO: ~17.9 million shares outstanding
- NASDAQ: FLKS
- No debt
Novel Treatments for Neuromuscular Conditions

NASDAQ: FLKS