UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): November 7, 2016

ATYR PHARMA, INC.
(Exact name of registrant as specified in its charter)

Delaware	**001-37378**	**20-3435077**
(State or other jurisdiction of incorporation)	**(Commission File Number)**	**(I.R.S. Employer Identification No.)**

3545 John Hopkins Court, Suite #250
San Diego, CA 92121
(Address of principal executive offices, including zip code)

(858) 731-8389
(Registrant's telephone number, including area code)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 7.01 Regulation FD Disclosure.

aTyr Pharma, Inc. (the "Company") intends to use an investor presentation to conduct meetings with investors, stockholders and analysts and at investor conferences, and which the Company intends to place on its website. A copy of the presentation materials is attached hereto as Exhibit 99.1. The Company does not undertake to update the presentation materials.

The information under this Item 7.01, including Exhibit 99.1, is being furnished and shall not be deemed "filed" for the purposes of Section 18 of the Securities and Exchange Act of 1934, as amended, or the Exchange Act, or otherwise subject to the liabilities of that section, nor shall they be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as expressly set forth by specific reference in such filing.

Item 9.01 Exhibits.

(d) Exhibits

Exhibit No.	Description
99.1	Corporate Presentation Materials of aTyr Pharma, Inc. dated November 2016

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Date: November 7, 2016

aTyr Pharma, Inc.

By: /s/ John D. Mendlein
John D. Mendlein, Ph.D.
Chief Executive Officer

EXHIBIT INDEX

Exhibit No.	Description
99.1	Corporate Presentation Materials of aTyr Pharma, Inc. dated November 2016

New Hope For Severe Rare Muscle & Lung Disease Patients

Building a New Class of Medicines

Physiocrine Based Therapeutics To Promote Tissue Homeostasis

aTyr Pharma

Corporate Presentation

November 2016

Forward-Looking Statements

The following slides and any accompanying oral presentation contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. The use of words such as "may," "might," "will," "should," "expect," "plan," "anticipate," "believe," "estimate," "project," "intend," "future," "potential," "opportunity," or "continue," and other similar expressions are intended to identify forward-looking statements. For example, all statements we make regarding the potential therapeutic benefits of Physiocrines and our product candidates, including Resolaris™ and iMod. Fc, the ability to successfully advance our pipeline or product candidates, the timing within which we expect to initiate, receive and report data from, and complete our planned clinical trials, and our ability to receive regulatory approvals for, and commercialize, our product candidates, our ability to identify and discover additional product candidates, and the ability of our intellectual property portfolio to provide protection are forward-looking statements. All forward-looking statements are based on estimates and assumptions by our management that, although we believe to be reasonable, are inherently uncertain. All forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those that we expected. These risks, uncertainties and other factors are more fully described in our filings with the U.S. Securities and Exchange Commission, including our most recent Annual Report on Form 10-K and in our subsequent filings. The forward-looking statements in this presentation speak only as of the date of this presentation and neither we nor any other person assume responsibility for the accuracy and completeness of any forward-looking statement. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise, except as required by law.

We own various U.S. federal trademark applications and unregistered trademarks, including our company name and Resolaris™. All other trademarks or trade names referred to in this presentation are the property of their respective owners. Solely for convenience, the trademarks and trade names in this presentation are referred to without the symbols ® and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Treating Rare Disease Patients with Agonists of Homeostatic Pathways

Physiocrine* Biology	• Pioneering new biology to provide new therapeutic intervention points • Human proteins evolved from gene family over more than 3 billion years
Resokine Pathway	• Potentially new treatment paradigm of immuno-modulation • In vivo, MOA and patient data suggest homeostatic role in muscle & lung
Resolaris: Drug Candidate For Multiple Rare Myopathies	• 1st Resokine pathway agonist muscular dystrophy trial completed • Potential activity signals in FSHD • 3 ongoing trials readout expected in December 2016
Biologics Pipeline & Rare Disease Business Model	• 2nd Resokine agonist (iMod.Fc) for lung disease clinical trials in 2017 • Building franchises in rare diseases influenced by an immune component

**Proteins for life (physio) specific activity (crine)*

Harnessing the Power of Physiocrines for Patients

1st in class candidates for rare diseases with an immune or fibrotic component

Indications selected on basis of mechanism of action and biology along with potential for significant treatment effect

*FSHD = Fascioscapulohumeral Muscular Dystrophy
*LGMD2B = Limb-Girdle Muscular Dystrophy 2B

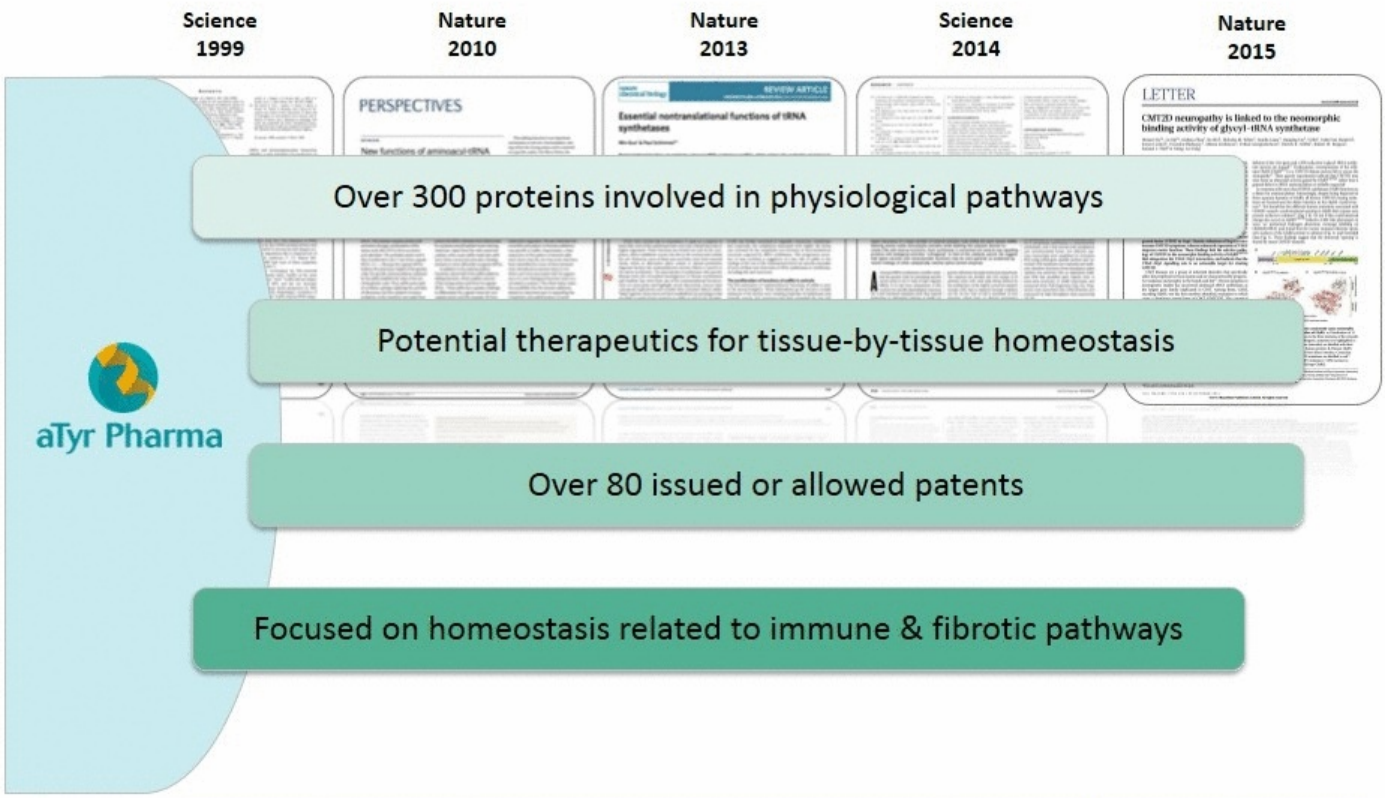
New classes of biology have led to meaningful medicines

- ***TNF Inhibitors*** *(Humira® WW sales over $14B in 2015)*
- ***Complement inhibitors*** *(Soliris® net product sales over $2.6B in 2015)*
- ***Insulins*** *(used by over 3 million Americans to treat diabetes in 2012)*

POTENTIAL OF PHYSIOCRINE PROTEINS

DISCOVERY OF A NEW CLASS OF PROTEINS FROM ALTERNATIVE SPLICING OF ANCIENT GENES

Pioneering New Biology for Meaningful Medicines

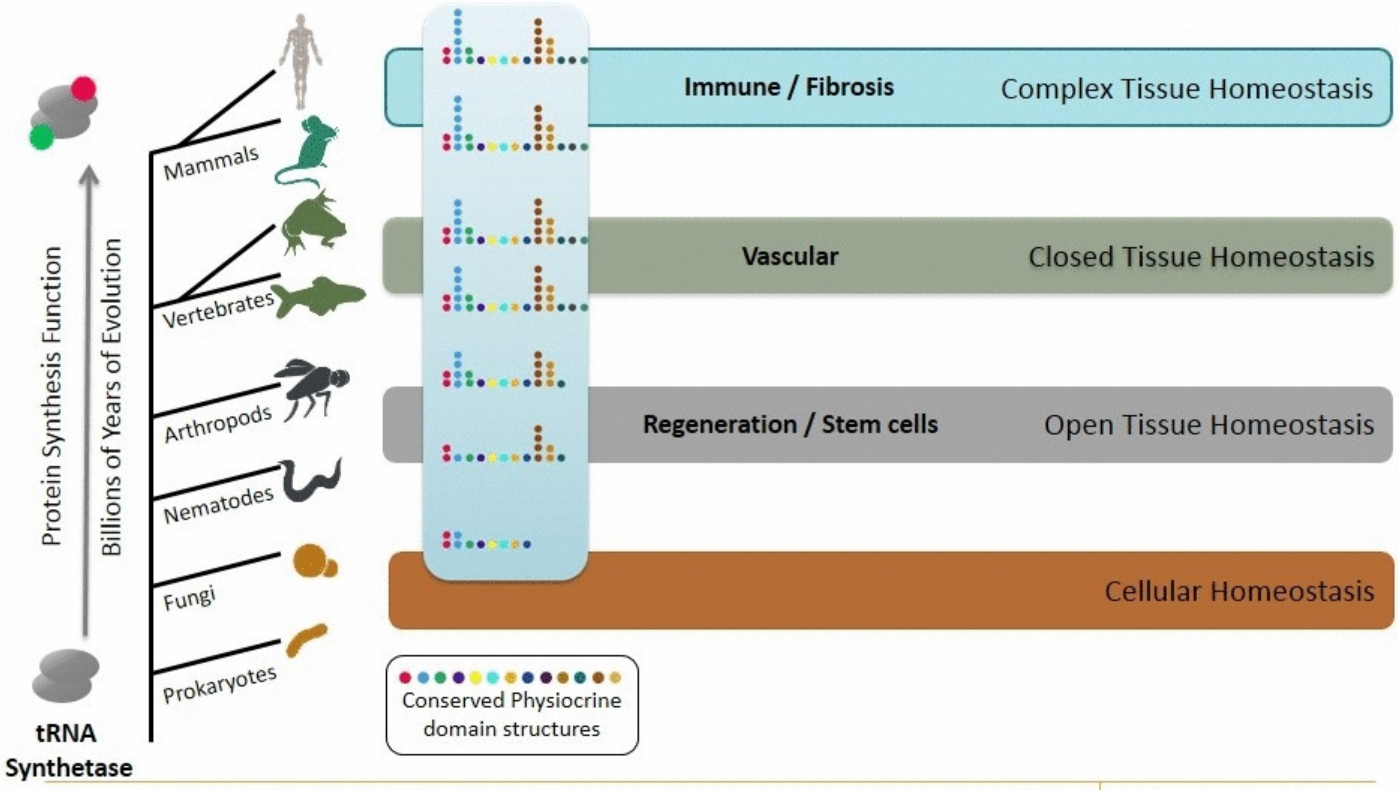


aTyr Pharma

- Over 300 proteins involved in physiological pathways
- Potential therapeutics for tissue-by-tissue homeostasis
- Over 80 issued or allowed patents
- Focused on homeostasis related to immune & fibrotic pathways

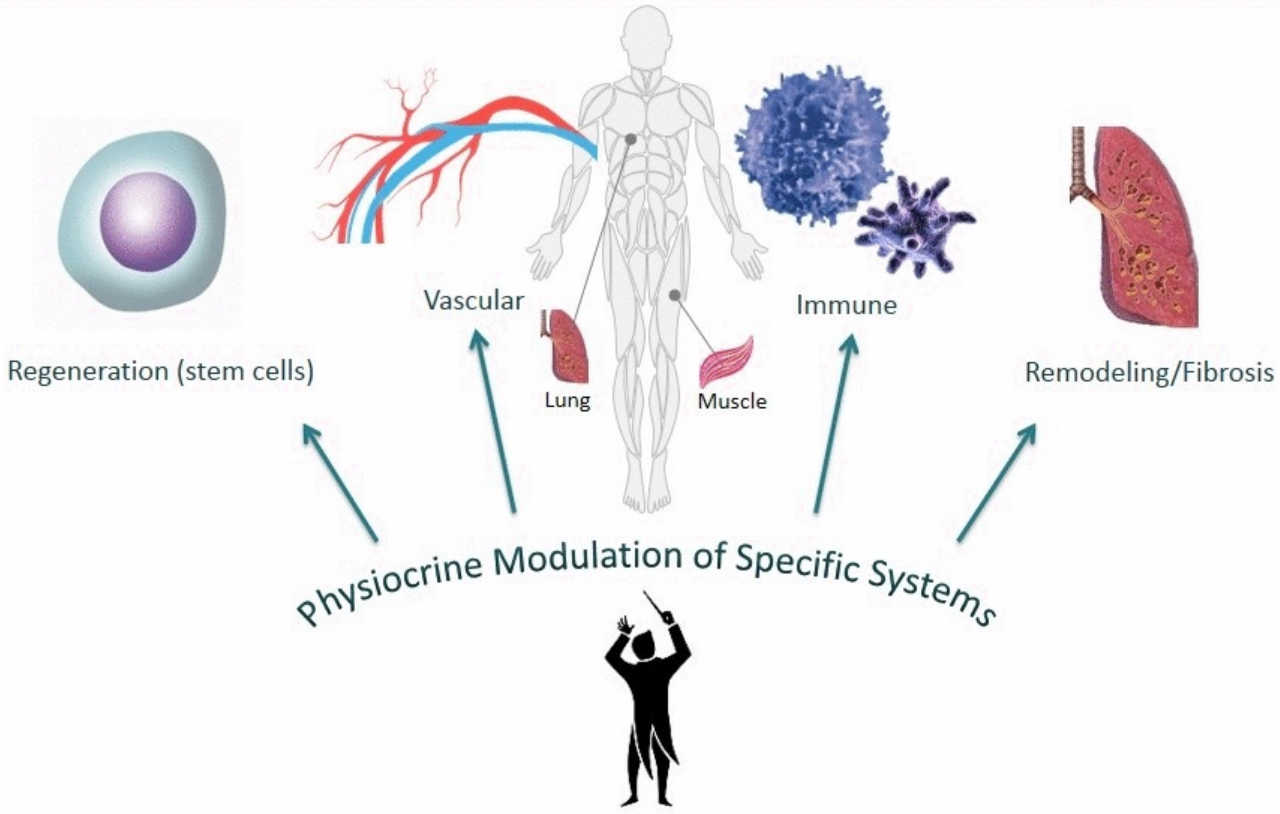
Evolution of Homeostasis & Physiocrines

Physiocrine hypothesis: physiological modulation from primordial tissue homeostasis



aTyr Pharma

Physiocrine Orchestration of Homeostasis




HARNESSING THE RESOKINE* PATHWAY
NATURAL PATHWAY FROM SKELETAL MUSCLE
TO TREAT MULTIPLE RARE MUSCLE DISEASES
*Resokine: for resolution of immune activity

Resokine Pathway Paradigm

1st Physiocrine Pathway Modulated in the Clinic

An extracellular homeostatic pathway that sets T cell responses

Arising from histidine aminoacyl tRNA synthetase (HARS) gene

Changes activated T cell responses at levels <100pM

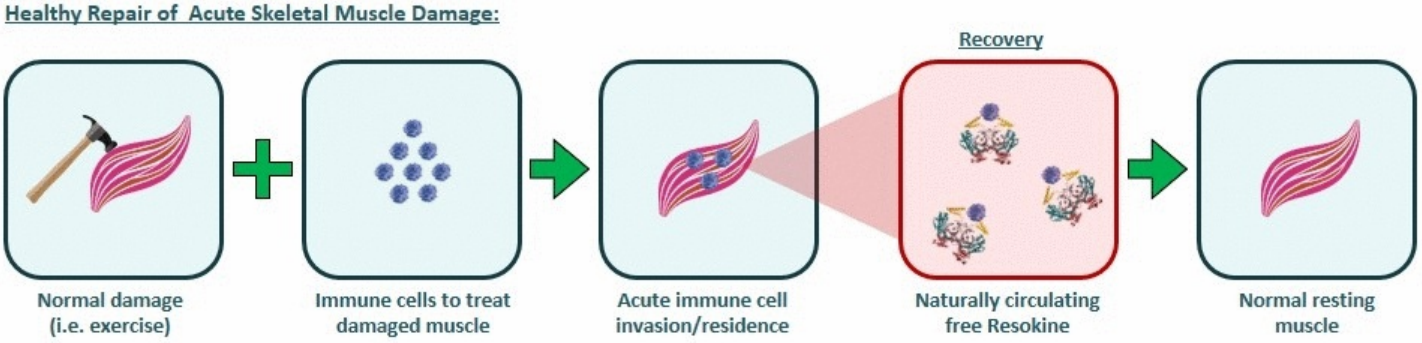
Resokine pathway disruption or insufficiency leads to inappropriate immune responses, contributing to muscle & lung disease

Resolaris, an agonist, plays a role in homeostasis & T cell responses in muscle

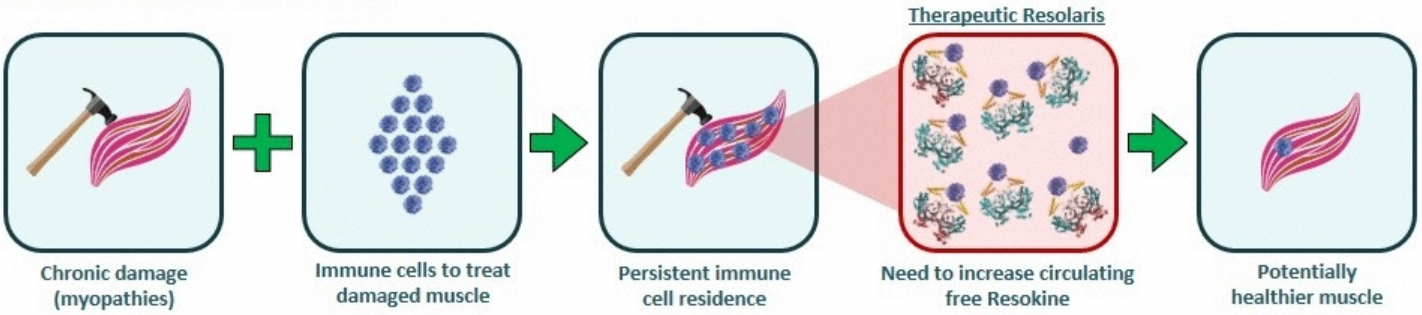
Model of Resokine Pathway

In skeletal muscle health and disease

Healthy Repair of Acute Skeletal Muscle Damage:



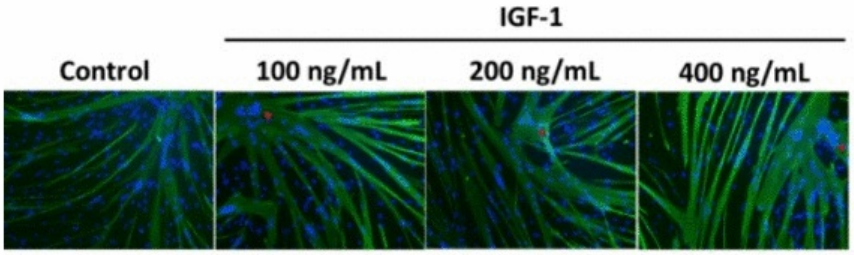
Our Hypothesis - Potential of Resolaris:



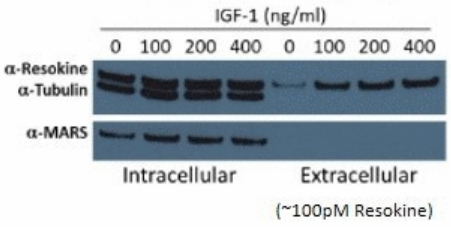
Resokine Release From Differentiating Myoblasts

Linking the Resokine pathway to muscle biology

PRE-CLINICAL

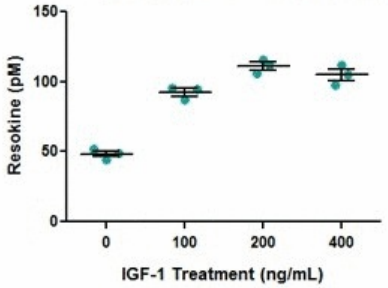


Resokine (Western Blot)



(~100pM Resokine)

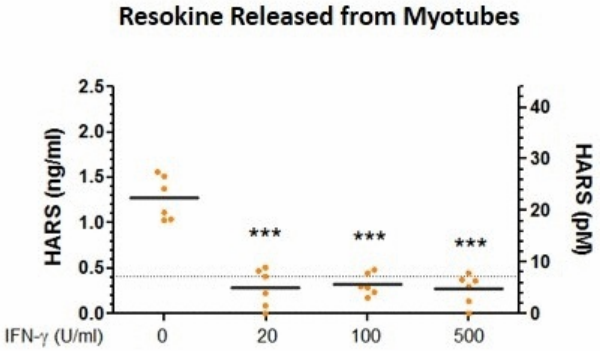
Extracellular Resokine (ELISA)

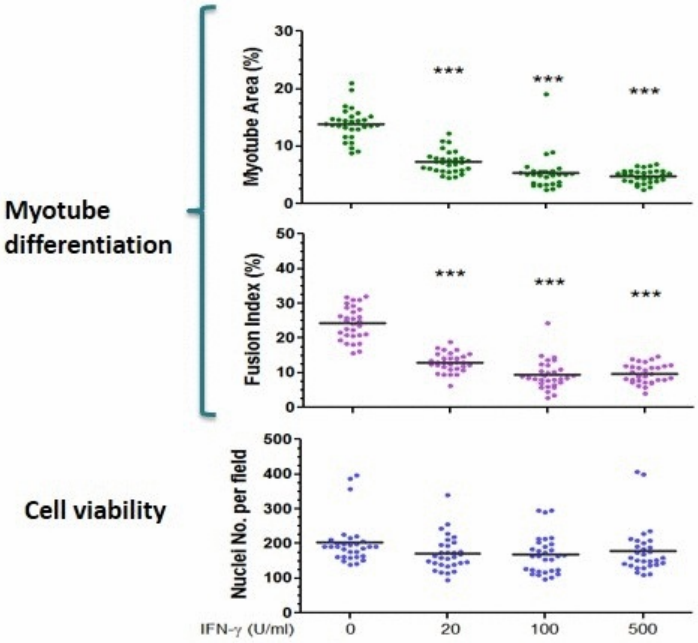


Antibodies sufficient to block 100pM Resokine
block >50% of differentiation (slower)

Human myoblasts were isolated from a healthy volunteer properly consented and not in a clinical trial

IFN-γ Reduces Resokine Release & Myotube Differentiation





*p<0.05, **p<0.01, ***p<0.001, n=6 (ELISA) or 30 (10 images/well×3 wells)

Human myoblasts were isolated from a healthy volunteer properly consented and not in a clinical trial

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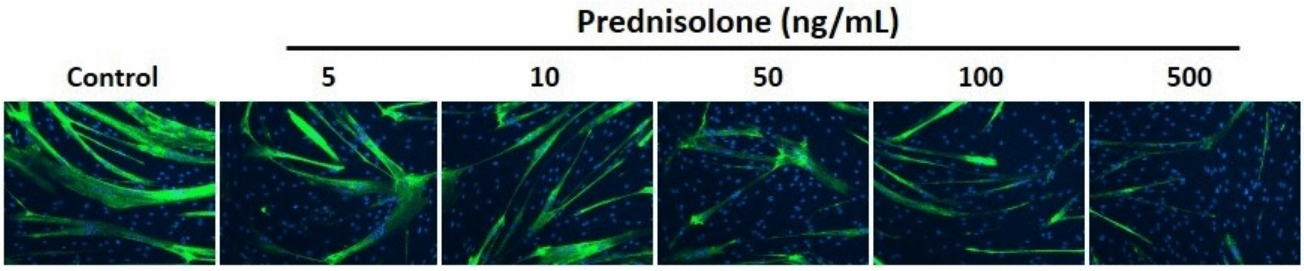
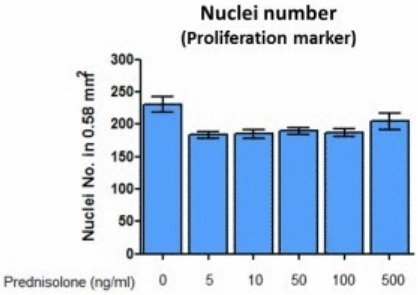
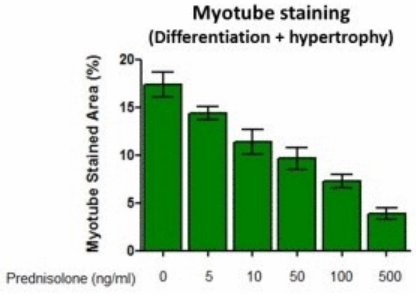
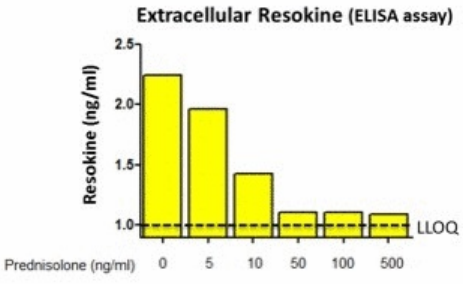
Steroid Treatment Decreases Muscle Growth & Resokine Release



Myotube (myosin)/Nuclei (Hoechst), Images at 10× magnification; **Differentiation Day 0-6**





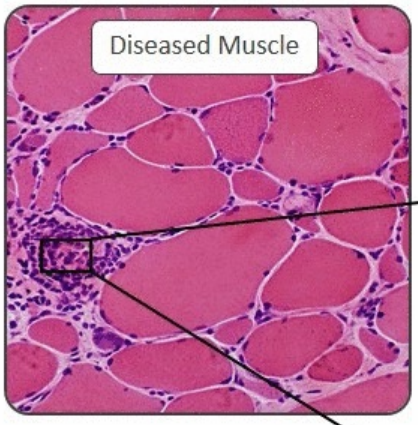


Human myoblasts were isolated from a healthy volunteer properly consented and not in a clinical trial

T Cell Release of Granzyme B Can Cause Muscle Damage

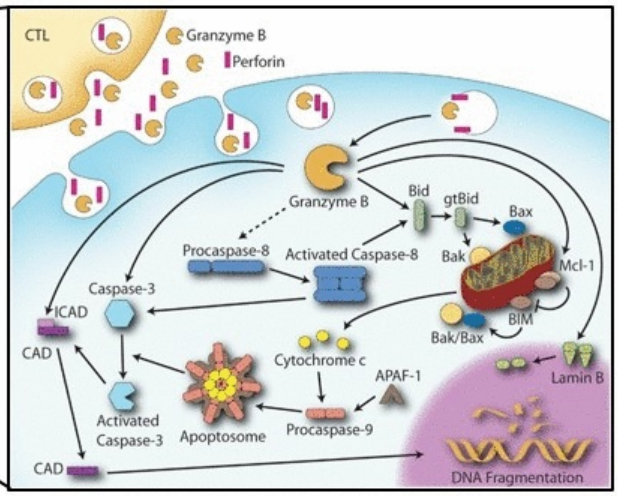
Excessive immune cell invasion contributes to a disease immune phenotype

Immune cell infiltration



Granzyme B expressing cells cause muscle cell damage

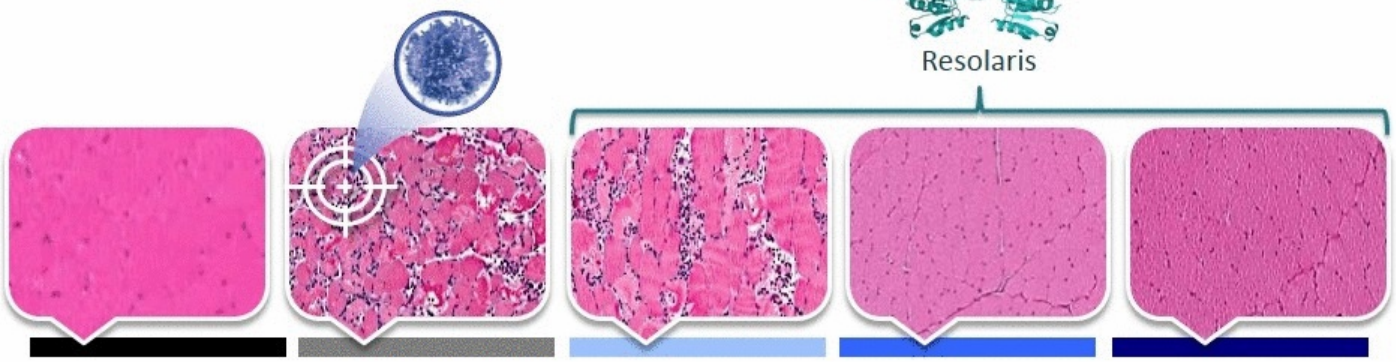
Cell Death



Treating Immune Cell Invasion in Skeletal Muscle

One week of therapeutic treatment in two week Statin myopathy model

Resolaris



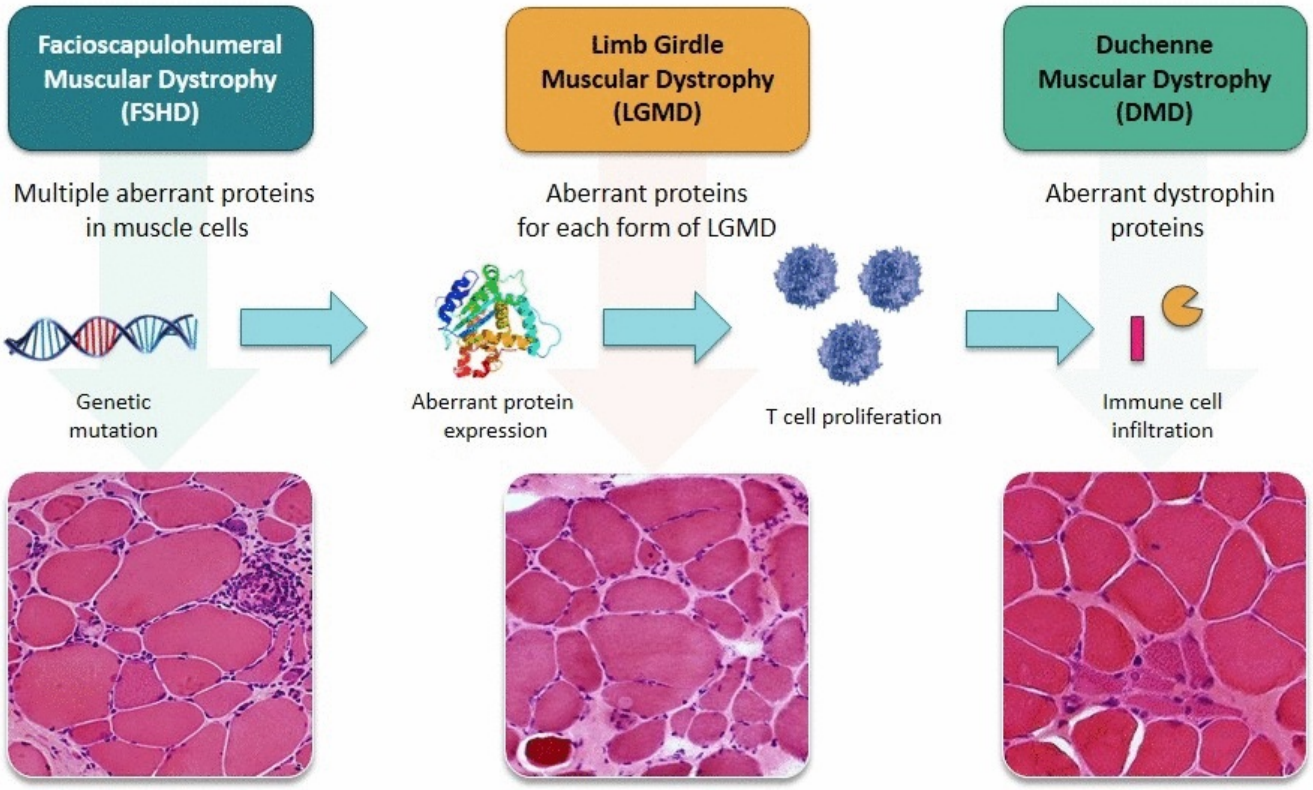
Control	Statin days 1-14 (toxic dose)	0.3 mg/kg Resolaris days 7-14 Statin days 1-14	1.0 mg/kg Resolaris days 7-14 Statin days 1-14	3.0 mg/kg Resolaris days 7-14 Statin days 1-14

↓ Cytokines, ↓ T-cells and ↓ Monocytes with Resolaris administration

aTyr unpublished data

Resokine Pathway Linked to Rare Genetic Muscle Diseases

Aberrant proteins, immune invasion & deteriorated muscles



Frisullo *et al.*, J. *Clin. Immunol.*, 2011
Flanigan *et al.* Human Gene Therapy, 2013
Gallardo *et al.* Neurology, 2001

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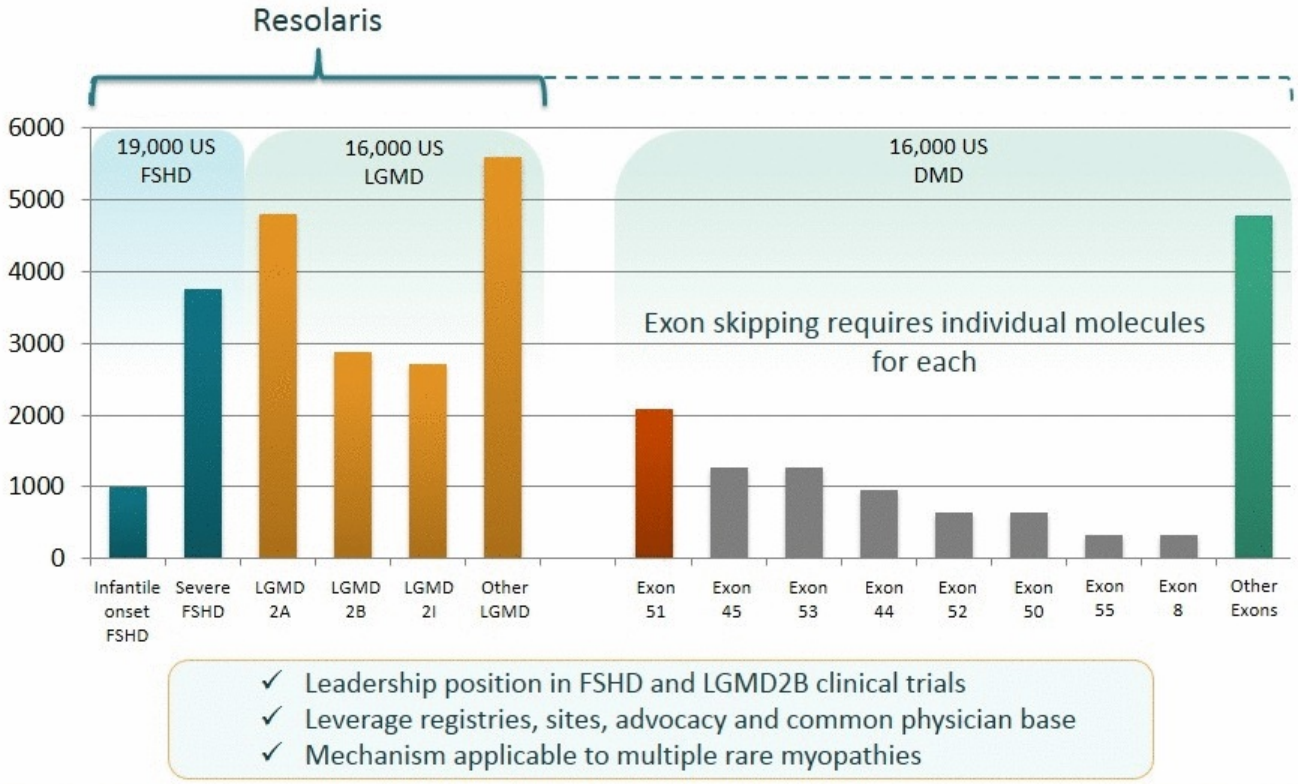
Resolaris: One Product, Multiple Rare Diseases

Promise for severely afflicted myopathy patients



- ✓ Leadership position in FSHD and LGMD2B clinical trials
- ✓ Leverage registries, sites, advocacy and common physician base
- ✓ Mechanism applicable to multiple rare myopathies

FSHD: *Average prevalence rates of FSHD are approximately 1/17,000. Applying this rate to the US population based on recent census data equals approximately 19,000.*
LGMD: *16,000 cases estimated in US population. 1/20,000 Wickland and Kissel, Neural. Clin. 2014. Relative Prevalence of Limb Girdle Muscular Dystrophies in the United States Population. Wicklund et al., Neurology 2013.*
DMD: *Prevalence of approximately 5/100,000. Orphanet Report Series - Prevalence of rare diseases: Bibliographic data - May 2014 - Number 1*


RESOLARIS CLINICAL DEVELOPMENT
POTENTIAL NEW THERAPY FOR PATIENTS
WITH RARE MUSCLE DISEASES

Clinical Strategy for Resolaris in Skeletal Muscle

Staging rare muscle disease indications

1st Physiocrine based therapeutic in clinic

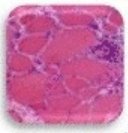
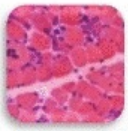
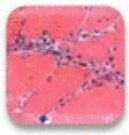
To promote muscle homeostasis

Focus on Rare Myopathies with an Immune Component (RMIC)

003, 004 & 005 data readouts expected in December 2016

Resolaris

Clinical Trials

	RMIC	Preclinical	Phase 1	Phase 1b/2
 Adult FSHD[1]				Phase 1b/2 Trial (002) – Completed
				Phase 1b/2 Trial (004) – Ongoing
				Phase 1b/2 ext. (005/006) – Ongoing
 Early Onset FSHD				Phase 1b/2 Trial (003) – Ongoing
				Phase 1b/2 ext. (006) – Ongoing
 Adult LGMD2B[2]				Phase 1b/2 Trial (004) – Ongoing
				Phase 1b/2 ext. (006) – Ongoing

Phase 1b/2 Patient Data to Best Inform Clinical Path Forward

- Establishing data dossier on safety
- Exploring activity assessments such as PROs, biomarkers & muscle testing
- Directionality on endpoints for approval

[1] *Facioscapulohumeral Muscular Dystrophy*
[2] *Limb-girdle Muscular Dystrophy 2B*

Facioscapulohumeral Muscular Dystrophy (FSHD)

A progressive, debilitating muscular disease

Pathology	• Dominant/spontaneous toxic gain of function (↑ Dux4) • Immune infiltration by activated T cells [1], primarily $CD8^+$ • Defects in biochemical/physical/structural muscle components leading to tissue death
Clinical	• Debilitating, progressive skeletal muscle weakness • Severe pain, chronic fatigue and respiratory insufficiency • Often diagnosed before adulthood (early onset form) • May have visual or auditory impairment (early onset form)
Standard of care	• No therapeutic treatments • Only supportive care provided

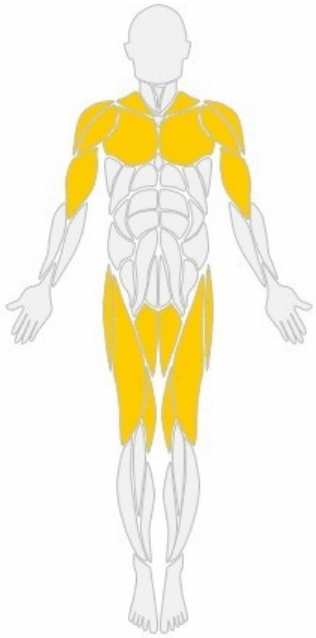
"Unaffected muscle" in an FSHD Patient | *Transition to immune activity* | *Muscle destruction* | *Infiltration of fat/atrophy*

[1]*Frisullo et al. J Clin Immunol (2011) 31:155–166*

Limb-Girdle Muscular Dystrophy 2B (LGMD2B)

A severe muscle disease with a genetic loss of function

Pathology	• Toxic loss of function mutation (dysferlin) • Immune infiltrates consisting of $CD4^+$, $CD8^+$ and macrophages[1] • Muscle group progression
Clinical	• Debilitating, progressive skeletal muscle weakness • Challenges moving limbs • May have respiratory insufficiency
Standard of care	• No therapeutic treatments • Only supportive care provided



[1]*Gallardo et al. Neurology 2001;57:2136–2138; Yin et al. Int J Clin Exp Pathol 2015;8(3):3069-3075*

Adult FSHD (002) Trial

Study Design

- Double-blinded, placebo-controlled
- Multiple ascending doses
- N=20 (5 in each cohort)
- 3:1 Randomization (Resolaris:placebo)
- 4 sites in 4 countries

Study Objective

Evaluate Safety and Tolerability:

- Build safety dossier for Resolaris
- Generally well-tolerated at doses tested*

Evaluate Potential Activity Assessments:

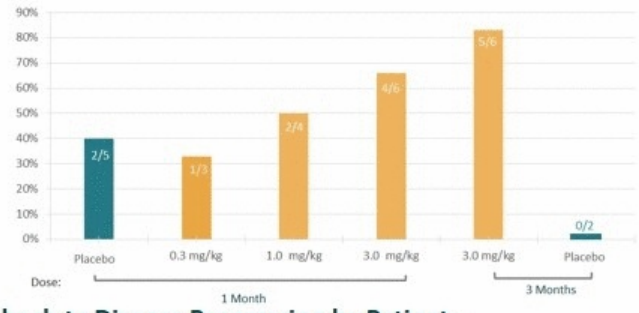
1. Manual Muscle Test (MMT):
   - Validated endpoint for functional strength
2. Individualized Neuromuscular Quality of Life (INQoL):
   - Validated patient reported outcome
3. Evaluate a new targeted MRI technique
4. Biomarker assessments

**One reversible infusion related reaction (IRR) patient in 002*

3 Month Adult FSHD (002) INQoL Results

Encouraging Improvement Signal in INQoL

% Responder Analysis:



Absolute Disease Progression by Patient:

INQoL: *Validated Patient Reported Outcome*

- Global systematic assessment used in clinical studies and trials (to test for increased disease burden)

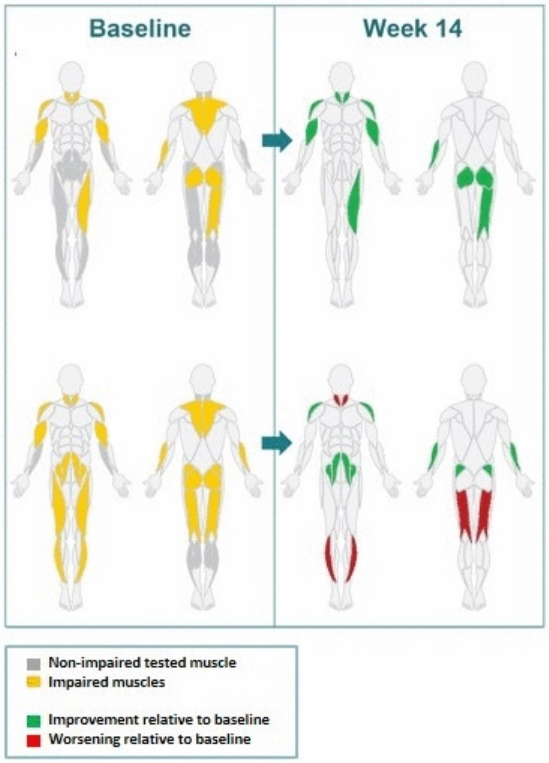
Encouraging Activity Signals:

- 5 of 6 patients in cohort 3 (3 mg/kg of Resolaris over 3 months) showed improvement in their INQoL score vs. 0 out of 2 patients on placebo
- Patients on Resolaris reported a **~9.9%** improvement in INQoL compared to a **~15.6%** worsening in the placebo group.
- Relative improvement v. 3.0 mg/kg cohort at 3 months was **~25.5%** *(p-value = 0.03)*

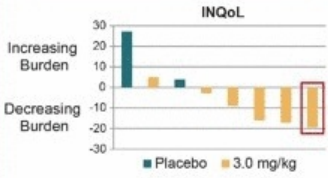
**Relative improvement placebo v. 3.0 mg/kg cohort at 3 months: 25.5% (p=0.03)*

Resolaris 3 Month Adult FSHD (002) MMT Results

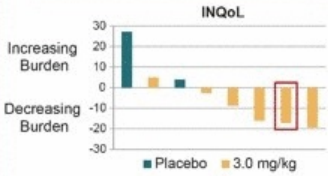
Sample of Patients' MMT scores on Resolaris



MMT % of Muscles Changed
Improved: 39.3
Stable: 60.7
Worse: 0.0



MMT % of Muscles Changed
Improved: 28.6
Stable: 50.0
Worse: 21.4



Manual Muscle Testing (MMT):

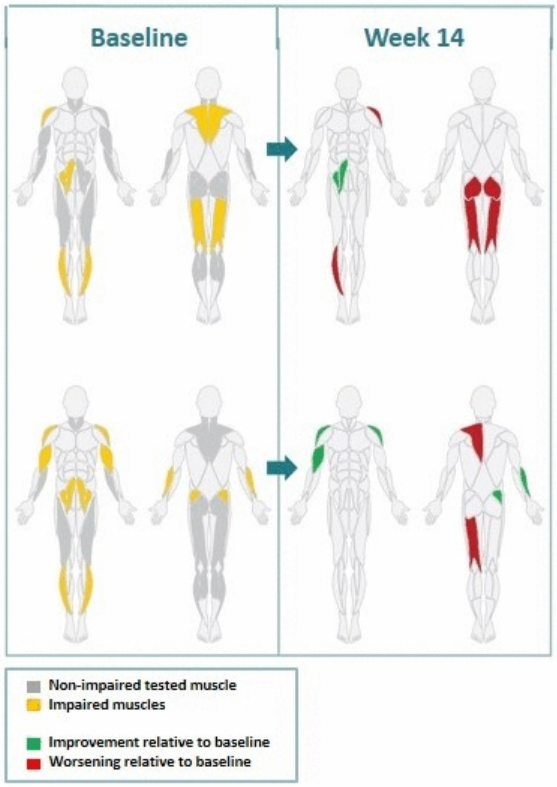
Validated Endpoint for Functional Strength

Encouraging Activity Signals:

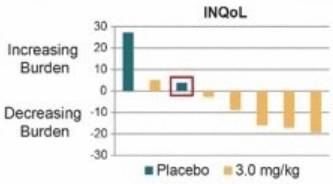
- A trend for improvement was observed compared to placebo, especially in upper limbs
- 100% patients with an improved MMT score had an improved INQoL score

Placebo 3 Month Adult FSHD (002) MMT Results

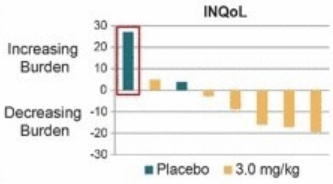
Placebo Patient's MMT results



MMT % of Muscles Changed
Improved: 3.6
Stable: 75.0
Worse: 21.4



MMT % of Muscles Changed
Improved: 17.9
Stable: 75.0
Worse: 7.1

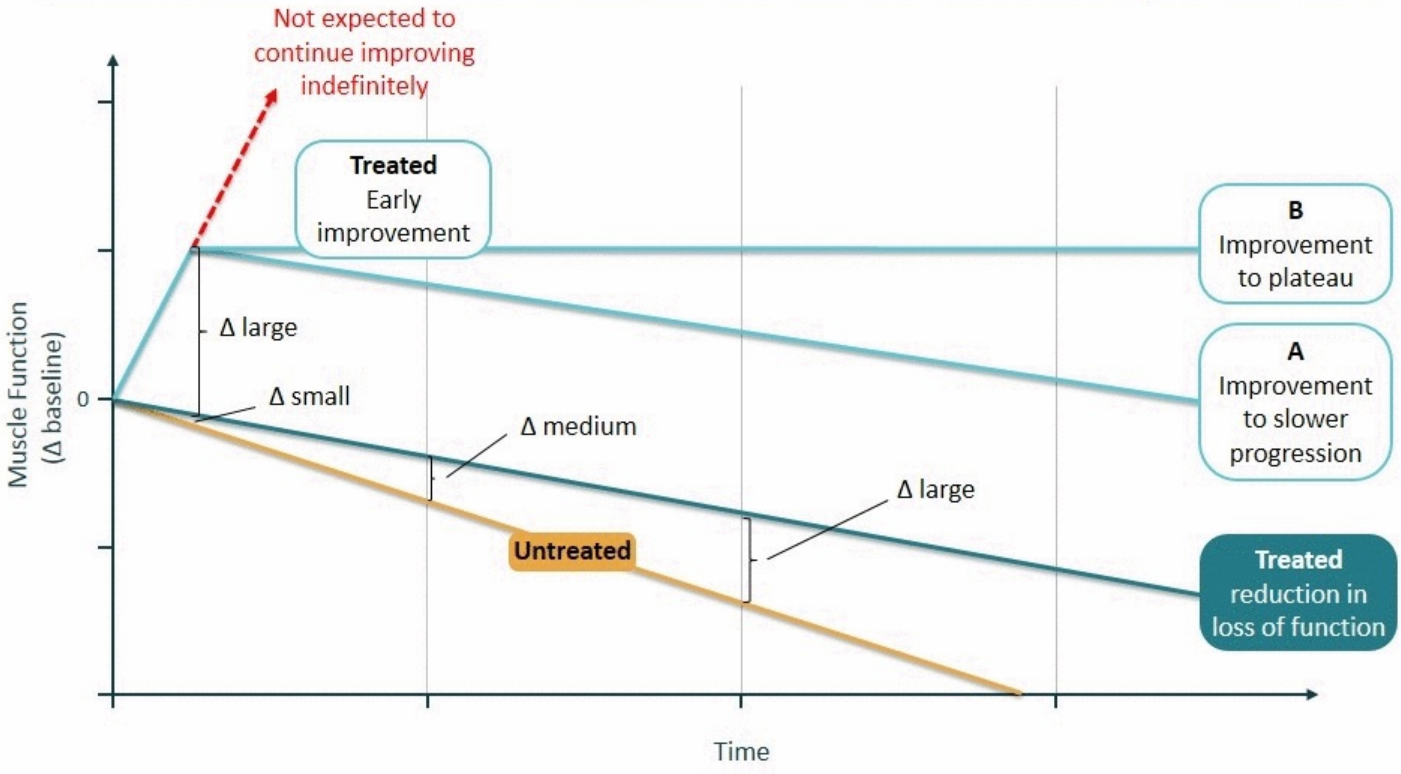


Manual Muscle Testing (MMT):

All patients on placebo, at 3 months, did not show trends for improvement in either INQoL or MMT

Modeling Progression of Loss of Muscle Function

Observing Improvement vs. Slowing Progression



Model Above For Illustrative Purposes Only; Not based on any Resolaris clinical data

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Resolaris Clinical Trial Summary 2016

Completion of Exploratory Trials

CLINICAL DEVELOPMENT

Trial	Indication(s)	Patients	Highest Dose	Design	Data Timing
002	Adult FSHD	3 dose cohorts (n=20 Total)	3mg/kg weekly	Placebo controlled, Double blinded; Interpatient Dose Escalation	Announced 1Q 2016
003	Early onset FSHD	Stage 1 (n=8) Stage 2 (n=8)	3mg/kg weekly	Open-label, Intrapatient Dose Escalation	4 pts. top-line Dec. 2016*
004	Adult LGMD2B, Adult FSHD	LGMD2B (n=10) FSHD (n=8)	3mg/kg biweekly	Open-label, Intrapatient Dose Escalation	18 pts. top-line Dec. 2016*
005	Adult FSHD	Rollover from 002	3mg/kg weekly	Long-term Safety Extension	Update Dec. 2016*
006	LGMD2B, FSHD, Early onset FSHD	Rollover from 003 & 004	3mg/kg weekly	Long-term Safety Extension	TBD

Ongoing Trial Objectives

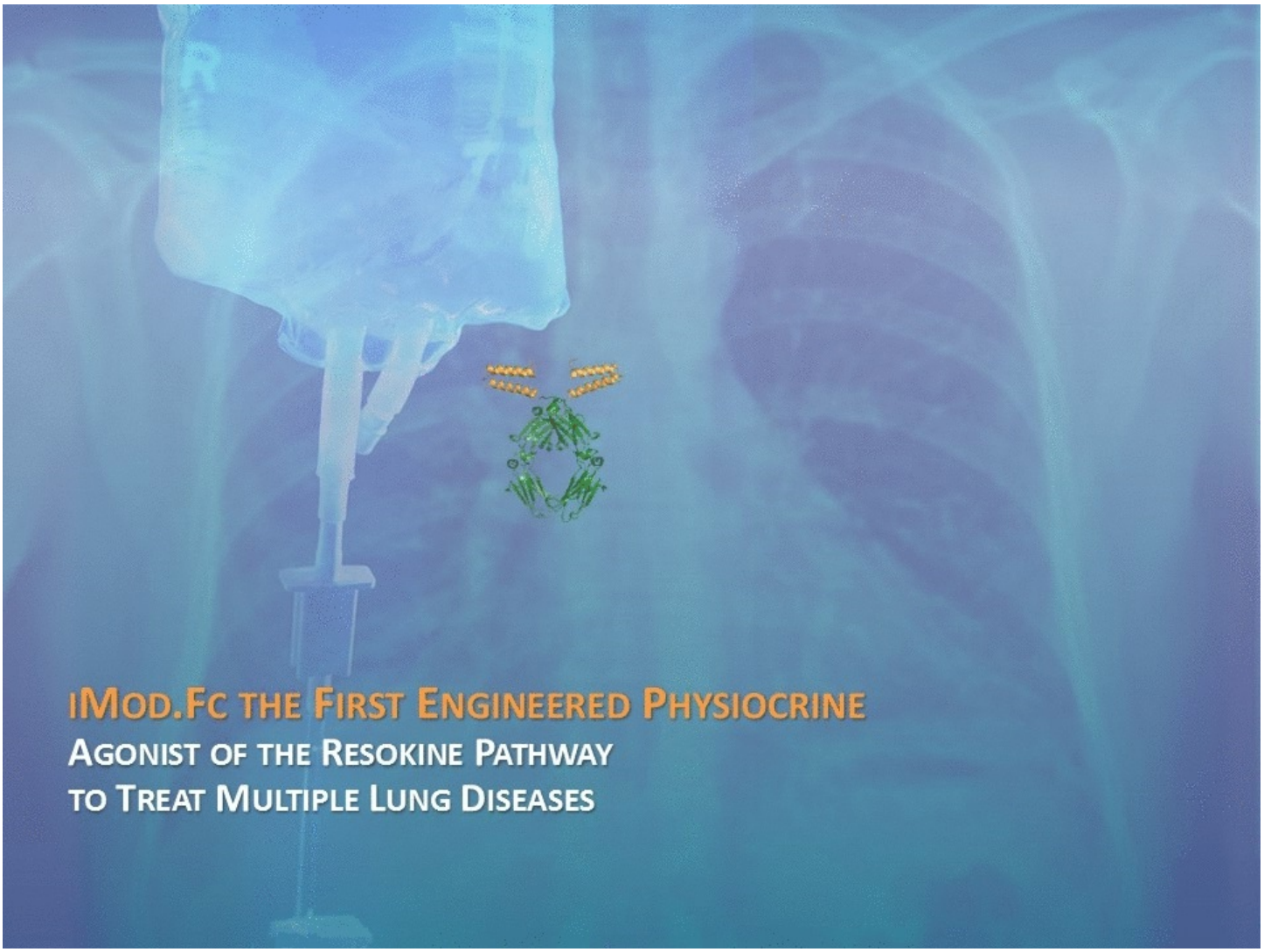
Evaluate Safety and Tolerability:

- Build safety dossier for Resolaris
- Explore multiple indications, different dosing regimens, longer duration

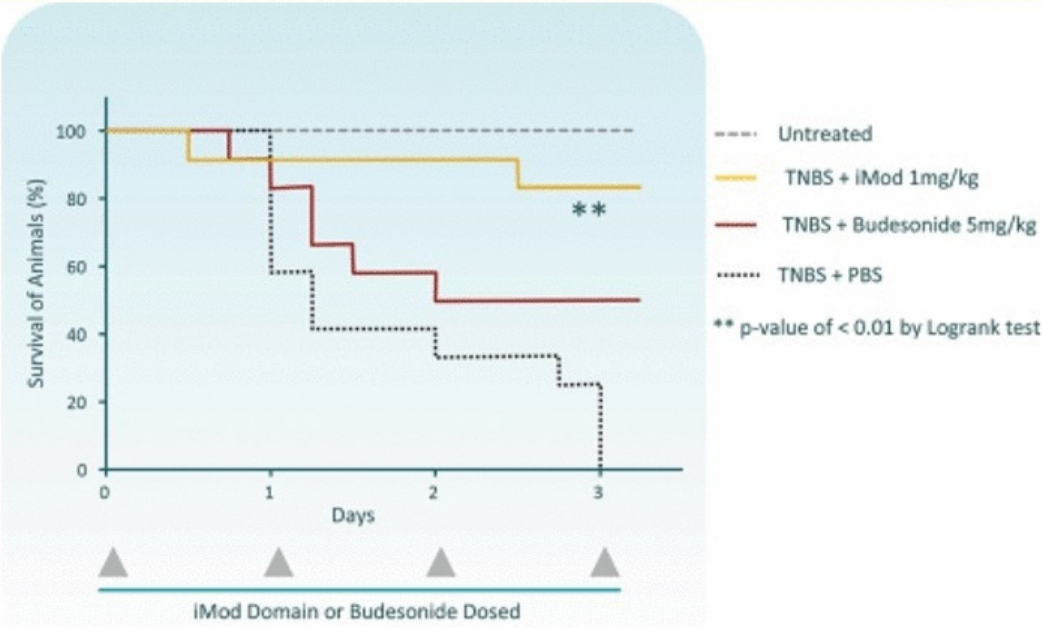
Evaluate Potential Activity Assessments:

1. Functional/Strength: MMT
2. Patient Reported Outcomes: INQOL
3. MRI / Biomarkers assessments

**According to current expectations*


iMod.Fc the First Engineered Physiocrine
Agonist of the Resokine Pathway
to Treat Multiple Lung Diseases

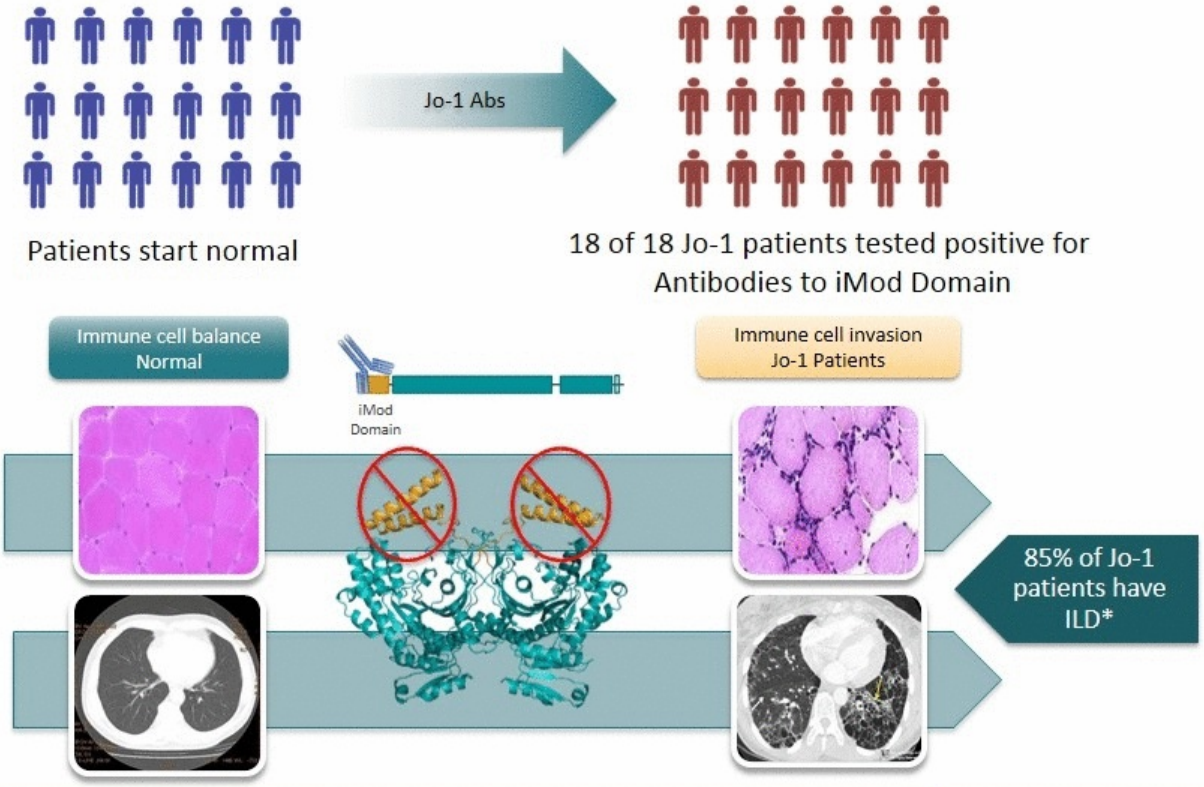
Discovery of the Resokine iMod Domain



- Rodent model of severe immune cell activity induced by administration of trinitrobenzene sulfonic acid (TNBS)
- Animals administered the iMod domain survived longer than those given either the vehicle control phosphate buffer solution (PBS) or Budesonide ($p<0.01$)

Blockade of Pathway in Muscle & Lung Disease

Anti-Synthetase syndrome provides evidence in humans of Resokine pathway



*ILD = Interstitial Lung Disease

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Interstitial Lung Disease Overview

Collectively a heterogeneous group of disorders that involves pathology that begins in the interstitium

Many associated with extensive alteration of alveolar and airway architecture

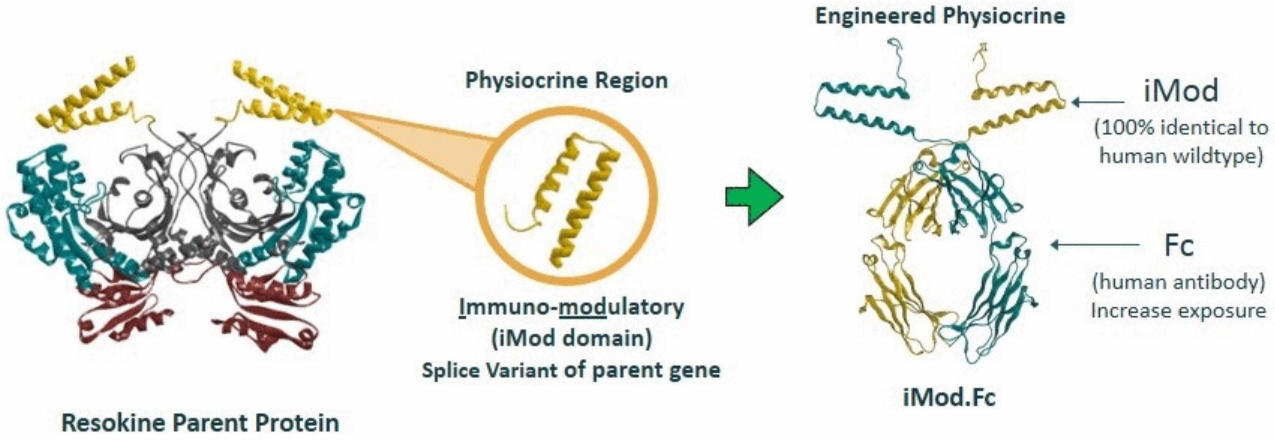
Share similar clinical, radiographic, physiologic and pathologic manifestations

Well over 100 different forms of ILD have been described, most of which involve an immune and/or fibrotic component

Source: Applied Chest Imaging Laboratory – Harvard University

iMod.Fc Leverages Knowledge of Splice Variant Biology

Harnessing the iMod. Domain



Rationale for iMod.Fc

- iMod domain is a Resokine splice variant expressed in lung
- Lung requires a once-monthly dosing TPP
- iMod.Fc possesses ~350x increase in exposure compared to iMod alone

iMod.Fc an Engineered Physiocrine for Lung Disease

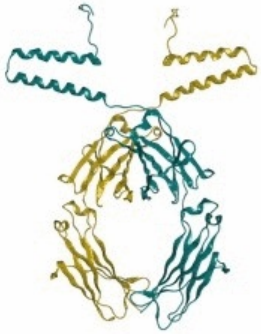
New Target Product Profile (TPP) and new molecule to open up lung indications

Preclinical Status and Goals

- ✓ Activity in industry proven model of IPF (approved drugs: Pirfenidone & Nintedanib)
- ✓ Immuno- & fibro- modulatory activity
- ✓ Successful *E. coli* production for low COGs
- ✓ Rat/non-human primate non-GLP safety & PK data support advancement to IND
- • Expect to initiate clinical trial with iMod.Fc in 2017

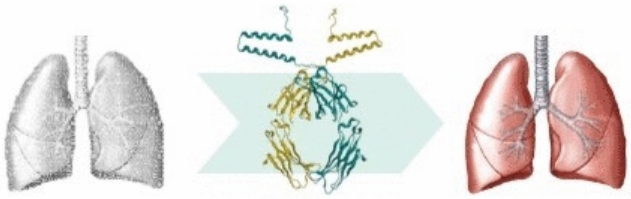
Potential Therapeutic applications

- • Rare pulmonopathies with an immune component (RPICs)
- • Broader reach into RPICs and interstitial lung disease (ILD) indications



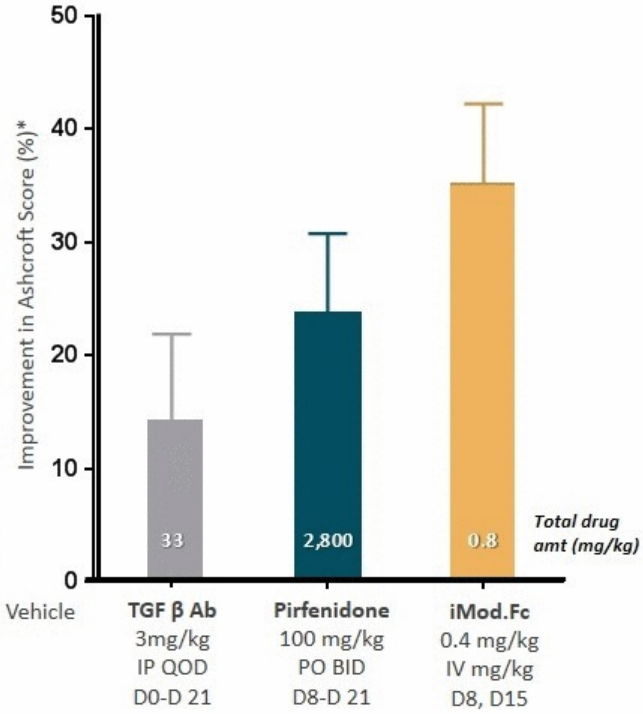
Two iMod.Fc Doses Outperform 28 Pirfenidone Doses

IPF Model Activity



iMod.Fc

- iMod.Fc 1/3500th of total Pirfenidone dose
- Better than 11 TGFβ Ab doses
- Established IPF rodent model
- Improves inflammation & fibrosis
- Differentiated mechanism



**The Ashcroft scale for the evaluation of bleomycin-induced lung fibrosis is the analysis of stained histological samples by visual assessment*

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BUILDING A NEW CLASS OF THERAPEUTICS
FOUNDATION FOR THE FUTURE

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EXPERIENCED INDUSTRY VETERANS

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Chief Executive Officer

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Sanuj Ravindran, M.D.
Chief Business Officer

The Medicines Company | ASIAN HEALTH CARE FUND | RADIUS | BURRILL & COMPANY

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Chief Medical Officer

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VP, Enterprise Talent and Organization

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Upcoming Catalysts and Financial Guidance

Resolaris Readouts Dec. 2016*

- Early Onset FSHD (003) Trial – Data from first 4 patients in Stage 1
- LGMD2B/FSHD (004) Trial – Top-line results from 10 LGMD2B, 8 FSHD patients
- First Extension (005) Trial – Update from these patients

Prudently Advancing Pipeline:

- December 2016* data readout to select best advancement path for Resolaris
- iMod.Fc program on track for clinical trial initiation in 2017

Cash Position:

- $96.6M in cash, equivalents & investments as of 6/30/16
- Anticipate cash, equivalents & investments will fund operations into 2018

**According to current expectations*

Revolutionary Drugs Leveraging New Biology

Opportunity to own a new class of meaningful medicines