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

January 9, 2017
Date of Report (Date of earliest event reported)

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)**	**(IRS Employer Identification No.)**

3545 John Hopkins Court, Suite #250
San Diego, California 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 obligations 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 January 2017

SIGNATURE

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.

ATYR PHARMA, INC.

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

Date: January 9, 2017

Exhibit No.	Description
99.1	Corporate Presentation Materials of aTyr Pharma, Inc. dated January 2017

Exhibit 99.1

ADVANCING NEW THERAPEUTIC HORIZONS

HARNESSING NOVEL PHYSIOCRINE BIOLOGY TO PROMOTE HOMEOSTASIS

CORPORATE PRESENTATION
JANUARY 2017

aTyr Pharma
NASDAQ: **LIFE**

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 Stalaris™, 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, our projected cash expenditures, 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 Quarterly Report on Form 10-Q, Annual Report on Form 10-K and in our other 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.

LIFE Value Proposition

Pioneers of new therapeutic intervention points in homeostasis - **The World of Physiocrines**

Favorable safety profile and potential clinical activity from **1st Physiocrine** program, Resolaris, in 2 rare myopathies

Advancing **2nd Physiocrine** program, Stalaris, into human trials this year

Closing in on a **3rd Physiocrine-**based opportunity as a 2017 IND candidate

Partnership Opportunities

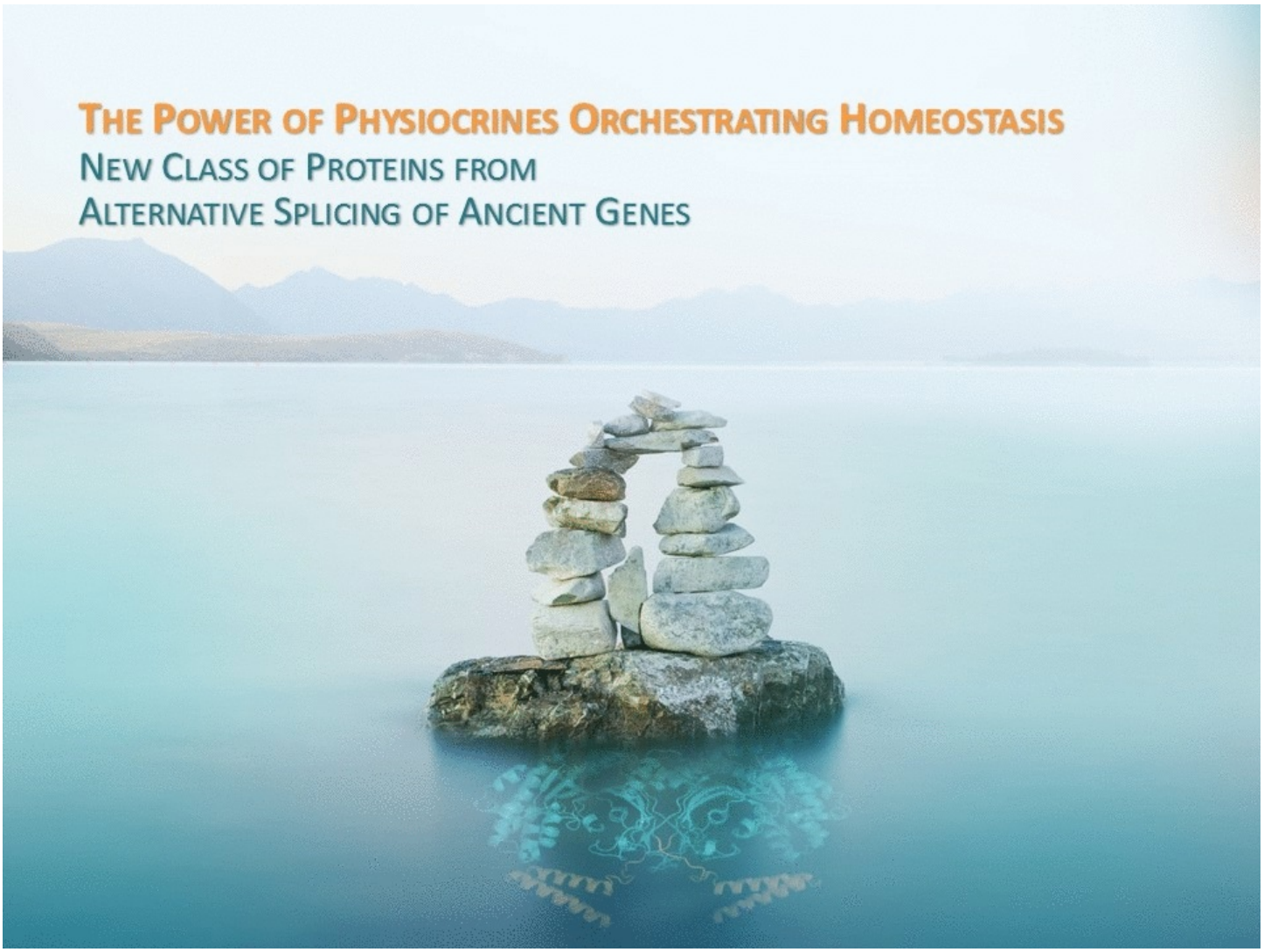
Pursuing partnership(s) for one or more programs to accelerate clinical and preclinical pipeline

$76M estimated cash 2016 EOY*
$51M market capitalization 2016 EOY

**Estimated cash, cash equivalents, and investments provided pending completion of year-end financial close and external audit*

The Power of Physiocrines Orchestrating Homeostasis

New Class of Proteins from Alternative Splicing of Ancient Genes



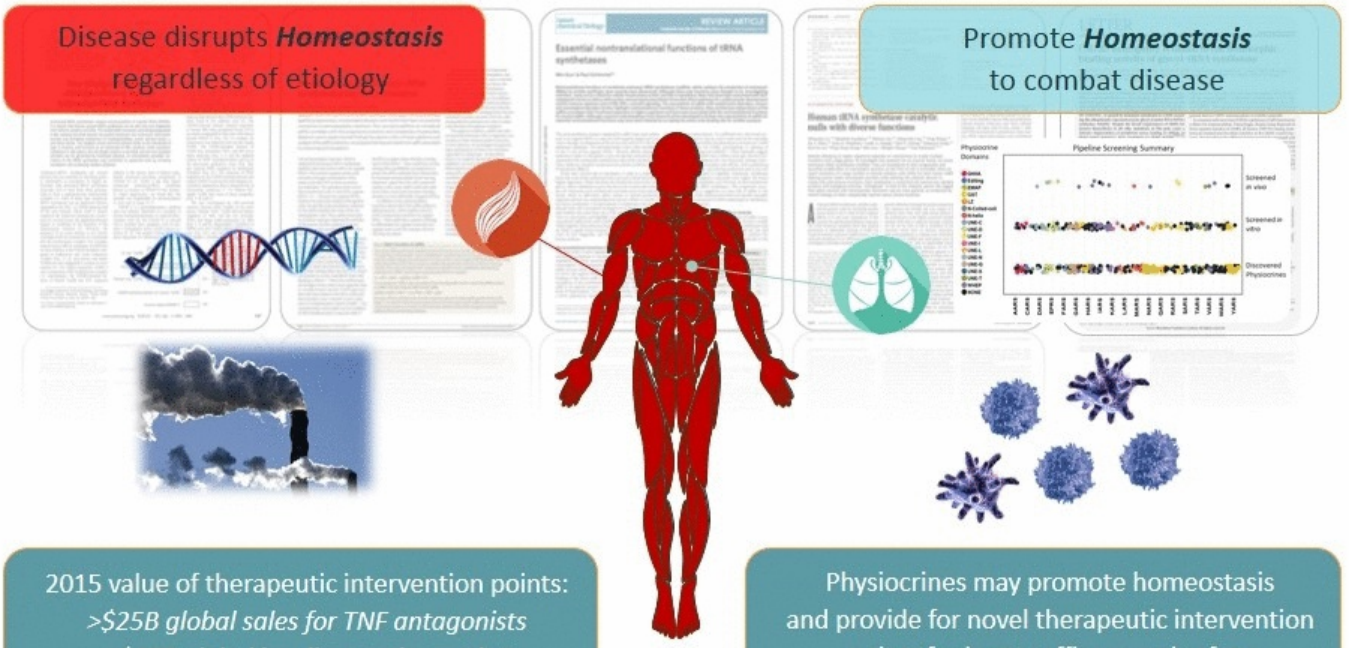
Orchestrating Homeostatic Pathways for Novel Therapies

Discovery of potential therapeutic intervention points

Science 1999 | Nature 2010 | Nature 2013 | Science 2014 | Nature 2015

Disease disrupts ***Homeostasis*** regardless of etiology

Promote ***Homeostasis*** to combat disease

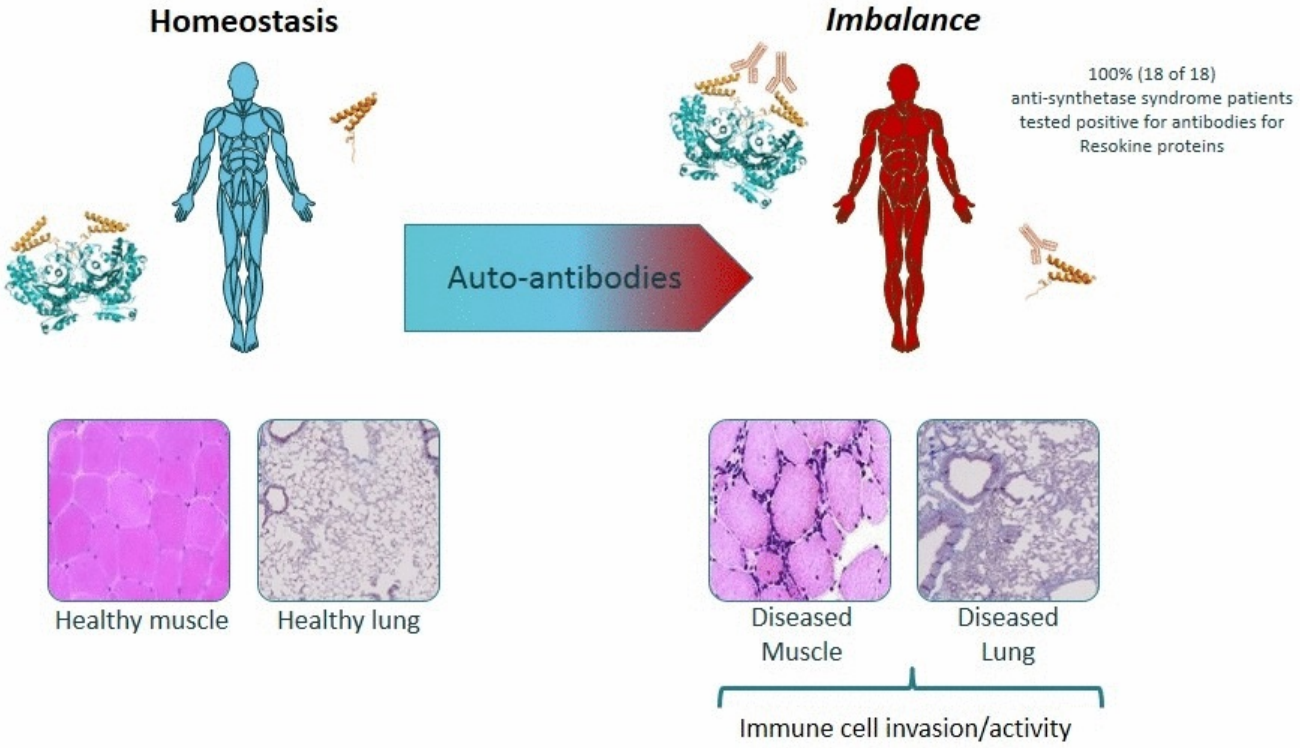


2015 value of therapeutic intervention points:
>$25B global sales for TNF antagonists
>$27B global insulin agonist market

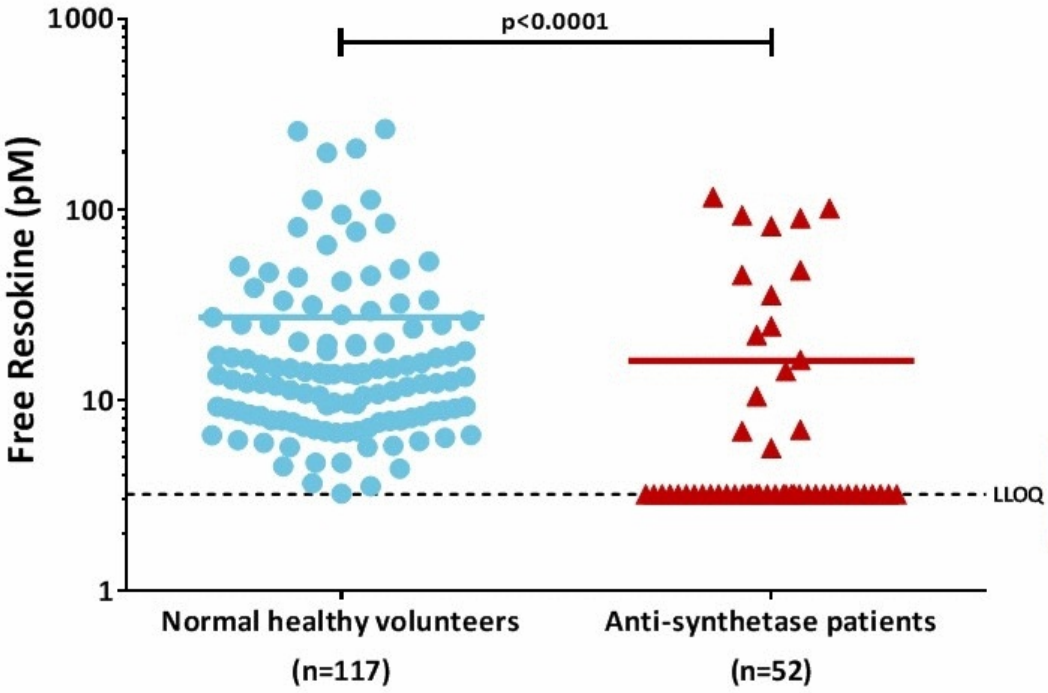
Physiocrines may promote homeostasis and provide for novel therapeutic intervention points for better efficacy and safety

Evidence for Homeostatic Role of a Physiocrine in Humans

Disrupting the Resokine Pathway Promotes Muscle and Lung Disease



Free Resokine Pathway in Anti-Synthetase Patients Diminished



69% at or below limit of detection

Unpublished data from aTyr and collaborator
Statistics: Mann-Whitney test

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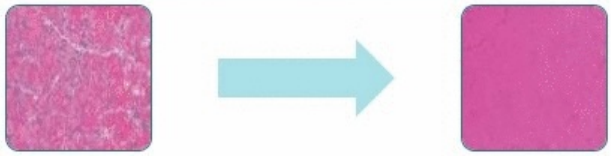
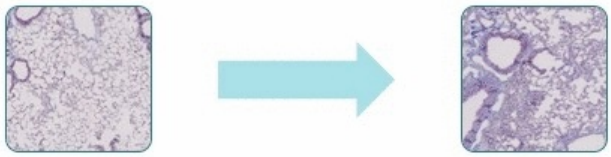
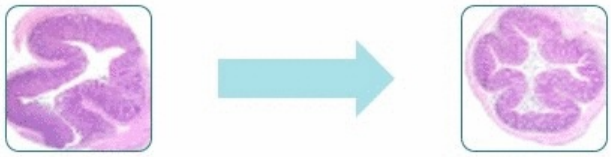
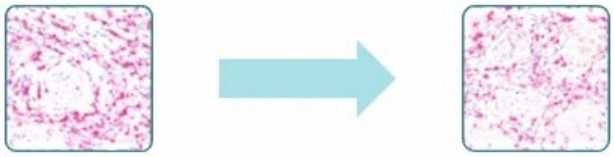
Agonists of the Resokine Pathway in Immune Driven Models

Balancing the immune response to tissue insults

Disease Model	Resokine Homeostatic Effect	Immune Targets
Skeletal Muscle Statin Induced Myopathy		CD4/CD8 & macrophages
Lung Bleomycin Induced Lung Fibrosis		Th17/CD4
Colon TNBS Induced Colitis		Th17/CD4
Skin IL23 Induced Psoriasis		Th17/CD4

In vivo administration of Resokine proteins to animal models of T cell driven disease states.
Cell type indicates type of cells involved but may not be limited to these cells.

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Resokine: 1st Physiocrine Pathway Harnessed

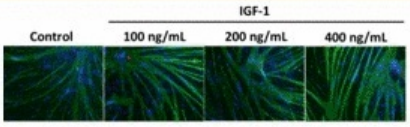
"Resolution of immune activity"

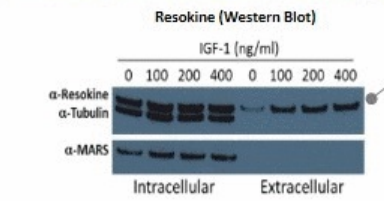
Muscle
Resokine pathway relates to a secreted 57kD protein from skeletal muscle (full length HARS*)

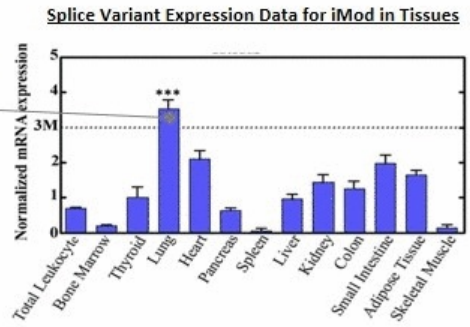
Lung
Resokine pathway relates to a 7kD protein (the iMod domain, a splice variant of HARS)

MOA
- Involved in muscle differentiation
- Tempers activated T cell response

MOA
- Lung expression >> skeletal muscle
- Tempers activated T cell response







*HARS or histidine aminoacyl tRNA synthetase is a single gene responsible for a series of Physiocrine proteins

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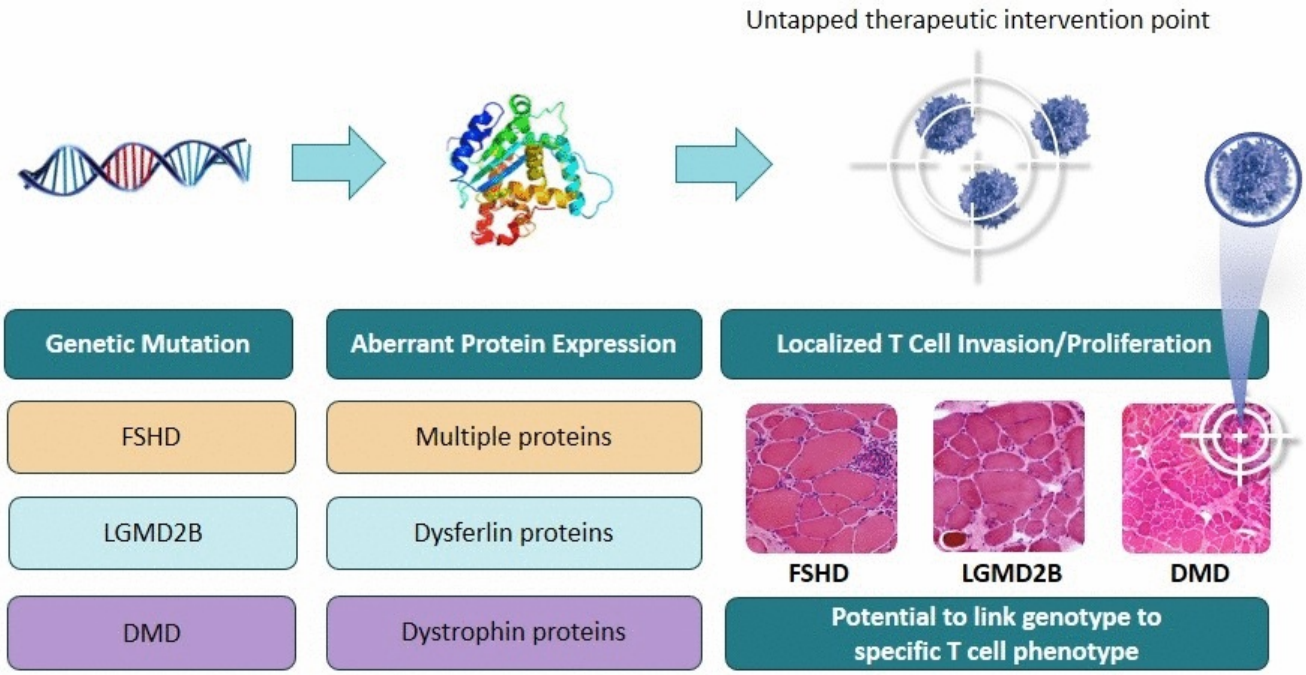
RESOLARIS
HARNESSING THE RESOKINE PATHWAY
TO TREAT MULTIPLE RARE MUSCLE DISEASES

Rare Myopathies with an Immune Component (RMIC)

Chronic damage, homeostasis disrupted



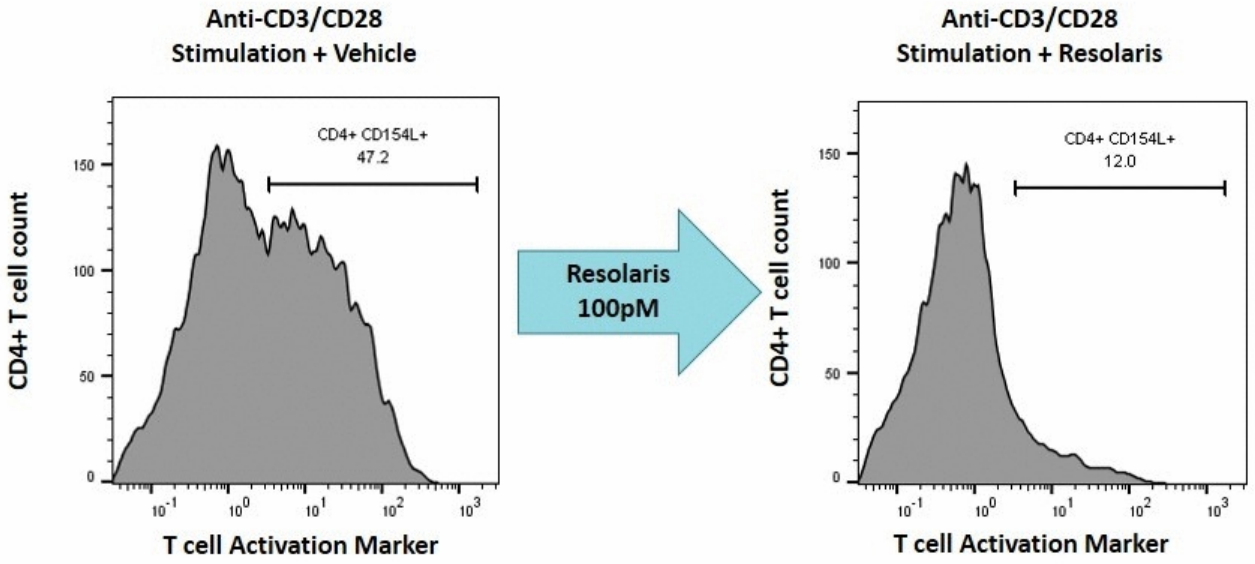
Frisullo et al., J. Clin. Immunol., 2011. Gallardo et al. Neurology, 2001. Flanigan et al. Human Gene Therapy, 2013.

***FSHD** = Facioscapulohumeral Muscular Dystrophy (FSHD). **LGMD2B** = Limb Girdle Muscular Dystrophy 2B.*

***DMD** = Duchenne Muscular Dystrophy.*

Resolaris Tempers Activated T cells

Demonstrated effect as an immuno-modulator



*Resolaris appears to work on **activated** T cells*

On the Left: *Gated on CD4⁺ T cells. Resolaris at 100 pM. 24 hours stimulation with anti-CD3/CD28 Abs.*

On the Right: *T cells were stimulated with anti-CD3/CD28 antibodies in the presence of vehicle or Resolaris . After 24 h, supernatants were collected and analyzed by ELISA, Statistics by T test*

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First Physiocrine For Patients: Resolaris

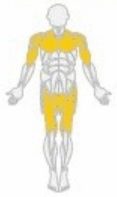
Derived from a naturally occurring protein, the histidine aminoacyl tRNA synthetase **(HARS)**

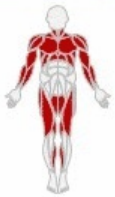
- Skeletal muscle secretes Resokine
- Resokine, an agonist, plays a role in homeostasis & T cell responses in muscle
- Recombinant version of Resokine
- Demonstrated favorable safety profile and potential clinical activity in two rare myopathy indications
- Therapeutic potential for rare myopathies with an immune component (RMIC), **over 20** potential indications

➢ **Strategy:** Establish broad utility across multiple indications

Few Treatment Options: FSHD, LGMD2B, & DMD

	FSHD	LGMD2B	DMD
Genetics	Toxic gain of function (DUX4 region)	Loss of function mutations (Dysferlin gene)	Loss of function mutations (Dystrophin gene)
Immune Pathology	Immune infiltration[1] by activated T cells ($CD8^+$)	Immune infiltrates[2] of $CD4^+$, $CD8^+$ and macrophages	Immune infiltrates[3] of $CD4^+$, $CD8^+$
Clinical	Debilitating, progressive skeletal muscle weakness Pain, fatigue, difficulty moving limbs, may have respiratory distress		Similar clinical symptoms to FSHD and LGMD2B, with potential severe cardiac weakness and effects, and higher morbidity
Standard of Care	No therapeutic treatments, only supportive care provided		Steroids and recently approved exon specific drugs
Disease Progression	Heterogeneous by muscle	Homogeneous by muscle group	Homogeneous, steeper slope, by muscle groups





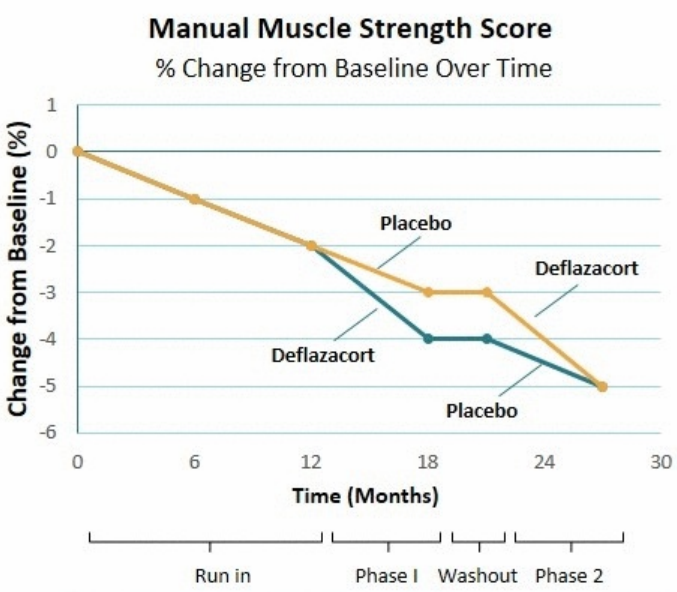
[1]*Frisullo et al. J Clin Immunol (2011) 31:155–166*
[2]*Gallardo et al. Neurology 2001;57:2136–2138; Yin et al. Int J Clin Exp Pathol 2015;8(3):3069-3075*
[3]*Flanigan et al. Human Gene Therapy, 2013. Yin et al. Int J Clin Exp Pathol 2015.*

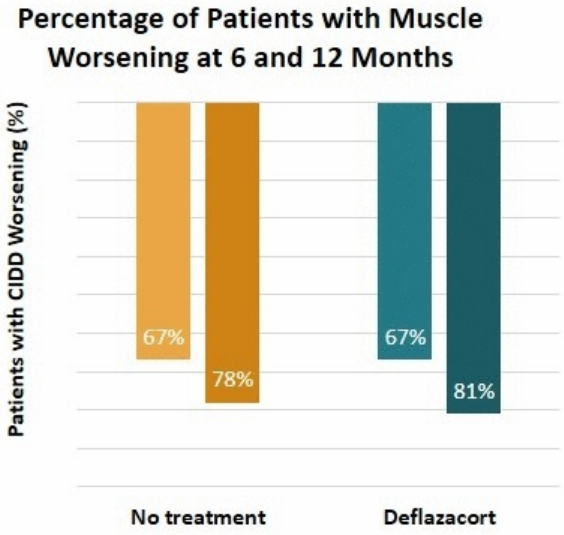
RMIC Disease Progression Case History (LGMD2B)

First symptoms	Misdiagnosed w/ polymyositis	LGMD2B Diagnosis	Part time wheelchair-bound	Full time wheelchair-bound	Full dependency due to severe physical disability
Age <15	16 – 18		19 – 27		28 - 34
• Walks normally, active childhood	• Abnormal gait • Knees locked • Difficulty climbing stairs and running	• Difficulty rising from a chair, raising hands above head • Uses a cane and leg braces	• Slight improvement when steroids stopped • Unable to rise from a chair	• Requires assistance in daily living	• Unable to turn over in a bed or raise hands above head • Uses service dog for daily activities

[1]*https://www.youtube.com/watch?v=JLqHis1yPUI*
[2]*http://mwtn2013blisswelch.blogspot.com/*

LGMD Patients Manual Muscle Strength Progressively Declines





Treatment with Deflazacort was for 6 months in each arm. Single site, placebo controlled, cross over design (n=25)

Manual muscle strength assessed bilaterally by the modified Medical Research Council Scales (MRC)
CIDD (Clinical Investigation of Duchenne Dystrophy) score, graded from 0 (worst) to 10 (best)

Walter et al, Orphanet Journal of Rare Diseases, 2013

Resolaris Phase 1b/2 Clinical Trials

Objectives

Evaluate Safety and Tolerability

- ✓ Build safety dossier for Resolaris
- ✓ Multiple indications, different dosing regimens, longer duration

Evaluate Potential Activity Assessments*

- ✓ Functional / Strength: MMT
- ✓ Patient Reported Outcomes: INQoL
- ± MRI / Biomarkers assessments

Trial	Indication(s)	Patients	Highest Dose	Design
002	Adult FSHD	3 dose cohorts (n=20 Total)	3.0 mg/kg Weekly (12 weeks)	Placebo controlled, Double blinded; Interpatient Dose Escalation up to 12 weeks
003	Early onset FSHD	Stage 1 (n=8)	3.0 mg/kg Weekly (6 weeks)	Open-label, Intrapatient Dose Escalation for 12 weeks
004	Adult LGMD2B, Adult FSHD	LGMD2B (n=10) FSHD (n=8)	3.0 mg/kg Biweekly (4 weeks)	Open-label, Intrapatient Dose Escalation for 12 weeks

**MMT = Manual Muscle Testing, a validated assessment tool that measures muscle function/strength*

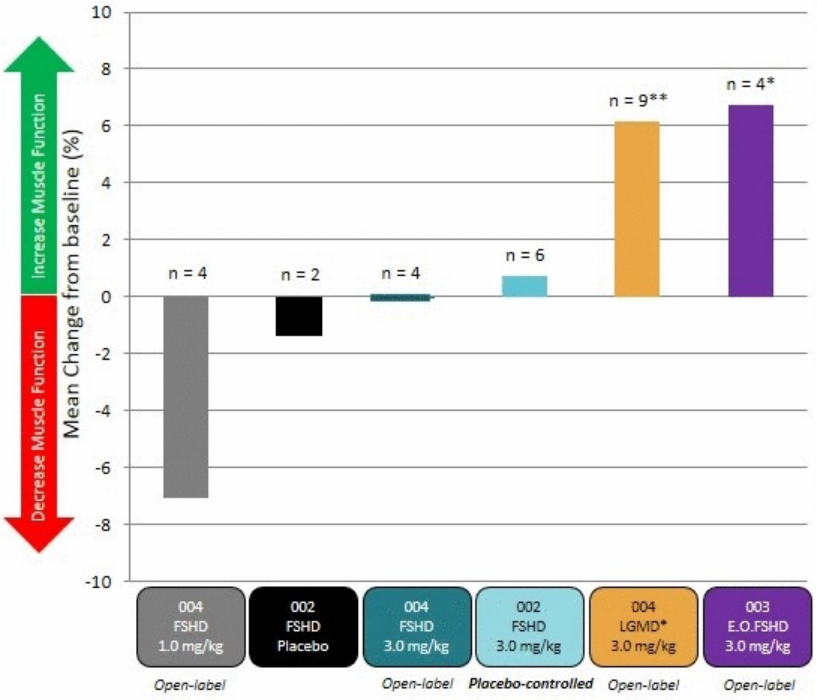
INQoL = Individualized Neuromuscular Quality of Life, a patient reported outcome measure designed specifically for neuromuscular disease

Relatively Stable or Improved Muscle Function Observed

Change from baseline overall MMT scores at week 14

Overall Mean MMT Change Week 14 by Dose Group

FSHD & LGMD2B Patients From 002, 003, 004 Trials



Manual Muscle Testing (MMT):
A measure of muscle function/strength

50% to 78% of patients in Resolaris dose groups had increased MMT scores

No placebo patients had increased MMT scores

3.0 mg/kg weekly identified as an active dose

**Early onset FSHD (003) Trial represents interim data results (4 patients of a total of 8)*
***One patient in 004 Trial did not have an MMT measurement due to being wheelchair bound at baseline*

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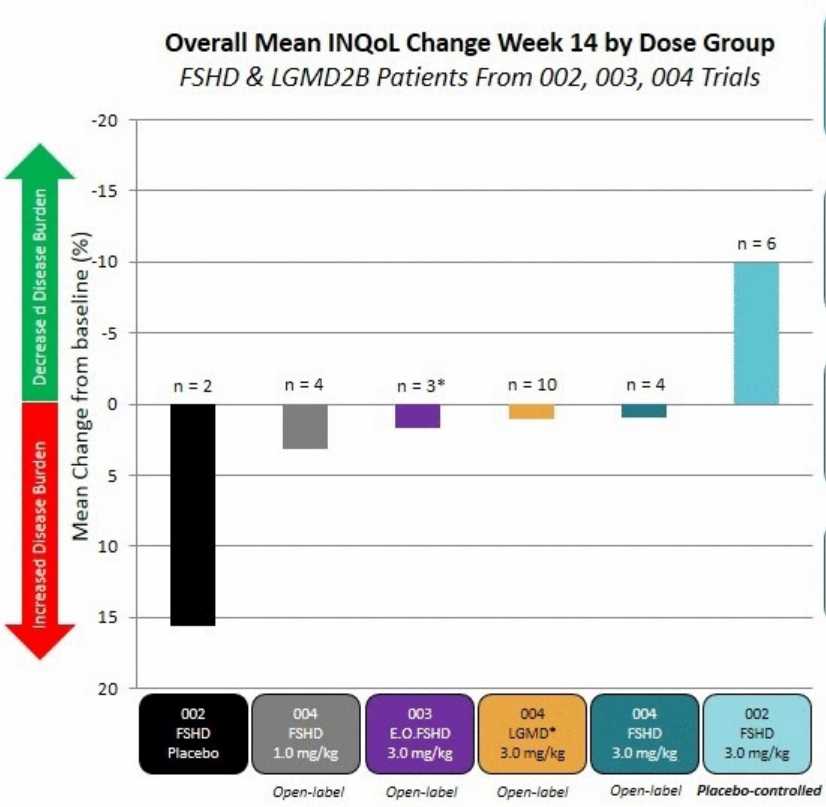
Patients Reported Relatively Stable or Decreased Disease Burden

Change from baseline overall INQoL scores at week 14



INQoL: *A patient reported outcome measuring level of disease burden*

50% to 83% of patients in Resolaris dose groups had stable or decreased disease burden

No placebo patients decreased their disease burden

3.0 mg/kg weekly identified as an active dose

**Early onset FSHD (003) Trial represents interim data results (4 patients of a total of 8)*
One patient in 003 Trial did not have an INQoL measurement taken at baseline

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Robust Safety & Tolerability Dossier

44 patients have received Resolaris for a total drug exposure of 149 patient months

No observed immuno-suppressive effects: consistent with a homeostatic pathway

Resolaris demonstrated a favorable safety profile and was generally well-tolerated across all doses tested in multiple myopathies, various age-groups, and with long-term exposure

No Serious Adverse Events (SAE) were reported by study investigators and the Adverse Events (AE) reported were mild-to-moderate

No clinical symptoms observed with low-level anti-drug antibody assay signals and protocol discontinuations were primarily driven by transient infusion related reactions (IRR)

Going Forward: Target Product Profile (Discontinuation Rate ≤ 10%)

- *Potential to pre-medicate patients*
- *Potentially relax cut-off criteria for discontinuations*

FDA lifted partial clinical hold for dosing above 3.0 mg/kg

Resolaris Status and 2017 Development Goals

Clinical Status

- ✓ Established a favorable safety profile and identified an active dose
- ✓ Signals of clinical activity across (1) LGMD2B (2) FSHD and (3) Early onset FSHD
- ✓ Commercial scale manufacturing poised for future trials

2017 Development Goals

First Half

- **Clinical Results:** Early Onset FSHD Patients (003)
- **Regulatory:** Advance interactions with regulatory agencies
- **Biomarker/MOA:** Introduce Mechanistic/PD Assay

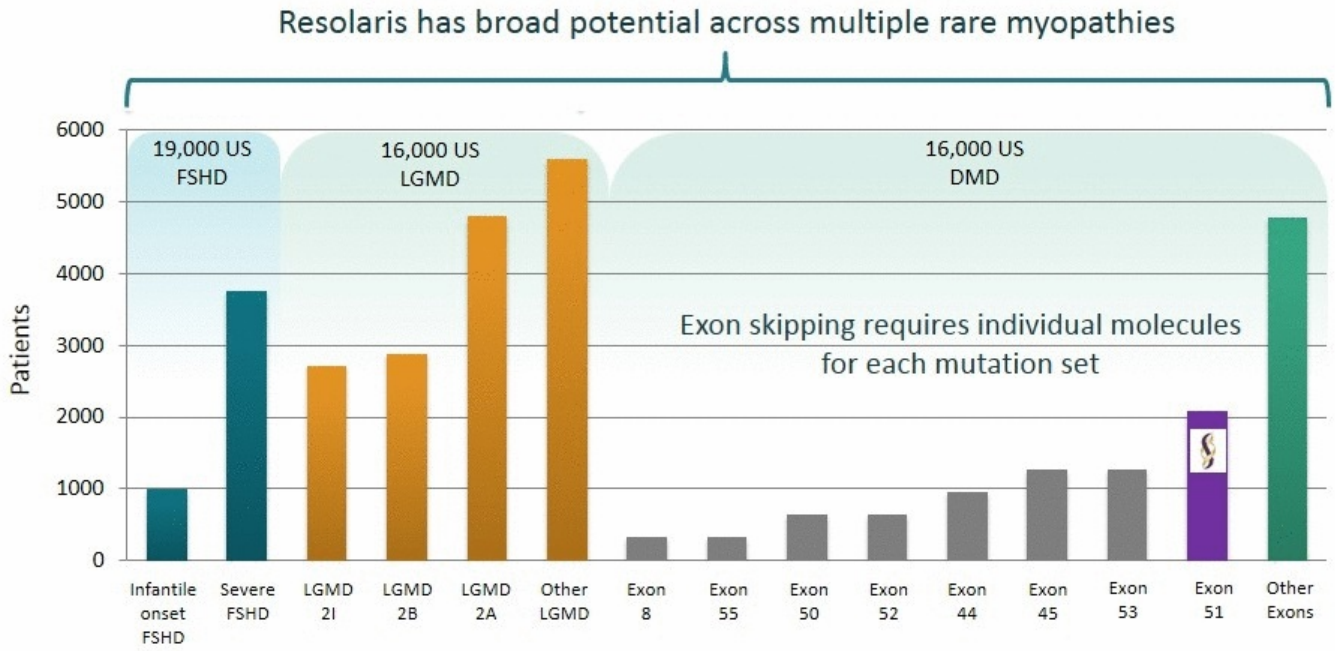
Second Half

- **Clinical Trial:** Kick off next trial post partnership*

**Partner for one or more programs*

Resolaris: One Product, Multiple RMICs

Promise for severely afflicted myopathy patients



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. 20`14. 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*


STALARIS
LUNG PHYSIOCRINE ENGINEERED
TO TREAT MULTIPLE PULMONARY DISEASES

Interstitial Lung Disease Opportunity

Driven by a combination of immunological and fibrotic pathways

Interstitial Lung Disease (ILD)	Over 100 different specific disease types
Standard of Care	Steroids and immuno-suppressants Approved therapies for IPF*: Pirfenidone & Nintedanib
Pathology	
Pattern of Disease	  Pattern of disease, e.g. usual interstitial pneumonia (UIP) vs. non-specific interstitial pneumonia (NSIP), to determine diagnosis/prognosis
Prognosis	Poor prognosis for these patients e.g. 2-3 year median survival for IPF

Adapted from: Thannickal VJ, et al. Ann Rev Med. 2004;55:395-417 (and) 2013 ATS Statement: Update of the International Multidisciplinary Classification of the Idiopathic Interstitial Pneumonias
**IPF = Idiopathic Pulmonary Fibrosis*

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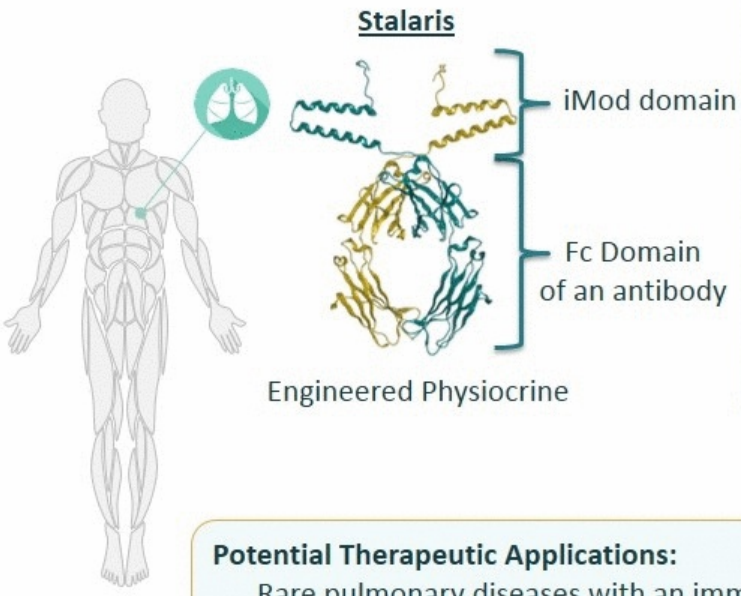
Stalaris Program: Opportunity for Lung Patients

Leverages Knowledge of Resokine Pathway in Lung



- **iMod domain:** Resokine splice variant relatively more expressed in ***lung*** than other tissues
- **Fc Domain:** increased exposure to potentially enable ***once-monthly dosing in humans***
- **Engineered result:** Stalaris ~350x increased exposure vs. iMod; while retaining T cell modulation activity
- **1st molecule** from internal Fc platform

Potential Therapeutic Applications:

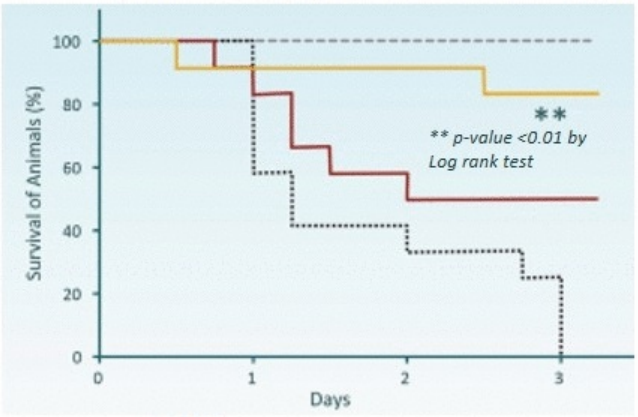
Rare pulmonary diseases with an immune component (RPICs)
Broader reach into RPICs and interstitial lung disease (ILD) indications

Stalaris from Greek, statera for balance

Discovery of the iMod Domain

Promotes Survival more than Steroids

Rodent Survival Model of Severe Immune Cell Activity



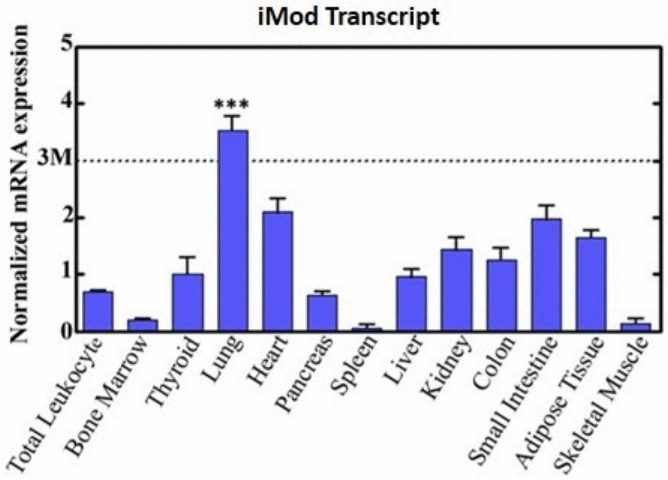
- Untreated
- TNBS + iMod 1mg/kg daily dosing
- TNBS + Budesonide 5mg/kg daily dosing
- TNBS + PBS

iMod promoted ***longer survival*** *(p < 0.01)* than vehicle or Budesonide

Rodent survival model of severe immune cell activity induced by administration of trinitrobenzene sulfonic acid (TNBS)

iMod Domain in Lung

Splice Variant Express Data for iMod in Lung

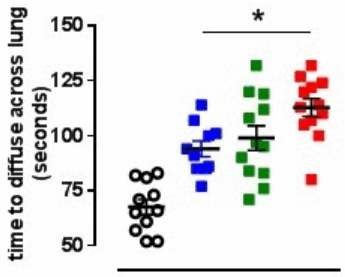


Splice variant for the **iMod domain** is relatively more expressed in **lung** than other tissues

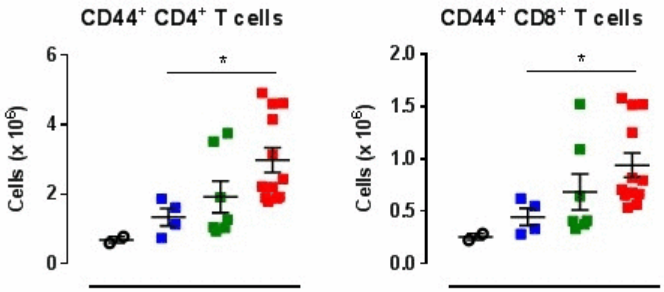
Knockout of Resokine Pathway Increases T Cell Invasion Post Disease Induction

Rodent functional knockout inducing idiopathic pulmonary disease using Bleomycin

Impairment of lung function

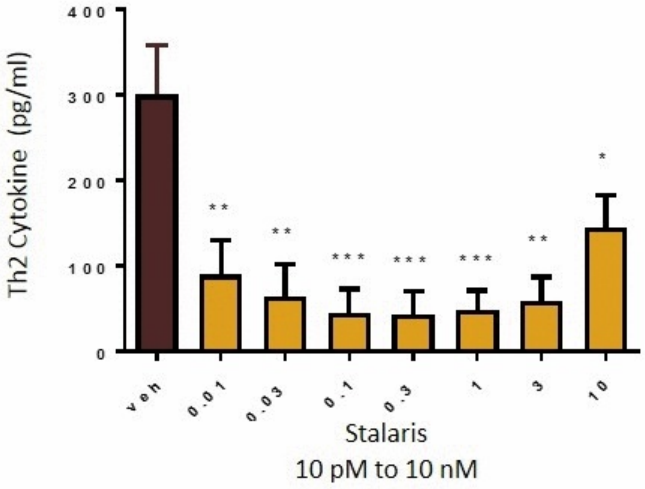


T cell Invasion



** p < .05*

Stalaris Tempers Activated T Cells at High Affinity



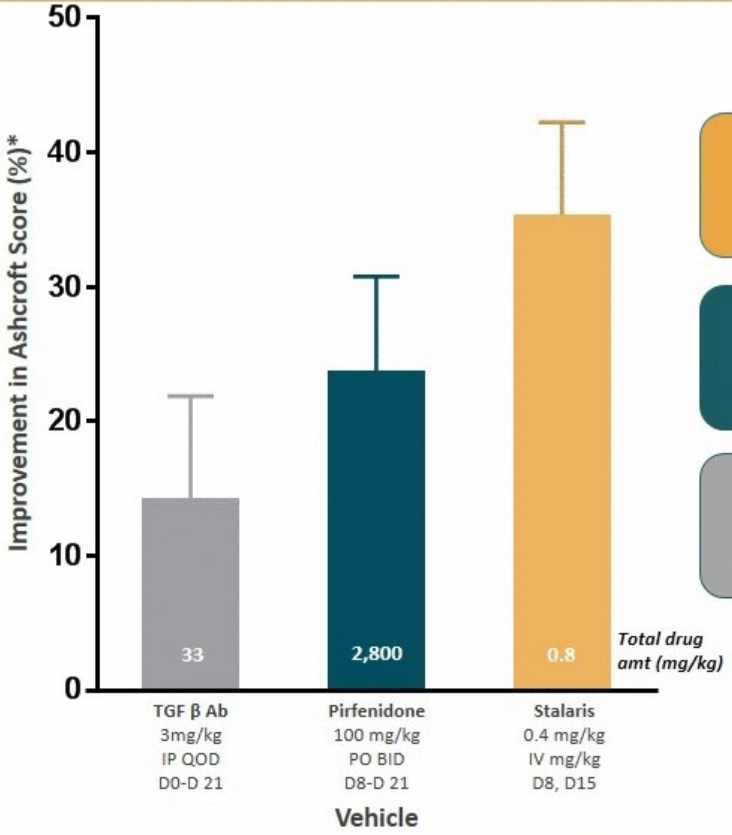
- Stalaris inhibits Th2 type cytokines from activated T cells
- Th2 cytokines play a role in promoting **fibrosis** in certain interstitial lung diseases

**** p < .001; ** p <.01; * p < .05*

aTyr Pharma

Stalaris Outperforms Current Treatments

Established Rodent Model for Idiopathic Pulmonary Fibrosis (IPF)



Superior activity
in established IPF fibrotic model

Stalaris **outperformed pirfenidone** at **1/3500th** total dose

Two doses of Stalaris **outperformed 11 TGFβ Ab** doses

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

aTyr Pharma

Stalaris: Status and 2017 Development Goals

Preclinical Status:

- ✓ Activity in industry proven model of IPF (approved drugs Pirfenidone & Nintedanib)
- ✓ GMP manufacturing kicked off
- ✓ Rat/non-human primate non-GLP safety & PK data support advancement to IND

2017 Development Goals:

First Half

- **Biomarker/MOA:** Introduce mechanistic/PD assay
- **IND Enabling:** Initiate preclinical safety studies

Second Half

- **GMP Manufacturing:** Complete clinical trial supply
- **Clinical Trial:** Initiate First in human clinical trial


BUILDING A NEW CLASS OF THERAPEUTICS
FOUNDATION FOR THE FUTURE

LIFE Leaders

moderna
messenger therapeutics
SK&F
The Medicines Company
Adnexus
AMGEN
NOVARTIS
CELLTECH
MEDAREX
AnaptysBio
Genentech
GILEAD
MERCK
editas MEDICINE
Aurora Biosciences Corporation
VOLCANO
VERTEX
Cooley

John Mendlein, Ph.D.
Chief Executive Officer

Sanuj Ravindran, M.D.
Chief Business Officer

Sanjay Shukla, M.D.
Chief Medical Officer

David King, Ph.D.
SVP, Research

Grove Matsuoka
SVP, Product Programs and Planning

Ashraf Amanullah, Ph.D.
VP, Manufacturing

Andrea Cubitt, Ph.D.
VP, Product Protection

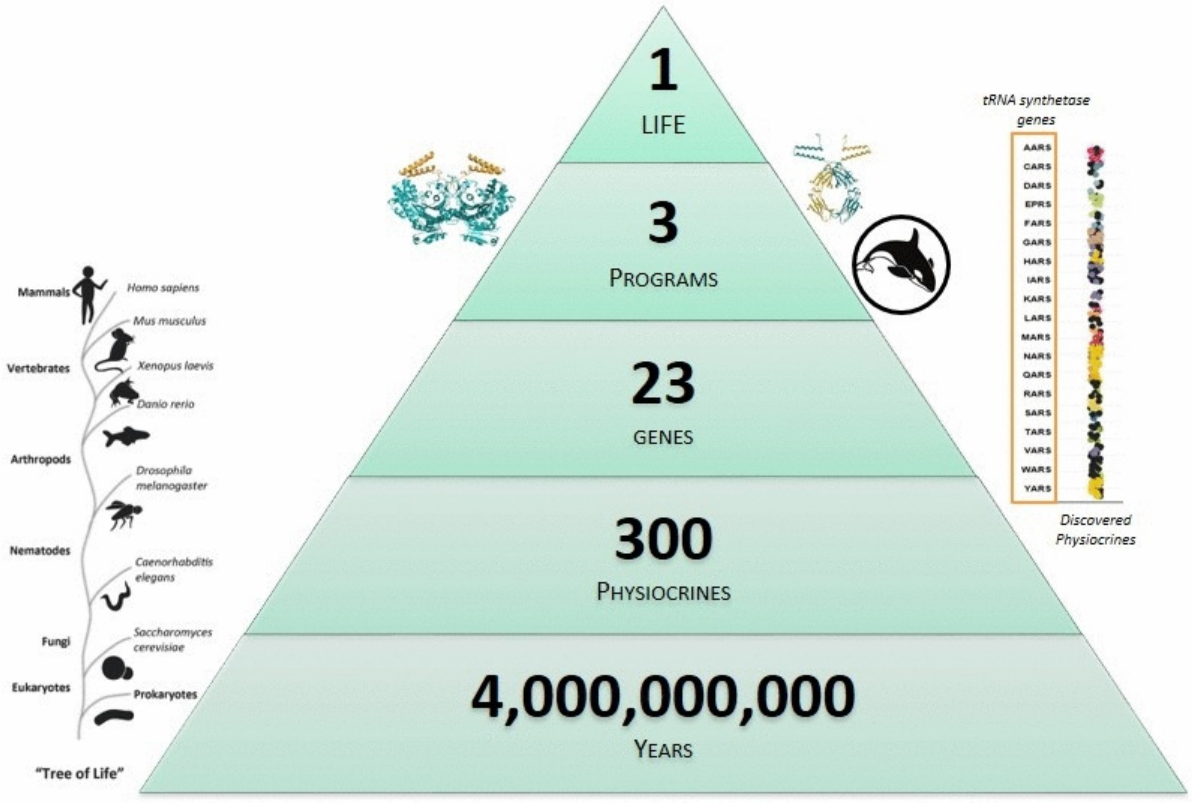
John Blake, CPA
VP, Finance

Holly D. Chrzanowski
VP, Enterprise Talent and Organization

Nancy Krueger
VP, Legal Affairs

GILENYA (fingolimod)
Prilosec OTC
AVASTIN bevacizumab
Cosentyx (secukinumab)
Zantac
cimzia (certolizumab pegol)
OPDIVO (nivolumab)
Sandoglobulin®
MYLOTARG (gemtuzumab ozogamicin for injection)
YERVOY (ipilimumab)
SANDIMMUNE (cyclosporine capsules, USP)
PNEUMOVAX 23 (Pneumococcal Vaccine Polyvalent)
Sandostatin LAR octreotide IM INJECTION
GARDASIL
ACTEMRA tocilizumab
Tamiflu
INTRON A Interferon Alfa-2b, Recombinant
Temodar temozolomide

LIFE Numbers



LIFE Partnering Strategy

"Partner One or More Programs to Accelerate Clinical Development"

FOUNDATION FOR THE FUTURE

Partnering Assets

The World of Physiocrines: New therapeutic intervention points

Resolaris: Favorable safety profile and potential clinical activity in myopathies

Stalaris: First-in-class treatment for lung diseases, entering clinic in 2017

3rd Physiocrine-based program: in 3rd attractive therapeutic area

Priorities

Lower cost of capital to strategically advance pipeline

Accelerate our programs for greater value to stakeholders

Leverage complementary resources and capabilities of partner organizations

LIFE 2017 Goals and Financial Guidance

2017 Goals

- Partner One or More Programs
- Advance Pipeline with Two Molecules in the Clinic
- Declare 3rd IND Candidate from Physiocrine Discovery Engine

Financial Guidance

- $76M estimated cash 2016 EOY*
- Operations funded into 3Q 2018 without any partnerships
- ~30% expected reduction in operational cash burn compared to 2016**

**Estimated cash, cash equivalents, and investments provided pending completion of year-end financial close and external audit*
***Operational cash burn only, excludes cash from financings*


THANK YOU!