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): January 11, 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 Financial Statements and Exhibits.

(d) Exhibits

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

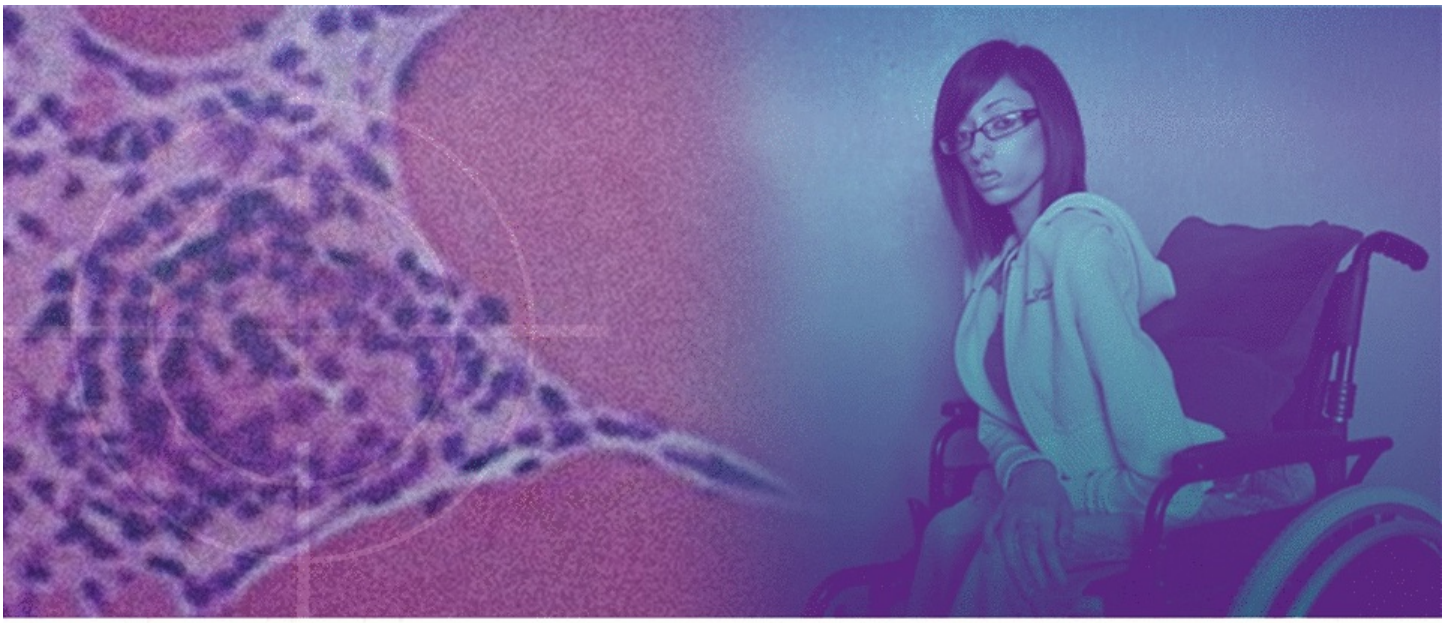
Date: January 11, 2016

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 January 2016



New Promise for Rare Disease Patients with Immune & Fibrotic Pathologies

January 2016

aTyr Pharma
Brave Science, Meaningful Medicines

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 Quarterly Report on Form 10-Q. 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.

Tissue Restoration in Rare Diseases of Muscle & Lung

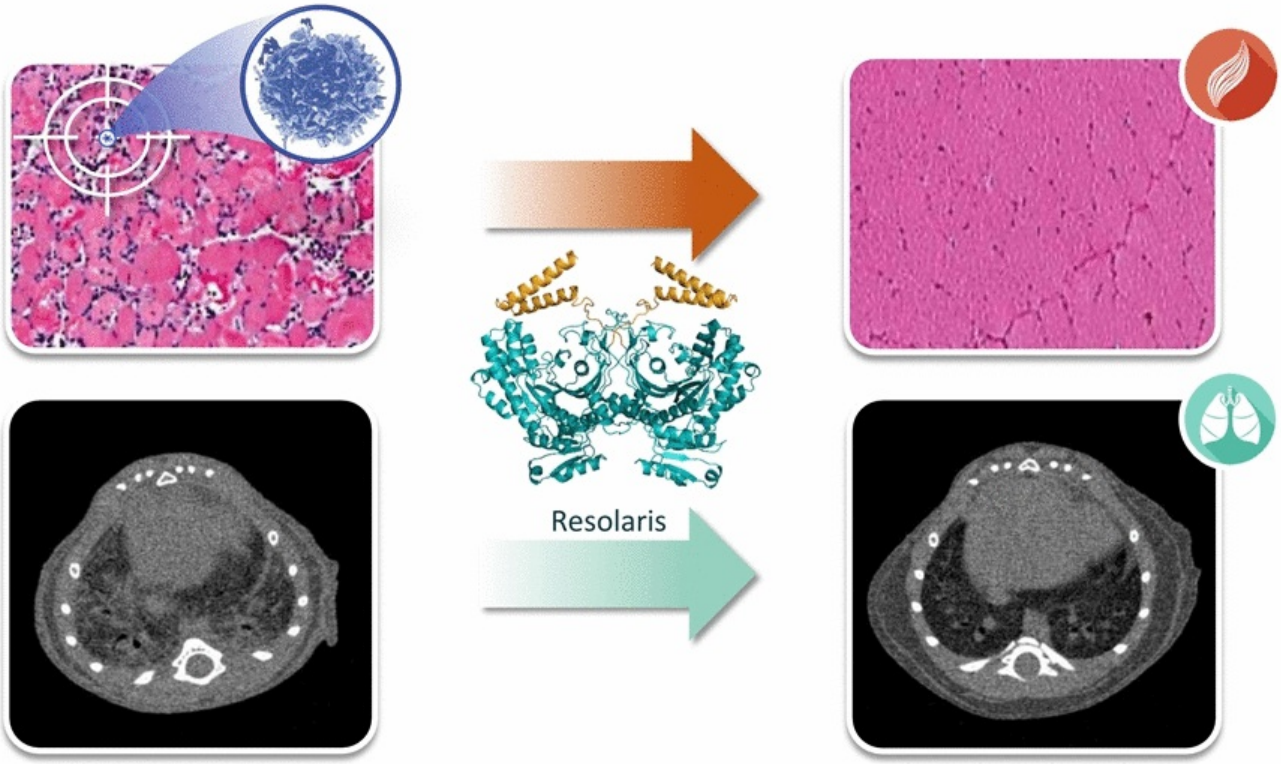
Physiocrine* Disruptive Opportunity	New biology, new therapeutic intervention points	Natural modulators of immune & fibrotic pathways
Resolaris: One Protein Many Rare Diseases	Immune/fibrotic nexus in rare muscle & lung diseases	Therapeutically promote tissue homeostasis and restoration
Autonomous Pipeline	1st in class muscle, lung & liver therapies from internal product engine	iMod.Fc second product candidate in pipeline of patent protected, novel proteins
Strong Team, Results Driven	Product & patient driven, rare disease expertise	Unique investment thesis: rare disease business model based on newly discovered pathways

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

Resolaris Improves Muscle & Lung Immune/Fibrotic Components

Two weeks of treatment in Statin myopathy & Bleomycin IPF models*

FIRST PROGRAM

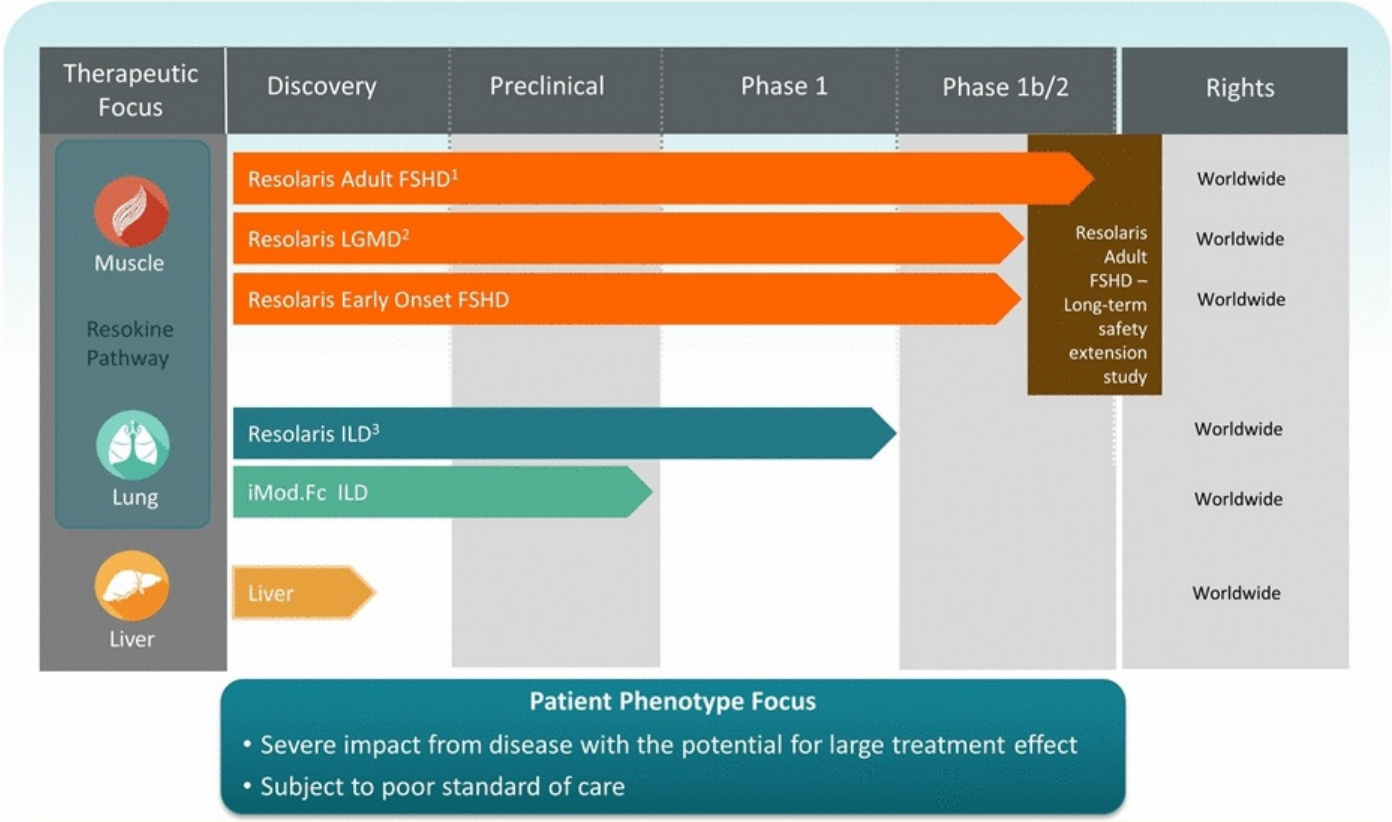


**Idiopathic Pulmonary Fibrosis ("IPF"), a subset of Interstitial Lung Disease ("ILD")*

Immuno/Fibrosis Modulation Pipeline

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

PARADIGM SHIFT IN TREATMENTS



[1] *Facioscapulohumeral Muscular Dystrophy*
[2] *Limb-girdle Muscular Dystrophy*
[3] *Interstitial Lung Disease*

Leadership Team

EXPERIENCED INDUSTRY VETERANS

John Mendlein, Ph.D.
Chief Executive Officer

moderna · Adnexus · Aurora Biosciences Corporation · SK&F

Sanuj Ravindran, M.D.
Chief Business Officer

The Medicines Company · Asian Health Care Fund · RADIUS · Burrill & Company

Melissa Ashlock, M.D.
SVP, Translational Medicine & Therapeutics

Cystic Fibrosis Foundation · National Heart Lung and Blood Institute · National Human Genome Research Institute

Kelly Blackburn
VP, Clinical Operations

VERTEX · Millennium · Wyeth · Genetics Institute

John McKew, Ph.D.
VP, Research

NIH National Institutes of Health · Wyeth · Genetics Institute

Andrew Cubitt, Ph.D.
VP, Product Protection

AnaptysBio · Aurora Biosciences Corporation · xceptor

Ashraf Amanullah, Ph.D.
VP, Manufacturing

Genentech · GILEAD · MERCK

John Blake, CPA
VP, Finance

VOLCANO · BD


Discovery of Physiocrine Proteins:
Alternative Splicing of Ancient Genes
Leads to New Biology

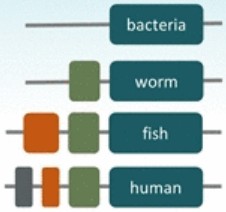
Dual Roles of tRNA Synthetases: Protein Synthesis & Potential for Physiological Regulation

tRNA Synthetases:
In all cellular life forms
4 billion years old

Intracellular Function:
23 genes in humans
Protein synthesis

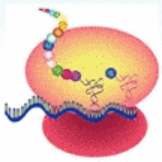
Extracellular Function:
~300 Physiocrines
Splice variants offer new biology

Physiocrine Regions of tRNA Synthetase displayed in a gene



Intracellular
(Original Primordial Function)

Protein Synthesis (retained in all species)



Extracellular Physiological
(Systems Evolved with Species)

- Regenerative Systems (worm)
- Vascular Systems (fish)
- Immune Systems (human)

Therapeutic Opportunities

Augment Homeostatic Pathways by Administering Physiocrine Proteins

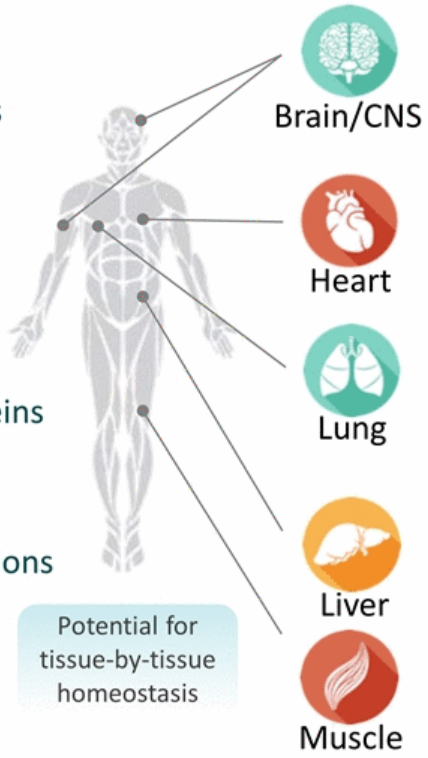
Orchestrate multiple physiological processes

Focus on Immuno- & Fibro-modulation

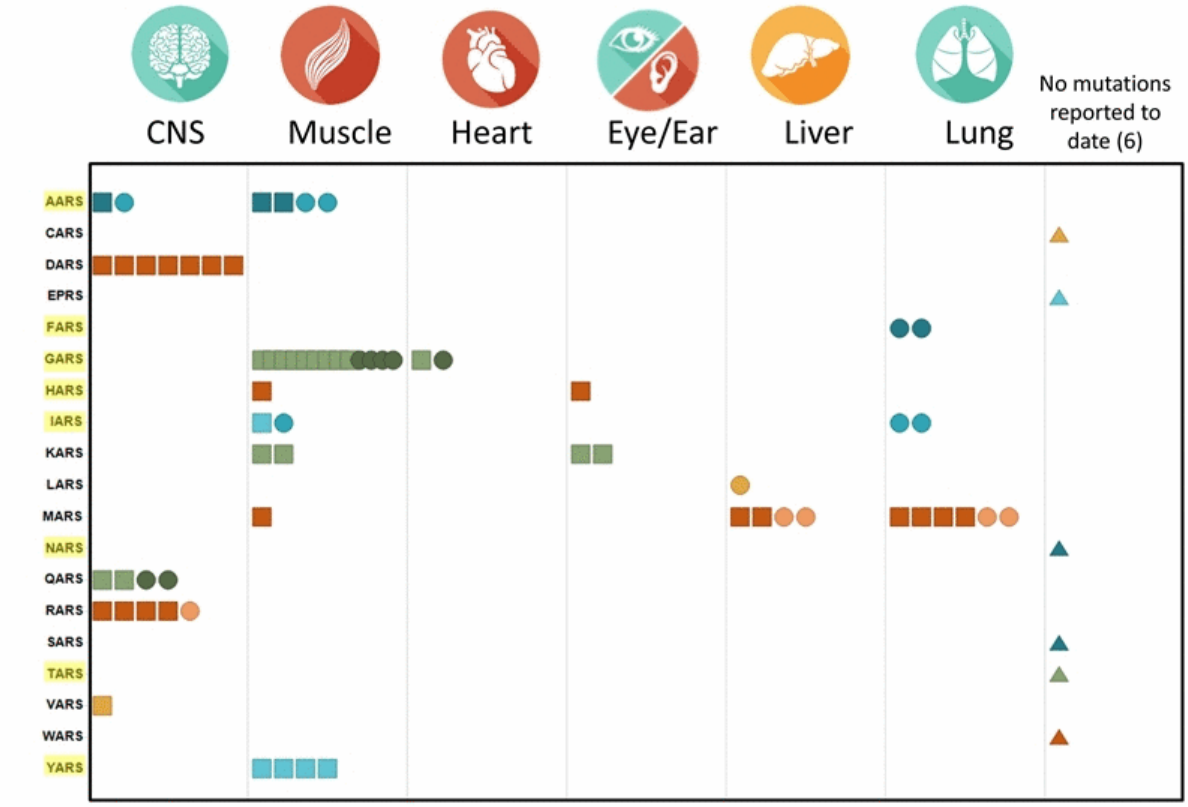
Primer on Physiocrines

Potential for novel physiological modulation in disease

- Extracellular functions of intracellular tRNA synthetases
- New class of modulators of tissue homeostasis
- Conserved, genetic gain of function over time
- ~300 proteins varying in size (40-500AA)
- Work via GPCRs, TLRs, cytokine receptors & other proteins
- Not glycosylated & non-canonical leader sequences
- At least 14/23 members of family with disease connections



Physiocrine Mutations in Disease Organ Phenotypes



Domain location of mutation:

Physiocrine

Catalytic (may overlap with Physiocrine domain)

tRNA synthetases targeted by autoantibodies

Leading Journal Publications: Science & Nature

Published in Lo et al., Science, 2014; Weiwei, He, et al., Nature 2015. Graphics are visual representations for illustrative purposes.

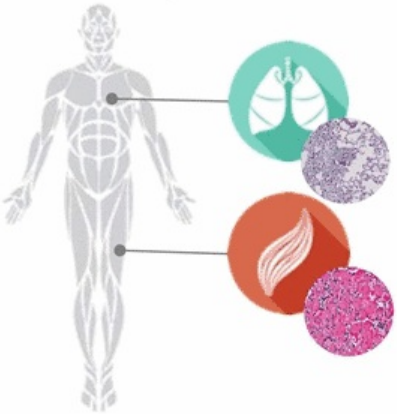

The First Physiocrine, the Resokine Pathway:
Potential New Therapies
in Rare Muscle & Lung Diseases

Molecules of the Resokine Pathway

New hope for rare muscle & lung disease patients

Resokine* Pathway Discovery:

- Immuno-modulatory & fibro-modulatory activity via in vivo screening
- Clinical correlates with Jo-1 Ab phenotype: myopathy & ILD where we believe the pathway is disrupted



*Naturally occurring Physiocrines***

Resolaris™
(slightly truncated from wildtype)

iMod
(splice variant)

Engineered Physiocrine

iMod.Fc

Therapeutic applications with a Jo-1 Ab phenotype:

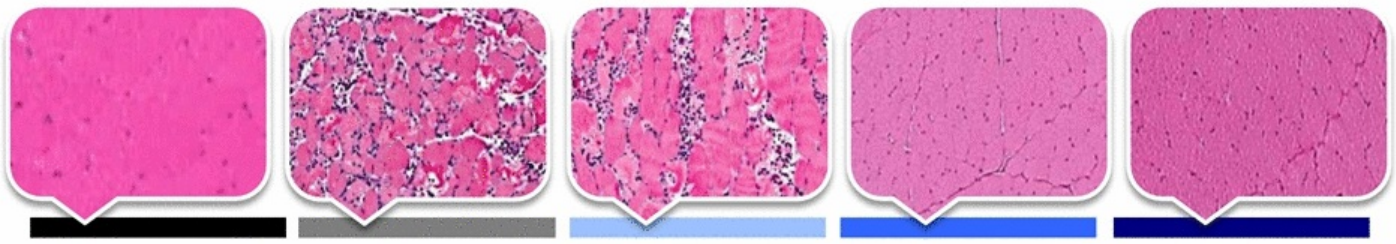
- Rare myopathies with an immune component (RMICs)
- Rare pulmonopathies with an immune component (RPICs)
  - Pursuing subsets of ILD

*Resokine (name for extracellular HARS, a tRNA Synthetase)
**Zhou et al, JBC, 2014

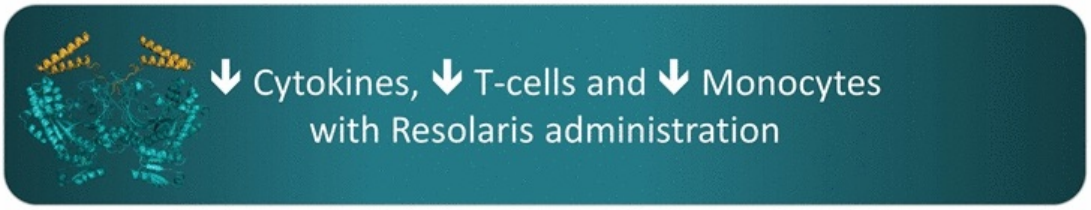
Ability to Treat Immune Cell Invasion in Muscle

Myopathy model: in vivo Resolaris effects

RESOLARIS
PRECLINICAL



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

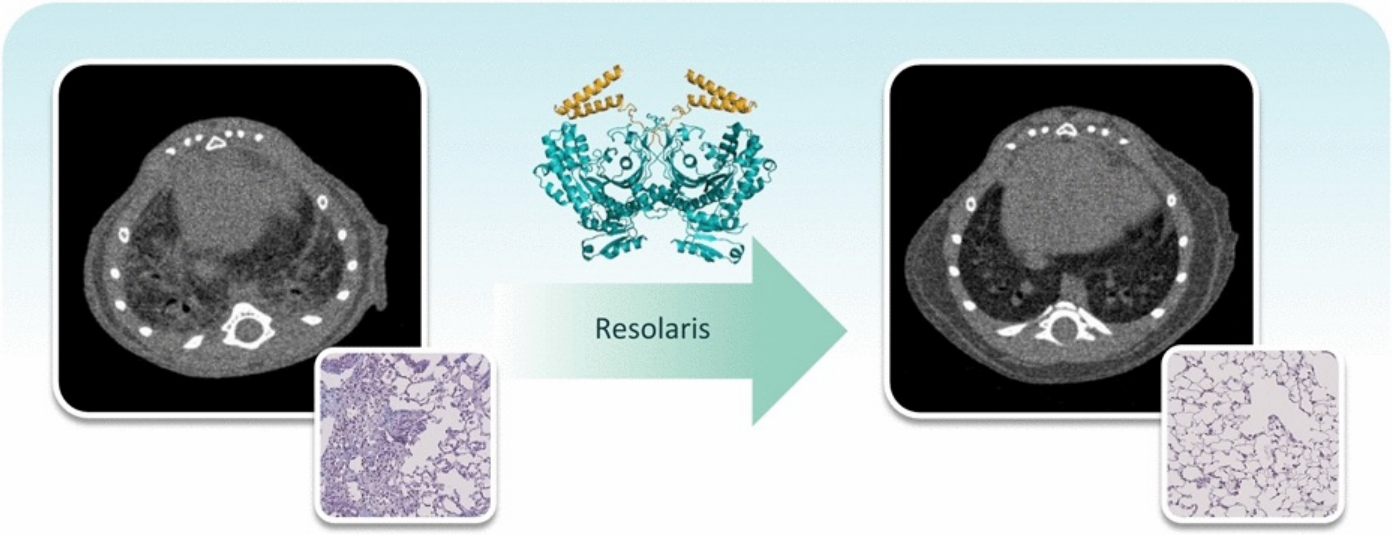


aTyr unpublished data

Resolaris: Active In Lung Inflammation & Fibrosis Model

Three week rodent model, two weeks of therapeutic treatment

PROMISING THERAPEUTIC ACTIVITY



Pulmonary Inflammation and Fibrosis Induced with Bleomycin

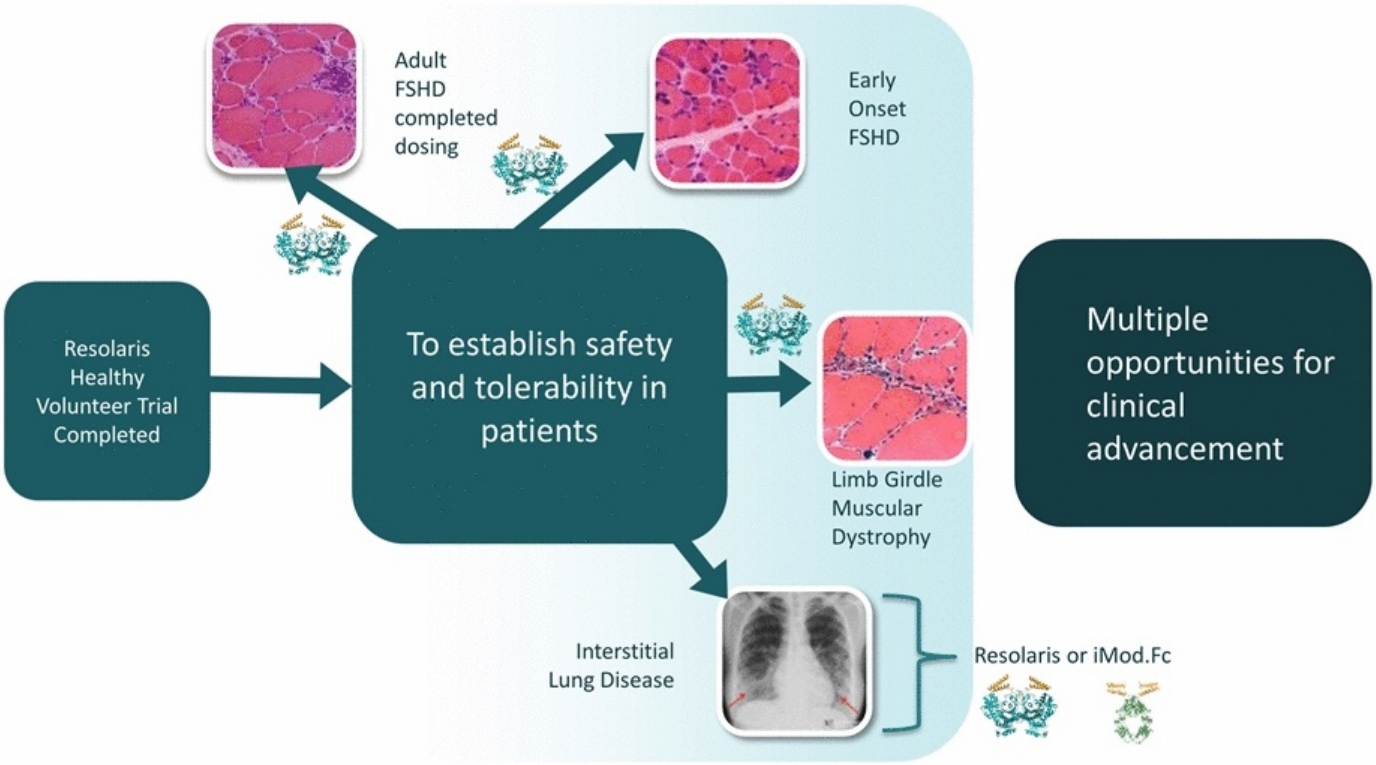
Promising therapeutic activity*
Compared favorably to Pirfenidone

Experimental data provided by Stelic CRO
CT scans taken at day 14, lung histology taken at day 21
** Activity of mouse Resolaris (3mg/kg) vs vehicle control*


Clinical Development of Resolaris:
Harnessing a Natural Pathway
to Treat Multiple Muscle & Lung Diseases

Clinical Path for Resolaris™ & iMod.Fc

Staging Rare Muscle & Lung Disease Indications



Resolaris for Multiple Muscle Indications

Rare myopathies with an immune component (RPIC)

	Facioscapulohumeral Muscular Dystrophy (FSHD)	Limb-girdle Muscular Dystrophy 2B (LGMD2B)
Pathology	▪ Immune component (e.g. T cells) ▪ Toxic gain of function mutation (Dux4 protein) ▪ Muscle-by-muscle progression; MRI assessable	▪ Immune component (e.g. T-cells) ▪ Toxic loss of function mutation (dysferlin) ▪ Muscle group progression; MRI assessable
Clinical	▪ Debilitating muscle weakness ▪ Difficulty raising arms, foot drop when walking ▪ May have visual or auditory impairment	▪ Debilitating muscle weakness ▪ Challenges moving limbs ▪ May have respiratory insufficiency
Standard of care	▪ No therapeutic treatments ▪ Only supportive care provided	
Trials	▪ **Adult FSHD P1b/2 completed dosing in cohort 3** ▪ **Early onset FSHD P1b/2 trial initiated 4Q15** ▪ Explore safety, tolerability, and activity	▪ **P1b/2 trial initiated in 4Q15** ▪ **First patients dosed** ▪ Explore safety, tolerability, and activity

Similar clinical phenotype to Jo-1 Ab disease as both are sometimes misdiagnosed as either polymyositis or Jo-1 Ab Phenotype

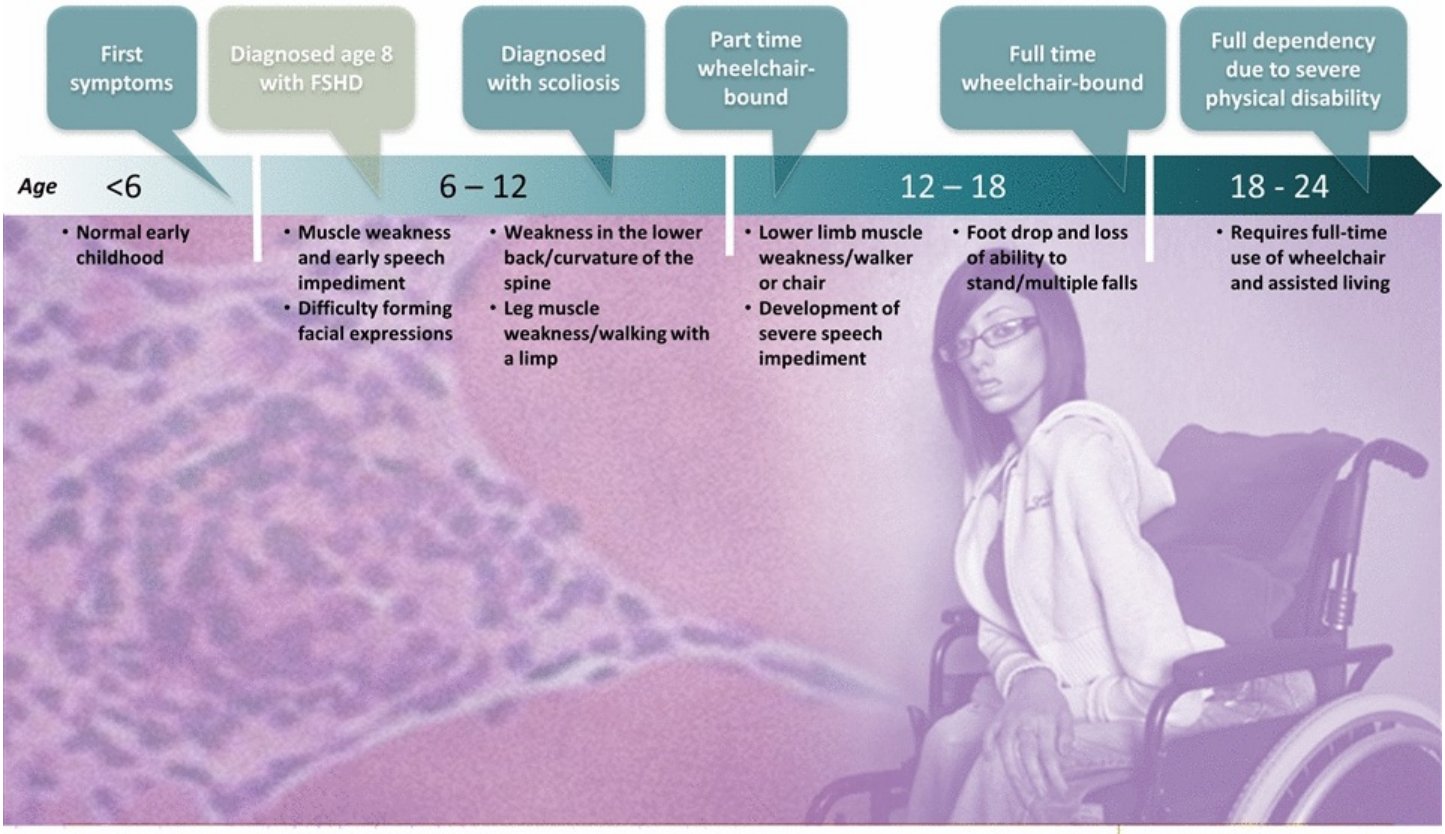
LGMD2B Disease Progression Case History

Steroid-induced myopathy

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	• 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

https://www.youtube.com/watch?v=JLqHis1yPUI
http://mwtn2013blisswelch.blogspot.com/

Early Onset FSHD Case History



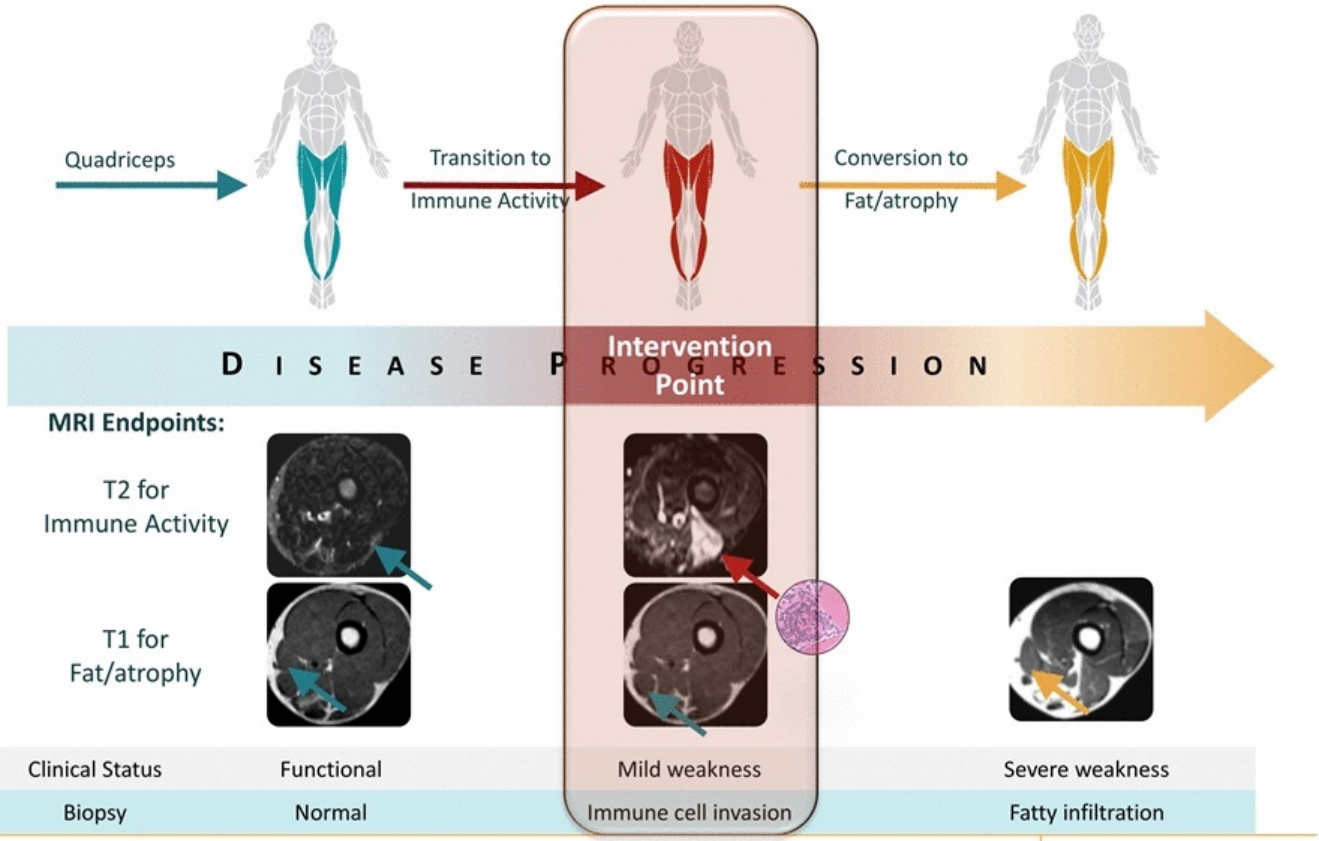
http://www.theguardian.com/lifeandstyle/2009/may/28/muscular-dystrophy-disability-fshd

Climbing Mountains; Sarabjit Parmar, 2014

Monitoring Muscle-by-Muscle Disease Phenotype

Immunologically driven disease progression assessed by MRI

RESOLARIS CLINICAL



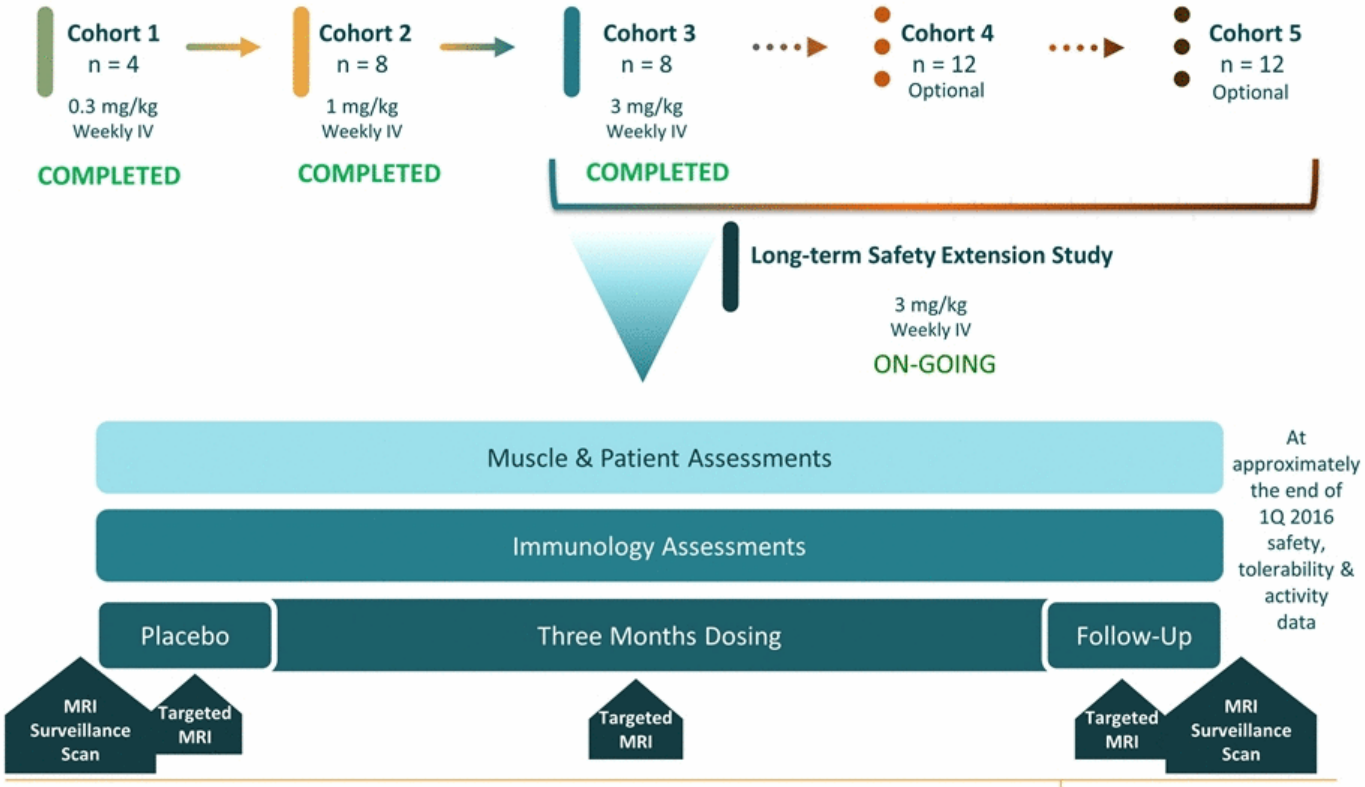
Clinical Status	Functional	Mild weakness	Severe weakness
Biopsy	Normal	Immune cell invasion	Fatty infiltration

Frisullo et al., J Clin. Immunol., 2011; Also based on unpublished work and communications with investigators and KOLs

Exploratory Study of Resolaris in Adult FSHD

Phase 1b/2 randomized, double-blind, placebo controlled, multiple ascending dose

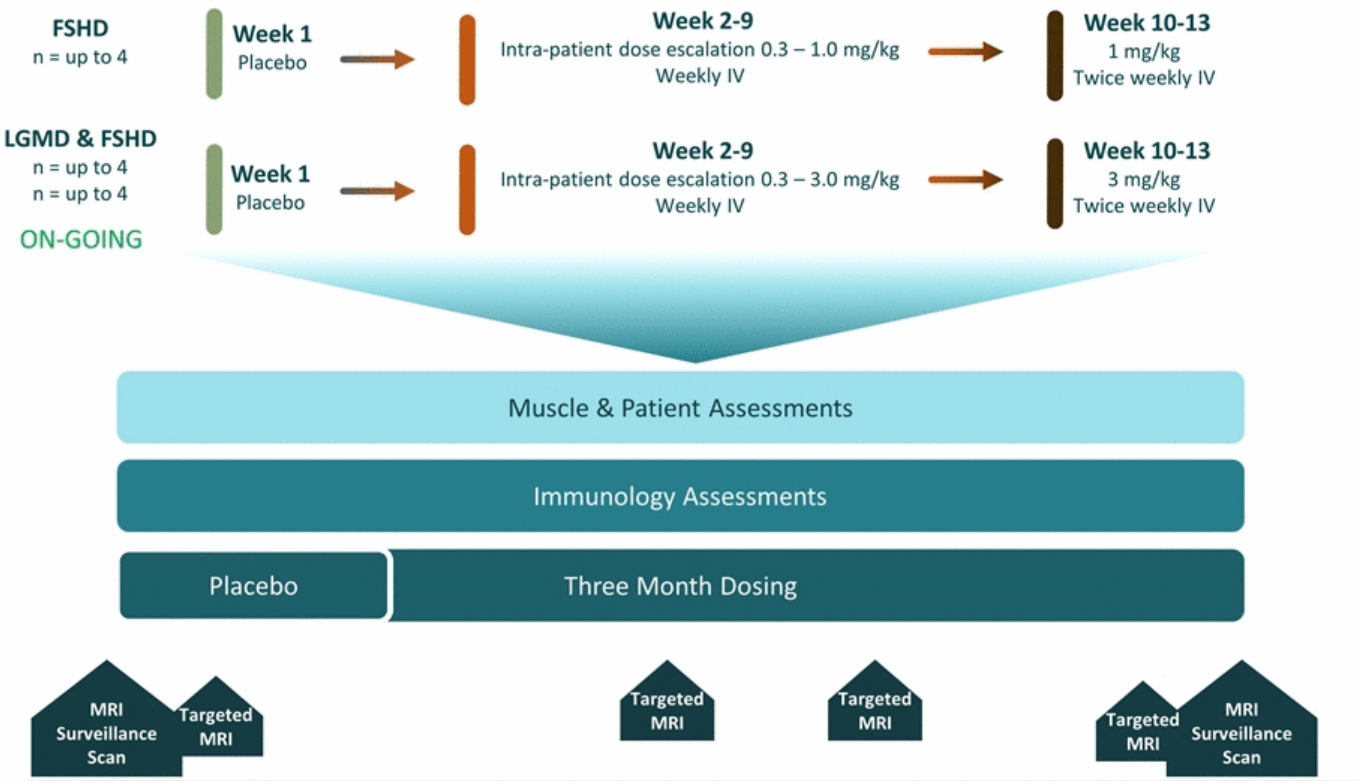
RESOLARIS CLINICAL



LGMD2B/FSHD: Exploratory Study of Resolaris

Phase 1b/2 open-label, intra-patient dose escalation study

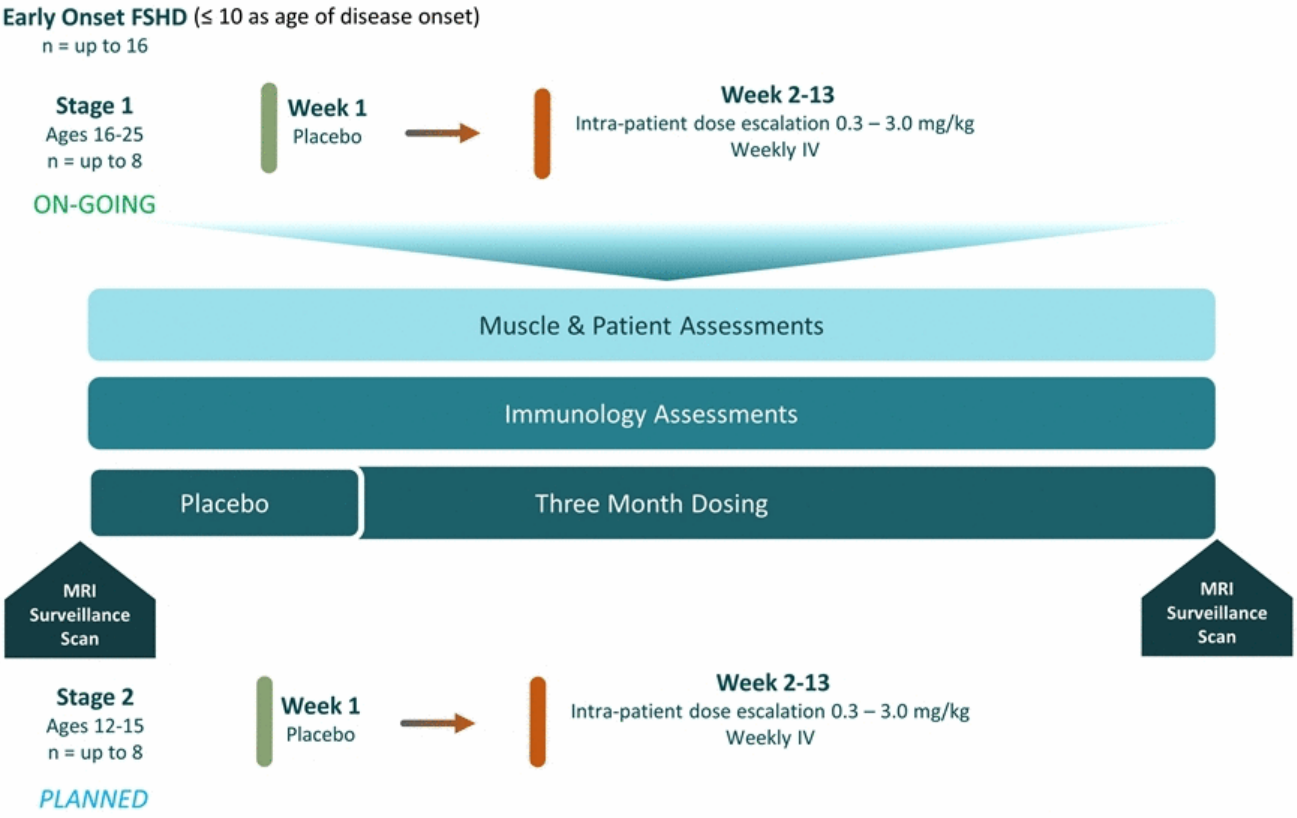
RESOLARIS CLINICAL



Early Onset FSHD: Exploratory Study of Resolaris

Phase 1b/2 open-label, intra-patient dose escalation study

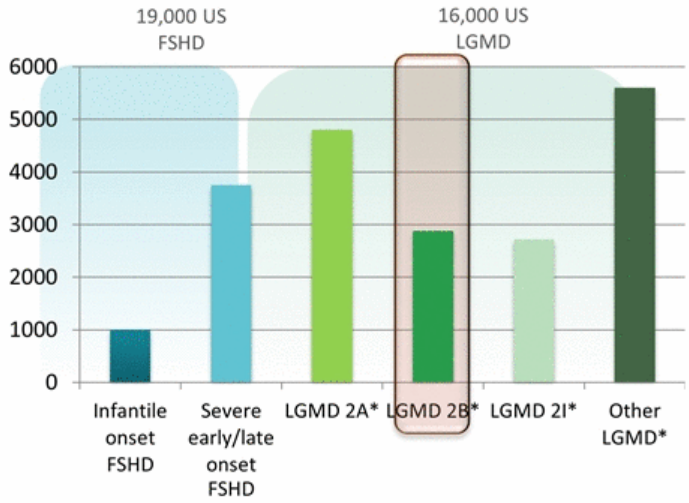
RESOLARIS CLINICAL

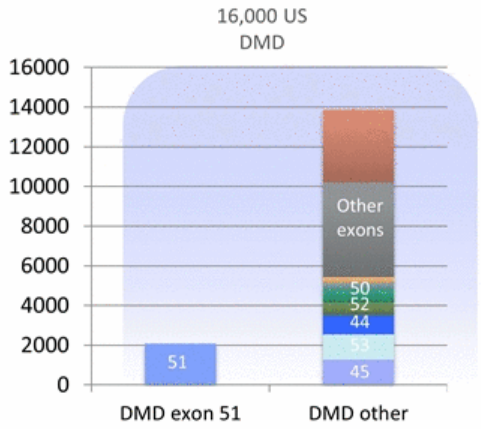


Resolaris: One Product, Multiple Rare Diseases

Promise for grave, recalcitrant myopathy patients

COMMERCIAL





- Leverage registries, sites and advocacy groups to access FSHD/LGMD patients
- Leverage sites for indication expansion
- Common physician base for patient ID, prescribing and clinical development in RMICs

***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*

Two Molecules Active in Lung Models: Resolaris & iMod.Fc

Severe, rare disorders with high unmet medical need

Interstitial Lung Disease
> 80 RPIC Forms

Pathogenesis	▪ Lung damage leading to alveolar inflammation or fibrosis ▪ Worst prognosis: lower DLCO and rapid decline of DLCO over three years
Clinical manifestations	▪ Shortness of breath and cough ▪ Specific chest radiographic abnormalities ▪ Decreased lung volume noticed in pulmonary function tests
Standard of care	▪ O_2, pulmonary rehab ▪ Immunosuppressive (cyclophosphamide with low dose prednisone) ▪ Lung transplant
Upcoming Trials	▪ **Expect to initiate exploratory P1b/2 trial with iMod.Fc (2017) and/or Resolaris (by the end of 2016)** ▪ Evaluating appropriate forms of ILD ▪ Goal is to explore safety, tolerability, biological and clinical activity

An Engineered Physiocrine for Lung Disease: iMod.Fc

New TPP to open more lung indications

RESOKINE FRANCHISE

Rationale for iMod.Fc*:

- Resolaris TPP: Weekly dosing; limits lung applications
- Develop molecule for new TPP: potentially once-monthly dosing

Product Concept:

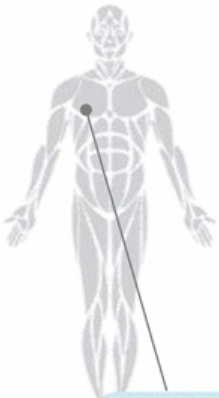
- Two iMod domains per Fc of an antibody
- Extend exposure to hit TPP

Preclinical Path and Goals:

- Industry proven model of IPF (approved drugs: Pirfenidone & Nintedanib)
- *E. coli* produced for low COGs
- Show immuno- & fibro- modulatory activity
- Show safety at higher doses

Potential Therapeutic applications:

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



Rare Pulmonopathies with an Immune Component ("RPICs")

Lung

** iMod.Fc refers to immunomodulatory domain of HARS fused to an Fc region of an antibody*

TPP = Target Product Profile

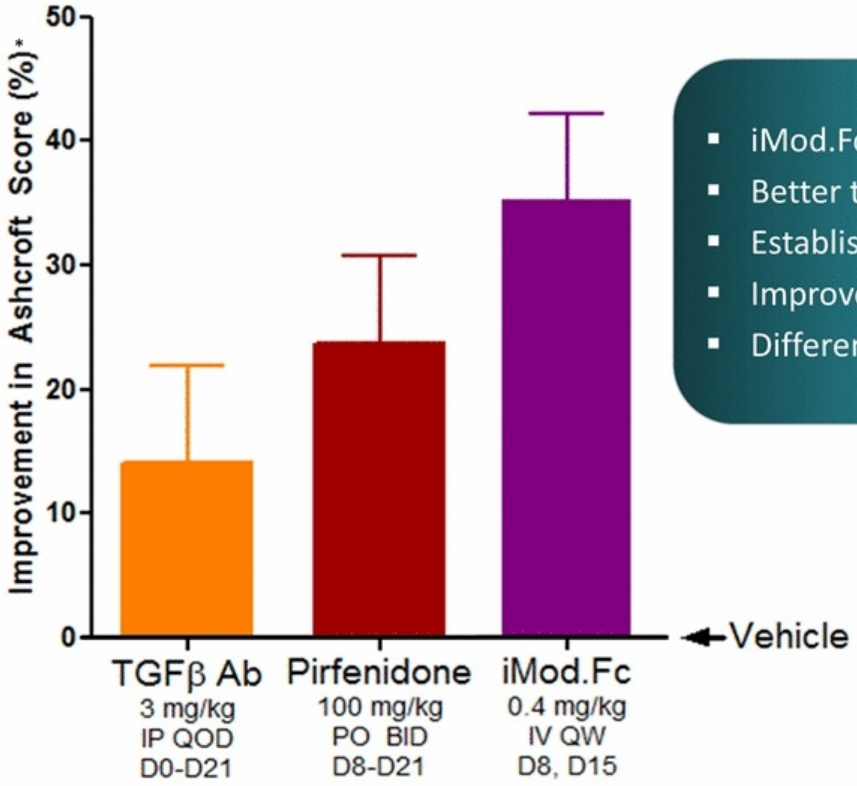
iMod.Fc

iMod
(100% identical to human wildtype)

Fc
(human antibody)

Two iMod.Fc Doses Outperform 28 Pirfenidone Doses

SECOND IND CANDIDATE

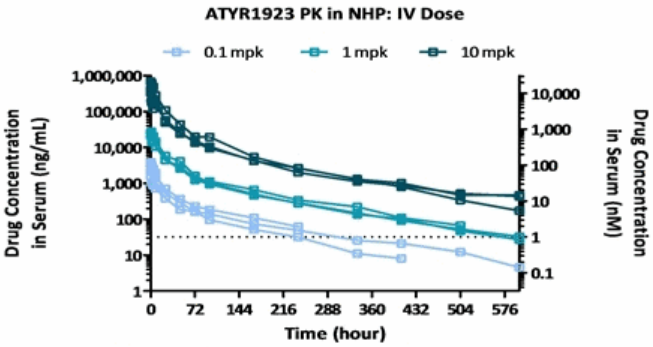


- iMod.Fc 1/250th of Pirfenidone dose
- Better than 10 TGFβ Ab doses
- Established IPF rodent model
- Improves inflammation & fibrosis
- Differentiated mechanism

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

iMod.Fc: Non-Human Primate and Rodent PK and Safety

Non-Human Primates



Non-GLP double-dose study

- No clinical observations
- No pro-inflammatory cytokine signal

Attractive PK

Rodents

Non-GLP toxicology

- 1-month study at dose level 25x efficacious dose
- No pro-inflammatory cytokine signal
- No clinical observations
- No changes in body or tissue weights
- 14 tissues examined microscopically; all normal

Attractive PK

Supports potential for monthly dosing in patients


Building a New Class of Therapeutics:
Foundation for the Future

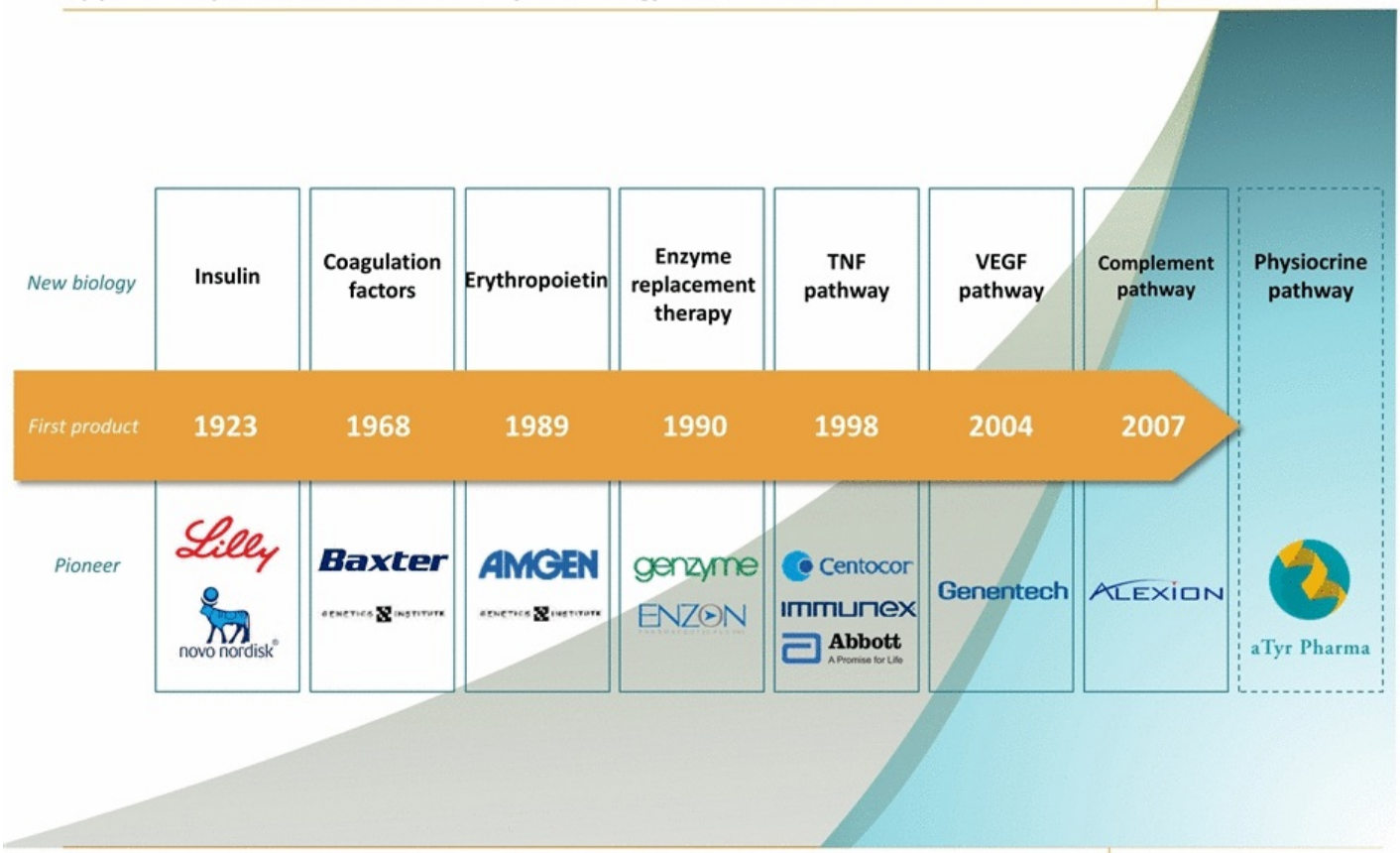
Broad IP Protection for Physiocrine Composition of Matter

Strategic Assets for Programs and Class	▪ ~300 Physiocrines discovered ▪ Over 200 Physiocrines interrogated via protein expression and functional assays ▪ >200 pending applications worldwide ▪ 70 issued or allowed patents
Global Patent Estate	▪ Claims to therapeutic compositions to block competitors ▪ Therapeutic compositions and methods of use including full length proteins ▪ Antibodies with selective binding specificity to a Physiocrine
Resolaris Program	▪ US Patent protection to 2033, without patent extensions ▪ Composition of matter patents issued or allowed in the US and Europe ▪ Comprised of a number of patent families including U.S. Patent No. 8,835,387 covering Resolaris

Revolutionary Drugs Leveraging New Biology

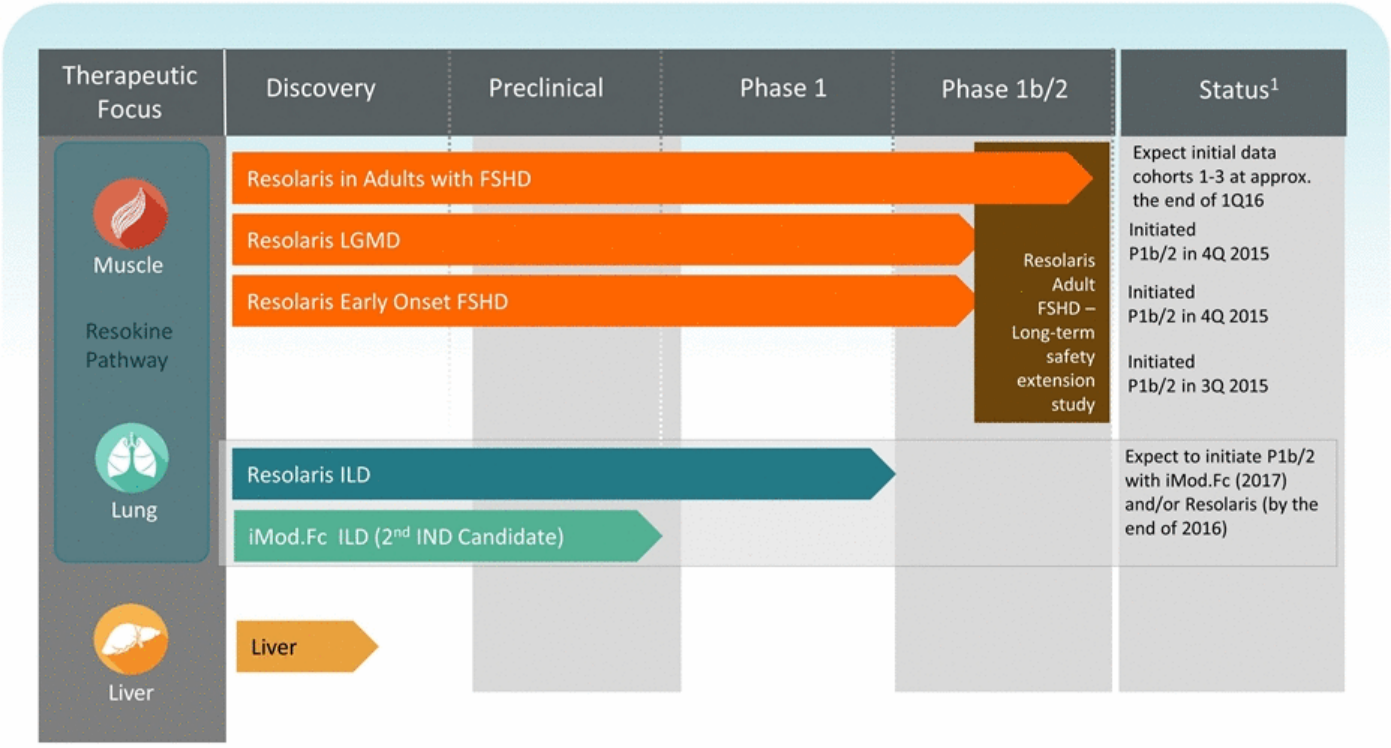
Opportunity to own a new class of meaningful medicines

MEANINGFUL MEDICINES



Immuno/Fibrosis Modulation Pipeline

POTENTIAL FIRST-IN-CLASS MEDICINES



[1] The expected timing of the anticipated next milestones for our clinical programs for Resolaris in FSHD, LGMD and RPIC is based on our current estimates and is subject to change based upon a variety of risk factors.


KEEP
CALM
AND
MAINTAIN
HOMEOSTASIS
Thank You