Salarius PHARMACEUTICALS
The Cancer Epigenetics Company

Company Overview

October 2019

Safe Harbor Statement

This presentation contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Any statement in this presentation that is not a historical fact is a forward-looking statement.

Forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially and reported results should not be considered as an indication of future performance. Examples of such statements include, but are not limited to: statements relating to the commercial or market opportunity and expansion; the adequacy of Salarius' capital to support its future operations and its ability to successfully initiate and complete clinical trials and regulatory submissions; expected dose escalation and dose expansion; number of additional clinical sites; expected cohort readouts; expected therapeutic options for SP-2577 and related effects; timing of development and future milestones; the nature, strategy and focus of Salarius; future economic conditions or performance; and the development, expected timeline and commercial potential of any product candidates of Salarius. Salarius may not actually achieve the plans, carry out the intentions or meet the expectations or projections disclosed in the forward-looking statements and you should not place undue reliance on these forward-looking statements. Such statements are based on management's current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a result of many factors, including, without limitation: the ability of Salarius to raise additional capital to meet Salarius' business operational needs and to achieve its business objectives and strategy; Salarius' ability to project future capital needs and cash utilization; future clinical trial results; that the results of studies and clinical trials may not be predictive of future clinical trial results; the sufficiency of Salarius' intellectual property protection; risks related to the drug development and the regulatory approval process; and the competitive landscape and other industry-related risks. Salarius disclaims any intent or obligation to update these forward-looking statements to reflect events or circumstances that exist after the date on which they were made. You should review additional disclosures we make in our filings with the Securities and Exchange Commission, including our Quarterly Reports on Form 10-Q and our Annual Report on Form 10-K. You may access these documents for no charge at http://www.sec.gov.

Investor Highlights: Salarius Pharmaceuticals is an Epigenetic Focused Clinical-stage Oncology Biotech Company

1 **Salarius has a differentiated LSD1 inhibitor with expected human data in 2020**

- Multi-company interest and clinical data validates LSD1 as a therapeutic target

2 **Development strategy focused on Speed to Market and Market Expansion**

- Speed to Market: Ewing sarcoma trial → Rare Pediatric Disease and Orphan Status Designation
- Market Expansion: Advanced Solid Tumor trial → Hormonal cancers, sarcomas ($1B+ markets)

3 **Seasoned management team leading Salarius**

- Experienced in product, clinical and early stage development

4 **Lead clinical program funded by extensive non-dilutive capital**

- $18.7M CPRIT award and support from the National Pediatric Cancer Foundation

5 **Opportune time to capitalize on growth potential**

- Potential to expand into other indications of high value (including immunotherapy)
- Relatively short timeline to pivotal inflection points

Seasoned Leadership Team

David J. Arthur
Chief Executive Officer

Margaret Dugan, MD
Senior Medical Advisor

Steve Horrigan, PhD
Chief Scientific Officer

Scott Jordan
Chief Business Officer

Mark Rosenblum
Chief Financial Officer

John Walling, PhD
VP Chemistry, Manufacturing & Control

Daniela Y Santiesteban, PhD
Director of Research and BD

Board of Directors

David Arthur, MBA	**Jonathan Northrup, MBA**	**Tess Burleson, CPA**	**Paul Lammers, MD MSc**	**Bruce McCreedy, PhD**	**William McVicar, PhD**	**Arnold Hanish, CPA**
Salarius Pharmaceuticals	Stingray Therapeutics	Translational Genomics Research Institute	Triumvira Immunologics	Precision BioSciences	Flex Pharma	Omeros Corporation
	Eli Lilly		Merck-Sorono	Triangle Pharmaceuticals	Inotek Pharmaceuticals	Eli Lilly

Salarius Development Pipeline

	Indication	Preclinical	Clinical*	Status
Seclidemstat	Ewing Sarcoma	**Dose Escalation and Expansion Refractory and Relapsed Ewing**		• Phase 1/2 enrolling up to 50 patients • Dose escalation in cohort 4 • Safety and efficacy data in 2020
	Advanced Solid Tumors	**Dose Escalation and Expansion Enriching for mutations and prostate[1]**		• Phase 1 enrolling up to 50 patients • Dose escalation in cohort 4 • Safety and efficacy data in 2020
	Glioblastoma	**In vivo studies ongoing**		• Partnership with The Ivy Brain Tumor Center/ NeuroTrials LLC • Preparing for Phase 0 study

[1] Advanced Solid Tumor Study is open to all non-Ewing solid tumor patients except for primary CNS tumors

* Expanded Phase 2 in Ewing sarcoma could potentially be a registration study following discussions with the FDA regarding improvements in response, duration of response compared to SOC

Salarius is Poised to Add to the Growing Epigenetic Wave

The epigenetic space has been increasing in activity since 2018

Preclinical

Celgene & triPHASE

~$1B deal ($40M upfront) to advance a preclinical asset (lead optimization)

Clinical

Salarius PHARMACEUTICALS

Phase 1: LSD1; Ewing's and Solid Tumors

Constellation PHARMACEUTICALS

Phase 1: EZH2 and BET inhibitors; solid/heme

ORYZON

Phase 2: LSD1; AML and SCLC

IMAGO

Phase 2b: Raised $40M to advance LSD1 program

Drug registration

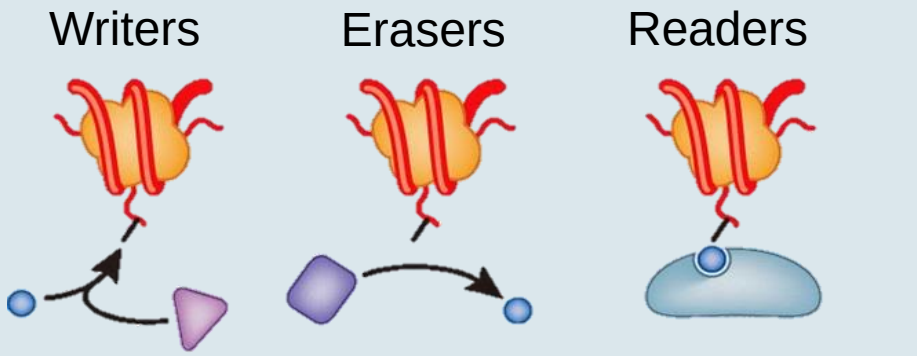
Epizyme™

Submitted an NDA for Epithelioid Sarcoma (1H2019) and has plans to submit another for Follicular Lymphoma (2H2019)

Salarius is an Epigenetic Focused Oncology Biotech Company

Epigenetics addresses how cells regulate gene expression through various chemical modifications

Epigenetic enzymes can be grouped into:

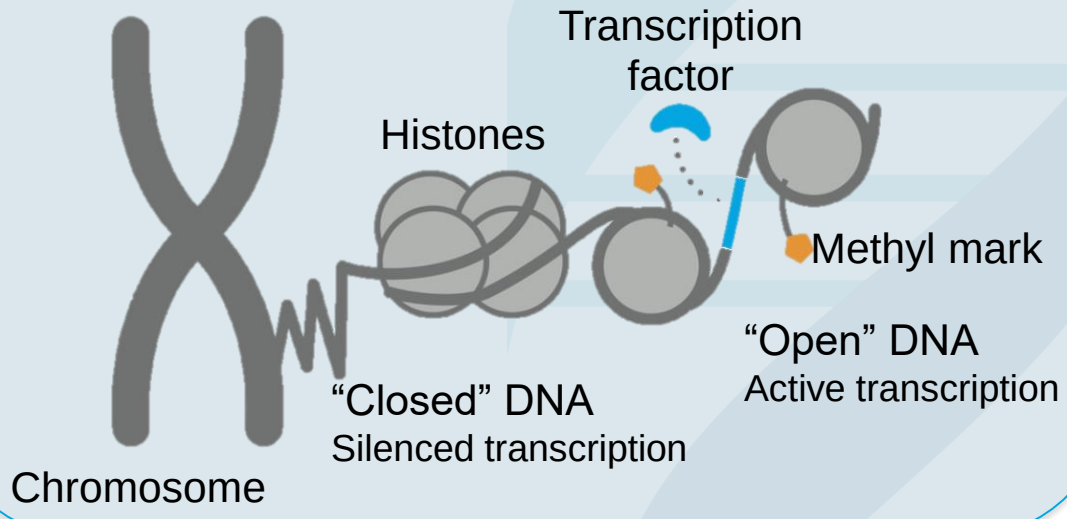


Tarakhovsky *Nat Immunol* 2010

Examples:

DNMT1	LSD1	BRD
DNA methyltransferase 1	Lysine specific Demethylase 1 (LSD1)	Bromodomain proteins

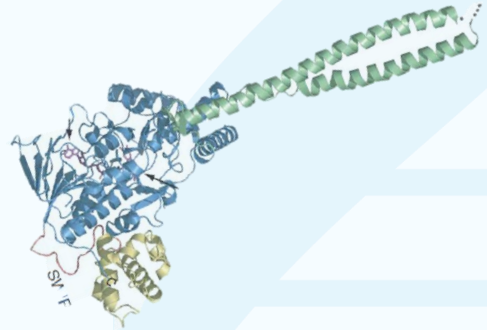
Salarius' lead compound inhibits LSD1, a methyl mark eraser that influences "closing" and "opening" of DNA to alter gene transcription



LSD1 Is An Attractive Target For Cancer Therapy

- **Lysine Specific Demethylase 1 (LSD1)** is an epigenetic "eraser" that is a target of interest for solid tumors and hematological cancers

  - LSD1 overexpression is often correlated with poor prognosis via regulation of pathways involved in:
    - Cell differentiation
    - Cell motility
    - Stem-like phenotype
    - Cell cycle
  - LSD1 associates with over 60 gene regulatory proteins[1]



LSD1 affects gene expression via enzymatic and scaffolding properties

Lead compound, **Seclidemstat** (SP-2577), comprehensively inhibits **LSD1**

[1]Majello,B. *Cancers* 2019.

LSD1 is a target of interest given its role in cancer progression

cancers

MDPI

Review

Expanding the Role of the Histone Lysine-Specific Demethylase LSD1 in Cancer

Lysine-specific demethylase 1 (LSD1/KDM1A/AOF2/BHC110) is expressed and is an epigenetic drug target in chondrosarcoma, Ewing's sarcoma, osteosarcoma, and rhabdomyosarcoma☆,☆☆

Cell

LSD1 Is a Subunit of the NuRD Complex and Targets the Metastasis Programs in Breast Cancer

OPEN ACCESS Freely available online

PLoS one

Over-Expression of LSD1 Promotes Proliferation, Migration and Invasion in Non-Small Cell Lung Cancer

Recent works demonstrate LSD1's demethylation independent activity

nature chemical biology

ARTICLES

https://doi.org/10.1038/s41589-019-0263-0

CRISPR-suppressor scanning reveals a nonenzymatic role of LSD1 in AML 2019

DOI: 10.1002/pbc.27888

RESEARCH ARTICLE 2019

Pediatric Blood & Cancer

aspho

WILEY

Catalytic inhibition of KDM1A in Ewing sarcoma is insufficient as a therapeutic strategy

Cell Reports 2018

Enhancer Activation by Pharmacologic Displacement of LSD1 from GFI1 Induces Differentiation in Acute Myeloid Leukemia

ARTICLES

https://doi.org/10.1038/s41590-018-0273-1

nature immunology

2019

Histone demethylase LSD1 is required for germinal center formation and BCL6-driven lymphomagenesis

Competitive Landscape and Differentiation

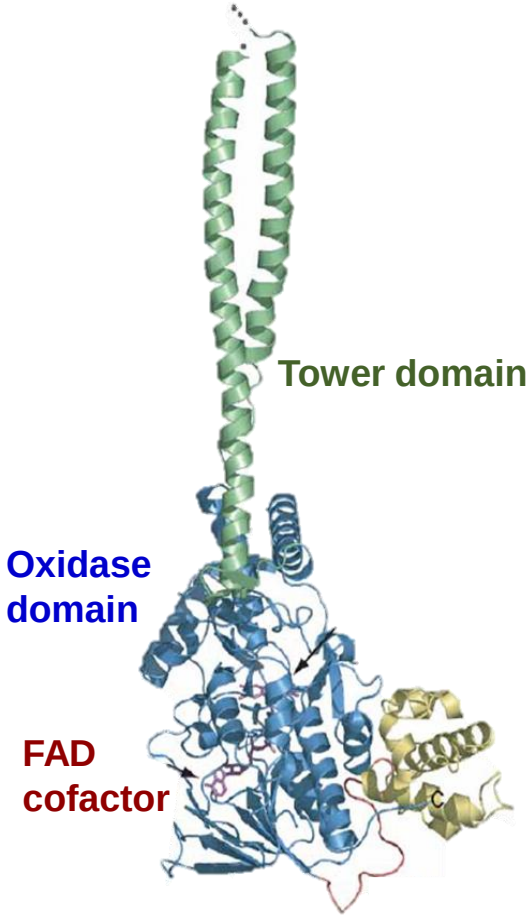
Seclidemstat is a Differentiated Inhibitor Addressing Areas of High Unmet Need Supported by Strong IP

- Seclidemstat (SP-2577) is a small molecule oral therapeutic differentiated by:
  (1) Mechanism – reversible vs. irreversible
  (2) Binding location – comprehensive inhibition of enzymatic and scaffolding properties

- Strategically positioned in indications of high unmet need w/ strong mechanistic rationale:
  - Ewing Sarcoma – Aggressive childhood bone cancer, no approved targeted treatments
  - Other Sarcomas – Share a similar biology to Ewing sarcoma
  - Late Stage Prostate/Breast/Ovarian and other cancers are upside

- Composition of matter patents allowed globally
  – US patent expires in 2032 exclusive of possible extensions

LSD1 Competitive Landscape Demonstrates Seclidemstat's Differentiation



	Company	Drug Name	MoA	Indications and Phase
In clinic	Salarius Pharmaceuticals	SP-2577	**Reversible**	Ewing sarcoma (Ph1), Advanced Solid Tumors (Ph1)
	Incyte	INCB59872	Irreversible	Advanced malignancies (AML, SCLC) (Ph1/2), Ewing sarcoma (Ph1b)
	Oryzon	ORY-1001 (RG6016)	Irreversible	AML (Ph2b), SCLC (Ph2a)
	Celgene	CC-90011	**Reversible**	Non-Hodgkin's lymphoma and AST (Ph1), SCLC (Ph1)
	Imago	IMG-7289	Irreversible	AML and myelodysplastic syndrome (Ph1/2a completed), myelofibrosis (Ph2b)
Preclinic[1]	Bea-ctica	BEA-17	**Reversible**	Glioblastoma
	Rasna Therapeutics	RASP-201	**Reversible**	AML
	Hanmi	HM9XXX series	**Reversible**	AML and SCLC

[1]Not an exhaustive list of companies in preclinical stage

Degree of LSD1 Inhibition Impacts Therapeutic Activity

Amount of LSD1 function inhibited

Enzymatic activity – Demethylation
Impact: Moderately alter gene expression

LSD1-- SNAG domain association
Impact: Alter gene expression – cancers driven by SNAG domain proteins (AML, SCLC)

Broader LSD1 – cofactor associations
Impact: Potential efficacy in broader range of cancer types, destabilizes LSD1 and complexes

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Incyte
ORYZON
Celgene
IMAGO

Salarius PHARMACEUTICALS
Incyte
ORYZON
Celgene
IMAGO

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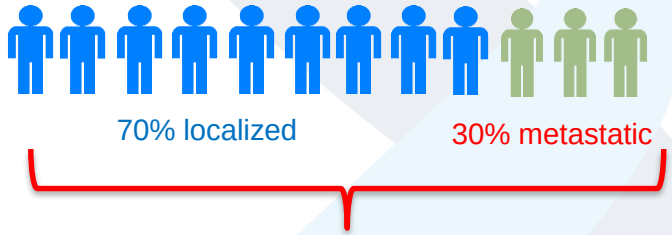
✓ Differential activity
✓ Toxicology Profile

Speed to Market: Seclidemstat in Ewing sarcoma

Ewing Sarcoma – High Unmet Need in a Critical Population

- Devastating, painful disease that mostly affects children and adolescents
  - ~500 cases diagnosed annually in the US; median age of diagnosis is 15 years old[1]
  - Current treatment causes debilitating short and long-term side effects
  - **70% of patients with relapsed/metastatic disease will succumb to the disease**[2]

- Salarius is developing an **effective and less-toxic treatment option**
  - Strong mechanistic rationale to target LSD1 -- cures in animal models
  - Potential FDA designations allow for accelerated approval opportunities
    - Orphan Status and Rare Pediatric Disease Designation granted
  - $200M+ global market*



Chemotherapy, Radiation, Disfiguring Surgeries

No standardized 2nd line of treatment

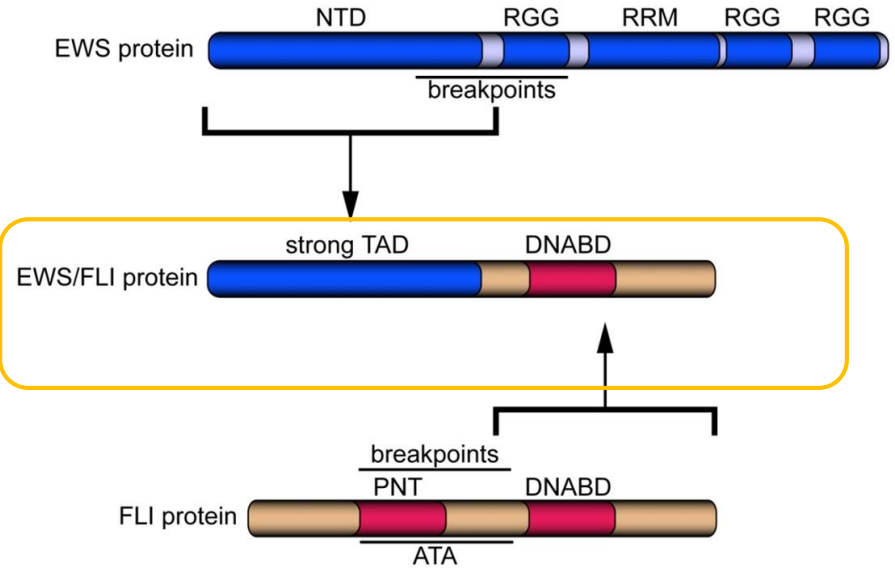
Possible Pediatric Priority Review Voucher adds an additional ~$100M of value to Seclidemstat[3]

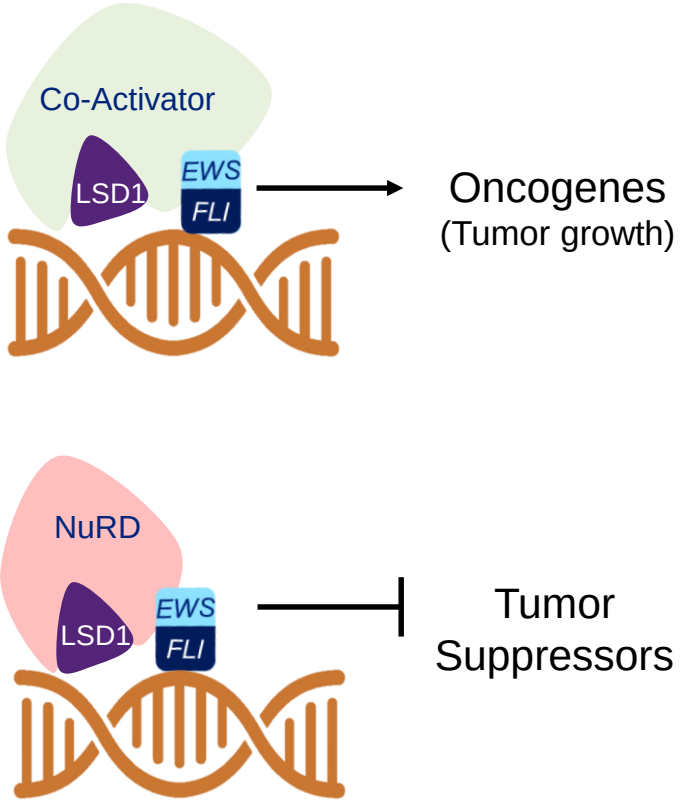
[1] Sarcoma Foundation· Ewing's Sarcoma from www.curesarcoma.org/patient-resources/sarcoma-subtypes/Ewings-sarcoma/
[2] Pishas, Kathleen I and Stephen L Lessnick. "Recent advances in targeted therapy for Ewing sarcoma" *F1000Research* vol. 5 F1000 Faculty Rev-2077. 25 Aug. 2016
* Based on market and estimated price of Seclidemstat

[3] Based on average selling price, see Appendix A

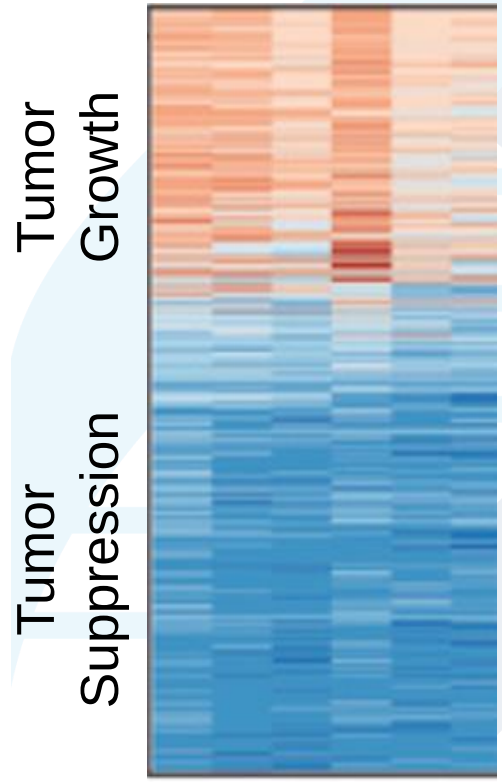
Therapeutic Opportunities In Ewing Sarcoma: EWS-FLI Inhibition Via LSD1 Targeting

Ewing sarcoma is driven by a chromosomal translocation → Aberrant transcription factor - gene dysregulation → Oncophenotype





Ewing cells (A673)

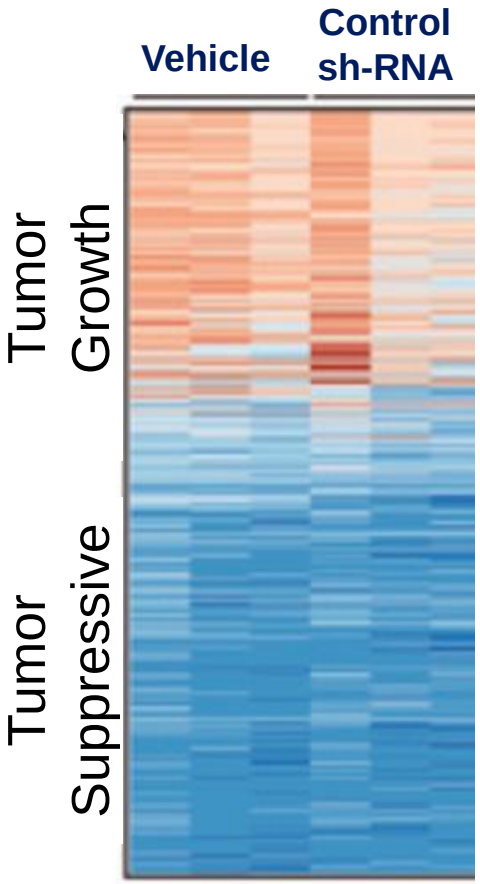


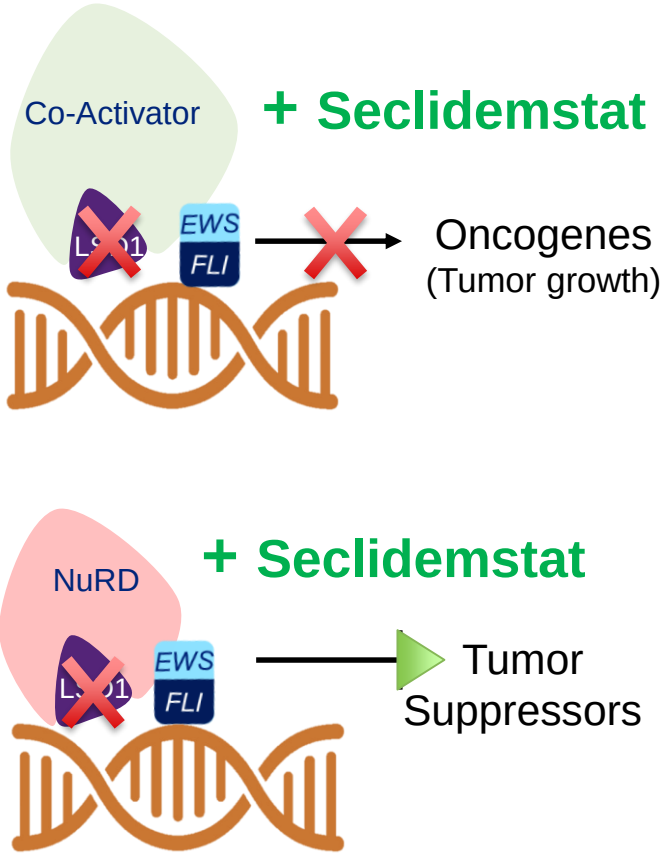
Red = Incorrectly turned ON
Blue = Incorrectly turned OFF

Sankar et al. *Clinical cancer research* 20.17 (2014)

Seclidemstat Reverses Ewing Sarcoma Gene Expression

Ewing's cells (A673)





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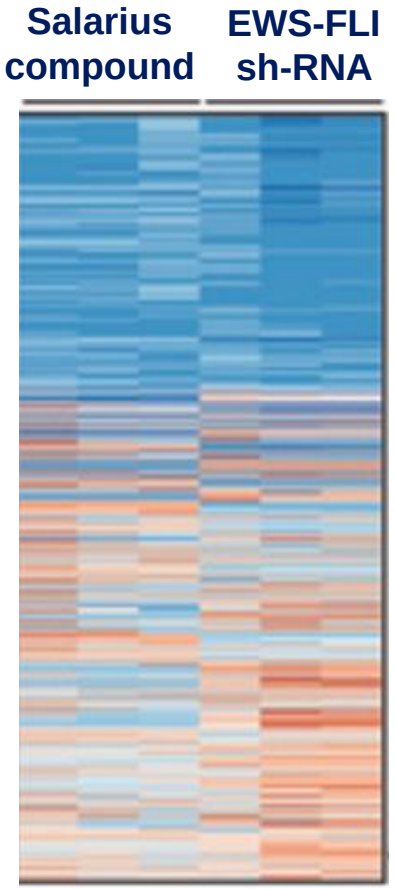
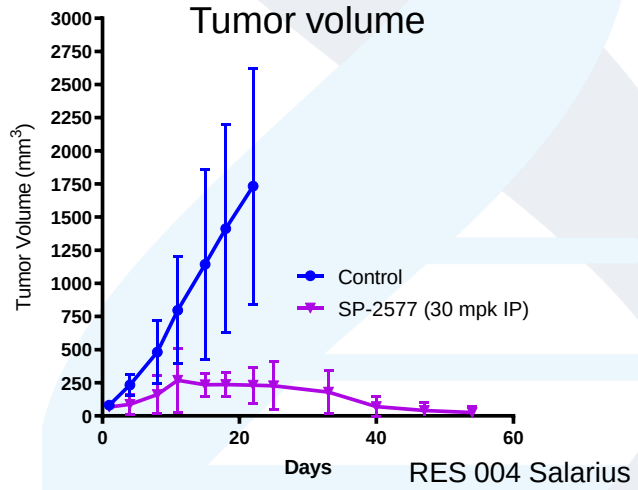
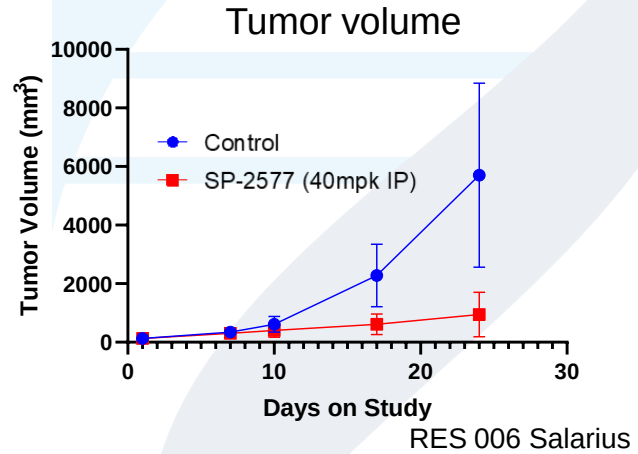


SKNMC in vivo studies





Red = Incorrectly turned ON
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Sankar et al. *Clinical cancer research* 2017 (2014)

Ewing Sarcoma Phase 1/2 Targeting Safety And Efficacy Data Readouts In 2020

CURRENTLY ENROLLING AT

8 CLINICAL SITES

Open-label dose escalation / dose expansion study design

Dose escalation

- Dose escalation in cohort 4
- ~20 patients → On track to establish Maximum Tolerated Dose by 1H2020
- Targeting AACR or ASCO for data release

Dose expansion

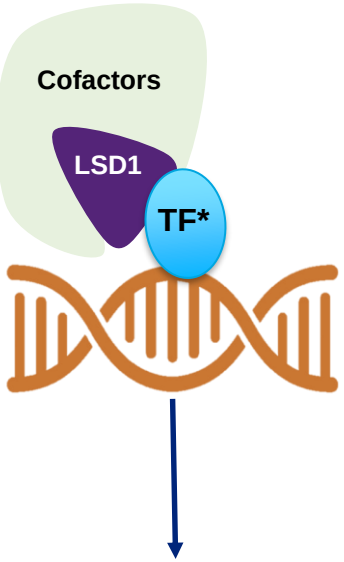
- ~20 patients at MTD → Safety and efficacy data in 2H2020/1H2021

Early data shows PK is dose proportional

Market Expansion: Seclidemstat in Advanced Solid Tumors

LSD1 Expression Levels are Correlated with Poor Patient Prognosis Across Several Cancer Types

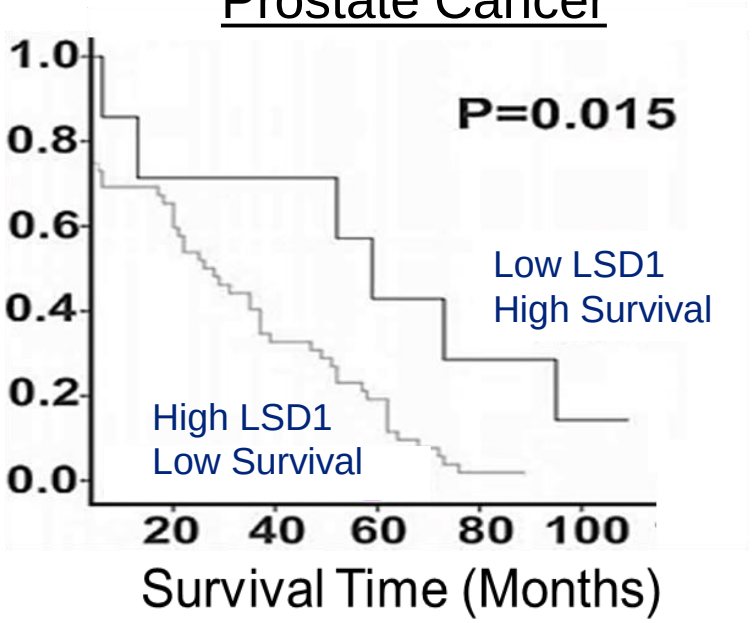
LSD1 associates with different cofactors to drive disease progression across various indications



Pro-Tumor Signaling

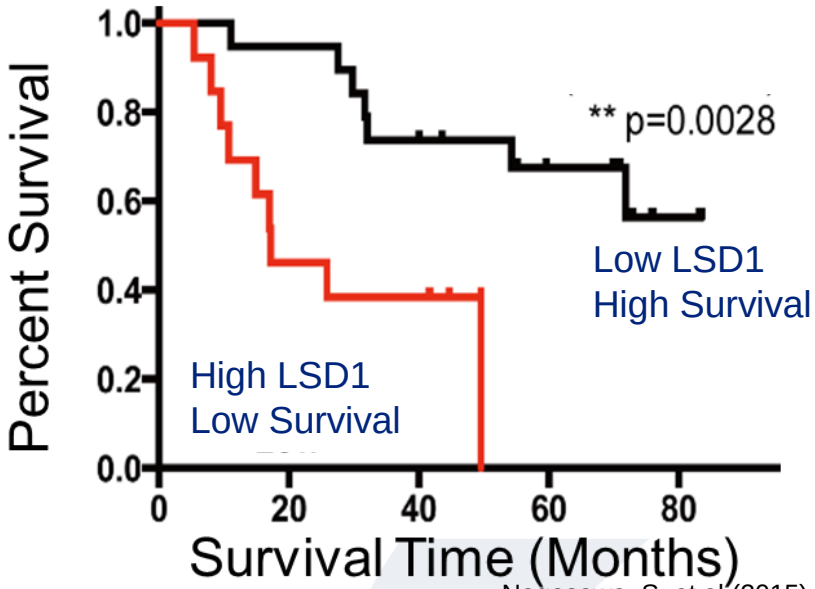
*transcription factors vary based on cancer type

Castration Resistant Prostate Cancer



Kashyap, V., et al. (2013).

Triple Negative Breast Cancer (TNBC)

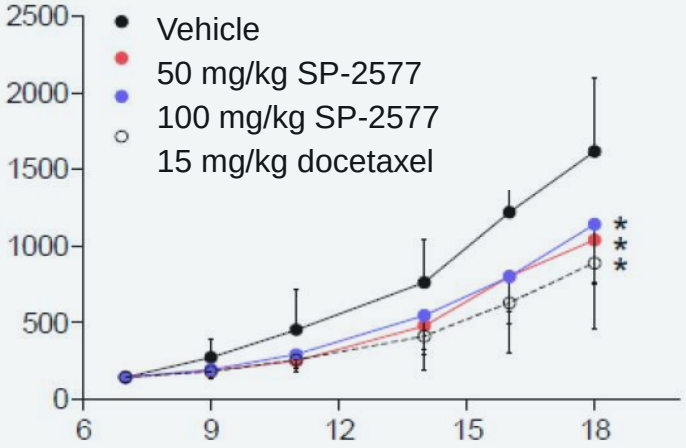


Nagasawa, S. et al (2015)

Internal and External Data Demonstrate Single Agent Activity in Hard to Treat Cancers

Prostate Cancer

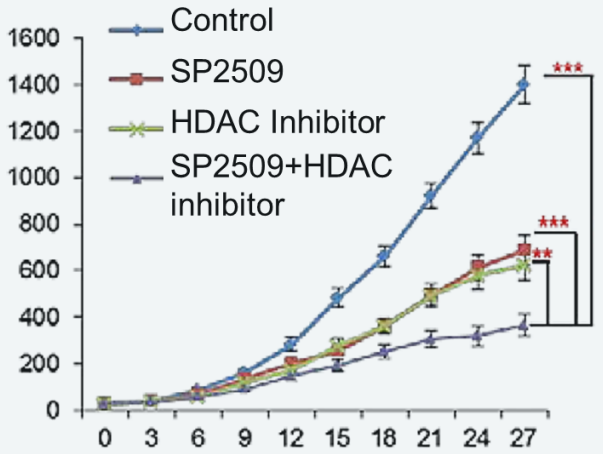
Seclidemstat slows tumor growth in difficult to treat 22RV1 androgen variant animal model



RES 007 Salarius

Triple Negative Breast Cancer

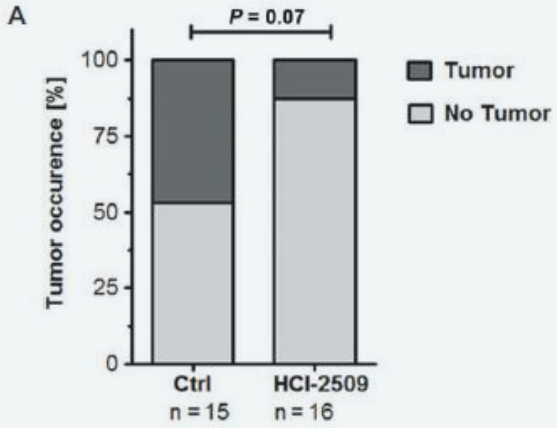
Seclidemstat analog showed ~50% single agent activity, and synergy with an HDAC inhibitor



Cao, Chunyu, et al. *International journal of cancer* (2018)

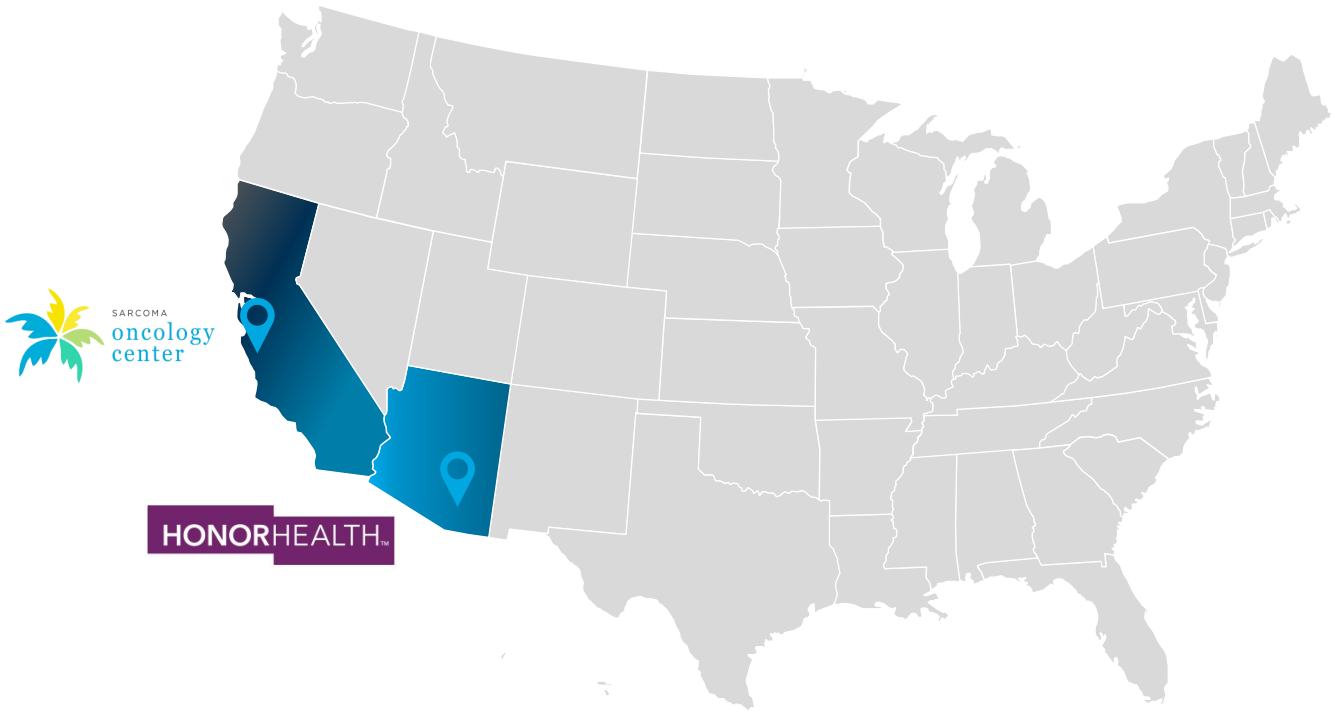
Non-Small Cell Lung Cancer

Seclidemstat analog decreased tumor occurrence in tumors driven by EGFR or KRAS mutations



Macheleidt, Iris F., et al. *Molecular Oncology* (2018)

Advanced Solid Tumor Clinical Trial Overview



Open-label dose escalation / dose expansion study design

- Enrolling advanced malignancies and enriching for indications Seclidemstat has shown preclinical efficacy
  - Dose level 4
  - Prostate, breast, related sarcomas, patients with specific genetic backgrounds
- Potential for early signs of therapeutic activity via biomarker readout
- Cohort readouts in 2020

Future Opportunities

Therapeutic Options for Seclidemstat

1. **Monotherapy**
   Currently in clinical proof-of-concept. Preclinically, Seclidemstat has anti-tumor activity across range of cancer types

2. **Synergy with chemotherapy**
   Preclinically, LSD1i shows ability to re-sensitize cells to standard of care agents

3. **Synergy with targeted agents**
   Seclidemstat and its analog shows synergy with other agents such as PARP, EGFR, HDAC, DNMT1 inhibitors

4. **In combination with checkpoint inhibitors**
   Seclidemstat may increase tumor immunogenicity influencing T cell infiltration, antigen presentation

Salarius' ongoing clinical and preclinical work will further clarify the best options for different patients.

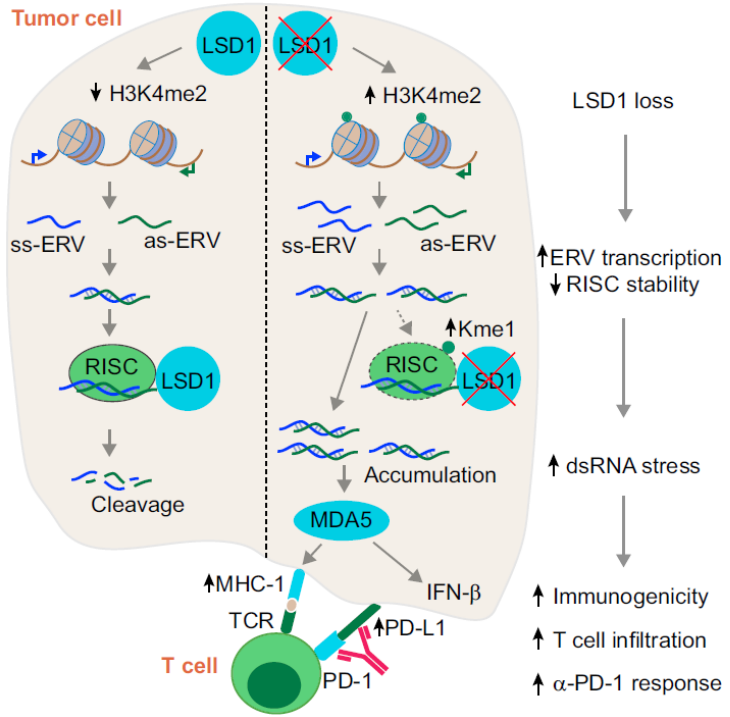
LSD1 Ablation Improves Immunotherapy Efficacy

Cell

Article

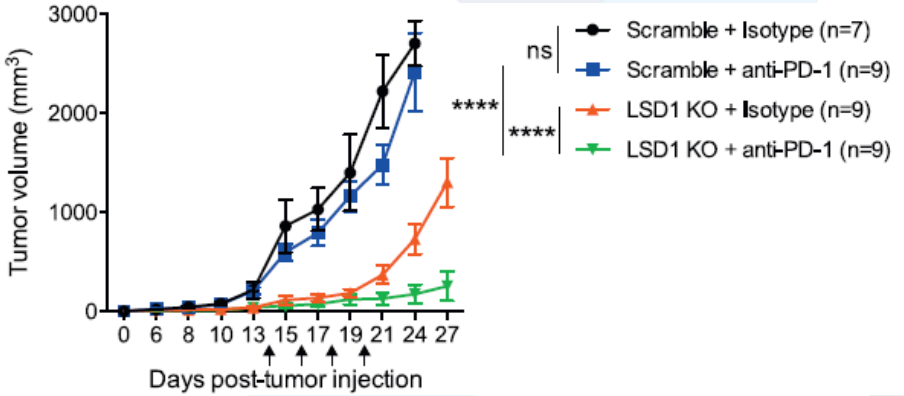
LSD1 Ablation Stimulates Anti-tumor Immunity and Enables Checkpoint Blockade

- LSD1 ablation leads to activation of the IFN pathway and **increases a tumor's immunogenicity**
- Provides a potential therapeutic options for immune-refractory patients



"Cold" tumors turn "hot"

In vivo tumor model



LSD1 KO +PD-1 treatment leads to significant tumor volume reduction.

Sheng, Wanqiang, et al. "LSD1 Ablation Stimulates Anti-tumor Immunity and Enables Checkpoint Blockade." Cell (2018).

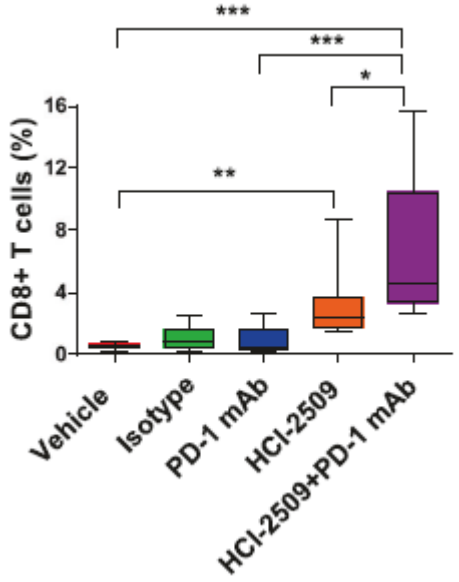
Seclidemstat Analog Shows *in vivo* Synergy with Anti-PD-1

Oncogene

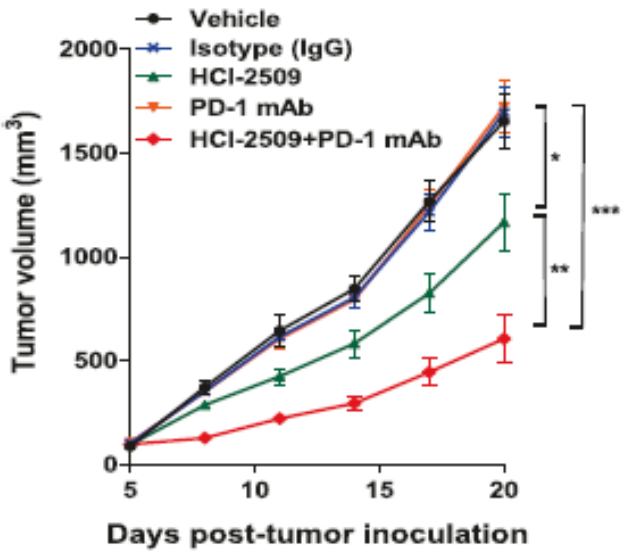
Inhibition of histone lysine-specific demethylase 1 elicits breast tumor immunity and enhances antitumor efficacy of immune checkpoint blockade

- Fewer than 20% of TNBC patients respond to checkpoint inhibitors
- *In vivo* studies showed significant increase in CD8+ T cells and tumor growth suppression for single agent therapy
- Salarius compound sensitizes refractory tumor to checkpoint inhibition

CD8+ T cell infiltration

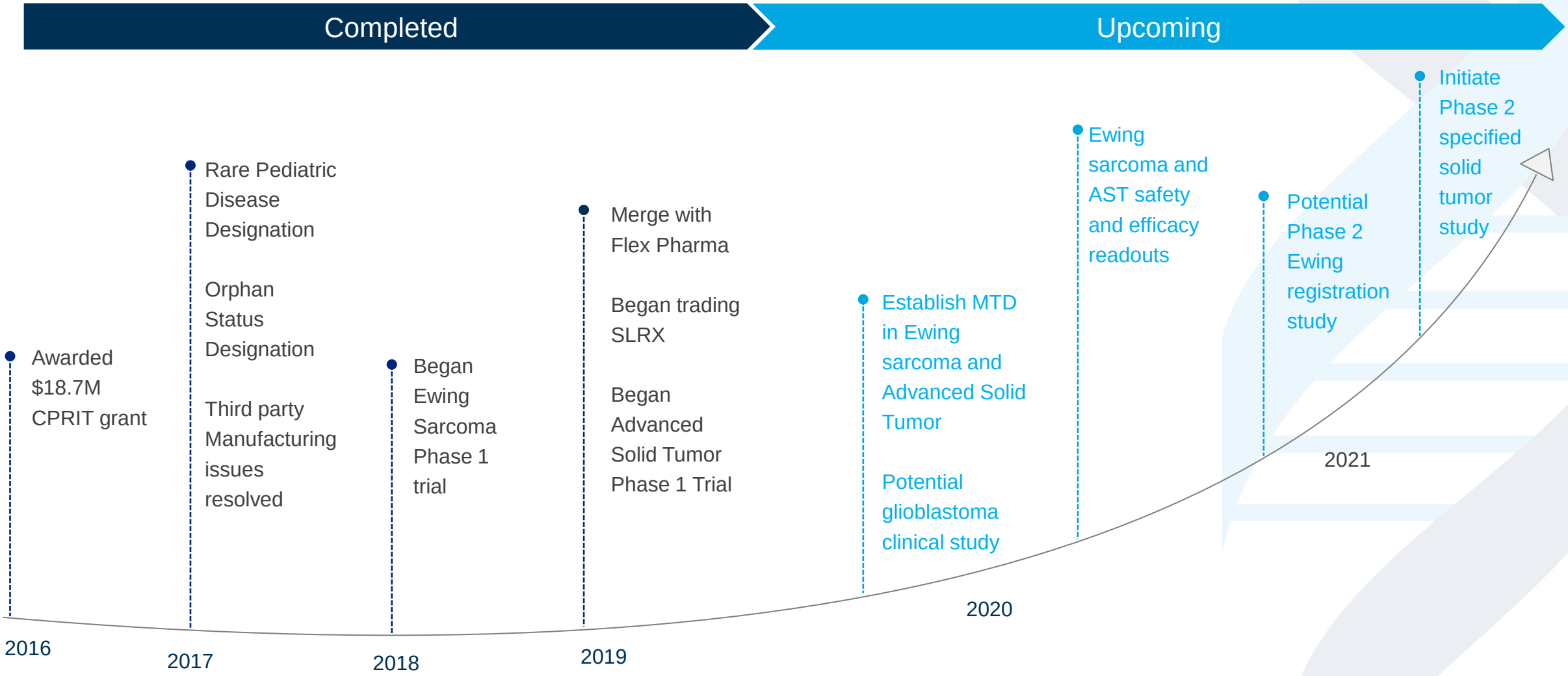


EMT6



Qin, Ye, et al. *Oncogene* (2018): 1.

Salarius' Development and Future Milestones



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- Speed to Market: Ewing sarcoma trial → Rare Pediatric Disease and Orphan Status Designation
- Market Expansion: Advanced Solid Tumor trial → Hormonal cancers, sarcomas ($1B+ markets)

3 **Seasoned management team leading Salarius**

- Experienced in product, clinical and early stage development

4 **Lead clinical program funded by extensive non-dilutive capital**

- $18.7M CPRIT award and support from the National Pediatric Cancer Foundation

5 **Opportune time to capitalize on growth potential**

- Potential to expand into other indications of high value (including immunotherapy)
- Relatively short timeline to pivotal inflection points

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The Cancer Epigenetics Company

Thank you!

Appendix A. Seclidemstat Is Eligible To Receive A Pediatric Priority Review Voucher (PRV) Upon Ewing Approval, ~$100M Value

Date Voucher Awarded	Company Voucher	Held or Sold	Status
2014	BioMarin	Sold July 2014 to Sanofi $67M	Redeemed
2015	United Therapeutics	Sold August 2015 to AbbVie $350M	Redeemed
2015	Asklepion Pharmaceutics	Transferred to Retrophon and Sold May 2015 to Sanofi $245M	Redeemed
2015	Wellstat Therapeutics	Transferred to AstraZeneca	Unused
2015	Alexion Pharmaceuticals	Held	Redeemed
2015	Alexion Pharmaceuticals	Held	Unused
2016	Sarepta Therapeutics	Sold February 2017 to Gilead for $125M	Redeemed
2016	Ionis Pharmaceuticals	Held	Unused
2017	Marathon Pharmaceuticals	Held	Unused
2017	BioMarin	Sold November 2017 for $125M	Unused
2017	Novartis	Held	Redeemed
2017	Ultragenyx Pharmaceutical	Sold December 2017 to Novartis $130M	Redeemed
2017	Spark Therapeutics	Sold April 2018 to Jazz $110M	Unused
2018	Ultragenyx	Sold July 2018 for $81M	Unused
2018	GW Pharma	Sold March 2019 to Biohaven for $105M	Unused
2018	Leadiant Bioscience Inc.	Held	Unused
2018	Sobi and Novimmune	Sold August 2019 to Astra Zeneca for $95M	Unused
2019	Vertex	Held	Unused
2019	Alexion	Held	Unused
2019	Novartis	Held	Unused

Average PRV value: $144M Median PRV value: $118M

https://www.raps.org/regulatory-focus/news-articles/2017/12/regulatory-explainer-everything-you-need-to-know-about-fdas-priority-review-vouchers