



**ORYZON**

**A GLOBAL LEADER IN EPIGENETICS**

INVESTOR PRESENTATION

MADX: ORY

April 2019

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# Company Highlights

- ✓ **MADX: ORY** A **publicly traded** company on the Spanish Stock Exchange
- ✓ Integrated in the **IBEX Small Cap Index**
- ✓ A **clinical stage** biopharmaceutical company developing innovative therapies in the field of Epigenetics
- ✓ A competitive **EPIGENETIC PLATFORM** validated scientifically and clinically
- ✓ Three therapeutic programs in LSD1 in development with multiple indication opportunities
- ✓ Large IP portfolio with technology fully developed in-house
- ✓ **Raised €50M** (in 2015-2017). Additional **€13M** raised from investors in the US and Europe **in October 2018**
- ✓ **Cash runway** expected till **4Q2020**
- ✓ Loss/Earnings from Operations 2018: **-3.3M€**
- ✓ One of the **MOST LIQUID** companies in the MicroCap group in the Spanish Stock Market
  - ✓ 39.1 M Shares outstanding. Fully diluted
  - ✓ 350,000 daily volume (Avg Traded Volume in 2018)
  - ✓ +88M shares negotiated in 2018 / ≈5 months for share full turnover



ORYZON GENOMICS SA  
BALANCE SHEET DATA (AUDITED)  
(Amounts in thousands US \$)

	December 31st, 2018	December 31st, 2017
Cash and cash equivalents	39.296 <sup>(1)</sup>	41.916
Marketable securities	162	256
Total Assets	77.231	73.210
Deferred revenue	0	0
Total Stockholders' equity	51.668	41.294

<sup>(1)</sup> 34,5 M€



# EPIGENETIC & LSD1 in human diseases

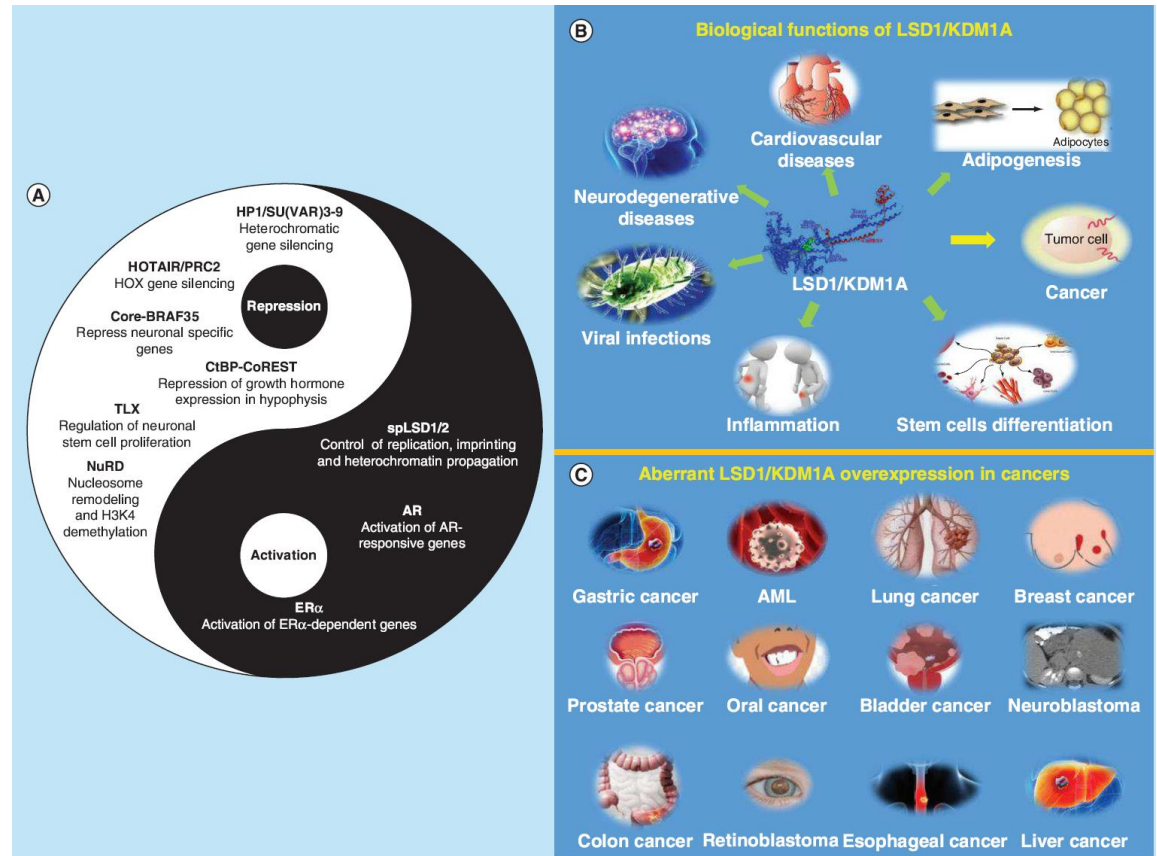
Epigenetic mechanisms regulate the function of chromosomes

Chromatin remodeling enzymes are a central component of the epigenetic regulation

Lysine specific histone demethylase 1 (LSD1), aka KDM1A, removes methyl marks at mono- and dimethyl-H3K4 (histone H3 lysine 4) and H3K9 (histone H3 lysine 9)

LSD1 is involved in different pathologies:

- ✓ Solid tumors
- ✓ HemOnc
- ✓ Hematol. disorders
- ✓ Inflammation
- ✓ Neurodegeneration
- ✓ Psychiatric disorders
- ✓ Viral Infections
- ✓ Others...

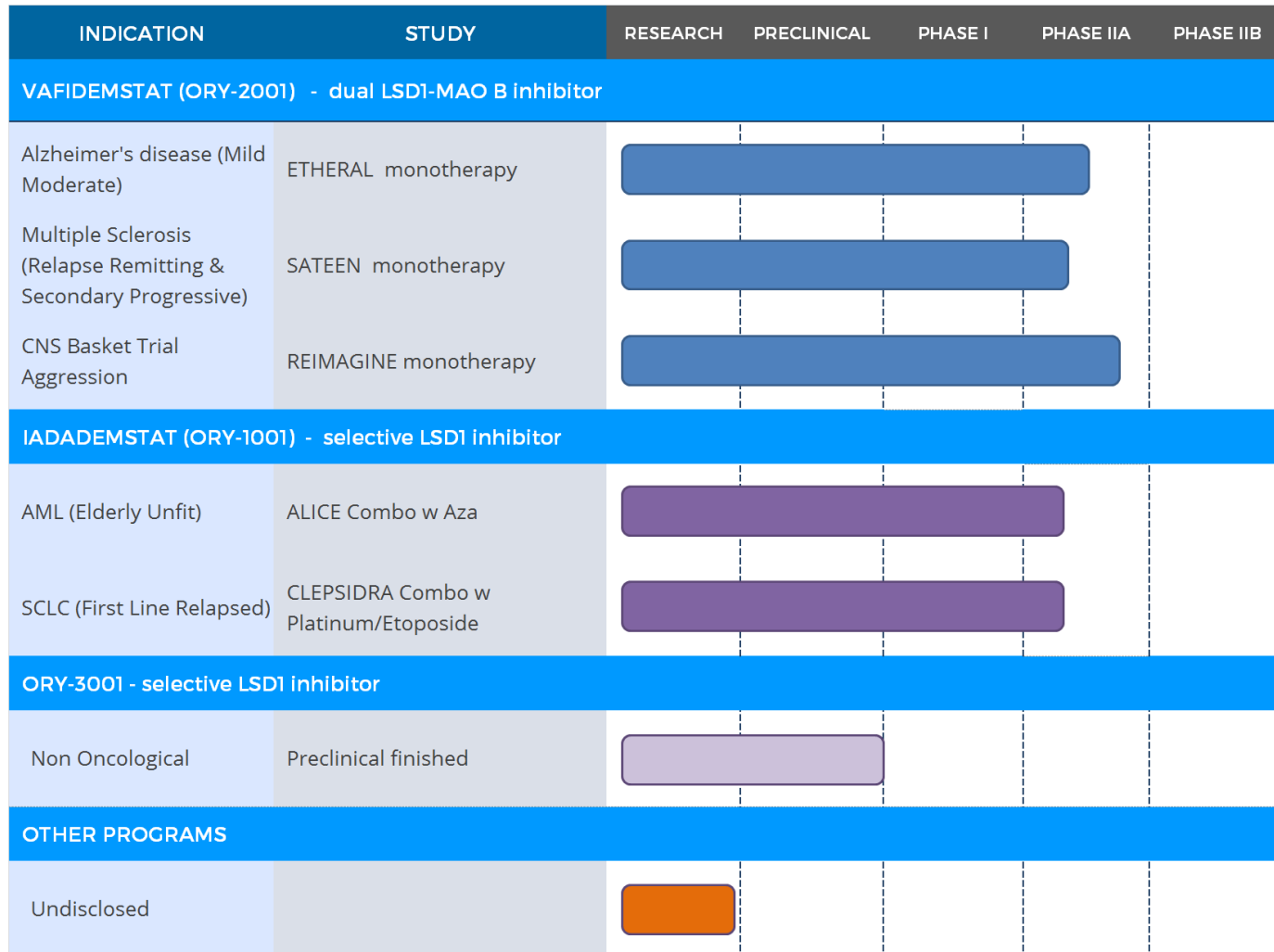


Fu et al., Future Med. Chem. 2017 9(11)

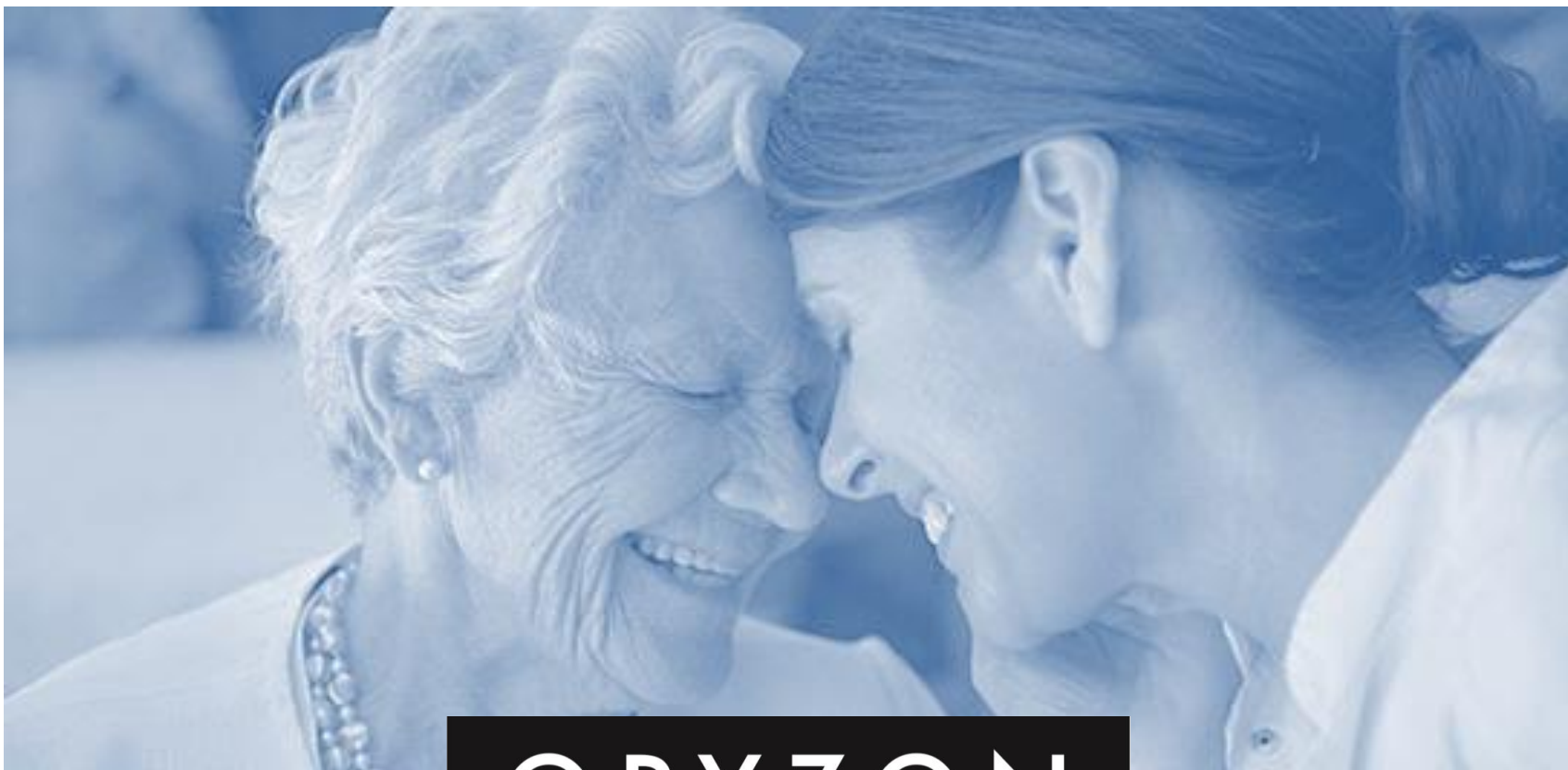
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## Extensive pipeline : 2 programs in clinic with multiple indications each

- ✓ A Productive Epigenetic Platform
- ✓ A strong focus on LSD1







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A GLOBAL LEADER  
IN CNS EPIGENETICS

**VAFIDEMSTAT a Phase II Clinical Stage Compound with a broad  
developability in CNS diseases**

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## Vafidemstat (ORY-2001): a “Neuron-fixer”

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- ✓ A small molecule that selectively inhibits LSD1 and MAO-B (IC50 s of 100nM in LSD1 / 75 nM in MAOB)
- ✓ Covalent binder. Excellent Pharmacology. High oral bioavailability
- ✓ Demonstrated target engagement in various animal species
- ✓ Characterized in 6 and 9 months PC regulatory toxicological studies
- ✓ Positive results in 7 different animal models and in *in-vitro* models
- ✓ Produces positive results in:
  - ✓ Cognition
  - ✓ Neuroprotection
  - ✓ Neuroinflammation
  - ✓ Social Withdrawal / Apathy
  - ✓ Aggression / Agitation
  - ✓ Others
- ✓ Biomarkers identified in animals that show promise for use in humans
- ✓ Capable of acting in all the processes that manifest in neurodegenerative disease patients
- ✓ Safe in humans in a Phase I trial with 106 healthy volunteers
- ✓ BBB penetrance and human target engagement established
- ✓ Pharmacologically active in humans

**In Phase IIa in three different clinical studies**

## Vafidemstat restores cognition measured by NORT in SAMP8 AD model

MILD

MODERATE

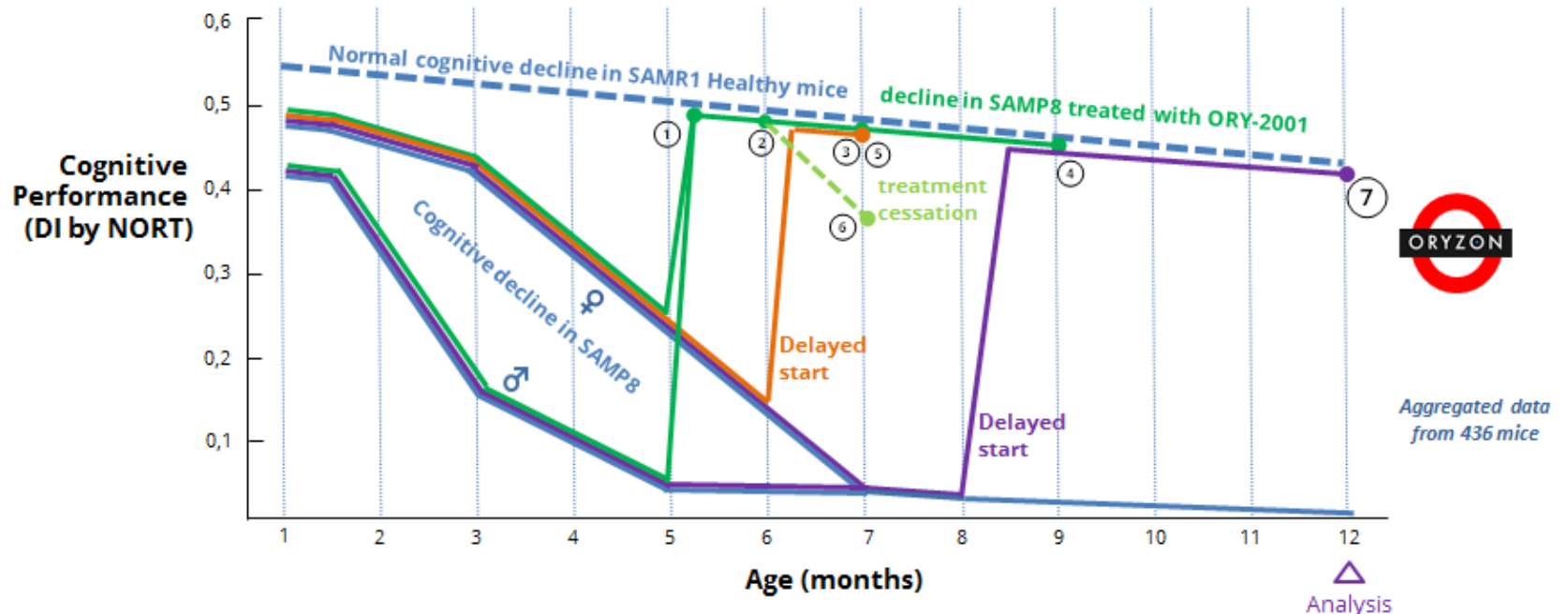
SEVERE

Treatment from month 5 during 1 week<sup>①</sup>, 1 month<sup>②</sup>, 2 months<sup>③</sup>, 4 months<sup>④</sup>

Treated from month 6 during 1 month (Delayed start-1)<sup>⑤</sup>

Treatment from month 5 during 1 month, tested at month 7 (1 month after treatment cessation)<sup>⑥</sup>

Treatment from month 8 during 4 months (Delayed start-2)<sup>⑦</sup>



**Preclinical results suggestive of Disease modifying potential**

(Similar memory restoration results observed with vafidemstat in the R6/1 HD model. Positive effects in memory also described recently in the NMDA receptor-hypofunction mice with T-448, a selective LSD1 inhibitor from Takeda)



## Vafidemstat reduces aggression in mice Alzheimer's Disease model

In the cognition tests we noticed that SAMP8 male mice treated with vehicle aggressed cage mates while vafidemstat-treated animals did not. Later we confirmed this in proper *Resident-intruder* aggression tests.



**SAMP8 MICE treated with Vehicle  
Resident Intruder test**



**SAMP8 MICE treated with ORY-2001 0,32mg  
Resident Intruder test**

SAMP8 animals treated with vafidemstat are not aggressive and have normal levels of basal activity (no sedation)

Vafidemstat also enhances sociability and reduces social withdrawal (data not shown)

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Vafidemstat

CLINICAL DEVELOPMENT

## REIMAGINE Study

- ✓ A single center open label exploratory PhIIa basket trial to assess the effect of vafidemstat in reducing aggression in patients with two neurodegenerative and three neuropsychiatric indications
- ✓ N=30, with 6 participants per condition
- ✓ Single arm of vafidemstat (1.2 mg)
- ✓ 8 weeks treatment duration

✓ AD

✓ DLB

✓ BPD

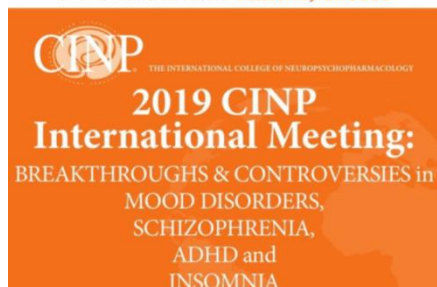
✓ ADHD

✓ ASD

*Top Line Data 2019*

**Global Analysis**

3-5 October 2019 Athens, Greece



**BPD**

**ADHD**

**ASD**



*Conferences where preliminary data are expected to be presented. Some TBC*



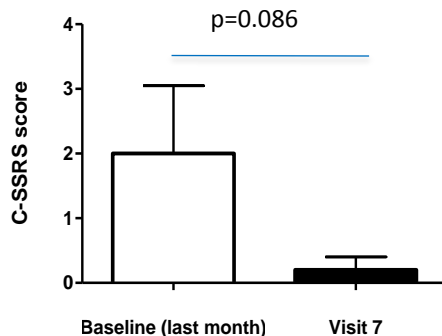
## The study has met the primary and secondary endpoints in BPD patients

**Borderline Personality Disorder (BPD) patients treated with vafidemstat showed a reduced aggressivity and a better overall performance in the core scales of the disease**

Demographic data BPD patients		
n° of patients		6
Sex	Male	0 (0%)
	Female	6 (100%)
Age	Median (years)	37,33
	(Min , Max )	(25/46)
Race	Caucasian	6 (100%)
Weight	Median (Kg)	60,72
	(Min , Max )	(52,7/89,8 )
Height	Median (cm)	164,37
	(Min , Max )	(162/172)
BMI	Median	22,51
	(Min , Max )	(19,39/33,39)

### Primary endpoint: Safety

- ✓ Vafidemstat was safe and well tolerated by the BPD patients
- ✓ Patients had an overall decrease in the Columbia-Suicide Severity Rating Scale (C-SSRS)

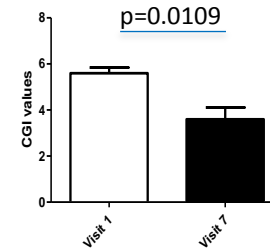


## Secondary endpoints: Efficacy

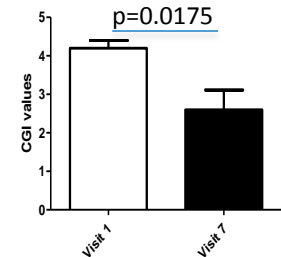
- ✓ Vafidemstat produced significant improvements on the Clinical Global Impression (CGI) CGI-S and CGI-I scales
- ✓ Vafidemstat also produced significant improvements on the Neuropsychiatric Inventory (NPI), not only at the 4-item agitation/aggression NPI subscale score, but also at the global NPI score (12 items)

✓ Remarkably, vafidemstat not only improved aggression but also produced significant improvements on the Borderline Personality Disease Checklist (BPDCL), both on the GLOBAL scale and on the combined score for NON-aggression related domains

CGI-S

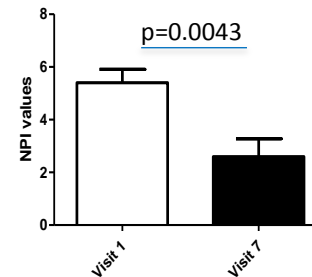


CGI-I



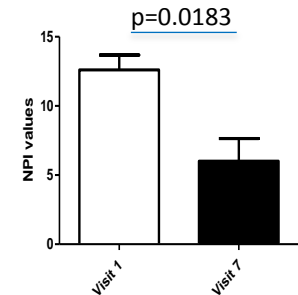
NPI

Agitation/Aggression (4 items)



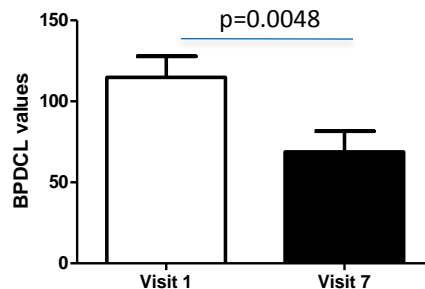
Total NPI

(12 items)



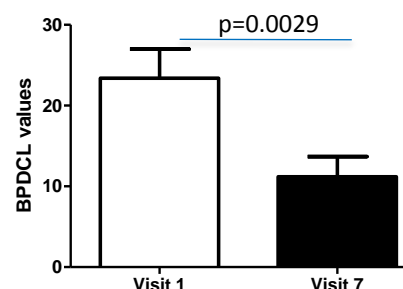
BPDCL

(Total Score)



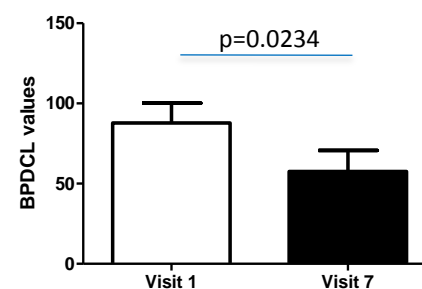
BPDCL

Aggression-related combined score  
(3 domains)



BPDCL

Non-Aggression-related combined score  
(6 domains)



### Vafidemstat may be a therapeutic option for BPD

- ✓ BPD prevalence ranges between 0.5%-1.4%<sup>1</sup> of the total population ( $\leq 9.1\text{M}$  in US+EU5)
  - ✓ The treatment of BPD is largely based on psychotherapeutic interventions. It represents a significant unmet medical need: No drugs currently approved for this condition
    - ✓ Anxiety & depression are usually treated with common antidepressants but do not seem to have a strong effect on other features of the disorder. Some anxiolytic (benzodiazepines) may worsen the clinical presentation.
    - ✓ Antipsychotic agents (Risperdal®, Seroquel® etc) have shown some effect to reduce anxiety, paranoid thinking, anger/hostility, and impulsivity in patients with BPD, but sedation, weight gain<sup>2</sup> and other side effects are a significant hurdle for long term treatment and adherence.
  - ✓ Vafidemstat reduces aggression and social withdrawal while enhances sociability and restores memory in animals
- ✓ In BPD patients, it not only improves aggression but produces an overall improvement of the core features of the disease, with no sedation and no weight gain
  - ✓ Vafidemstat may be a disease modifying therapeutic option for BPD

<sup>1</sup> [BMC Psychiatry](#). 2016; 16: 249.

<sup>2</sup> [Neuropsychiatr Dis Treat](#). 2017; 13: 2231–2241.



## Alzheimer's, the huge need



- ✓ **45 million** people affected worldwide
- ✓ The Global cost of AD is **\$605 billion/year**
- ✓ No therapeutic options so far
- ✓ The recent failures of BACE-i and mAb's against Abeta (Aducanumab, Crenezumab and others) have finally convinced the industry about the need to look for other MoAs
- ✓ AMBAR study (Grifols) has demonstrated statistical improvement in ADAS-Cog, language and verbal scales and QoL after 14 months in plasmapheresis vs placebo in moderate AD, demonstrating therapeutic feasibility in this target population

## Vadifemstat proposition in AD

- ✓ Vafidemstat is safe and highly brain-penetrant in humans
- ✓ We have demonstrated indirectly brain target engagement in humans
- ✓ In preclinical models we see positive effects on memory, aggression, sociability and apathy, all core features in Mild and Moderate AD patients
- ✓ We have identified biomarkers that may be surrogate pharmacological biomarkers
- ✓ Vafidemstat is pharmacologically active in humans
- ✓ **The drug may provide clinical improvement in AD in both domains, symptomatic and disease modifier**

An ambitious Phase IIa study to provide useful information to design future Phase II/III studies

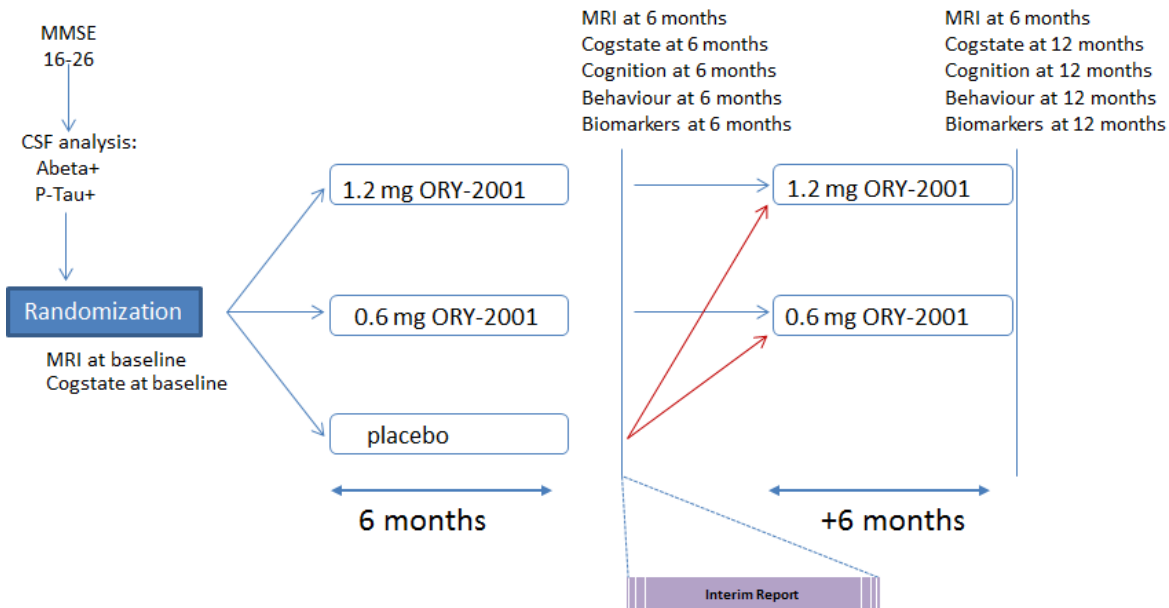
- ✓ **150 Mild to Moderate AD patients**
- ✓ **Primary Objective: Safety & Tolerability**
- ✓ **Secondary Objectives :**
  - ✓ Cognition/Agitation/Apathy/QoL
  - ✓ Volumetric MRI
- ✓ **Biomarker guided study** with several CSF inflammatory Biomarkers



- ✓ 125 patients in EU. 17 sites
- ✓ Spain, France & UK actively recruiting
- ✓ **80 randomized** as per mid March



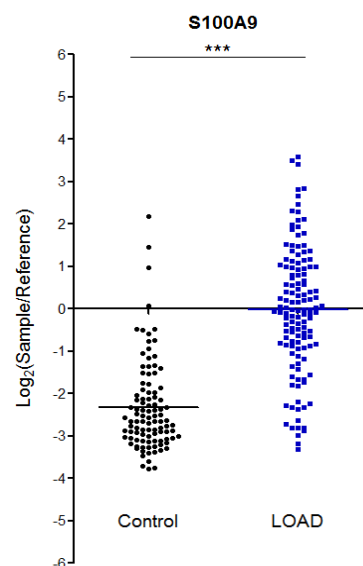
- ✓ A Twin study in US: around 25 patients
- ✓ IND approved
- ✓ FPI expected 1H2019



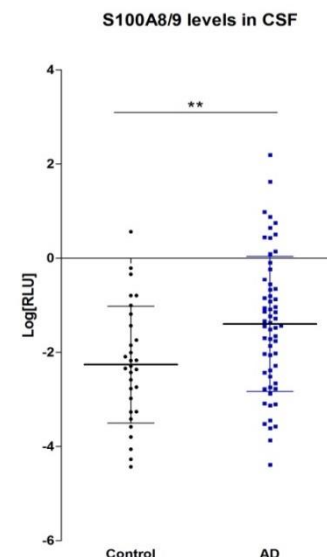
### S100A9 has been characterized as one of the TOP10 up-regulated genes in LOAD dataset

- ✓ S100A9 PROTEIN levels are significantly increased in CSF from AD patients compared to age-matched controls
- ✓ S100A9 CSF PROTEIN levels are monitored in ETHERAL AD trial
  - ✓ S100A9 and inflammation have a correlation with the disease
  - ✓ Inflammation plays a mechanistic role in the progression of the disease
  - ✓ Vafidemstat reduces S100A9 in animals

Human PFC (RNA)



Human CSF (protein)



S100A9 CSF levels will be monitored in Phase II studies  
S100A9 has the potential to be a surrogate biomarker for drug activity  
S100A9 data might be part of a rationale for a fast track

Changes in S100A9 in patient's CSF may have important clinical development implications

## **SATEEN** A pilot study in MS to see a proof of biological activity

**S**afety, **T**olerability and **E**fficacy in an **E**PIGENETIC approach to treat Multiple Sclerosis

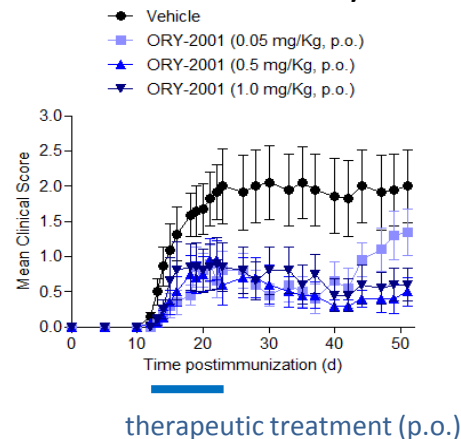
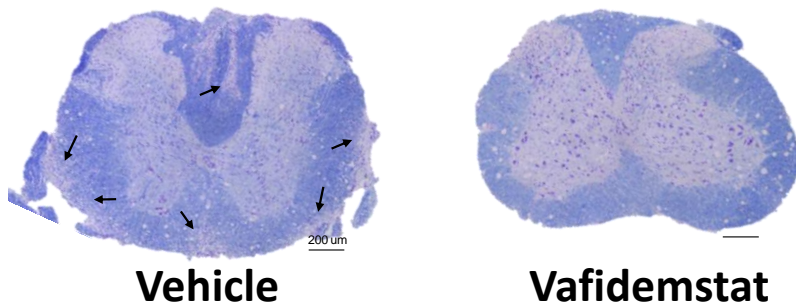
Randomised, double-blind, placebo-controlled, 3-arm, 36 weeks parallel-group study to evaluate the safety and tolerability of vafidemstat (ORY-2001) in patients with Relapsing-Remitting Multiple Sclerosis (RRMS) and Secondary Progressive Multiple Sclerosis (SPMS)

Spain only; 9 sites; 24 patients (RR & SP)

Active recruitment ongoing

Excellent safety. One patient is +1year on treatment

A broad preclinical evidence in different models supports vafidemstat activity in the MS paradigm





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IN EPIGENETICS

**Iadademstat (ORY-1001)**

**A Phase II stage clinical  
compound**

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## Iadademstat (ORY-1001): the most advanced selective LSD1 inhibitor in clinic

- ✓ LSD1 is involved in different cancers. High levels of LSD1 often correlate with more aggressive forms of cancer and/or bad prognosis
- ✓ Iadademstat is a small molecule that selectively inhibits LSD1. Preclinical in-vivo positive results in xenografts of AML, SCLC and in PDX of SCLC
- ✓ First LSD1i drug to enter into clinical trials and still Best in Class
- ✓ Produced positive results in an Acute Leukemia Phase I/IIa trial
- ✓ Identified Biomarkers to stratify SCLC patients
- ✓ Phase IIa ongoing in SCLC (CLEPSIDRA)
- ✓ Phase IIa ongoing in AML (ALICE)
- ✓ Preclinical / Biomarkers and new combos under constant investigation

Cancer Cell  
Article

### ORY-1001, a Potent and Selective Covalent KDM1A Inhibitor, for the Treatment of Acute Leukemia

Tamara Maes,<sup>1,6,\*</sup> Cristina Mascaró,<sup>1</sup> Iñigo Tirapu,<sup>1</sup> Angels Estiarte,<sup>1</sup> Filippo Ciceri,<sup>1</sup> Serena Lunardi,<sup>1</sup> Nathalie Guibourt,<sup>1</sup> Alvaro Perdomo,<sup>1</sup> Michele M.P. Lufino,<sup>1</sup> Tim C.P. Somervaille,<sup>2</sup> Dan H. Wiseman,<sup>2</sup> Cihangir Duy,<sup>3</sup> Ari Melnick,<sup>3,4</sup> Christophe Willekens,<sup>5</sup> Alberto Ortega,<sup>1</sup> Marc Martinell,<sup>1</sup> Nuria Valls,<sup>1</sup> Guido Kurz,<sup>1</sup> Matthew Fyfe,<sup>1</sup> Julio Cesar Castro-Palomino,<sup>1</sup> and Carlos Buesá<sup>1</sup>

<sup>1</sup>Orizon Genomics, S.A. Carrer Sant Ferran 74, 08940 Cornellà de Llobregat, Spain

<sup>2</sup>Leukaemia Biology Laboratory, Cancer Research UK Manchester Institute, The University of Manchester, Manchester M20 4BX, UK

<sup>3</sup>Department of Medicine, Division of Hematology & Medical Oncology, Weill Cornell Medicine, New York, 10065 NY, USA

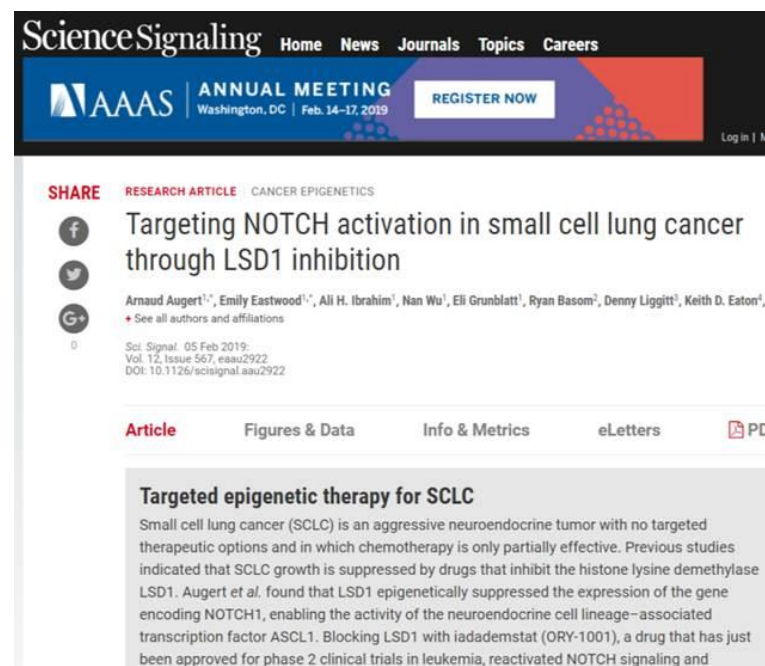
<sup>4</sup>Department of Pharmacology, Weill Cornell Medicine, New York, 10065 NY, USA

<sup>5</sup>Drug Development Department (DITEP) and Hematology Department, Gustave Roussy, Université Paris-Saclay, 94805 Villejuif, France

<sup>6</sup>Lead Contact

\*Correspondence: tmaes@orizon.com

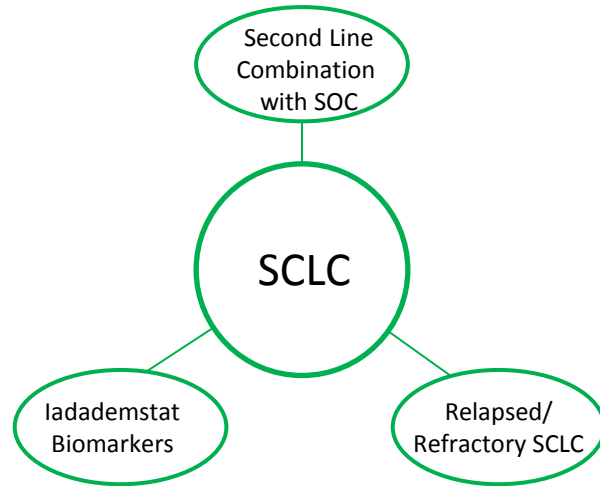
<https://doi.org/10.1016/j.ccell.2018.02.002>



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**MoA well characterized in SCLC, AML and Medulloblastoma**



Small Cell Lung Cancer is the main indication under exploration

## POTENTIAL IADADEMSTAT ONCOLOGICAL INDICATIONS:

### Solid Tumors

Small Cell Lung Cancer  
Prostate cancer  
Colorectal cancer  
Bladder cancer  
Some breast cancers

### HemONC

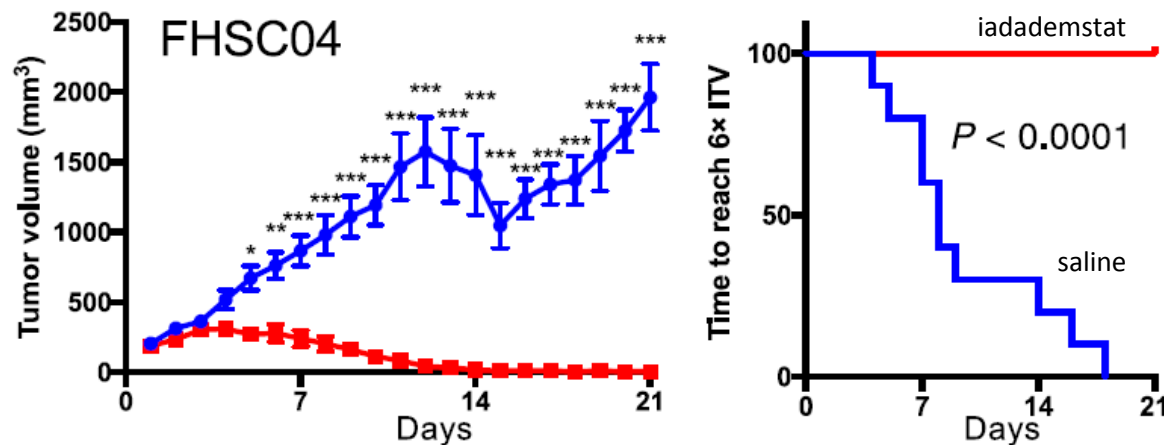
AML  
MDS  
Myelofibrosis  
Non Hodgkin  
Lymphoma

### Brain Tumors

Medulloblastoma  
Glioblastoma

## Iadademstat opportunity in SCLC

- ✓ LSD1 is a target well characterized in SCLC and validated in preclinical models. LSD1 inhibitors are effective in vitro and in-vivo xenograft models of SCLC
- ✓ Iadademstat produces complete and durable tumor regression in different chemoresistant PDX models
- ✓ Characterized MoA (induction of Notch and repression of ASCL1)
- ✓ Identified and patented Biomarkers that are differential in sensitive cell lines
- ✓ Characterization of Biomarkers in tumors and plasma from patients
- ✓ Phase II clinical trial ongoing in second line SCLC patients using these biomarkers to stratify patients and identify super-responders



**CLEPSIDRA:** A Combination trial of LSD1 and Etop-Platinum in Small Cell Lung Cancer in **biomarker-ID** Relapsed pAtients

**A Phase IIa study to assess the safety, tolerability, dose finding and efficacy of iadademstat (ORY-1001) in combination with platinum-etoposide chemotherapy in patients with relapsed, extensive-stage disease small cell lung cancer who are positive to candidate predictive biomarkers**

- ✓ Single arm
- ✓ Open label; 4 sites in Spain
- ✓ Up to 36 patients to be enrolled
- ✓ **Primary end point:** Safety and tolerability of the combo with platinum-etoposide therapy
- ✓ **Secondary endpoints:** RECIST responses; time to responses; duration of response; and overall survival

### Preliminary Results

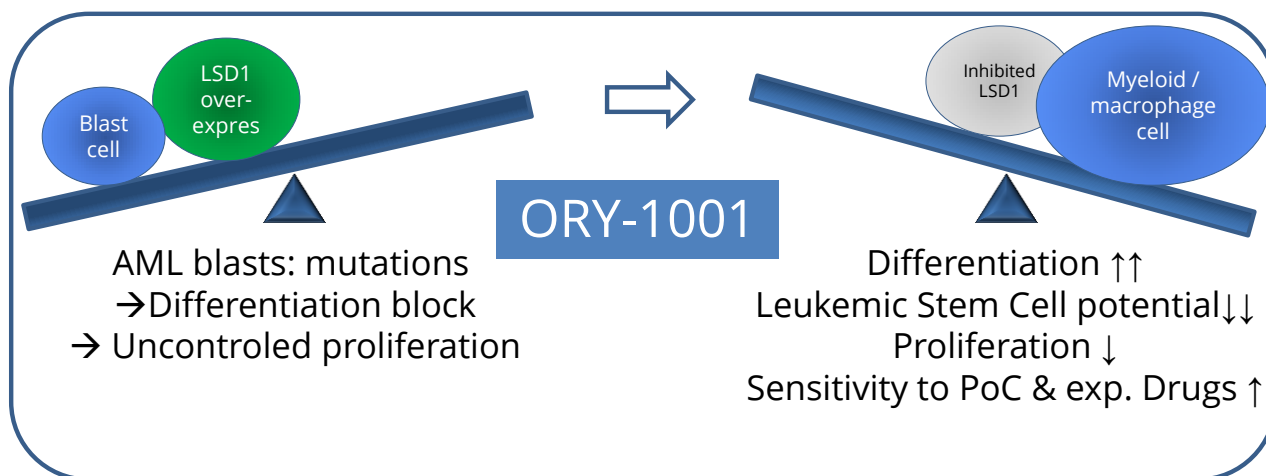
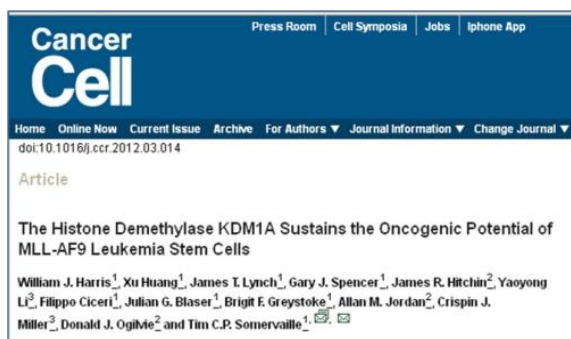
- ✓ Patient 1 already completed the first two cycles of combo iada+SoC and has started cycle 3.
- ✓ Satisfactory and dynamic recruitment pace



**Clinical Preliminary  
Reports to be  
presented at several  
Medical Conferences to  
be announced in 2019-  
2020**

**LSD1 is a target for HEMATOLOGICAL CANCERS, and in particular, for a subset of acute myeloid leukemia: *mixed lineage leukemia* MLL-AML**

- ✓ Oryzon's LSD1 inhibitors block progression of leukemia into the circulation in mice with experimentally initiated MLL-AF9 AML
- ✓ Oryzon's LSD1 inhibitors target Leukemia Stem Cells but spare normal HSPCs



### Phase I/IIa previous data

- ✓ Safe and very well tolerated and therefore a meaningful candidate for combination with other agents
- ✓ PD Biomarkers identified in different subsets of leukemia
- ✓ Antileukemic activity observed in 29% of patients (12/41), including one CRi as Proof of Biological concept

## ALICE: An AML trial with LSD1i in Combination with azacitidine in the Elderly

A Phase IIa study to evaluate the safety, tolerability, dose finding and efficacy of iadademstat (ORY-1001) in combination with azacitidine in older patients with AML in first line therapy

- ✓ Single arm & Open label. Up to 36 patients to be enrolled
- ✓ **Primary end point:** Safety and tolerability of the combo with hypomethylating agent Azacitidine
- ✓ **Secondary endpoints:** Responses; time to responses; duration of response; and overall survival

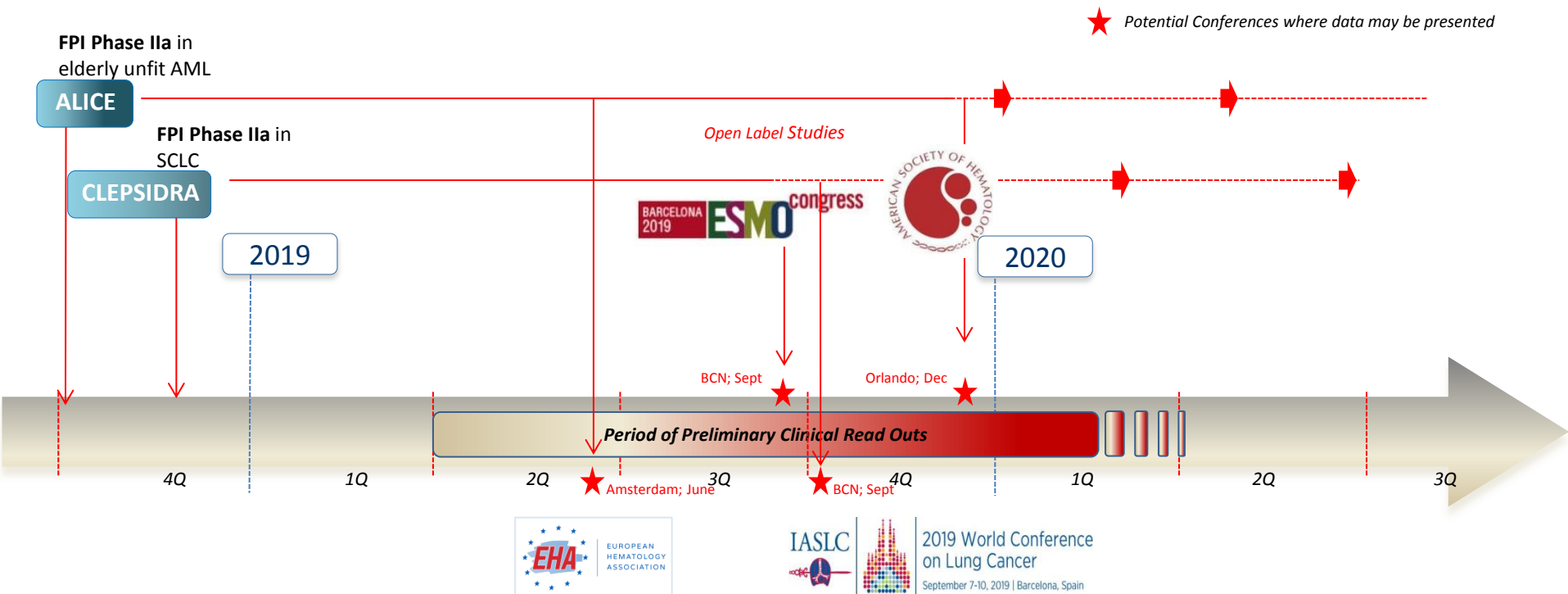
### Preliminary Results

- ✓ 3 patients have already gone through the first cycle; good tolerability
- ✓ Satisfactory and dynamic recruitment pace



Clinical Preliminary  
Reports to be  
presented at several  
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2020

## IADADEMSTAT (ORY-1001): lead CANCER asset

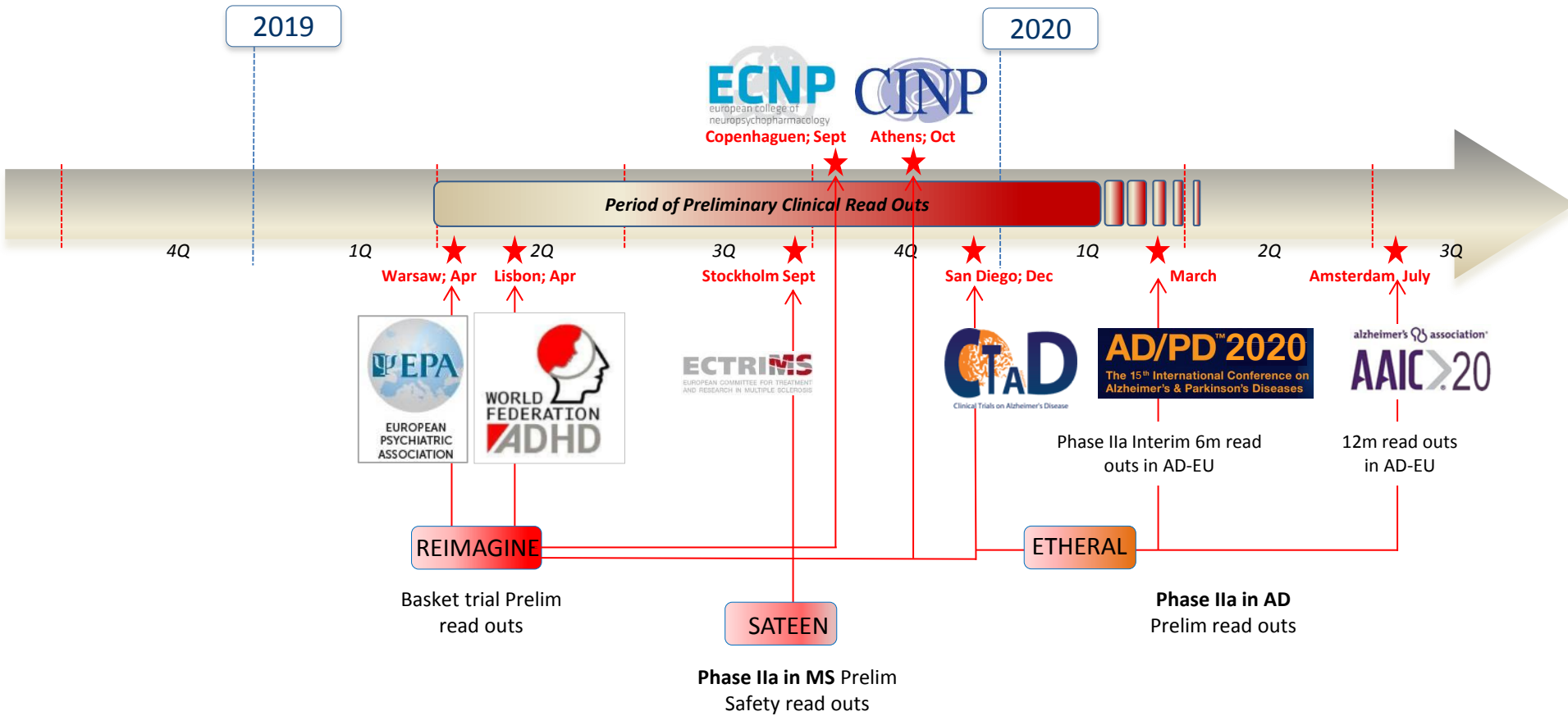




# Recent & Anticipated Oryzon main catalysts

## VAFIDEMSTAT (ORY-2001): lead CNS asset

★ Potential Conferences where data may be presented



**ORYZON**  
**A GLOBAL LEADER**  
**IN CNS EPIGENETICS**



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