ONCONOVA THERAPEUTICS

Corporate Update

August 20, 2018 | Nasdaq: ONTX

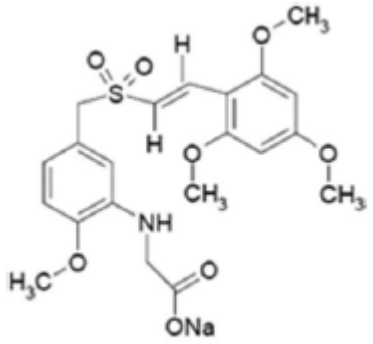
This presentation contains forward-looking statements about Onconova Therapeutics, Inc. based on management's current expectations which are subject to known and unknown uncertainties and risks. Onconova has attempted to identify forward-looking statements by terminology including "believes," "estimates," "anticipates," "expects," "plans," "intends," "may," "could," "might," "should," "approximately" or other words that convey uncertainty of future events or outcomes. This presentation assumes the Company raises capital for disclosed product development plans. Our actual results could differ materially from those discussed due to a number of factors, including, but not limited to, our ability to raise additional financing on favorable terms, the success of our clinical trials and our ability to obtain regulatory approvals and other risk factors outlined in our annual and quarterly reports filed with the Securities and Exchange Commission. We are providing this information as of the date of this presentation and do not undertake any obligation to update any forward-looking statements, whether written or oral, that may be made from time to time, as a result of new information, future events or otherwise except as required by law.

ONCONOVA THERAPEUTICS, INC.

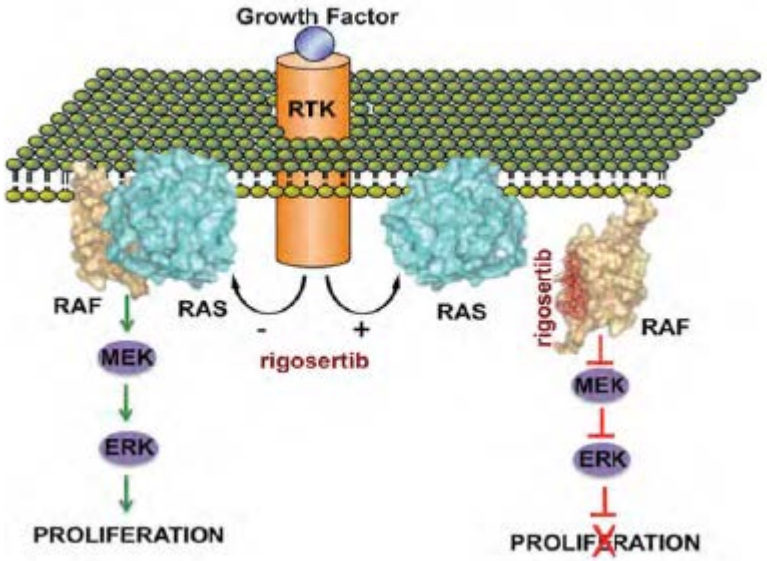
- Founded in 1998; IPO in 2013 (Nasdaq: ONTX)
- Phase 3 stage clinical candidate: rigosertib
  - Focused on Myelodysplastic Syndromes (MDS)
- Rigosertib partnered in Japan and Latin America
  - Additional partnerships to come
- Broad pipeline of drug candidates
  - Larger opportunities in solid tumors and other indications

ABOUT RIGOSERTIB: PHASE 3 STAGE LEAD DRUG

Patent protected new chemical entity (NCE)



RAS targeted novel mode of action



Two formulations in clinical trials worldwide

IV product for infusion

Oral soft gel capsules

PORTFOLIO: RIGOSERTIB AND OTHER OPPORTUNITIES

Lead Program

- Phase 3 INSPIRE trial progressing to completion after promising interim analysis and enhanced powering
- Trial completion projected in H2-2019

Oral Rigosertib

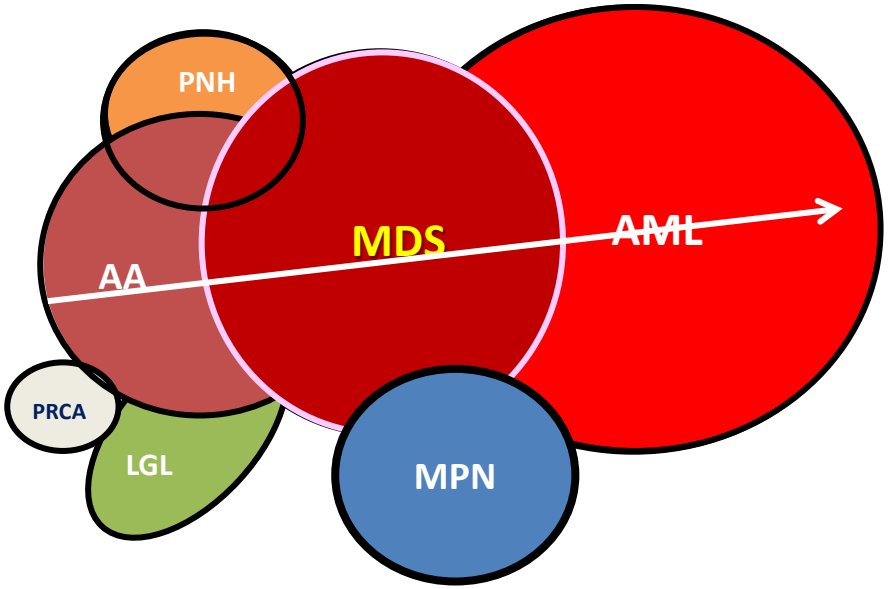
- Oral rigosertib provides two large-market opportunities
- Combination trial for front-line high risk MDS ready to advance to Phase 3 protocol in Q4-2018

More Catalysts

- NCI funded RASopathies trial for rare pediatric indications
- New CDK inhibitor presents opportunities for the future

MDS IS RELATED TO OTHER BONE MARROW DISEASES

- MDS: malignant bone marrow disorder characterized by:
  - Bone marrow failure leading to low blood counts
  - 30% of patients progress to AML
- US prevalence is 59,000
  - ~13,000 have higher risk (HR) MDS
  - ~10,000 second-line patients
- Available Treatments limited to hypomethylating agents
  - Vidaza (Celgene); Dacogen (Eisai/J&J)
  - Approved >decade ago; now off-patent
  - New therapy could have $billions opportunity



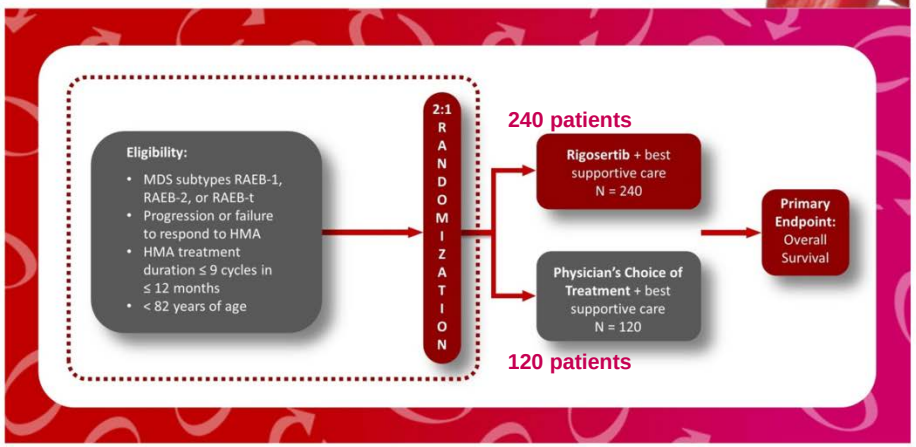
INSPIRE PHASE 3 TRIAL RESULTS EXPECTED IN 2019

The Pivotal MDS **INSPIRE** Trial is Now Recruiting Patients

INternational **S**tudy of **P**hase III **I**ntravenous **R**igos**E**rtib

STUDY DESCRIPTION

A Phase 3, international, randomized, controlled study of Rigosertib + best supportive care versus physician's choice of treatment + best supportive care in patients with myelodysplastic syndrome (MDS) after failure of a hypomethylating agent (HMA).



PRIMARY ENDPOINTS

Overall survival in the intention-to-treat population and in patients with very high risk per the Revised International Prognostic Scoring System (Greenberg et al, *Blood* 2012).

INTERNATIONAL TRIAL

More than 170 trial sites

INSPIRE start
December 2015

Interim Analysis
January 2018

Trial size increased after "promising" signal

Top-line Data
H2-2019 (projected)

INTERIM ANALYSIS

Status of INSPIRE trial after interim analysis

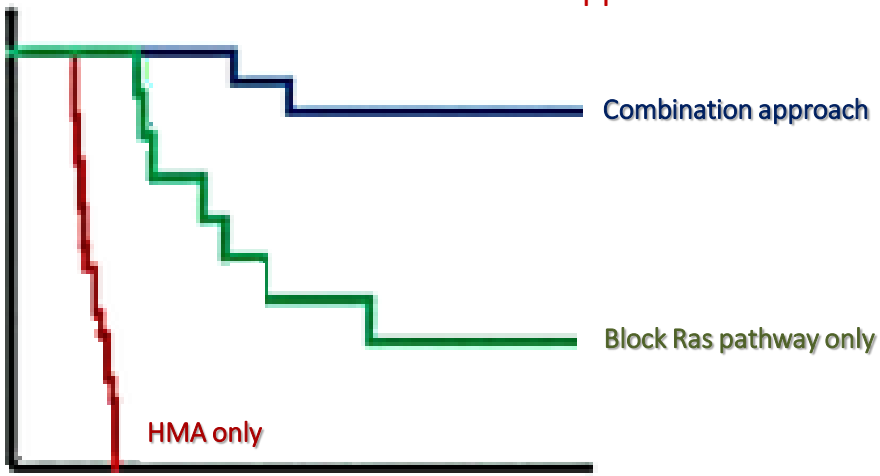
- Based on IDMC, no safety signal seen
- Efficacy not futile, in fact a “promising” survival signal seen for patients randomized to rigosertib arm
- Increased power of trial to 90%
  - 360 patients to be randomized
  - Greater proportion of Very High Risk patients based on rigid eligibility criteria of length of time on AZA prior to randomization to create a more homogenous patient population
- Higher potential probability of regulatory success with two successive analyses as agreed to by Health Authorities
  - Top-line analysis after 288 death events
  - Trial directed to the highest unmet medical need in MDS

COMBINATION THERAPY WITH RIGOSERTIB + AZACITIDINE

Preclinical evidence supports synergism of rigosertib + azacitidine combination

AML Animal Model

Validation of combination approach

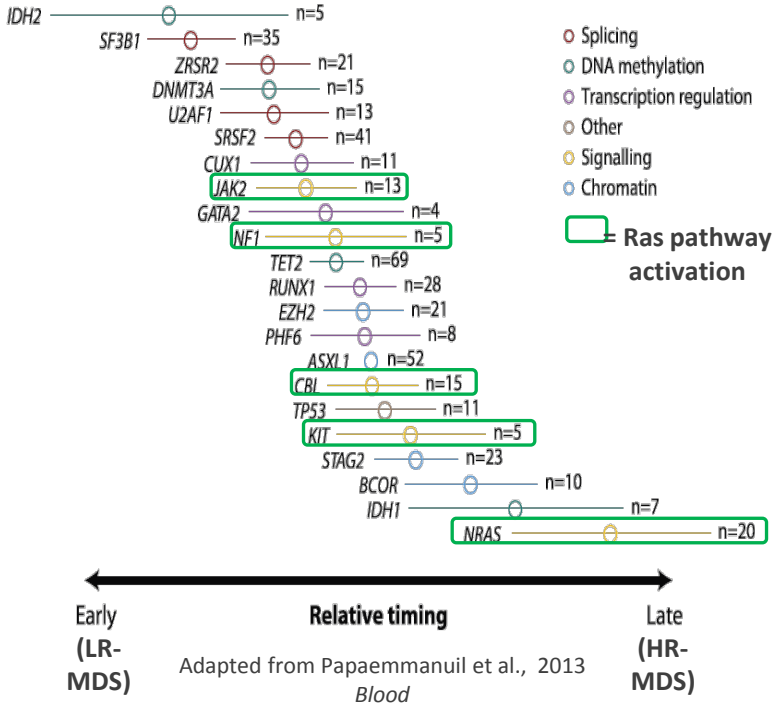


Block methylation only

Lu et al., 2016 *Cancer Cell*

More than 80 patients enrolled in combination trial including expansion cohort

Temporal Order of Gene Mutations in 107 MDS Patients



Adapted from Papaemmanuil et al., 2013 *Blood*

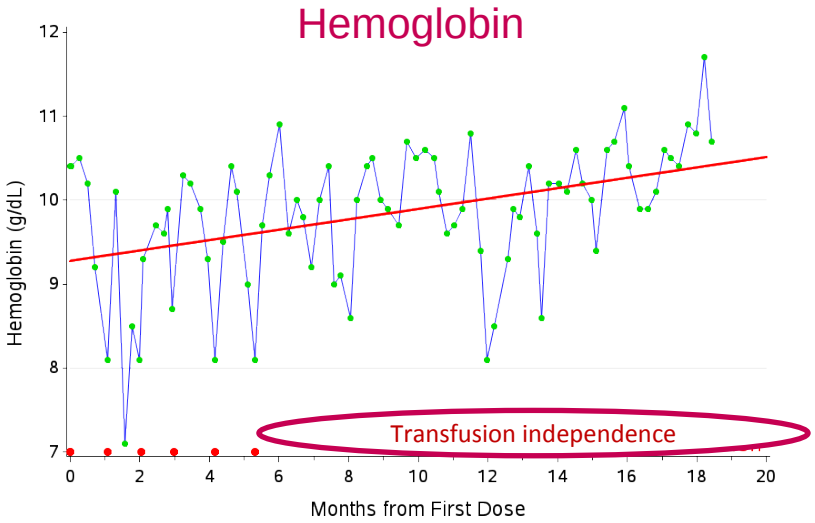
INITIAL RESPONSE DATA FOR ONGOING COMBINATION TRIAL

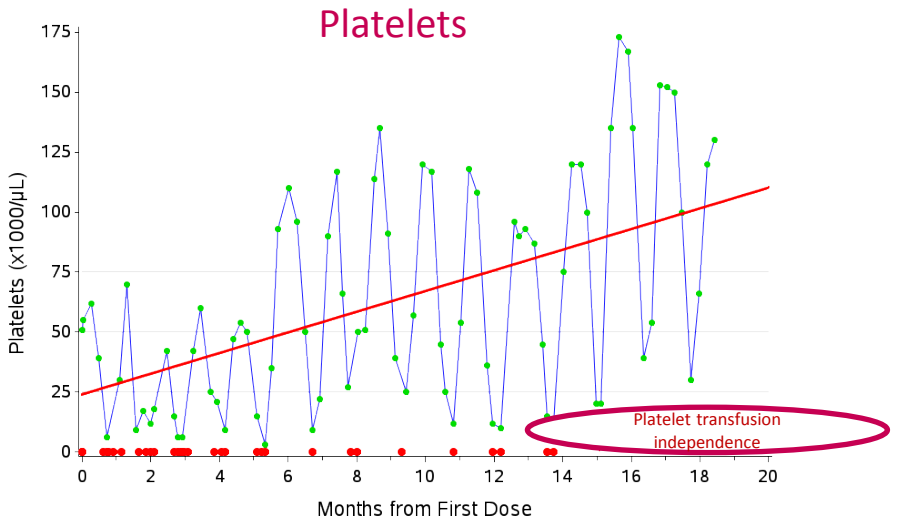
An additional 45 patients are enrolled in the expanded Phase 2 trial at an increased dose of oral rigosertib (1120 mg) to determine optimal efficacy and safety

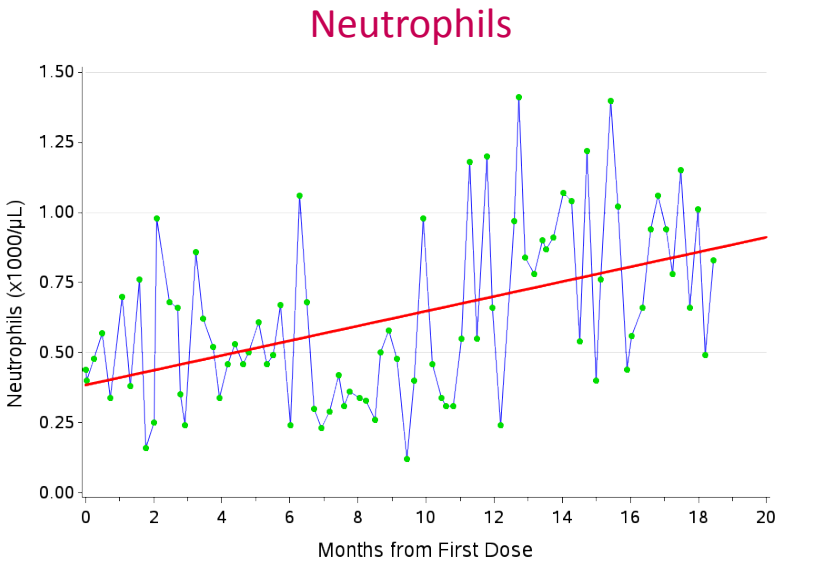
Response Criteria	Response per IWG 2006	
	No prior HMA (N=20)	HMA resistant (N=13)
Complete Remission*	**7 (35%)**	**1 (8%)**
Marrow CR + Hematologic Improvement (HI)	6 (30%)	4 (31%)
Marrow CR alone	3 (15%)	3 (23%)
Stable Disease	3 (15%)	5 (38%)
Overall IWG Response	**17 (85%)**	**8 (62%)**

**All responders had CR and no PR was noted in this study*

COMBINATION THERAPY LEADS TO TRANSFUSION INDEPENDENCE







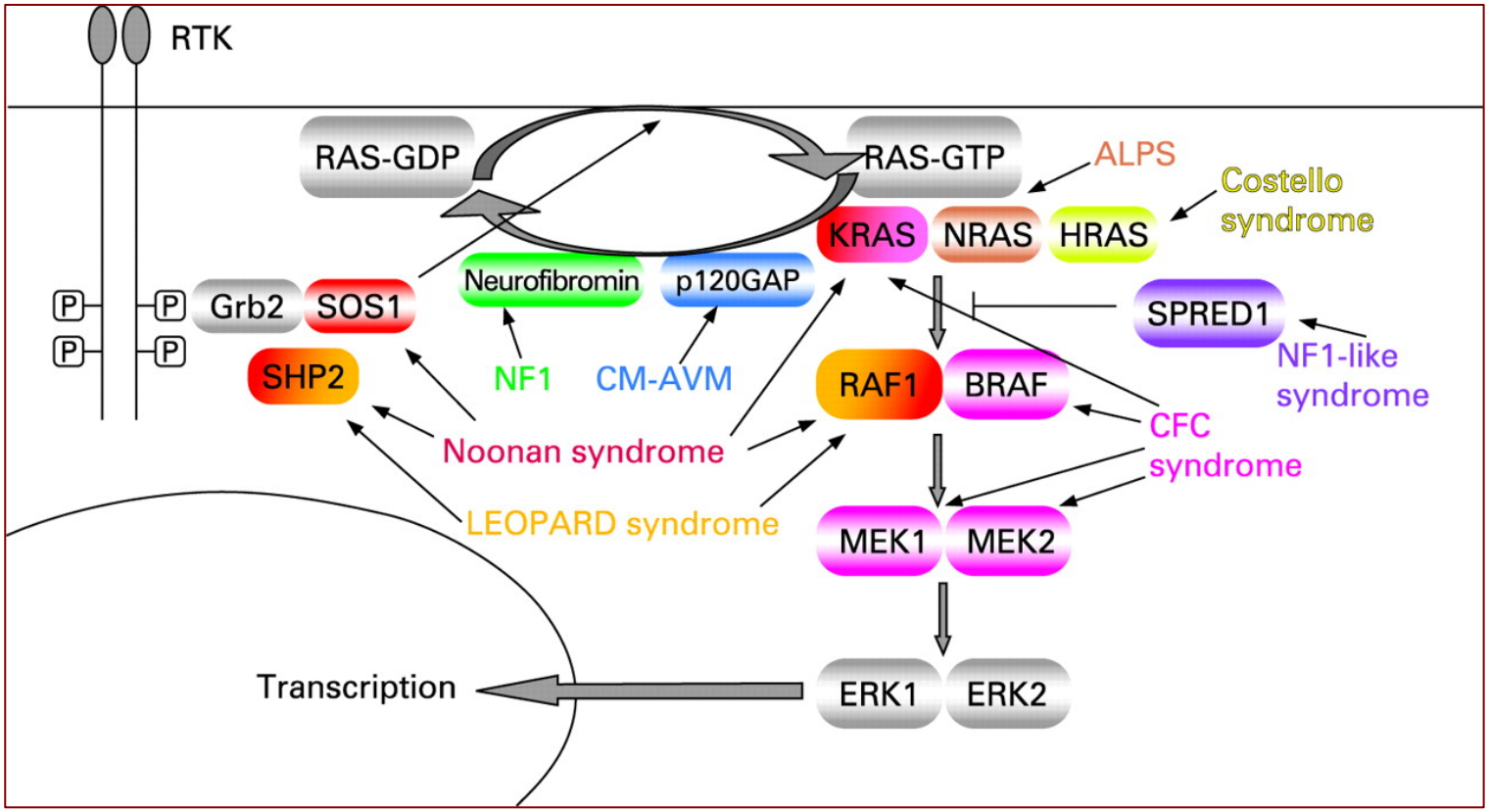
- 12 cycles of AZA – stable disease
- RBC and platelet transfusions
- Blasts 7%
- Monosomy 7
- Runx-1
- AZA + RIG in 09-08 for 20+ months
- Complete remission
- RBC transfusion independence
- <5% blasts
- PB CR criteria

COMBINATION THERAPY: NEXT STEPS AND TIMELINES

Step	Start	Complete	Remarks
Phase 2 expansion *Fully enrolled*	Q1-2017	Q1-2018	▪ Incidence of hematuria reduced (to date)in the trial ▪ Dose and schedule of 1120 mg daily dose explored*
Phase 3 protocol	Q1-2018	Q4-2018	▪ Synopsis created ▪ SPA and BTD submissions contemplated after complete efficacy assessment
Phase 3 trial**	2019	2021	▪ Rapid enrollment expected ▪ All patients to receive active therapy ▪ Response endpoint can be achieved in <6-9 months after patient is enrolled

**Dose justification to be based on safety data from expansion trial and the recently presented oral rigosertib data in Lower-Risk MDS (ASH 2017)*
***Pending additional financing and/or business development*

RASOPATHIES: RIGOSERTIB FOR RARE PEDIATRIC DISEASES



Milestones

- NCI CRADA signed January 2018
- Potential for first patient in H2-2018
- UCSF non-clinical program initiated
  - Funded by LLS
- JMML clinical program could initiate in 2019

ON 123300: NEXT GENERATION CDK4/6 INHIBITOR

Differentiation for a Competitive Field

- Recently launched Ibrance®, Kisquali® and Verzenio® have been hailed as potential breakthroughs in cancer therapy
  - First FDA approval for CDK 4/6 inhibitor is for breast cancer
- ON 123300 differentiated features
  - Also targets ARK5 controlling cellular metabolism and survival
  - Potential to act as single agent
  - May be active in resistant cells

Partnership with HanX

- License for Greater China
  - Onconova retains ROW rights
- HanX to fund IND-enabling studies
- Upfront, milestones, royalties
- HanX a specialty Oncology company
  - Phase 2 stage PD-1 antibody
  - Checkpoint blockade and CDK inhibition believed to be synergistic
- Pre-IND consultation with the FDA
  - Guidance for manufacturing
  - Development plan for an IND application

- Next Milestone is IND
  - US IND anticipated in H1-2019

RECENT KEY EVENTS

Year	Date	Advance
2018	May 2	Closing of Underwritten Public Offering
	March 26	FDA Pre-IND guidance completed for CDK4/6 inhibitor ON 123300
	March 5	License Agreement with Pint Pharma for Rigosertib in Latin America
	February 12	Closing of Underwritten Public Offering
	January 17	Moving Forward with INSPIRE Pivotal Trial After Promising Interim Analysis
	January 4	CRADA for Rigosertib in RASopathies with the National Cancer Institute
2017	December 19	License/Collaboration with HanX for ON 123300 (CDK4/6 + ARK5) inhibitor

THE VALUE PROPOSITION

- Currently the Company is valued near cash balance
  - Recent market capitalization is between $35 and $40 million
  - The peak public valuation in early 2014 was >$670 million

- Discounted NPV of the first indication is between $150 and $300 million
  - Topline data in lead program expected mid-2019, highly unmet medical need
  - The oral rigosertib combination opportunity, a couple years behind the IV, provides a significant upside, independent of the outcome of the IV trial

- A well-differentiated CDK4/6 compound entering clinic in early 2019
  - Provides more downside protection and the potential for a significant Business Development (BD) upside in late 2019

- The Company is fully funded to Q4-2019

FINANCIAL DETAILS & SUMMARY

Onconova founded in 1998; public since 2013

Ticker	Nasdaq ONTX	**Debt**	$0
Stock Information	▪ ~85 million common shares outstanding ▪ Public float ~95% ▪ YTD average daily volume: 1.3 million	**Liquidity**	Cash and cash equivalents of $29.5 million as of 06-30-2018
Ownership*	683 Capital, EcoR1 Capital, Armistice Capital, Tyndall, Sabby; Board and management	**Burn-rate**	~$5.5 million per quarter over the last 8 quarters
Analyst Coverage*	H.C. Wainwright, Laidlaw, Maxim, Dawson James, Van Leeuwenhoeck Research (VLR)	**Partnerships**	▪ Rigosertib is partnered with SymBio Pharmaceuticals in Japan/Korea and Pint Pharma in Latin America ▪ CDK 4/6 & ARK-5 compound ON 123300 partnered with HanX for Greater China ▪ Onconova retains rights in the rest of the world

**Reports available upon request*

MANAGEMENT TEAM

Ramesh Kumar, Ph.D.
CEO & Co-founder

- Bristol-Myers Squibb
- DNX
- Baxter
- Kimeragen
- Princeton University

Steven M. Fruchtman, M.D.
President & Chief Medical Officer

- Novartis
- Janssen
- Syndax
- Allos Therapeutics
- Spectrum Pharmaceuticals
- Mount Sinai

Mark Guerin
Chief Financial Officer

- Barrier Therapeutics
- Cardiokine
- PriceWaterhouseCoopers

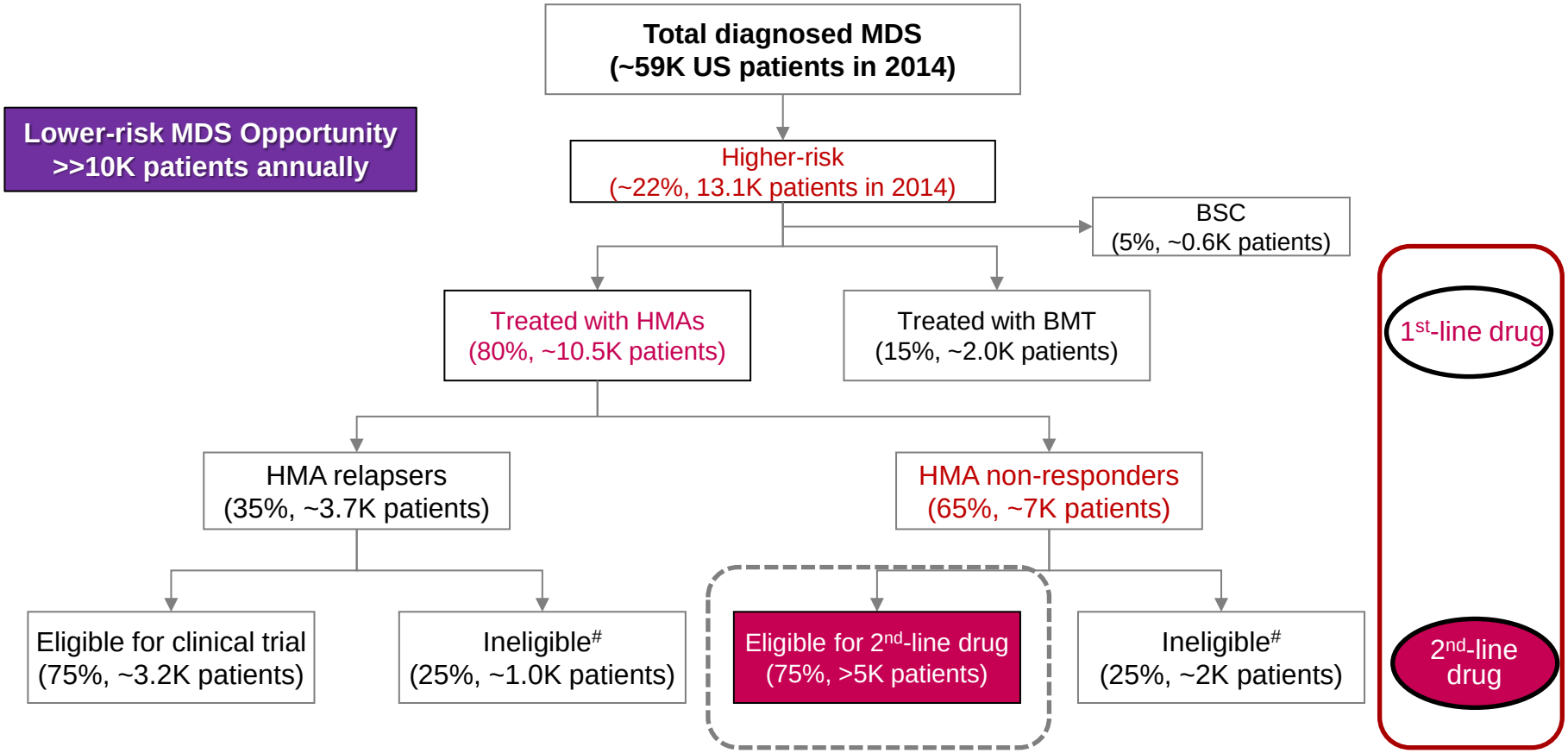
Manoj Maniar, Ph.D.	Senior VP, Product Development	Alcon, SRI
Wolfgang Meyer, Ph.D.	Sr. VP Regulatory Affairs GM, Onconova GmBh	Amgen, Micromet, GPC, Fujisawa
Michael Petrone, M.D.	VP Clin. Dev. Medical Affairs and Pharmacovigilance	GSK, Roberts, GPC

UPCOMING CATALYSTS AND PRESENTATIONS

- Development Milestones
  - Presentation of Expansion Phase 2 Combination Trial Data
    - Phase 3 trial protocol, potential Special Protocol Process — 2018
  - RASopathies Pediatric Oncology program
    - Initiation of clinical trial at NCI
  - CDK 4/6+ARK5 Inhibitor program
    - IND process and start of Phase 1 program — 2019
  - INSPIRE Phase 3 Trial
    - Full enrollment and top-line data
- Anticipated Business Development Activities
  - Additional regional alliances for Rigosertib — 2018-19
  - Additional alliances for CDK program


ONCONOVA
THERAPEUTICS
info@onconova.us

RIGOSERTIB IN MYELODYSPLASTIC SYNDROMES



- Rigosertib for 2nd-line patients (INSPIRE Phase 3 trial)
- For 1st-line patients, in combination with Azacitidine, the current standard of care
- Oral rigosertib for transfusion dependent lower-risk patients

RIGOSERTIB CLINICAL STAGE PROGRAMS

Disease	Formulation	Indication	Stage	Expected Timelines	Potential Market Opportunity (US)/Benefit	
MDS*	Intravenous	HR-2nd line. No approved product following HMA failure	Phase 3	• Interim analysis completed • Phase 3 completion 2019	~5,000 patients	No directly competing FDA approved product in the market
	Oral	HR-1st line In combination with AZA	Phase 2	Phase 3 protocol, SPA process, in 2018	~18,000	No oral NCE approved since 2005
	Oral	Lower Risk	Phase 2	Select patient population in 2018	>10,000	Longer potential duration of treatment
RASopathies^	Intravenous and oral	JMML/other Ras Pathway diseases	Phase 1	• NIH CRADA signed • Proof of concept in 2019	Rare disease	Pediatric clinical trial

**Myelodysplastic Syndromes (MDS) are bone marrow diseases related to failure of cellular production and possible transformation to acute leukemia (MSKCC website, other academic resources.)*

^RASopathies are rare inherited diseases of children that include cancer and cardiovascular disease (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4115674/pdf/nihms604870.pdf)