Developing Targeted Therapeutics

Providing Safe and Effective New Treatment Options for Patients Most Likely to Respond
Forward-Looking Statements

Certain statements in this presentation are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. These statements may be identified by the use of words such as "anticipate," "believe," "forecast," "estimated" and "intend" or other similar terms or expressions that concern Trovagene's expectations, strategy, plans or intentions.

These forward-looking statements are based on Trovagene's current expectations and actual results could differ materially. There are a number of factors that could cause actual events to differ materially from those indicated by such forward-looking statements. While the list of factors presented in the 10-K is considered representative, no such list should be considered to be a complete statement of all potential risks and uncertainties. Unlisted factors may present significant additional obstacles to the realization of forward-looking statements. Forward-looking statements included herein are made as of the date hereof, and Trovagene does not undertake any obligation to update publicly such statements to reflect subsequent events or circumstances.
Investment Thesis
Nasdaq: TROV

Oncology Drug Development Expertise
► Onvansertib – only first-in-class, 3rd generation Polo-like Kinase 1 (PLK1) inhibitor in development
► Three active Investigational New Drug (IND) Applications: Hematologic and Solid Tumor Cancers
► Completed and published Phase 1 study in solid tumor cancers
► Orphan Drug Designation in Acute Myeloid Leukemia (AML) in the U.S. and Europe
► Biomarker strategy to identify patients most likely to respond to treatment
► Funding to advance development programs well into 2019

Attractive Investment Thesis
► Clinical development programs in three key indications of significant medical need for new treatment options
  – Phase 1b/2 in Acute Myeloid Leukemia in combination with standard-of-care chemo
  – Phase 2 in metastatic Castration-Resistant Prostate Cancer in combination with Zytiga®
  – Phase 1b/2 in metastatic Colorectal Cancer in combination with FOLFIRI + Avastin®
► Working with leading investigators and cancer institutions who approached Trovagene
► Demonstrated synergy with Onvansertib in combination with already approved drugs
► Proven safety, tolerability and preliminary data demonstrating treatment benefit
► Patent protection out to 2032
Onvansertib Market Opportunity

Market Potential By Indication Per Year of Treatment
Estimated Total ~10.5 Billion

Sales ($ Millions)

Approximate Year of FDA Approval

AML 650
Colorectal 1,265
Prostate 1,470
Pancreatic 2,216
Breast 2,070
Small Cell Lung 1,750
Ovarian 1,056

2020 2021 2022 2023 2024 2025 2026 2027 2028

Licensed Global Development & Commercialization Rights to Onvansertib (PLK1 Inhibitor) from NMS

- Largest oncology research and development company in Italy
- Developed anthracycline class of drugs (doxorubicin)
- Leader in protein kinase drug development (Polo-like Kinase Inhibitors)

- Identification and validation of molecular targets focused on driver oncogenes
- Excellent track record licensing innovative drugs to pharma/biotech companies including: Genentech (Roche), Ignyta (Roche), Novartis
Nerviano Oncology Portfolio Success

- Excellent track record licensing innovative drugs to pharma/biotech companies that have subsequently received FDA breakthrough status and priority review designation

<table>
<thead>
<tr>
<th>Licensed</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARRAY</td>
<td>Encorafenib (B-RAF IP) Melanoma Braf mutation in combination with binimetinib</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roche</td>
<td>Entrectinib (TRK, ROS, ALK) Non-Small Cell Lung</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ignya</td>
<td>Milciclib (CDK, other kinases) Thymic Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tiziana Life Sciences</td>
<td>Onvansertib (PLK1 inhibitor) AML, mCRPC, mCRC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>trovagene</td>
<td>MPS1 Inhibitor Solid Tumors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genentech</td>
<td>ADC (PNU-652)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OXFORD BioTherapeutics</td>
<td>ADC (NMS-P945)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Strategy for Developing Onvansertib

► 3 active INDs in place

► Leveraging a proven cancer target, PLK1

► Biomarkers to identify patients most likely to respond to treatment

► Orphan Drug Designation in AML

► Combination therapy with already approved drugs
  – Phase 1b/2 trial of Onvansertib + cytarabine or decitabine in Acute Myeloid Leukemia (AML)
  – Phase 2 trial of Onvansertib + Zytiga® in metastatic Castration-Resistant Prostate Cancer (mCRPC)
  – Phase 1b/2 trial of Onvansertib + FOLFIRI and Avastin® in metastatic Colorectal Cancer (mCRC)

► Phase 1b/2 trial-ready in pancreatic, ovarian, breast and lung cancer
Onvansertib – Pipeline Within a Molecule Opportunities in Leukemias/Lymphomas and Solid Tumors

- Three active Investigational New Drug (INDs) Applications in place with the FDA

<table>
<thead>
<tr>
<th>Leukemias &amp; Lymphomas</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Myeloid Leukemia – Orphan Drug Designation in the U.S. and Europe</td>
<td>Phase 1b/2 trial in combination with low-dose cytarabine (LDAC) or Decitabine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metastatic Castration-Resistant Prostate (CRPC)</td>
<td>Phase 2 trial in combination with Zytiga® (abiraterone acetate)/prednisone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorectal (CRC)</td>
<td>Phase 1b/2 trial in combination with FOLFIRI + Bevacizumab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pancreatic</td>
<td>Phase 1b/2 trial ready</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovarian</td>
<td>Phase 1b/2 trial ready</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>Phase 1b/2 trial ready</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Cell Lung</td>
<td>Phase 1b/2 trial ready</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Solid Tumor Cancers

---

Copyright © 2018 Trovagene, Inc.
Partnering Strategy

► Engaging in clinical trial collaborations across a number of major tumor types

► Identifying regional pharma partners for collaboration (Japan, Europe)

► Establishing partnerships to fund clinical trials
PLK1: Established Target for Cancer Therapy

PLK1 Plays a Critical Role in Initiation, Maintenance and Completion of Mitosis

Polo-like Kinase 1 (PLK1)

- Belongs to a family of kinases (PLK1,2,3,4,5)
- Dysfunction leads to cancer formation and progression
- Over-expressed in dividing cancer cells
- Inhibition leads to cancer cell death

1Liu et al- PLK1, A Potential Target for Cancer Therapy; Translational Oncology – Vol. 10 – pp. 22-32; February 2017
Onvansertib: First-in-Class, 3rd Generation PLK1 with Best-in-Class Attributes

- High Selectivity for PLK1
- Demonstrated Safety and Tolerability
- Synergistic in Combination
- Predictive Biomarker
- Flexible Dosing and Scheduling
- Oral Administration
- Ideal Pharmacokinetics
- 24-hour Half-Life
Onvansertib: Highly-Selective Only for PLK1

Selective PLK1 Inhibitor

► Tested against >260 kinases
► PLK1 was the only active target (IC$_{50}$ of 2nM)

Causes cancer cell death by G$_2$M arrest

► Onvansertib blocks cell division (mitosis)

<table>
<thead>
<tr>
<th>PLK Member</th>
<th>Onvansertib IC$_{50}^*$ (μM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLK1</td>
<td>0.002</td>
</tr>
<tr>
<td>PLK2</td>
<td>&gt; 10</td>
</tr>
<tr>
<td>PLK3</td>
<td>&gt; 10</td>
</tr>
</tbody>
</table>

1Data on File, Trovagene, Inc.
Onvansertib Combination Therapy Strategy

- Cornerstone of precision cancer medicine
- Demonstrated synergy with chemotherapies and targeted therapeutics
- Enhances efficacy (targets key pathways by synergy or additive effect)
- Reduces drug resistance, while providing therapeutic benefits

Onvansertib: Synergy May Enhance Efficacy of Standard of Care (SOC) Therapies

Onvansertib Synergistic in Combination with SOC Therapies

- **Prostate**: Zytiga® (abiraterone)
- **Doxorubicin**
- **Cisplatin**
- **Gemzar®** (gemcitabine)
- **Beleodaq** (belinostat)
- **Velcade®** (bortezomib)
- **Camptosar®** (irinotecan)
- **Taxol®** (paclitaxel)
- **Avastin®** (bevacizumab)
- **Cytarabine**
- **Venclexta®** (venetoclax)

- **Acute Myeloid Leukemia**
- **Chronic Lymphocytic Leukemia**
- **Colorectal**
- **T-Cell Lymphoma**
- **Acute Myeloid Leukemia**
- **Bladder**
- **Pancreatic**
- **Breast**
- **Ovarian**
- **Non-Small Cell Lung**
- **Leukemias (Acute Myeloid Leukemia)**
- **Leukemias**
- **Lymphomas**
- **Ovarian**
- **Breast**
- **Ovarian**
- **Non-Small Cell Lung**
- **Small-Cell Lung**

Data on File, Trovagene, Inc.
Onvansertib Clinical Development Roadmap

- Acute Myeloid Leukemia
- Colorectal
- Prostate
- Pancreatic
- Breast
- Ovarian
- Small-Cell Lung
Acute Myeloid Leukemia¹
Significant Need for New Treatment Options

► Aggressive hematologic malignancy of immature blood cells

► 20,000 new cases, 10,400 deaths annually, and 5 year survival rate of 25%

► Treatment options vary based on patient condition / age, but can include:
  – Chemotherapy / Radiation / Stem Cell Transplant

► Preclinical in-vitro and in-vivo data demonstrate efficacy of Onvansertib* as single agent and in combination with drugs used to treat AML

*Orphan Drug Designation granted for Onvansertib by the FDA September, 2017 and by the EMA in July, 2018 ;¹National Cancer Institute SEER 2016; ²Valsasina et al., Mol Cancer Ther; 11(4) April 2012
Onvansertib Positioning in AML Patient Selection Algorithm

AML Diagnosis
18,376\(^1\) cases/year

Eligible for Induction Treatment
~11,000

Ineligible for Induction Treatment
~7,400

Responders
50-70%

Consolidation Treatment

Relapsed & Refractory
30-50%
3,300 to 5,500

Onvansertib in combination with standard-of care chemotherapy and/or targeted therapeutics\(^2\)

\(^1\)Visser et al. (2012), Eur J Cancer (48). Estimated cases in EU27 per year; \(^2\)e.g. Midostaurin for FLT3 mutation
Ongoing Phase 1b/2 Clinical Trial in AML

**Phase 1b:** Dose escalation to assess safety and identify recommended Phase 2 dose

- Administered orally, once daily on days 1-5 of each cycle (21-28 days)

**Phase 2:** Assess safety and preliminary antitumor activity

- **Efficacy Endpoints:** Rate of complete response (CR + CRi) defined as morphologic leukemia-free state (MLF)
- **Exploratory Endpoints:** Evaluation of pharmacodynamic and correlative biomarkers
Phase 1b/2 Trial Anti-Leukemic Activity

- Phase 1b objective is to assess the safety and tolerability of Onvansertib in combination with standard-of-care chemotherapy
- Of the 19 patients evaluable for safety, 12 patients had an evaluable bone marrow biopsy to assess anti-leukemic activity based on criteria from the 2017 ELN recommendations
- Of the 12 patients evaluated for preliminary anti-leukemic activity, 1 patient had a PR, 9 patients had SD and 2 patients had PD

% Bone Marrow Blast Reduction from Baseline

1 Dohner et al., Blood, 2017. 2 American Society of Hematology (ASH) Conference Poster Presentation - December 2018

Copyright © 2018 Trovagene, Inc.
Patient Case Overview

- 75 year-old male, diagnosed with AML in 2009 and treated with induction chemotherapy; relapsed in March 2018 and entered trial in April 2018 on Onvansertib + Decitabine
- Onvansertib entry dose of 12 mg/m² and was increased to 18 mg/m² at cycle 6
- Patient reached PR as of the end of cycle 4 / beginning of cycle 5 and is currently on cycle 8 of treatment
- % bone marrow blast decreased from 94% (at screening) to 2% (cycle 7) and circulating blasts decreased from 92% (C1D1) to 4% (C7D15)

Patient 07-009

3 American Society of Hematology (ASH) Conference Poster Presentation - December 2018
PLK1 Inhibition Can Be Monitored Through pTCTP Status

- pTCTP as a marker of PLK1 activity:
  - PLK1 phosphorylates the translational control tumor protein (TCTP) on serine 46\(^1\)
  - pTCTP was identified as a specific marker for PLK1 activity in in-vivo preclinical models\(^1\)

\(^1\)Cucchi et al., Anticancer Res., 2010
Simple Blood Test for Predicting Response to Onvansertib

- Biomarker assay uses a blood sample to test whether a patient has a greater likelihood to respond to Onvansertib.
- If patient is positive for biomarker assay, then drug is administered.
- Blood test examines the extent that Onvansertib inhibits PLK1 enzymatic activity (called target engagement) within circulating cancer cells.


- Eligible Subject: target engagement assessed.
- Non-Eligible Subject: no target engagement assessed.

<table>
<thead>
<tr>
<th>Onvansertib</th>
<th>pTCTP</th>
<th>TCTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2018 Trovagene, Inc.
PLK1 Inhibition by Onvansertib is Correlated with Higher Response to Treatment

- The 5 patients with target engagement showed a decrease in circulating blasts of ≥50% on the last time point recorded compared to baseline.
- 3 of 5 patients with target engagement had a decrease of ≥50% in their last BM biopsy compared to baseline.
- Decreases in circulating and bone marrow blasts were significantly higher in patients with target engagement compared to patients without target engagement.

---

3 American Society of Hematology (ASH) Conference Poster Presentation - December 2018
Metastatic Castration-Resistant Prostate Cancer
Opportunity to Increase Duration of Response to Therapy

► 25,000 men die from metastatic prostate cancer annually and the five-year survival rate is 37\% \(^2\)

► Treatments
  – Zytiga\textsuperscript{®} (Johnson & Johnson)/prednisone
  – Xtandi\textsuperscript{®} (Astellas/Pfizer)

► Ongoing need to increase duration of response to treatment
  – Patients develop resistance within 9-15 months\(^4\) and do not respond well to subsequent therapies

► Preclinical studies demonstrate synergy between Onvansertib and Zytiga\textsuperscript{®}
  – PLK1 inhibition improves abiraterone efficacy by repressing the androgen signaling pathway\(^3,4\)

Ongoing Phase 2 Clinical Trial in mCRPC

Onvansertib in Combination with Zytiga® and Prednisone in Patients with Metastatic Castration-Resistant Prostate Cancer (mCRPC)

**Dosing Regimen**

Onvansertib – 24 mg/m² Days 1-5 (21-Day Cycle) + Zytiga®/prednisone daily

**Duration**

4 Cycles = 12 Weeks

**Evaluation**

Disease Control based on PSA level

**Efficacy Endpoints**

Effect of Onvansertib in combination with Zytiga®/prednisone on disease control assessed by prostate-specific antigen (PSA) decline or stabilization pre- and post-treatment

**Safety Endpoint**

Safety of Onvansertib in combination with Zytiga®/prednisone

**Exploratory Endpoint**

Target inhibition of PLK1, evaluation of relevant biomarkers and correlation with patient response and genomic profile
Colorectal Cancer: Unmet need in mCRC

- 140K new cases of CRC in 2018 with 64.5% 5 year survival\(^1\)
  - ~51K deaths per year from mCRC\(^1\)

- Tumor biomarkers drive therapy decisions for 1\(^{st}\) line mCRC therapy\(^2\)
  - ~50% mCRC is RAS mutant (Kras)
  - Targeted therapies exclude patients with RAS mutations

- Large unmet need in RAS mutant CRC\(^2\)
  - No targeted therapies are available for RAS mutant CRC
  - Standard-of-care is chemotherapy (FOLFOX/FOLFIRI)
  - 2\(^{nd}\) line therapies have ~5% response rate in metastatic CRC (mCRC)

Onvansertib: Synergy in Combination with Irinotecan (FOLFIRI)

- Combination of Onvansertib with Irinotecan significantly reduces tumor growth compared to either drug alone.
- In 3 independent models tested, Onvansertib induced maximal tumor regression of ~84% compared to vehicle.
- Kras mutation is a biomarker for Onvansertib sensitivity.
- KRAS mutated NIH3T3 cells showed higher sensitivity to Onvansertib compared to KRAS wild-type (WT) cells.

1Investigator Brochure, Data-on-file, Trovagene
Planned Phase 1b/2 Clinical Trial in mCRC

Onvansertib in Combination with FOLFIRI + Avastin for Second-Line Treatment of Metastatic Colorectal Cancer in Patients with a Kras Mutation

**Phase 1b:** Dose escalation to assess safety and identify recommended Phase 2 dose

- Administered orally, once daily on days 1-5 every 14-days (2 courses per 28-day cycle)

**Phase 2:** Assess safety and preliminary antitumor activity

- **Efficacy Primary Endpoint:** Objective response rate (ORR) in patients who receive at least 1 cycle (2 courses) of Onvansertib in combination with FOLFIRI and bevacizumab

- **Efficacy Secondary Endpoint:** Preliminary efficacy defined as complete response (CR) plus partial response (PR) plus stable disease (SD)
2019 Value Creating Milestones

- Initiate mCRC Phase 1b/2 trial
- Efficacy and safety data in AML, mCRPC
- AACR Presentations in AML, mCRPC
- Complete enrollment of AML Phase 2
- Complete enrollment of mCRPC Phase 2
- AML Companion Diagnostic

- AML identify recommended Phase 2 dose (RP2D)
- Begin enrolling AML Phase 2 trial
- mCRPC ASCO-GU Presentation
- Efficacy and safety data readouts (AML and mCRPC)
- Formalize Japan Partnering Collaboration

- Data Readouts (AML, mCRPC, mCRC)
- Begin Enrolling Phase 2 mCRC
- AML – ASH Presentation

- Efficacy and safety data readouts (AML and mCRPC)
- Assess dose escalation Phase 1b mCRC trial and identify Phase 2 dose
Thank You

For additional information please contact: ir@trovagene.com