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): September 9, 2014

Mast Therapeutics, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**001-32157**	**84-1318182**
(State or other jurisdiction of incorporation)	**(Commission File Number)**	**(IRS Employer Identification No.)**

12390 El Camino Real, Suite 150, San Diego, California	**92130**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (858) 552-0866

Not Applicable
Former name or former address, if changed since last report

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 8.01. Other Events.

Beginning on September 9, 2014, the information attached as Exhibit 99.1 to this report relating to Mast Therapeutics, Inc. (the "Company") and its development programs may be presented from time to time by the Company at various investor and analyst meetings, including at the Rodman & Renshaw 16th Annual Investment Conference.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

The list of exhibits called for by this Item is incorporated by reference to the Exhibit Index immediately following the signature page of this report.

By filing this report, including the information contained in Exhibit 99.1 attached hereto, the Company makes no admission as to the materiality of any information in this report. The information contained in Exhibit 99.1 hereto is summary information that is intended to be considered in the context of the Company's filings with the U.S. Securities and Exchange Commission (the "SEC"), including its Annual Report on Form 10-K filed on March 26, 2014, Quarterly Report on Form 10-Q filed on August 11, 2014, and other public announcements that the Company makes, by press release or otherwise, from time to time. The Company undertakes no duty or obligation to publicly update or revise the information contained in this report, although it may do so from time to time as it believes is appropriate. Any such updating may be made through the filing of other reports or documents with the SEC, through press releases, or through other public disclosure.

Forward-Looking Statements

Mast Therapeutics cautions you that statements included in this report, including in Exhibit 99.1 attached hereto, that are not a description of historical facts are forward-looking statements that are based on the Company's current expectations and assumptions. Such forward-looking statements include, but are not limited to, statements regarding the Company's development, regulatory and commercialization strategies and plans for its product candidates, including MST-188 in sickle cell disease, arterial disease, heart failure, and AIR001, as well as the timing of activities related to those plans, including commencement and completion of clinical and nonclinical studies. Among the factors that could cause or contribute to material differences between the Company's actual results and the expectations indicated by the forward-looking statements are risks and uncertainties that include, but are not limited to: the uncertainty of outcomes in ongoing and future studies of its product candidates and the risk that its product candidates may not demonstrate adequate safety, efficacy or tolerability in one or more such studies, including MST-188 in the ongoing EPIC study and phase 2 study in acute lower limb ischemia; delays in the commencement or completion of clinical studies, including as a result of difficulties in obtaining regulatory agency agreement on clinical development plans or clinical study design, opening trial sites, enrolling study subjects, manufacturing sufficient quantities of clinical trial material, completing manufacturing process development activities, being subject to a "clinical hold," and/or suspension or termination of a clinical study, including due to patient safety concerns or lack of funding; the potential for institutional review boards or the FDA or other regulatory agencies to require additional nonclinical or clinical studies prior to initiation of planned clinical study of a product candidate; the risk that, even if clinical studies are successful, the FDA or another regulatory agency may determine they are not sufficient to support a new drug application; the potential that even if clinical studies of a product candidate in one indication are successful, clinical studies in another indication may not be successful; the Company's reliance on contract research organizations (CROs), contract manufacturing organizations (CMOs), and other third parties to assist in the conduct of important aspects of development of its product candidates, including clinical studies, manufacturing, and regulatory activities for its product candidates and that such third parties may fail to perform as expected; the Company's ability to obtain additional funding on a timely basis or on acceptable

terms, or at all; the potential for the Company to delay, reduce or discontinue current and/or planned development activities, including clinical studies, partner its product candidates at inopportune times or pursue less expensive but higher-risk and/or lower return development paths if it is unable to raise sufficient additional capital as needed; the risk that the FDA and regulatory agencies outside of the U.S. do not grant marketing approval of a product candidate, on a timely basis, or at all; the risk that, even if the Company successfully develops a product candidate in one or more indications, it may not realize commercial success with its products and may never generate revenue sufficient to achieve profitability; the risk that the Company is not able to adequately protect its intellectual property rights and prevent competitors from duplicating or developing equivalent versions of its product candidates; and other risks and uncertainties more fully described in the Company's periodic filings with the SEC and press releases.

You are cautioned not to place undue reliance on forward-looking statements, which speak only as of the date they are made. Mast Therapeutics does not intend to revise or update any forward-looking statement set forth in this report to reflect events or circumstances arising after the date hereof, except as may be required by law. This caution is made under the safe harbor provisions of Section 21E of the Securities Exchange Act of 1934, as amended, and Section 27A of the Securities Act of 1933, as amended.

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.

Mast Therapeutics, Inc.

September 9, 2014

By: /s/ Patrick L. Keran
Name: Patrick L. Keran
Title: President and Chief Operating Officer

Exhibit Index

Exhibit No.	Description
99.1	Mast Therapeutics, Inc. corporate presentation, September 9, 2014

MAST THERAPEUTICS, INC.

NYSE MKT: MSTX

Rodman & Renshaw 16th Annual Investment Conference

Brian M. Culley, CEO

September 9, 2014

Forward-Looking Statements

This presentation includes forward-looking statements about our business prospects, financial position, and development of MST-188 and AIR001 for therapeutic use in humans. Any statement that is not a statement of historical fact should be considered a forward-looking statement. Because forward-looking statements relate to the future, they are subject to inherent risks, uncertainties and changes in circumstances that are difficult to predict. Actual events or performance may differ materially from our expectations indicated by these forward-looking statements due to a number of factors, including, but not limited to, results of our pending and future clinical studies, the timeline for clinical and manufacturing activities and regulatory approval; our dependency on third parties to conduct our clinical studies and manufacture our clinical trial material; our ability to raise additional capital, as needed; our ability to establish and protect proprietary rights related to our product candidates; and other risks and uncertainties more fully described in our press releases and our filings with the SEC, including our annual report on Form 10-K filed with the SEC on March 26, 2014.

We caution you not to place undue reliance on any of these forward-looking statements, which speak only as of the date of this presentation. We do not intend to update any forward-looking statement included in this presentation to reflect events or circumstances arising after the date of the presentation, except as may be required by law.

Corporate Overview

- **Publicly-traded biopharmaceutical company based in San Diego**
- **Developing MST-188 for diseases of membrane dysfunction**
  - **Near-term focus on rare ("orphan") diseases**
    - **Sickle Cell Disease (SCD) – phase 3 enrolling**
    - **Acute Limb Ischemia (ALI) – phase 2 enrolling**
  - **Longer-term growth into larger markets**
    - **Heart Failure**
    - **Stroke**
- **Recently acquired Aires Pharmaceuticals (AIR001)**
  - **Phase 2 asset in Pulmonary Hypertension (PH)**
  - **Complementary to MST-188**

Lead Program
MST-188

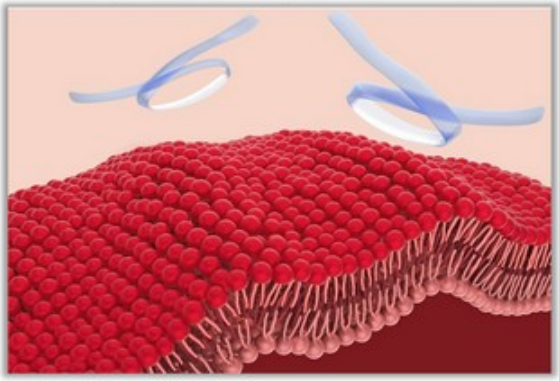
MST-188 Overview

API Structure:	$HO-(CH_2CH_2O)_{79}-(CH_2CHO)_{30}-(CH_2CH_2O)_{79}-H$ $\vert$ CH_3
CMC:	Large polymer (8,500 Daltons) manufactured by chemical synthesis and proprietary purification process
Administration:	IV infusion

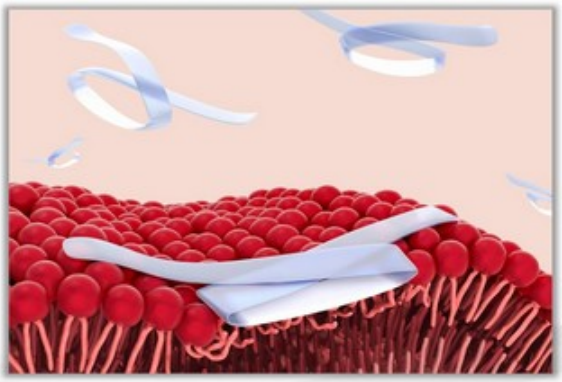
MST-188 Mechanism of Action

Hydrophobic core adheres to hydrophobic domains in circulation (e.g., damaged cell membranes)

No Affinity for Healthy Cell Membranes…

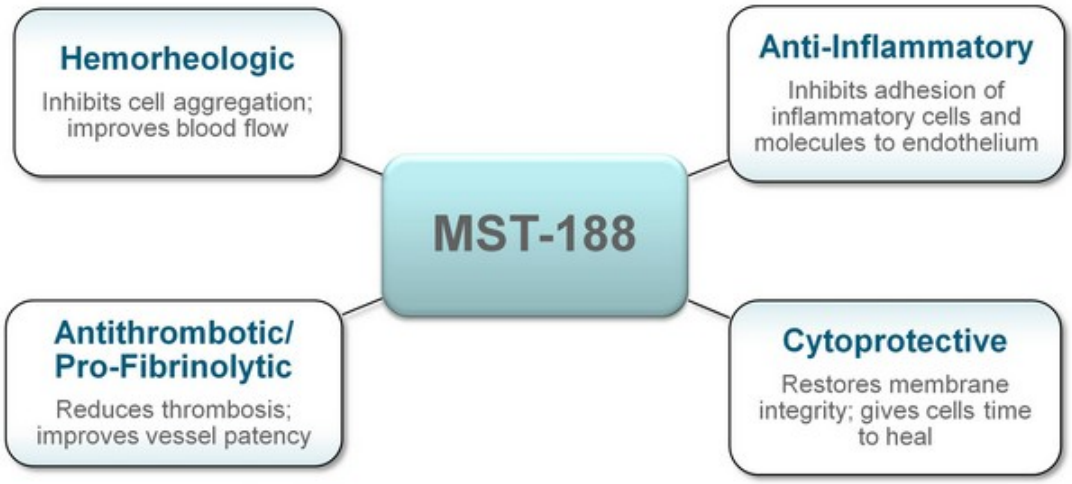


But Adheres to Damaged Cell Membranes



MST-188 Pharmacodynamics

Biophysical mechanism confers multiple pharmacodynamic features



MST-188 Clinical Development

	Preclinical	Phase 1	Phase 2	Phase 3
2014				
Sickle Cell Disease *(orphan)*				Enrolling
Acute Limb Ischemia* *(orphan)*			Enrolling	
Acute Heart Failure			Planned initiation: 1H 2015	
Stroke*		Planned initiation: 2H 2014		

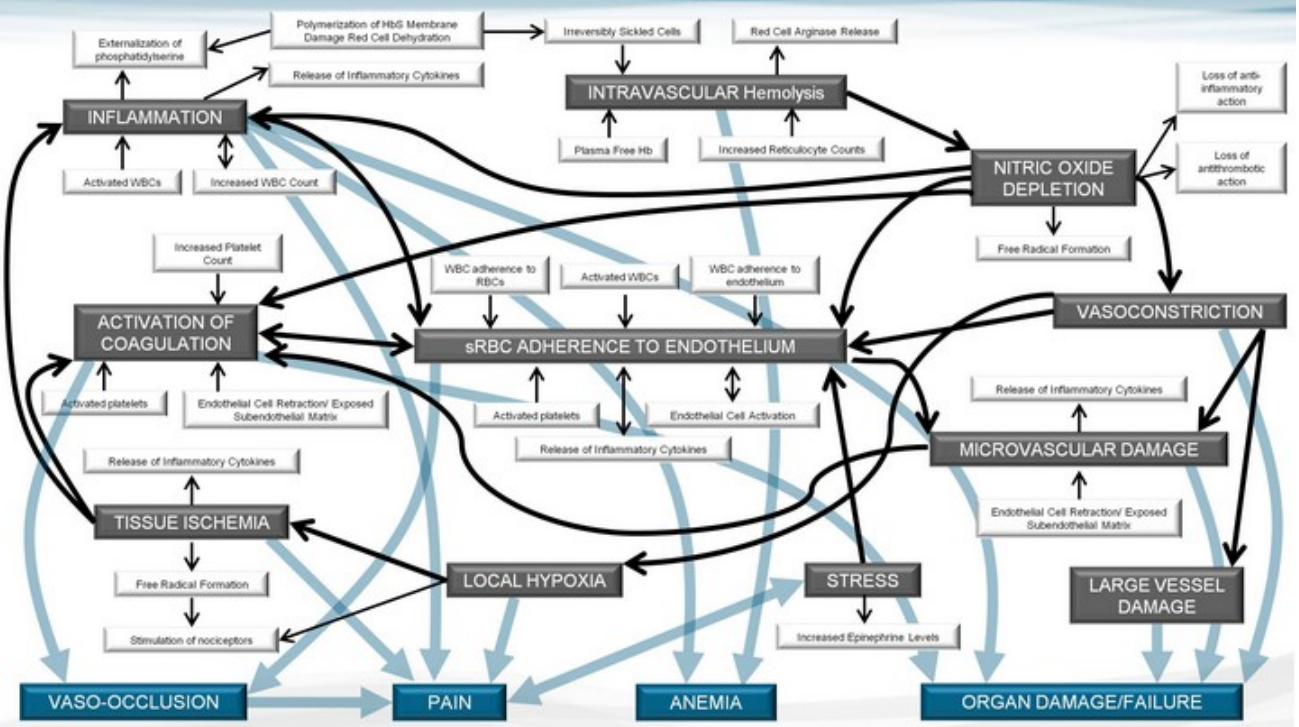
**In combination with thrombolytics*

Sickle Cell Disease

Overview of Sickle Cell Disease

- A chronic, genetic disorder and rare (orphan) disease
  - Affects 90,000 to 100,000 people in the U.S.
  - Characterized by severe deformation (i.e., "sickling") of red blood cells
- Hallmark of disease is a "vaso-occlusive crisis"
  - Exceedingly painful condition
  - Leading cause of hospitalization
- Significant unmet need
  - No approved agents to shorten duration or severity of crisis
  - Standard of care (hydration and analgesics) unchanged for >10 years
- Vaso-occlusion is associated with early death
  - Obstructed blood flow -> hypoxia -> tissue death -> organ failure
  - Average age at death; 42 years (males), 48 years (females)

The Complex Pathophysiology of Sickle Cell Disease Requires Multiple Sites of Intervention



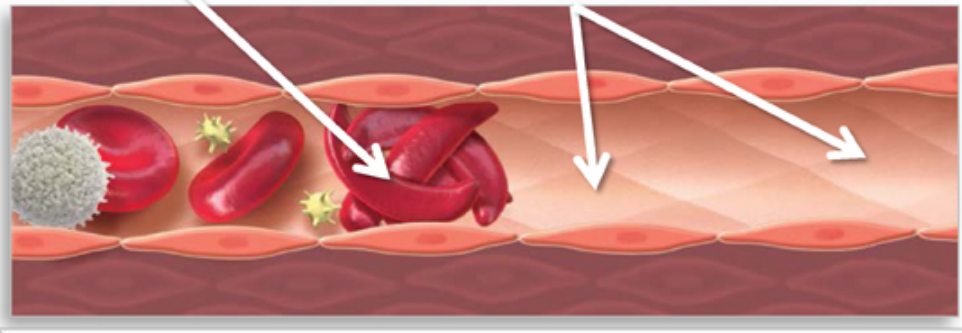
MAST THERAPEUTICS, INC.

NYSE MKT: MSTX

Role of MST-188 in Sickle Cell Disease

Vaso-Occlusion:
- Adhesion of poorly-deformable, "sticky" cells to endothelium
- Physical entrapment of rigid, sickled cells and vessel obstruction

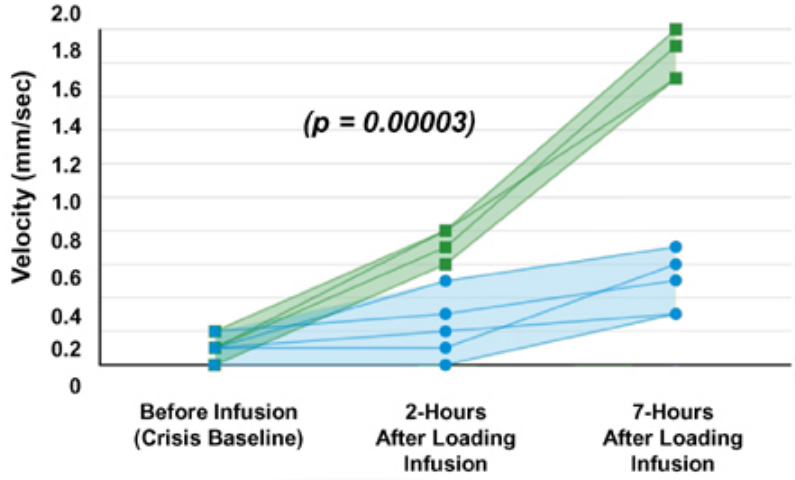
Ischemia:
- RBCs cannot traverse occlusion to deliver oxygen to tissue, resulting in ischemia, hypoxia and infarction



MST-188:
- Reduces adhesion of cells to endothelium (anti-inflammatory)
- Reduces RBC aggregation, improves RBC deformability, lowers viscosity, and restores flow (rheologic)

MST-188 Improves Blood Flow

MST-188 improved microvascular blood flow in SCD patients in crisis



Red cell velocity (mm/s) measured by video microscopy in nine sickle cell patients with vaso-occlusive crisis.

Source: J. Investig. Med. 2004;52(6):402-6

Phase 2 Study

- **Randomized, double-blind, placebo-controlled, multi-center study of MST-188* in SCD patients hospitalized for crisis**
- **MST-188 significantly improved important efficacy parameters**

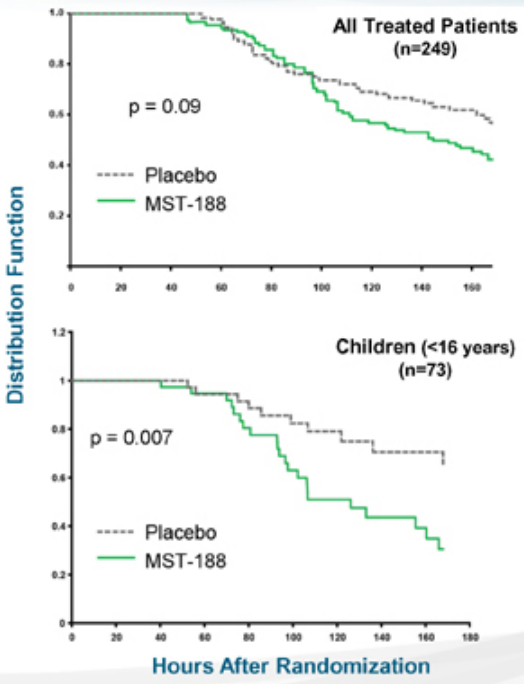
	Subjects Who Received Full Dose±		
	MST-188* (n=18)	Placebo (n=13)	*p* value±±
Duration of Crisis	44 hours	80 hours	0.025
Duration of Hospitalization	5 days	7 days	0.111
Total Analgesic Use	34mg	145mg	0.045
Parenteral Analgesic Use	27mg	133mg	0.022

± Excludes patients who had drug administration errors or incomplete pain assessments (16), who withdrew consent (2) and who withdrew because of injection site pain after 15 minutes of infusion. Subjects were excluded equally (n=9) between MST-188 and placebo.
±± Proportional hazards model adjusted for baseline pain.

Source: Blood, September 1, 1997 – Vol 90. No. 5
* 1st generation (non-purified) formulation

Phase 3 Study

- **Randomized, double-blind, placebo-controlled, multi-center study of MST-188 in 255 patients with SCD**
- **Time-to-event analysis demonstrates consistent trend in achievement of crisis resolution**
- **Original statistical plan, which required 350 patients, was reduced by almost 30% by prior sponsor (capital constraints), lowering statistical power.**
- **Observation period was stopped at 168 hours ("right censoring"), diminishing observable treatment differences**



Source: JAMA, November 17, 2001 – Vol 286, No. 17

Phase 3 Study

- Responders analysis is not impacted by "right-censoring" (discontinuation of observation period)
- MST-188 significantly increased the proportion of patients achieving crisis resolution at 168 hours (end of the observation period)

Group	MST-188	Placebo	*p* Value
All treated patients (n=249)	51.6%	36.6%	0.02
Patients <16 years (n=73)	59.5%	27.8%	0.009

Source: JAMA, November 17, 2001 – Vol 286, No. 17

Evaluation of Purified 188 In Crisis (EPIC): Pivotal Phase 3 Study Design

- Randomized, Double-Blind, Placebo-Controlled, Multicenter
  - 388 patients
  - Standard of care +/- MST-188
- Primary Efficacy Assessment
  - Duration of crisis
- Secondary Efficacy Assessments
  - Re-hospitalization for crisis within 14 days
  - Occurrence of acute chest syndrome
- Power
  - 90% power to detect a 16-hour difference (p=0.05)
  - 85% power to detect a 24-hour difference (p=0.01)

EPIC Success Factors

- Enrollment on-track at 14 months *(announced Aug 2014)*
  - >45 U.S. sites open
  - Multiple ex-U.S. sites open
- Most Advanced New Drug in SCD
  - Potential to be first approved drug to treat an on-going vaso-occlusive crisis
  - Substantial head start versus other new drugs in development for SCD
- Positive Factors for Regulatory Decision-Making
  - Significant unmet need
  - Fast Track designation
  - Orphan Drug designation
  - Healthcare disparity

Arterial Disease

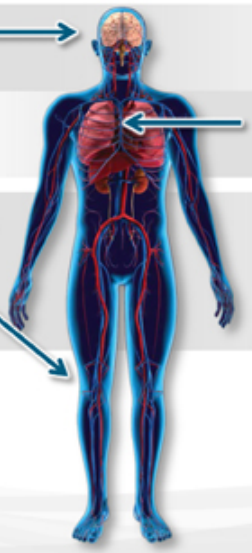
(MST-188 In Combination with Thrombolytics)

- **Acute Limb Ischemia**
- **Stroke**

Overview of Arterial Disease

- **A progressive circulatory problem in which obstructed arteries <u>reduce blood flow</u> to tissues**
  - Thrombolytic agents (tPA) are used to treat acute complications
  - Significant morbidity and mortality

Acute Ischemic Cerebrovascular Infarction
(stroke)



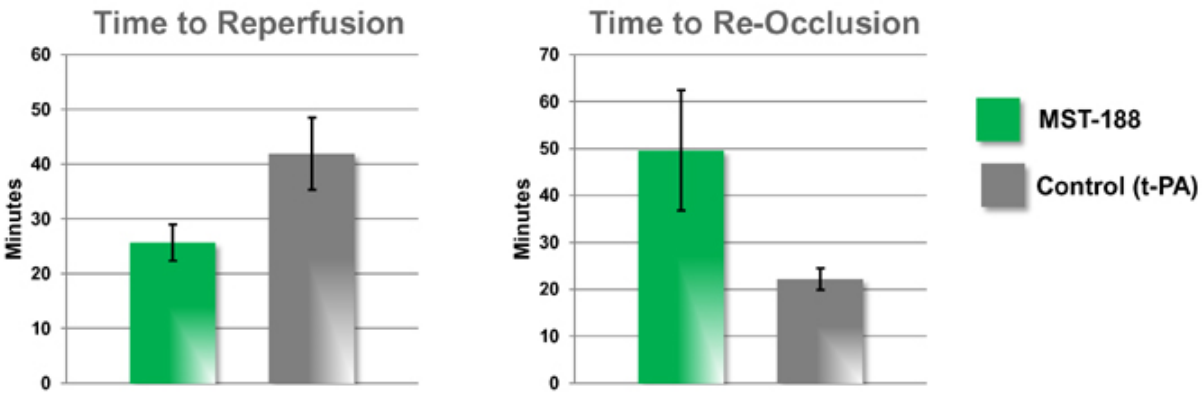
Acute Myocardial Infarction
(heart attack)

Peripheral Arterial Disease
- Intermittent Claudication
- Critical Limb Ischemia
- Acute Limb Ischemia

Development Strategy:
- Develop initially in ALI
- Expand into other markets

MST-188 Improved t-PA Effectiveness

Animals randomized to t-PA (n = 10) or t-PA + MST-188 (n = 10)



MST-188 Showed Synergy with Thrombolytics in Heart Attack

Parameter	MST-188*	Control	Difference	*p* Value N=114
Myocardial Infarct Size (median)	16%	26%	38% reduction	0.031
Myocardial Salvage (median)	13%	4%	125% increase	0.033
Ejection Fraction (median)	52%	46%	13% improvement	0.020
Incidence of Reinfarction	1%	13%	92% reduction	0.016

Source: Circulation 1996; 94: 298-307
*1st generation (non-purified) formulation

Phase 2 Study in ALI

- Clinical Proof-of-Concept Study
  - Biomarkers
  - Clinical outcomes
- Study Design
  - Randomized, double-blind, and active-controlled
  - Rutherford Class 2A/2B and catheter-directed thrombolysis
  - t-PA +/- low or high dose MST-188
  - 60 subjects (20 per arm)
- Timing
  - Study initiated Q1 2014
  - Completion of enrollment anticipated Q4 2015
- ALI data can be supportive of clinical development in stroke

Heart Failure
(Acute Decompensation)

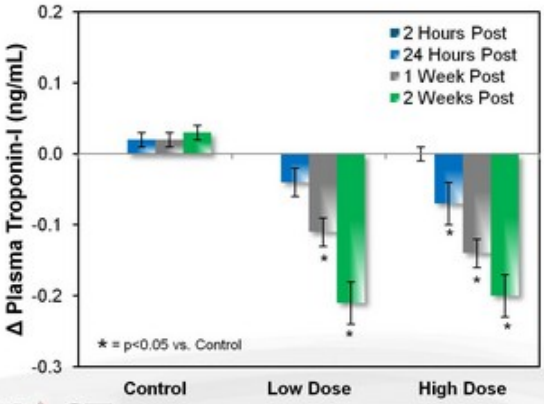
Overview of Heart Failure

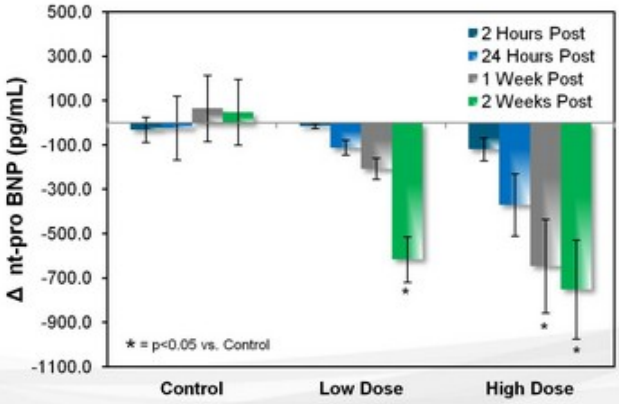
- **Chronic condition characterized by decreasing heart function**
  - Heart cannot pump enough blood to meet the body's needs
- **Significant Unmet Medical Need**
  - Leading healthcare cost in U.S. and Europe
- **Substantial and Growing Market Opportunity**
  - > 5 million individuals with heart failure in the U.S.
- **Acute Decompensation**
  - Each decompensation event contributes to worsening heart failure and damage to vital organs, decreasing survival probability following the next event
- **MST-188**
  - Membrane-sealant activity may restore weakened cardiac cell membranes, minimizing calcium overload injury
  - Durable effect may indicate a direct improvement in cardiac function

Proof-of-Concept in Heart Failure

(nonclinical model of chronic heart failure)

- Single 2h infusion resulted in improvements in hemodynamic parameters (LVEF, CO) and biomarkers (troponin, NT-proBNP)
  - Troponin associated with 180-day all-cause mortality
  - Elevated NT-proBNP associated with poor prognosis
- Potentially novel mechanism, compatible with existing treatments
- Planning to initiate Phase 2 in acute decompensated HF in 1H 2015





Source: data on-file

AIR001

(sodium nitrite) inhalation solution

AIR001

- **AIR001 is nitrite for intermittent inhalation (via nebulizer)**
  - **Beneficial effects include dilation of blood vessels and reduced inflammation**
  - **Positive hemodynamic effects – reductions observed in:**
    - pulmonary vascular resistance
    - pulmonary capillary wedge pressure
    - right atrial pressure
- **AIR001 being developed for Pulmonary Hypertension (PH)**
  - **PH is high blood pressure affecting the blood vessels in the lungs**
  - **Leads to shortness of breath, dizziness, fainting, leg swelling, etc.**
  - **Results in progressive heart failure and death**

AIR001 Clinical Data

- **Three phase 1 studies:**
  - Established MTD and safe dose level
  - Confirmed conversion of nitrite to NO
  - Acute improvements in hypoxia-induced pulmonary hypertension
  - No drug-drug interaction with sildenafil
- **One phase 2 study:** ***(announced Sep 8)***
  - Well-tolerated, with no treatment-related serious adverse events
  - All doses showed improvement in median pulmonary vascular resistance (PVR) & median distances obtained in the 6-minute walk test
  - Methemoglobin levels remained normal (< 1.5%)
- **Safety data in 124 healthy volunteers and patients with pulmonary hypertension (well-tolerated)**

AIR001 Clinical Development Plan

- **Evaluating AIR001 in Pulmonary Hypertension Associated with Left Heart Disease (e.g. World Health Organization Group 2)***
- **Supporting three, institution-sponsored Phase 2a studies to:**
  - Evaluate acute hemodynamic effects of AIR001
  - Evaluate acute effects versus placebo on maximum oxygen consumption and exercise hemodynamics
  - Evaluate inhaled versus intravenous administration of nitrite, as well as the safety of multiple doses of AIR001
- **Preliminary results anticipated 2H '15**

*Simonneau G, Robbins I, Beghetti M. et al. Updated clinical classification of pulmonary hypertension. *J Am Coll Cardiol 2009; 54: S43-S54.*

Upcoming News & Events

Reach Agreement with FDA on Phase 2 study of MST-188 in Heart Failure	**Q4 '14**
Report Data from Nonclinical Study of MST-188 in Heart Failure	Q1 '15
Report Data from Nonclinical Study of MST-188 in Embolic Stroke	**Q2 '15**
Initiate Enrollment in Phase 2 study of MST-188 in Heart Failure	1H '15
Complete Enrollment in Phase 2 study of MST-188 in ALI	**Q4 '15**
Complete Enrollment in EPIC study of MST-188 in SCD	Q4 '15
Report Data from Phase 2a study of AIR001 in WHO Group 2 PH	**2H '15**
Report Interim Results from Phase 2 study of MST-188 in Heart Failure	2H '15

MSTX Financial Overview

- Cash/investments at 6/30/14: $46.4 million
- Market capitalization: ~$80 million*
- Shares outstanding: ~126 million*
- Average daily volume (3 mo): ~885,000*
- No debt

Mast Investment Summary

- A Leader in Areas of Significant Unmet Need
  - Sickle Cell Disease: Most advanced (Phase 3) new drug in development
  - Acute Limb Ischemia: Initiated Phase 2 study in Q1 2014
  - Heart Failure: potential new mechanism with durable effects

- Recently acquired Aires Pharmaceuticals (AIR001)
  - Phase 2 program in PH associated with left heart disease

- Cash and marketable securities
  - $46.4 million at 6/30/14
  - No debt