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Sunesis Pharmaceuticals to Implement One-Time Sample Size Increase to Phase 3 VALOR Trial in AML

DSMB Recommends Increase Following Single, Pre-Planned Interim Efficacy and Safety Analysis of VALOR; Enrollment Completion Expected in 2013

DSMB Recommendation Triggers $25.0 Million Investment in Sunesis from Royalty Pharma

Sunesis to Host Conference Call Today at 9:00 AM Eastern Time

SOUTH SAN FRANCISCO, Calif., (September 11, 2012) – Sunesis Pharmaceuticals, Inc. (NASDAQ: SNSS) today announced that it will implement a one-time, 225-patient sample size increase to its Phase 3 VALOR trial of vosaroxin in acute myeloid leukemia (AML), bringing target enrollment to 675 patients. This is in response to the recommendation of the trial's independent Data and Safety Monitoring Board (DSMB) following their completion yesterday of a single, pre-planned interim analysis of unblinded efficacy and safety data sets from VALOR.

VALOR is a Phase 3, randomized, double-blind, placebo-controlled, pivotal trial of vosaroxin in patients with first relapsed or refractory AML. The pre-planned sample size increase of 225 additional patients is designed to maintain adequate statistical power over a broader range of survival outcomes. With the revised target sample size of 675 patients, Sunesis anticipates full enrollment of VALOR in 2013, with unblinding of the trial expected in the first half of 2014 upon reaching 562 events and final database lock. The DSMB recommendation also triggers Royalty Pharma's obligation to invest $25.0 million in Sunesis.

"The completion of VALOR's interim analysis is an important milestone for Sunesis," said Daniel Swisher, Chief Executive Officer of Sunesis. "In light of the design of VALOR, the DSMB's recommendation that we implement a one-time, 225-patient sample size increase is a promising development. We thank the DSMB for their comprehensive analysis, and trial investigators for their continued support of VALOR, which has now enrolled 412 patients. Importantly, we are pleased that we have committed funding that will allow us to implement this enrollment expansion and complete the pivotal trial in AML."

Sunesis' management and staff, VALOR clinical investigators, including members of the Study Steering Committee, and Royalty Pharma remain blinded to the interim trial data and analysis.

Royalty Pharma's $25.0 million investment is made pursuant to the terms of an agreement with Sunesis announced March 29, 2012. In exchange for their investment, Royalty Pharma will receive a 6.75% royalty on future net sales of vosaroxin and warrants to purchase Sunesis common stock.

Conference Call Information

Sunesis will host an update conference call today, September 11th at 9:00 a.m. Eastern Time. The call can be accessed by dialing (866) 700-6293 (U.S. and Canada) or (617) 213-8835 (international), and entering passcode 65702894. To access the live audio webcast, or the subsequent archived recording, visit the "Investors and Media - Calendar of Events" section of the Sunesis website at www.sunesis.com. The webcast will be recorded and available for replay on the company's website for two weeks.

About VALOR

VALOR is a Phase 3, randomized, double-blind, placebo-controlled, pivotal trial in patients with first relapsed or refractory AML. The trial's target enrollment is 675 patients at more than 110 leading sites in the U.S., Canada, Europe, Australia and New Zealand. The VALOR trial is currently enrolling patients, who are randomized one to one to receive either vosaroxin on days one and four in combination with cytarabine daily for five days, or placebo in combination with cytarabine. The trial's primary endpoint is overall survival. For more information on the VALOR trial, please visit www.valortrial.com.

About Vosaroxin

Vosaroxin is a first-in-class anti-cancer quinolone derivative (AQD), a class of compounds that has not been used previously for the treatment of cancer. Vosaroxin both intercalates DNA and inhibits topoisomerase II, resulting in replication-dependent, site-selective DNA damage, G2 arrest and apoptosis. Both the U.S. Food and Drug Administration (FDA) and European Commission have granted orphan drug designation to vosaroxin for the treatment of acute myeloid leukemia. Additionally, vosaroxin has been granted fast track designation by the FDA for the potential treatment of relapsed or refractory acute myeloid leukemia in combination with cytarabine.

About AML

AML is a rapidly progressing cancer of the blood characterized by the uncontrolled proliferation of immature blast cells in the bone marrow. The American Cancer Society estimates there will be approximately 13,780 new cases of AML and 10,200 deaths from AML in the U.S. in 2012. Additionally, it is estimated that the prevalence of AML across major global markets (U.S., France, Germany, Italy, Spain, United Kingdom, and Japan) is over 50,000. AML is generally a disease of older adults, and the median age of a patient diagnosed with AML is about 67 years. AML patients with relapsed or refractory disease and newly diagnosed AML patients over 60 years of age with poor prognostic risk factors typically die within one year, resulting in an acute need for new treatment options for these patients.

About Sunesis Pharmaceuticals

Sunesis is a biopharmaceutical company focused on the development and commercialization of new oncology therapeutics for the treatment of solid and hematologic cancers. Sunesis has built a highly experienced cancer drug development organization committed to advancing its lead product candidate, vosaroxin, in multiple indications to improve the lives of people with cancer. For additional information on Sunesis, please visit http://www.sunesis.com.

This press release contains forward-looking statements, including statements related to the design, conduct, progress and results of the VALOR trial, vosaroxin's effects, efficacy, safety profile and commercial potential as a single agent and in combination with cytarabine, and the timing and occurrence of Royalty Pharma's proposed investment of $25.0 million in Sunesis. Words such as "expected," "will," "triggers," "designed," "anticipates," "continued," "anticipates" and similar expressions are intended to identify forward-looking statements. These forward-looking statements are based upon Sunesis' current expectations. Forward-looking statements involve risks and uncertainties. Sunesis' actual results and the timing of events could differ materially from those anticipated in such forward-looking statements as a result of these risks and uncertainties, which include, without limitation, risks related to Sunesis' need for substantial additional funding to complete the development and commercialization of vosaroxin, risks related to Sunesis' ability to raise the capital that it believes to be accessible and is required to fully finance the development and commercialization of vosaroxin, the risk that raising funds through lending arrangements may restrict our operations or produce other adverse results, the risk that Sunesis' development activities for vosaroxin could be otherwise halted or significantly delayed for various reasons, the risk that Sunesis' clinical studies for vosaroxin may not demonstrate safety or efficacy or lead to regulatory approval, the risk that data to date and trends may not be predictive of future data or results, the risk that Sunesis' nonclinical studies and clinical studies may not satisfy the requirements of the FDA or other regulatory agencies, risks related to the conduct of Sunesis' clinical trials, risks related to the manufacturing of vosaroxin and supply of the active pharmaceutical ingredients required for the conduct of the VALOR trial, the risk of third party opposition to granted patents related to vosaroxin, and the risk that Sunesis' proprietary rights may not adequately protect vosaroxin. These and other risk factors are discussed under "Risk Factors" and elsewhere in Sunesis' Quarterly Report on Form 10-Q for the quarter ended June 30, 2012, Sunesis' Annual Report on Form 10-K for the year ended December 31, 2011 and Sunesis' other filings with the Securities and Exchange Commission. Sunesis expressly disclaims any obligation or undertaking to release publicly any updates or revisions to any forward-looking statements contained herein to reflect any change in the company's expectations with regard thereto or any change in events, conditions or circumstances on which any such statements are based.