Idera Pharmaceuticals Presents Data from a Phase 1 Clinical Trial of IMO-2125 in Treatment-Naïve Genotype 1 HCV Patients atEASL 2011

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- Phase 2 clinical trial expected to begin in second quarter 2011-

CAMBRIDGE, Mass., Apr 02, 2011 (BUSINESS WIRE) --

Idera Pharmaceuticals, Inc. (Nasdaq: IDRA) announced today the presentation of data from a four-week Phase 1 clinical trial of IMO-2125 in combination with ribavirin in treatment-naïve patients chronically infected with hepatitis C virus (HCV) genotype 1. During the four weeks of treatment, IMO-2125 in combination with ribavirin was well tolerated and produced clinically meaningful antiviral activity. IMO-2125 is a Toll-like Receptor 9 (TLR9) agonist that stimulates production of natural interferons and other antiviral cytokines. The presentation (Abstract #1209), entitled "IMO-2125 plus ribavirin gives substantial first-dose viral load reductions, cumulative antiviral effect, is well tolerated in naïve genotype 1 HCV patients: a Phase 1 trial", was made at the 46th Annual Meeting of the European Association for the Study of the Liver (EASL) being held in Berlin, Germany from March 30 - April 3, 2011. The presentation provided additional detail from the trial for which interim data was announced in December 2010.

"This study provides several key results that support our IMO-2125 development program," said Robert Arbeit, M.D., Vice President of Clinical Development at Idera. "First, IMO-2125 in combination with ribavirin had substantial antiviral activity in treatment-naïve patients. This antiviral activity was associated with decreases in serum liver enzyme levels over the four-week course of treatment. Second, IMO-2125 was well tolerated, and demonstrated important safety features in comparison to Pegasys(R) used in the control arm. These included shorter duration of flu-like symptoms and minimal hematologic toxicity, with no IMO-2125-treated patients developing neutropenia requiring intervention or platelet levels below lower limits of normal."

Dr. Arbeit continued, "We are preparing to initiate a 12-week Phase 2 clinical trial of IMO-2125 plus ribavirin in treatment-naïve genotype 1 HCV patients in the second quarter of 2011. We expect to use data from that study to select dosages for subsequent clinical trials of IMO-2125 in combination with ribavirin and a direct acting antiviral agent."

"We have now completed Phase 1 clinical evaluation of IMO-2125 in both treatment-naïve and null-responder HCV patients and have established that its immune stimulation mechanism of action provides clinically meaningful antiviral activity and is well tolerated," said Tim Sullivan, Ph.D., Vice President of Development Programs and Alliance Management at Idera. "By the end of this year we expect to have completed chronic nonclinical safety studies to support further clinical development of IMO-2125 as an immune modulatory component of HCV therapy."

"Our objective is to develop a novel immune modulator for the treatment of HCV as a potential alternative to pegylated interferons," said Sudhir Agrawal, D.Phil., Chairman and Chief Executive Officer at Idera. "We have confirmed the intended mechanism of action of IMO-2125 and are very pleased with its safety profile and antiviral activity in both null-responder and treatment-naïve HCV patients. We look forward to initiating the Phase 2 clinical trial, which we expect will provide the additional data needed to advance the clinical development of IMO-2125 and support studies in combination with direct-acting antiviral agents."

Phase 1 Clinical Trial in Treatment-naive HCV Patients

Study Design:

In this Phase 1 clinical trial, treatment-naïve genotype 1 HCV patients received IMO-2125 by subcutaneous injection over four weeks in combination with daily oral administration of standard, weight-based doses of ribavirin in one of four treatment regimens of 12 patients each. The four regimens of IMO-2125 were 0.08, 0.16, and 0.32 mg/kg once weekly and 0.16 mg/kg twice weekly. In addition, 12 patients received Pegasys(R) plus ribavirin. Study endpoints of safety and antiviral activity were measured through Day 29. Upon completion of the four weeks of protocol-specified treatment, all patients received follow-on treatment with Pegasys(R) plus ribavirin. Under the trial protocol, final safety and antiviral assessments were taken at Day 59, four weeks after the follow-on treatment with Pegasys(R) plus ribavirin was initiated.

Study Results:

Patient Population

All patients were Caucasian, except one Asian patient in the 0.16 mg/kg/week IMO-2125 group; all were infected with HCV genotype 1. Additional demographic and baseline data are summarized in the following table.

Cohort	IMO-2125 Regimen+ (mg/kg/wk)	N	Age > 50	IP-10 > 600 pg/mL	Male Sex	Baseline Log_{10} HCV RNA (mean ± SD)	IL28B CT or TT
1	0.08	12	3 (25%)	2 (16%)	9 (75%)	6.4 ± 0.7	not available
	0.16	12	0	1 (8%)	8 (67%)	6.6 ± 0.6	pending*
2	Pegasys(R)	6	0	1(16%)	4 (67%)	6.5 ± 0.9	pending*
	0.32	12	5 (42%)	4 (33%)	7 (58%)	6.2 ± 0.5	9 (75%)
3	0.16 2x/wk	12	3 (25%)	5 (42%)	5 (42%)	6.5 ± 0.4	9 (75%)
	Pegasys(R)	6	3 (50%)	1 (16%)	5 (42%)	6.6 ± 0.2	3 (50%)

+ All subjects received weight-based ribavirin
* IL28B genotyping results are pending.

Safety

- IMO-2125 was well tolerated at all dose levels in combination with ribavirin over four weeks of treatment, with no treatment-related serious adverse events and no treatment discontinuations. The most common adverse events observed in the IMO-2125 regimens were mild to moderate flu-like symptoms and injection site reactions.
- **Flu-like symptoms**. Among patients who received IMO-2125, flu-like symptoms consisted primarily of fever and chills with onset within approximately eight hours of dosing and of brief duration, typically lasting less than one day. In contrast, the observations for the patients receiving Pegasys(R) who experienced flu-like symptoms were consistent with the extensively published experiences showing that flu-like symptoms generally include malaise and fatigue, have delayed onset at one or two days after dosing, and often last two days or more.
- **Neutropenia**. Neutropenia (absolute neutrophil count (ANC) <1000/mm^3) with IMO-2125 plus ribavirin treatment was infrequent, occurring in five of 48 patients, or 10%, at some point during the four-week treatment period. Neutropenia in patients treated with IMO-2125 plus ribavirin was transient; no patients required intervention and at Day 29 no patients had ANC <1000/mm^3. Neutropenia was more common with Pegasys(R) plus ribavirin treatment, occurring in seven of 12 patients, or 58%. Two of these patients, or 17%, required intervention for their neutropenia and at Day 29 two additional patients had ANC <1000/mm^3.

At Day 29, all 48 patients who had received IMO-2125 initiated standard of care treatment with Pegasys(R) plus ribavirin. At Day 59, six of these patients, or 13%, had neutrophil counts less than 1000/mm^3.

- **Thrombocytopenia.** On Day 29, all patients treated with IMO-2125 plus ribavirin had platelet counts of 145,000/mm^3 or greater. Three of the 12 patients, or 25%, treated with Pegasys(R) plus ribavirin had platelet counts at or below 130,000/mm^3 on Day 29.

At Day 29, all 48 patients who had received IMO-2125 initiated standard of care treatment with Pegasys(R) plus ribavirin. At Day 59, 13 of these patients, or 26%, had platelet counts at or below 130,000/mm^3.

Liver Enzyme Normalization

- Serum liver enzyme levels, AST and ALT, are generally elevated in chronic hepatitis C patients. Treatment with all dose levels of IMO-2125 plus ribavirin led to progressive reductions in group means of AST and ALT to within normal limits by the end of the fourth week of treatment. Similar reductions in AST and ALT levels were observed in patients receiving treatment with Pegasys(R) plus ribavirin.

Effect on HCV RNA Viral Load

- ***Viral load reduction after first dose*.** IMO-2125 at all dose levels induced declines in viral levels at 48 hours after the first dose. The mean viral load reductions at 48 hours after the first dose with the 0.16 mg/kg once-weekly, 0.32 mg/kg once-weekly and 0.16 mg/kg twice-weekly IMO-2125 regimens were -2.5, -1.3, and -1.6 $\log_{10}$, respectively. The mean viral load reduction for patients treated with Pegasys(R) plus ribavirin at the same time point was -1.4 $\log_{10}$.
- ***Viral load reduction after four weeks.*** Antiviral response was variable within all treatment groups, including Pegasys(R) plus ribavirin. At Day 29, in each of the IMO-2125 treatment groups at 0.16 mg/kg/week or higher and in the Pegasys(R) plus ribavirin group, some patients

achieved greater than 4 log_{10} reductions in viral load and some failed to achieve even a 1 log_{10} reduction.

Mean viral load reductions from baseline at the mid-week evaluation in the fourth week of treatment with the 0.16 mg/kg once-weekly, 0.32 mg/kg once-weekly and 0.16 mg/kg twice-weekly IMO-2125 regimens were -3.4, -2.0, and -3.3 log_{10}, respectively. The mean viral load reduction for patients treated with Pegasys(R) plus ribavirin at the same timepoint was -3.8 log_{10}.

Mean viral load reductions from baseline at Day 29 with the 0.16 mg/kg once-weekly, 0.32 mg/kg once-weekly and 0.16 mg/kg twice-weekly IMO-2125 regimens were -1.7, -0.6, and -2.4 log_{10}, respectively. The mean viral load reduction for patients treated with Pegasys***(R)*** plus ribavirin at Day 29 was -3.4 log_{10}.

- **Prognostic factors affecting antiviral activity.** Uneven distribution of negative prognostic factors, such as IL28B CT or TT genotype, high baseline IP-10, and age, contributed to the variability in antiviral activity across the treatment groups. Additional data on IL28B genotype are being collected.

Summary of Antiviral Activity

		Viral Load Reduction			
Cohort	IMO-2125 Regimen+ (mg/kg/wk)	Mean Change HCV Log_{10} at 48h after 1st Dose (range)	HCV RNA from Days 2 to 29, % with decrease >1 log_{10}	>2 log_{10}	Mean change HCV log_{10} at Day 29 (range)
1	0.08	-1.1 (0.1 to -2.97)*	75%	42%	-0.9 (0.3 to -1.9)
2	0.16	-2.5 (-0.8 to -3.9)	100%	100%	-1.7 (-0.2 to -4.7)
3	0.32	-1.3 (0.2 to -2.8)	92%	50%	-0.6 (0.6 to -2.7)
3	0.16 2x/wk	-1.6 (-0.5 to -2.9)	92%	75%	-2.4 (-0.3 to -4.5)
2&3	Pegasys(R)	-1.4 (0.2 to -2.4)	100%	83%	-3.4 (-0.7 to -5.0)

+ N=12 per treatment regimen. All subjects received weight-based ribavirin.
* First cohort samples taken 24 hr post-dose.

Authors of the presentation and study investigators include Dominique Guyader, M.D., of Universite de Rennes, France, Pavel Bogomolov, M.D., of the State Institution Moscow Region named after M.F. Vladymirsky, Moscow, Russia, Zhanna Kobalava, M.D., of GOUVPO Russian Peoples' Friendship University (City Clinical Hospital #64), Moscow, Russia, Valentin Moiseev, M.D., of GOUVPO Russian Peoples' Friendship University (City Clinical Hospital #3), Moscow, Russia, Janos Szlavik, M.D., of Szt László Hospital, Budapest, Hungary, Béatrice Astruc, M.D., of Biotrial, Rennes, France, Istan Varkonyi, M.D., of Kenezy Hospital, Debrecen, Hungary, Tim Sullivan, Ph.D., Kerry Horgan, Alice Bexon, MBChB, and Robert Arbeit, M.D., of Idera Pharmaceuticals.

About IMO-2125

IMO-2125, a Toll-like Receptor (TLR) 9 agonist, is a novel immune modulator being developed as a component of treatment for chronic hepatitis C virus (HCV) infection. IMO-2125 is designed to stimulate the immune system, causing the body to generate natural interferons and other antiviral cytokines. IMO-2125 has been evaluated in a Phase 1 clinical trial in null-responder HCV patients as monotherapy for 4 weeks and in a Phase 1 clinical trial in treatment-naïve HCV patients in combination with ribavirin for 4 weeks.

About Idera Pharmaceuticals, Inc.

Idera Pharmaceuticals develops drug candidates to treat chronic hepatitis C virus infection, autoimmune and inflammatory diseases, cancer, and respiratory diseases, and for use as vaccine adjuvants. The company's proprietary drug candidates are designed to modulate specific Toll-like Receptors, which are a family of immune system receptors. Idera's pioneering DNA and RNA chemistry expertise enables us to create drug candidates for internal development and generates opportunities for multiple collaborative alliances. For more information, visit www.iderapharma.com.

Idera Forward Looking Statements

This press release contains forward-looking statements concerning Idera Pharmaceuticals, Inc. that involve a number of risks and uncertainties. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "estimates," "intends," "should," "could," "will," "may," and similar expressions are intended to identify forward-looking statements. There are a number of important factors that could cause Idera's actual results to differ materially from those indicated by such forward-looking statements, including whether results obtained in preclinical studies and early clinical trials such as the studies and trials referred to in this release will be indicative of results obtained in future clinical trials; whether products based on Idera's technology will advance into or through the clinical trial process on a timely basis or at all and receive approval from the United States Food and Drug Administration or equivalent foreign regulatory agencies; whether, if the Company's products receive approval, they will be successfully distributed and marketed; whether the Company's collaborations will be successful; whether the patents and patent applications owned or licensed by the Company will protect the Company's technology and prevent others from infringing it; whether Idera's cash resources will be sufficient to fund the Company's operations; and such other important factors as are set forth under the caption "Risk Factors" in Idera's Annual Report on Form 10-K for the year ended December 31, 2010 which important factors are incorporated herein by reference. Idera disclaims any intention or obligation to update any forward-looking statements.

SOURCE: Idera Pharmaceuticals

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