Assembly Biosciences Reports Positive Interim Results from Phase 1b Clinical Study of Long-Acting Helicase-Primase Inhibitor Candidate ABI-5366 Showing Reductions in Viral Shedding Rate and Genital Lesion Rate in Recurrent Genital Herpes

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– 94% reduction in HSV-2 shedding rate and 98% reduction in high viral load shedding rate, both statistically significant, observed in cohort evaluating 350 mg weekly oral dose compared to placebo over 29-day evaluation period –

– 94% reduction in genital lesion rate, also statistically significant, observed with 350 mg weekly oral dose compared to placebo over same period –

– Favorable safety and tolerability profile observed in the first two cohorts evaluating weekly oral doses of ABI-5366 –

SOUTH SAN FRANCISCO, Calif., Aug. 08, 2025 (GLOBE NEWSWIRE) -- Assembly Biosciences, Inc. (Nasdaq: ASMB), a biotechnology company developing innovative therapeutics targeting serious viral diseases, today announced positive interim antiviral activity, clinical outcomes, safety and pharmacokinetic (PK) results from a Phase 1b study evaluating ABI-5366, an investigational long-acting herpes simplex virus (HSV) helicase-primase inhibitor, in participants seropositive for HSV type 2 (HSV-2) with recurrent genital herpes.

For the powered antiviral endpoint, HSV-2 shedding rate, highly potent antiviral activity was observed with a 94% reduction compared to placebo ($p<0.01$) over the 29-day evaluation period in the cohort evaluating a 350 mg weekly dose. This reduction exceeds Assembly Bio's target for the study of an 80%-85% reduction in the rate of HSV-2 shedding. For a secondary clinical endpoint of genital lesion rate, a 94% reduction compared to placebo ($p<0.01$) was observed with the 350 mg weekly dose. The rate of samples with high viral load (i.e., $>10^4$ copies/mL HSV DNA), a potential surrogate for HSV-2 transmission and a secondary endpoint, was reduced by 98% compared to placebo ($p<0.05$) in this cohort.

ABI-5366 was observed to be well-tolerated at oral doses up to 350 mg weekly in participants seropositive for HSV-2 with recurrent genital herpes. The observed PK profile continues to support once-weekly dosing and the potential for once-monthly oral dosing regimens. With these data, Assembly Bio expects to move directly into Phase 2 clinical study preparation in parallel with completion of this Phase 1b study, which includes an ongoing cohort evaluating a monthly oral dosing regimen. The in-life portions of chronic toxicology studies of ABI-5366 are now complete and these studies are expected to support longer-term dosing in Phase 2.

"We are thrilled to see these interim data for ABI-5366 far exceeding the targets we had set in this study for antiviral activity and clinical outcomes in participants with recurrent genital herpes," said Anuj Gaggar, MD, PhD, chief medical officer of Assembly Bio. "These results underscore our conviction in the potential for ABI-5366 to reduce outbreaks and improve quality of life for those affected by the severe impacts of recurrent genital herpes. We will now work quickly to move ABI-5366 into longer-duration Phase 2 clinical studies, which we expect to initiate in mid-2026, and look forward to its continued progress."

A Phase 1b study of ABI-1179, another long-acting HSV helicase-primase inhibitor candidate, is being conducted concurrently. Assembly Bio expects to share interim data from this study of ABI-1179 and the ongoing cohort of the ABI-5366 Phase 1b study evaluating a monthly dosing regimen in the fall of this year.

Under the collaboration agreement between Assembly Bio and Gilead Sciences, Inc. (Gilead), Gilead has the right to opt in to an exclusive license for further development and commercialization of the helicase-primase inhibitor program after reviewing the option data package to be delivered by Assembly Bio following completion of the Phase 1b studies.

ABI-1179 was contributed by Gilead under the collaboration between Assembly Bio and Gilead. ABI-5366 and ABI-1179 are investigational product candidates that have not been approved anywhere globally, and their safety and efficacy have not been established.

Study ABI-5366-101 – Interim Phase 1b Results

Interim Results

The Phase 1b interim analysis reported here includes data from cohort B1, evaluating a loading dose of 150 mg and weekly doses of 30 mg (the 150/30 mg cohort), and cohort B2, evaluating a loading dose and weekly doses of 350 mg (the 350 mg cohort),

through the data cutoff date of July 29, 2025.

A total of 50 participants have been enrolled in the 150/30 mg and 350 mg cohorts; 40 assigned to ABI-5366 (20 participants in each cohort) and 10 assigned to placebo (five in each cohort). 45 participants from these cohorts have completed the 29-day evaluation period while five discontinued treatment; one due to an adverse event (described below), three withdrew consent and one withdrew for recurrence of genital herpes.

Antiviral activity and clinical outcomes by treatment arm are summarized below.

Antiviral Activity and Clinical Outcomes	**PBO**	**150/30 mg QW**	**350 mg QW**
HSV-2 Shedding Rate[a]	14.6%	14.5%	0.9%
High Viral Load Shedding Rate[b]	11.4%	9.4%	0.2%
Genital Lesion Rate[c]	19.7%	11.8%	1.3%
Mean (SD) Duration of Viral Shedding; days	5.8 (4.1)	3.6 (2.7)	1.8 (0.8)
Mean (SD) Duration of Genital Lesions; days	6.3 (4.3)	5.7 (4.3)	1.8 (1.0)

PBO=placebo; QW=once weekly; SD=standard deviation; High viral load = $>10^4$ HSV DNA copies/mL. All outcomes measured over evaluation period.

[a] HSV-2 shedding rate calculated as the number of positive HSV-2 anogenital swabs divided by the total number of swabs collected.

[b] High viral load shedding rate calculated as the number of positive HSV-2 anogenital swabs with HSV-2 $>10^4$ copies/mL divided by the total number of swabs collected.

[c] Genital lesion rate calculated as the number of days with genital lesions present divided by the total number of days assessed.

Statistically significant reductions were observed in the viral shedding rate, high viral load shedding rate and genital lesion rate for the 350 mg cohort compared to placebo as summarized below.

% Rate Reductions ABI-5366 350 mg QW vs PBO QW	**Rate Reduction**	**p-value[a]**
% Reduction in HSV-2 Shedding Rate	94%	p<0.01
% Reduction in High Viral Load Shedding Rate	98%	p<0.05
% Reduction in Genital Lesion Rate	94%	p<0.01

PBO=placebo; QW=once weekly; High viral load = $>10^4$ HSV DNA copies/mL

[a] Statistical analysis conducted using Poisson regression models and the corresponding p-values estimated accordingly.

No viral shedding of $>10^4$ HSV DNA copies/mL, a potential surrogate for HSV-2 transmission, was observed in the absence of lesions for the 350 mg cohort.

Across the 150/30 mg and 350 mg cohorts, ABI-5366 demonstrated a PK profile that continues to be supportive of once-weekly and potentially once-monthly dosing. ABI-5366 was observed to be well-tolerated at oral doses up to 350 mg weekly in the study population of participants seropositive for HSV-2 with recurrent genital herpes.

As the study is ongoing, individual treatment assignments remain blinded. Overall, the proportion of participants reporting treatment-emergent adverse events (TEAEs) was similar between ABI-5366 (90%) and placebo (90%) recipients. Of the TEAEs reported, the majority were grade 1 or grade 2. One grade 3 adverse event was reported, hypertriglyceridemia, in a participant with relevant medical history who had grade 4 elevated triglycerides pre-dose on Day 1. This adverse event resulted in study discontinuation but was not considered treatment related.

The proportion of participants reporting treatment-emergent laboratory abnormalities was higher in placebo (90.0%) than in ABI-5366 (67.5%) recipients, with the majority of observed abnormalities being grade 1 or grade 2. There were three participants with treatment-emergent grade 3 laboratory abnormalities, all considered unrelated to assigned treatment: an exercise-associated elevation in creatine kinase, a decrease in neutrophils and an elevation of cholesterol in the follow-up period in a participant that had a grade 2 elevation at baseline. There did not appear to be a dose-response relationship in either the frequency or severity of TEAEs or laboratory abnormalities. There have been no serious adverse events reported to date.

Study Overview

ABI-5366-101 is a randomized, blinded, placebo-controlled Phase 1a/b clinical study of ABI-5366. Positive interim data has been previously reported for Part A (Phase 1a), evaluating the safety, tolerability and PK of ABI-5366 following single dose administration in healthy participants. Part B (Phase 1b), in participants seropositive for HSV-2 with recurrent genital herpes, is evaluating weekly and monthly oral dose regimens over a 29-day dosing period in up to four cohorts randomized 20:5 between ABI-5366 and placebo with a pooled placebo analysis. Dosing is ongoing for cohort B3, evaluating a monthly dosing regimen of

ABI-5366.

In addition to assessing safety, tolerability and PK, Part B also evaluates antiviral activity by measuring changes in viral parameters including shedding rate, quantification of HSV-2 DNA levels obtained from anogenital swab samples, and clinical parameters including genital lesion rate and duration. Due to the long half-life of ABI-5366, the safety follow-up period for participants extends for 98 days after dosing, with safety data available as of the data cutoff date through at least Day 56 for all participants from these cohorts that completed the evaluation period. The trial results will support dose selection for future clinical studies.

The ABI-5366 Phase 1b study uses pooled data from placebo recipients across cohorts as a control. As additional placebo recipients are enrolled in later cohorts, the sample size for the pooled placebos will change, which is expected to result in adjustments to both the observed effect sizes compared to placebo and the tests of statistical significance for those observed effects.

Additional information about the Phase 1a/b trial is available at clinicaltrials.gov using the identifier NCT06385327. Assembly Bio expects to submit data from the trial for presentation at future scientific meetings.

About Recurrent Genital Herpes

Genital herpes is a chronic viral infection caused by HSV that can result in painful genital lesions, serious psychological and social impacts, and an increased risk of acquiring human immunodeficiency virus (HIV). Epidemiologic studies estimate over four million people in the United States and France, Germany, Italy, Spain and the United Kingdom experience recurrent genital herpes, with most people with initial symptomatic genital HSV-2 infection having three or more recurrences per year. While genital herpes can be caused by either HSV type 1 (HSV-1) or HSV-2, recurrences are more likely to be experienced by individuals infected by HSV-2. The current standard of care for recurrent genital herpes is nucleoside analogs given intermittently for recurrences or as daily chronic suppressive therapy; however, these are only partially effective in preventing recurrences and in reducing transmission of the virus. No new drugs have been approved in the United States or Europe to treat genital herpes for more than 25 years.

About Helicase-Primase Inhibition

HSV helicase-primase inhibitors target the viral helicase-primase complex, an essential viral enzyme complex that is conserved across both HSV-1 and HSV-2 and has no host equivalent. Inhibition of the helicase-primase complex is a clinically validated mechanism that has shown the potential for superior efficacy to the current standard of care, nucleoside analogs, in short-duration clinical studies in participants with recurrent genital herpes.

About Assembly Biosciences

Assembly Biosciences is a biotechnology company dedicated to the development of innovative small-molecule therapeutics designed to change the path of serious viral diseases and improve the lives of patients worldwide. Led by an accomplished team of leaders in virologic drug development, Assembly Bio is committed to improving outcomes for patients struggling with the serious, chronic impacts of herpesvirus, hepatitis B virus (HBV) and hepatitis delta virus (HDV) infections. For more information, visit assemblybio.com.

Forward-Looking Statements

The information in this press release contains forward-looking statements that are subject to certain risks and uncertainties that could cause actual results to materially differ. These risks and uncertainties include: Assembly Bio's ability to maintain financial resources and secure additional funding necessary to continue its research activities, clinical studies, other business operations and continue as a going concern; Assembly Bio's ability to realize the potential benefits of its collaboration with Gilead, including all financial aspects of the collaboration and equity investments; Assembly Bio's ability to initiate and complete clinical studies involving its therapeutic product candidates, including studies contemplated by Assembly Bio's collaboration with Gilead, in the currently anticipated timeframes or at all; safety and efficacy data from clinical or nonclinical studies may not warrant further development of Assembly Bio's product candidates; clinical and nonclinical data may not differentiate Assembly Bio's product candidates from other companies' candidates; potential effects of changes in government regulation, including as a result of the change in U.S. administration in 2025; results of nonclinical studies may not be representative of disease behavior in a clinical setting and may not be predictive of the outcomes of clinical studies; and other risks identified from time to time in Assembly Bio's reports filed with the U.S. Securities and Exchange Commission (the SEC). You are urged to consider statements that include the words may, will, would, could, should, might, believes, hopes, estimates, projects, potential, expects, plans, anticipates, intends, continues, forecast, designed, goal or the negative of those words or other comparable words to be uncertain and forward-looking. Assembly Bio intends such forward-looking statements to be covered by the safe harbor provisions contained in Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. More information

about Assembly Bio's risks and uncertainties are more fully detailed under the heading "Risk Factors" in Assembly Bio's filings with the SEC, including its most recent Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. Except as required by law, Assembly Bio assumes no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

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