SUNSHINE BIOPHARMA ANNOUNCES PUBLICATION OF SIGNIFICANT CORONAVIRUS RESEARCH RESULTS IN THE JOURNAL OF MEDICINAL CHEMISTRY

Current Test Positivity Rate for Coronavirus Infection in the U.S. is 18%

- *Development of a novel antiviral compound, XR8-23 (Compound 10), targeting SARS-CoV-2 papain-like protease (PLpro) with both submicromolar potency and animal model efficacy*
- *XR8-23 (Compound 10) showed significant drug accumulation in lung of mice and favorable pharmacokinetic properties*
- *Research was conducted in collaboration with the University of Arizona*

FORT LAUDERDALE, FL / ACCESSWIRE / September 4, 2024 / Sunshine Biopharma, Inc. (NASDAQ: "SBFM") (the "Company"), a pharmaceutical company offering and researching life-saving medicines in a variety of therapeutic areas including oncology and antivirals today announced the publication of new research results in the Journal of Medicinal Chemistry. The published data demonstrate a novel PLpro inhibitor with submicromolar potency and in vivo efficacy in a mouse model of SARS-CoV-2 infection. This peer-reviewed study marks an important milestone for Sunshine Biopharma in its effort to develop an effective treatment for SARS-CoV-2 infection.

There are still unmet medical needs to combat SARS-CoV-2 infection. SARS-CoV-2 undergoes mutation at a rapid rate, which leads to the continuous emergence of variants of concern (VOC) posing a significant threat to public health. In addition, certain populations, such as immunocompromised patients who are susceptible to severe and prolonged infections, may not respond well to current therapies or vaccines. For high-risk patients, blocking early infection at home may prevent disease rapid progression and reduce hospitalization.

PLpro is a compelling therapeutic target for developing antiviral compounds against SARS-CoV-2. It is a virus encoded protease essential for viral replication and is responsible for suppression of the human immune system following infection by the virus. "Sunshine has the intuition that despite the formal end of the pandemic, a new antiviral specifically designed to attack SARS-CoV-2 is needed in the clinic", commented co-lead Prof. Greg Thatcher of the University of Arizona. "Moreover, Sunshine has the perseverance to see the project through."

The active site of an enzyme is almost always the primary target for drug design. PLpro eluded scientist for many years due to its featureless active site. To address the challenge of PLpro's indistinct active site, we designed and synthesized a noncovalent inhibitor library targeting a vulnerability in PLpro remote from the active site incorporating the "BL2-groove", a key feature discovered by project co-lead, Prof. Rui Xiong of the University of Arizona.

One of the 50 compounds, XR8-23 (Compound 10), had an enzyme inhibition activity (IC_{50}) of 0.39 μM and exhibited a broad spectrum of antiviral activity towards at least 4 strains of VOC including WA1/2020, Gamma (P.1), Delta (B.1.617.2), and Omicron (BA.1). It had over 10-fold of selective accumulation in the lungs than in plasma and exhibited in vivo activity in a mouse-adapted SARS-CoV-2 infection (MA10) at 10 mg/kg by repeated IV injections.

"The publication of these results in the Journal of Medicinal Chemistry reflects our commitment to advancing science and improving patient outcomes," said Dr. Steve Slilaty, CEO of Sunshine Biopharma and a co-author of the publication. "These findings underscore the potential of XR8-23 (Compound 10) to transform the treatment landscape for coronavirus infections, and we look forward to further exploring its capabilities and clinical development in the future."

About University of Arizona

The University of Arizona, a land-grant university with two independently accredited medical schools, is one of the nation's top 50 public universities, according to U.S. News & World Report. Established in 1885, the university is widely recognized as a student-centric university and has been designated as a Hispanic Serving Institution by the U.S. Department of Education. The University ranked in the top 20 in 2019 in research expenditures among all public universities, according to the National Science Foundation, and is a leading Research 1 institution with $734 million in annual research expenditures. The university advances the frontiers of interdisciplinary scholarship and entrepreneurial partnerships as a member of the Association of American Universities, the 66 leading public and private research universities in the U.S. It benefits the state with an estimated economic impact of $4.1 billion annually.

About Sunshine Biopharma

Sunshine Biopharma currently has 61 generic prescription drugs on the market in Canada and 32 additional drugs scheduled to be launched in the remainder of 2024 and in 2025. Among the new drugs to be launched in 2024 is NIOPEG®, a biosimilar of NEULASTA®. Like NEULASTA®, NIOPEG® is a long-acting form of recombinant human granulocyte colony-stimulating factor (filgrastim). It is indicated to decrease the incidence of infection in patients with non-myeloid malignancies receiving anti-neoplastic therapy.

In addition, Sunshine Biopharma is conducting a proprietary drug development program which is comprised of (i) K1.1 mRNA, an mRNA-Lipid Nanoparticle targeted for liver cancer, and (ii) PLpro protease inhibitor, a small molecule for treatment of SARS Coronavirus infections. For more information, please visit: www.sunshinebiopharma.com.

Safe Harbor Forward-Looking Statements

This press release contains forward-looking statements which are based on current expectations, forecasts, and assumptions of Sunshine Biopharma, Inc. (the "Company") that involve risks as well as uncertainties that could cause actual outcomes and results to differ materially from those anticipated or expected. These statements appear in this release and include all statements that are not statements of historical fact regarding the intent, belief or current expectations of the Company, including statements related to the Company's drug development activities, financial performance, and future growth. These risks and uncertainties are further described in filings and reports by the Company with the U.S. Securities and Exchange Commission (SEC). Actual results and the timing of certain events could differ materially from those projected in or contemplated by the forward-looking statements due to a number of factors detailed from time to time in the Company's filings with the SEC. Reference is hereby made to cautionary statements and risk factors set forth in the Company's most recent SEC filings.

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