



KNOW Bio Announces Breakthrough Nitric Oxide Discovery to Combat COVID-19

First definitive demonstration of nitric oxide efficacy against the SARS-CoV-2 virus

Research Triangle Park, N.C. (September 10, 2020) – [KNOW Bio, LLC](#) has generated the first definitive evidence that nitric oxide (NO) can inhibit viral reproduction of SARS-CoV-2, the human coronavirus that causes COVID-19. Nitric oxide is a molecule produced naturally by the body to regulate blood flow, control inflammation, and defend against invading microorganisms.

These milestone in-vitro experiments were conducted by testing multiple nitric oxide-releasing compounds against wild type SARS-CoV-2 virus at an independent laboratory with a deep history of antiviral research. Therapeutic doses (<200 µM) were applied to infected VERO E6 cells and showed a dose-dependent effect on viral replication. The result was a greater than 99.9% reduction in virus observed after 24 hours versus virus observed on untreated cells. Furthermore, there was no cytotoxic impact (cell damage or cell death) on uninfected cells.

“We are the first to confirm the potent biological activity of nitric oxide against SARS-CoV-2, the novel coronavirus that causes COVID-19,” said Neal Hunter, Chief Executive Officer, KNOW Bio, LLC. “As a leader in the development of NO-based therapies, we felt we were best positioned to establish that NO is effective against this virus.”

Previous reports have only speculated on the potential of nitric oxide to serve as a therapeutic for patients with COVID-19 or as a preventative countermeasure for those who are at risk of exposure to the virus.¹ These conjectures were based in large part on prior published scientific evidence derived from studies conducted on the original SARS-CoV virus.

“The expansive literature supporting nitric oxide’s function as a broad-spectrum antimicrobial, shows that nitric oxide-based approaches can play a role in preventing, limiting, and/or treating the pulmonary consequences of COVID-19,” said Mark Schoenfisch, Ph.D., Chief Scientific Officer, KNOW Bio, LLC.

Nitric Oxide (NO) has been reported to:

- **Inhibit coronavirus infection** by altering spike protein binding and disrupting the ability of the virus to attach to the receptor and infect human cells.²
- **Inhibit coronavirus viral replication** inside an infected cell by slowing viral RNA production - resulting in fewer RNA strands and viral copies.³
- **Inhibit release** of reproduced virus by preventing host cell death via interfering with caspase activity - the reproduced virus particles thus remain within the infected cell and fewer virus particles are spread to infect other cells.⁴

“We have gained new understandings into the effective concentrations, rates of release and mechanism of action of nitric oxide against human coronavirus - providing valuable insights into safety and efficacy,” continued Schoenfisch.

--more--

Submission for publication and peer review is expected before year end.

“There are millions of lives being disrupted and hundreds of thousands lost to this frightening virus,” Hunter continued. “Our findings clearly show that nitric oxide-based therapeutics must be a part of any well-thought response to the COVID-19 pandemic.”

About KNOW Bio, LLC

KNOW Bio, LLC is a life science incubator focused on using its extensive intellectual property portfolio in the field of nitric oxide to redefine the standard of care for a number of diseases and conditions. KNOW Bio forms subsidiaries to focus on specific therapeutic applications, assembles teams of experienced personnel in each, granting them equity in their respective subsidiary, with KNOW Bio retaining controlling ownership. The KNOW Bio platform delivers shared resources to support and accelerate the deployment and development of subsidiary scientific discoveries as well as helping craft effective clinical and regulatory strategies. Once the subsidiary has an appropriate opportunity, usually proof of concept in their target, we then pursue a sale, IPO or other financing involving that subsidiary to provide capital for the other operating companies and returns to investors. Vast Therapeutics, Inc., Revian Inc., Diabetic Health, Inc. and EmitBio, Inc. are companies that have emerged from the KNOW Bio platform. For more info: www.knowbiollc.com.

References:

1. Adusumilli, N. C., Zhang, D., Friedman, J. M. & Friedman, A. J. Harnessing nitric oxide for preventing, limiting and treating the severe pulmonary consequences of COVID-19. *Nitric Oxide - Biology and Chemistry* vol. 103 4–8 (2020)
2. Åkerström, S., Gunalan, V., Keng, C. T., Tan, Y. J. & Mirazimi, A. Dual effect of nitric oxide on SARS-CoV replication: Viral RNA production and palmitoylation of the S protein are affected. *Virology* **395**, 1–9 (2009).
3. Åkerström, S. *et al.* Nitric Oxide Inhibits the Replication Cycle of Severe Acute Respiratory Syndrome Coronavirus. *J. Virol.* **79**, 1966–1969 (2005).
4. Kim, P. K. M., Kwon, Y. G., Chung, H. T. & Kim, Y. M. Regulation of caspases by nitric oxide. in *Annals of the New York Academy of Sciences* vol. 962 42–52 (New York Academy of Sciences, 2002).

Media Contact:

Kelli Fletcher, Clairemont Communications
k@clairemontcommunications.com
(910) 538-2183

Investor Contact:

John Oakley, Chief Financial Officer
joakley@knowbiollc.com
(919) 939-7715