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Nagasaki University (Japan)
neopharma Japan Co., Ltd.

Confirmation of Infection Inhibition Effectiveness of 5-Aminolevulinic Acid (5-ALA) Against Novel Coronavirus (COVID-19) Causative Virus and Various Mutant Strains

National University Corporation, Nagasaki University*1 (led by Dean Shigeru Kono, located in Nagasaki University, Bunkyomachi 1-14, Nagasaki City, Nagasaki Prefecture, hereinafter referred to as 'Nagasaki University'), in association with neopharma Japan Co., Ltd.*2 (led by Representative Director Satoshi Kawata, located in Kojimachi 6-2-6, Chiyoda Ward, Tokyo City, hereinafter referred to as 'NPJ'), today announced that they have confirmed the concentration-dependent infection inhibition effectiveness of 5-aminolevulinic acid*3 (hereinafter referred to as '5-ALA') against the novel coronavirus disease (hereinafter referred to as 'COVID-19'). This follows the results of tests involving infection of cell cultures with severe acute respiratory syndrome coronavirus 2 (hereinafter referred to as 'SARS-CoV-2'), the causative virus of COVID-19 and its various mutant strains.

This research was published in the international journal 'Tropical Medicine and Health' on the January 7th, 2022 (JST). It may be accessed through the following link:

[URL]

(https://tropmedhealth.biomedcentral.com/articles/10.1186/s41182-021-00397-x)

[Outline]

Genetic variants of SARS-CoV-2 began to appear in 2020 and have been spreading globally during the COVID-19 pandemic. Despite the presence of different COVID-19 vaccines, the discovery of effective antiviral therapeutics for the treatment of patients infected with SARS-CoV-2 are still urgently needed. 5-ALA is a naturally occurring amino acid that, due to its high bioavailability, has with various applications including anti-cancer therapeutics and health food supplements. In our previous study*4, we demonstrated that 5-ALA completely inhibits the

infection of SARS-CoV-2, the virus responsible for COVID-19, above a certain concentration in cultured cells. This in vitro antiviral effect of 5-ALA against SARS-CoV-2 infection was observed in both human and non-human cells without significant cytotoxicity. Therefore, upon further investigation of 5-ALA as a potential antiviral agent against COVID-19, we obtained comparable results in cell-based studies against various mutant strains.

[Research Topics]

- 5-ALA showed inhibitory effects against four mutant variants of SARS-CoV-2, including the Delta variant, in cell cultures.
- 5-ALA showed concentration-dependent antiviral effects without significant cytotoxicity.
- 5-ALA has multiple possible mechanisms of action, including inhibition of viral infection of cells and intracellular replication, suggesting that it may be effective against mutant variants of SARS-Cov-2 that may emerge in the future.

[Paper Title & Authors]

Title:

Antiviral activity of 5-Aminolevulunic acid against variants of sever acute respiratory syndrome coronavirus 2.

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[Glossary]

*1 Nagasaki University

Nagasaki University is a national university established in 1949. The campus was relocated and integrated in the 1950s and 1960s, and the medical faculties and research institutes (such as the School of Medicine, the School of Dentistry, the Nagasaki University Hospital, and the Institute of Tropical Disease) are now found on the Sakamoto Campus. Nagasaki University has an outstanding track record in the fields of tropical medicine, infectious diseases, and radiological science due to its geographical and historical background, and with its abundant accumulation of research and an unrivaled team of infectious disease researchers, it has become a well-known educational and research base for those studying virulent diseases in Japan and abroad.

http://www.nagasaki-u.ac.jp/

*2 neopharma Japan Co., Ltd.

neopharma Japan was established as a joint venture between Neopharma LLC, based in the United Arab Emirates (UAE) and neoALA Co., Ltd (formally known as COSMO ALA Co., Ltd). The Neopharma Group is an international pharmaceutical company headquartered in the United Arab Emirates (UAE), which is developing its pharmaceutical manufacturing and sales business mainly in the Middle East and other developing nations. neopharma Japan plays a key role in Neopharma LLC's overseas strategy within the area of pharmaceutical manufacturing. Furthermore, neopharma Japan is creating new added value for the Group as a whole by promoting research and development of various applications of 5-amino-levulinic acid (5-ALA)

https://www.neopharmajp.co.jp/

*3 5-Aminolevulinc Acid (5-ALA)

Human, animals, and plants all maintain their vital functions by producing energy within the organelles called mitochondria inside their cells. 5-aminolevulinic acid (5-ALA) plays an especially significant role in ensuring the functionality of these mitochondria. Inside the mitochondria, 5-ALA is transformed first into "heme" and then into a substance called "cytochrome", substances which are indispensable for energy production. It is also a very safe amino acid that has been used in health foods, cosmetics, pet supplements, animal feed and fertilizers for over a decade. In the field of oncology, 5-ALA is also approved as a diagnostic agent for the visualization of brain tumors and bladder cancer. In addition, 5-ALA is known to improve mitochondrial function, and a phase 3 physician-led clinical trial for mitochondrial disease is underway, led by Saitama Medical University.

http://5ala-journal.com/

*4 Released on February 9th, 2021

"5-aminolevulinic acid (5-ALA) found to inhibit infection of novel coronavirus (COVID-19) causative virus"

https://www.neopharmajp.co.jp/library/592faa4a16088b6a0b777d96/6022465c38c81ba70586c2e2.pdf

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