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Nagasaki University (Japan)

neopharma Japan Co., Ltd.

Confirmation of Inhibitory Effects of 5-Aminolevulinic Acid (5-ALA) Against Novel Coronavirus (COVID-19) Omicron Strain Infections

(URL link amended)

National University Corporation, Nagasaki University^{*1} (hereinafter referred to as 'Nagasaki University'), in association with neopharma Japan Co., Ltd.^{*2} (hereinafter referred to as 'NPJ'), today announced that they have confirmed the concentration-dependent inhibitory effects of 5-aminolevulinic acid^{*3} (hereinafter referred to as '5-ALA') against infections from the Omicron strain of the severe acute respiratory syndrome coronavirus 2 (hereinafter referred to as 'SARS-CoV-2'). This is based on the results of infection tests of cell cultures with the Omicron strain of SARS-CoV-2, which is the causative virus of the novel coronavirus disease (hereinafter referred to as 'COVID-19').

This research was published in the international journal 'Tropical Medicine and Health' on April 4th, 2022 (JST).

[URL] (The whole paper is now available for viewing at the amended link below)

<https://tropmedhealth.biomedcentral.com/articles/10.1186/s41182-022-00422-7>



[Outline]

There remains an urgent need to develop effective countermeasures against the spread of COVID-19 and its various mutant strains since the pandemic began in 2020. 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 above a certain concentration in cultured cells, 5-ALA can completely inhibit the infection of SARS-CoV-2 (the virus responsible for COVID-19) and four of its mutant variants, including the Delta strain. This invitro antiviral effect of 5-ALA against SARS-CoV-2 infections was observed in both human

and non-human cells without significant cytotoxicity. Therefore, after further investigating the potential of 5-ALA as an antiviral agent against COVID-19, we obtained comparable results in cell-based studies against the Omicron strain.

[Research Topics]

- 5-ALA showed inhibitory effects against the Omicron strain of SARS-CoV-2 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.
- 5-ALA improves mitochondrial function, suggesting the possibility that it may inhibit the mitochondrial fragmentation caused by viral infection and reduce damage to infected cells.

[Paper Title & Authors]

Title:

5-aminolevulinic acid antiviral efficacy against SARS-CoV-2 Omicron Variant in vitro.

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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-Aminolevulinic 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 January 1st, 2021

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

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