

D-Amino acids: Signaling severity in viral infection

November 28 2022

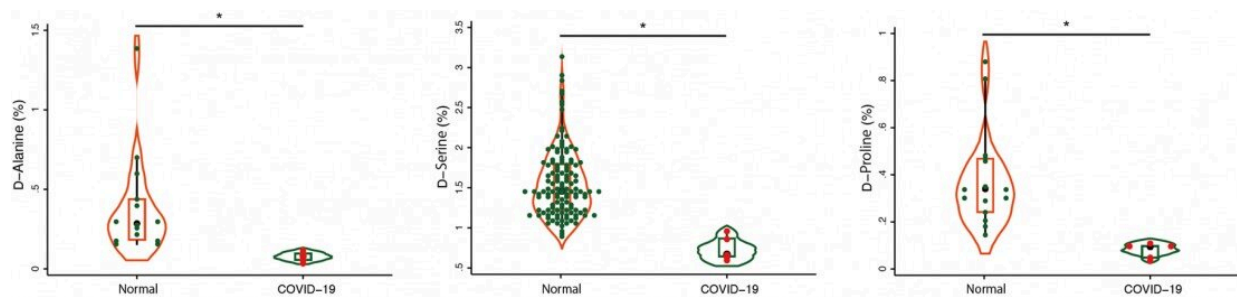


Fig. 1: Serum levels of D-amino acids decrease in patients with severe COVID-19. Credit: *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease* (2022). DOI: 10.1016/j.bbadis.2022.166584

Just as bricks are key components in constructing a building, molecules known as amino acids are essential components in constructing proteins in the body. Recently, researchers in Japan investigated the role of a particular group of amino acids, known as D-amino acids, in the progression of viruses like influenza A virus (IAV) and SARS CoV-2, the virus responsible for COVID-19.

In a new study published in *Biochimica et Biophysica Acta (BBA)—Molecular Basis of Disease*, the research team has uncovered a relationship between [D-amino acids](#) and severe viral infection in both animals and humans.

While our understanding of COVID-19 has evolved during the COVID-19 pandemic, methods to predict disease severity and treat severe COVID-19 infection have been somewhat limited. D-amino acids have been previously shown to function as biomarkers for diseases such as [kidney disease](#). However, the significance of D-amino acids in viral infection has not yet been explored, spurring the research team to investigate whether D-amino acids are affected during severe IAV infection or COVID-19.

"We first assessed serum levels of D-amino acids in a mouse model of severe IAV infection and found that D-amino acids were greatly reduced in these mice compared with uninfected mice," says lead author of the study Shihoko Kimura-Ohba. "When we evaluated serum from patients with severe COVID-19, we also found reduced levels of D-amino acids compared to those of healthy control subjects."

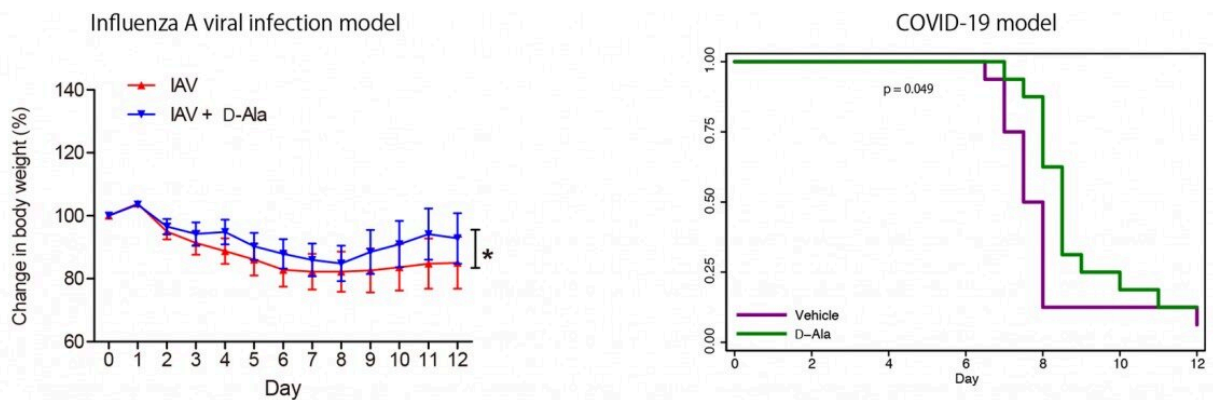


Fig. 2: Supplementation of D-alanine mitigated the severe body weight reduction in Influenza A virus (IAV) infection mice model, and improved survival in COVID-19 mice model. Credit: *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease* (2022). DOI: 10.1016/j.bbadis.2022.166584

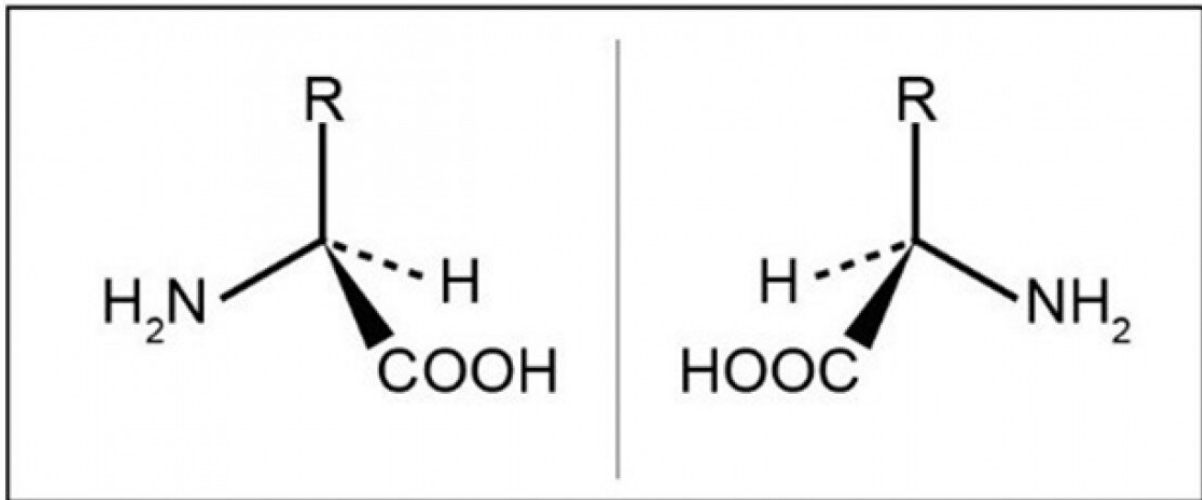


Fig. 3: Chiral amino acids. L- and D-amino acids are the same in molecular weight, bond angle, and bond length, but differ in their characteristics. Only L-amino acids have been regarded to be present in the body until recently. Credit: Dr Kimura

The researchers next explored the effects of supplementation with a specific D-amino acid known as D-alanine in mouse models of IAV infection and COVID-19. IAV mice exhibited a severe reduction in [body weight](#) that was mitigated by D-alanine treatment, while [survival rates](#) were improved in COVID-19 [mice](#) who received D-alanine treatment.

"Our results indicate that D-amino acids may serve as biomarkers to reflect the severity of viral infection," says senior author Tomonori Kimura. "Additionally, although the observed effects of D-alanine supplementation were limited, treatment with D-alanine may help to improve clinical outcomes in patients with severe viral [infection](#)."

The mechanism of D-alanine in the improvement of viral prognosis has

yet to be elucidated. However, the research team's findings indicate that D-amino acids represent promising biomarkers and therapeutic options for the evaluation and treatment of severe viral infections, including those associated with COVID-19.

More information: Shihoko Kimura-Ohba et al, d-Alanine as a biomarker and a therapeutic option for severe influenza virus infection and COVID-19, *Biochimica et Biophysica Acta (BBA)—Molecular Basis of Disease* (2022). [DOI: 10.1016/j.bbadis.2022.166584](https://doi.org/10.1016/j.bbadis.2022.166584)

Provided by Osaka University

Citation: D-Amino acids: Signaling severity in viral infection (2022, November 28) retrieved 6 May 2024 from <https://medicalxpress.com/news/2022-11-d-amino-acids-severity-viral-infection.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.