v1: 20 November 2023

Commentary

Can Urolithin A Help in Curing COVID-19 Infection?

Peer-approved: 20 November 2023

Qeios, Vol. 5 (2023)
ISSN: 2632-3834

Rafeef Abdul-jabar[1]

1. University of Basrah, Iraq

Urolithin A (UA) is a natural gut microbiome-derived food metabolite that is synthesized after eating certain foods high in polyphenols. UA offers high health benefits for our body, especially its antioxidant and anti-inflammatory roles, which lead us to wonder if UA can participate directly or indirectly in curing or, at the very least, lessening the symptoms of COVID-19. To date, there has been no study investigating UA's role in curing COVID-19 or any viral infection.

Correspondence: papers@team.qeios.com — Qeios will forward to the authors

Introduction

The use of foods to promote good health and longevity has been discussed in traditional Chinese, Ayurvedic, and Mediterranean medicine, among many other ancient texts. Even today, these concepts continue to inspire contemporary wellness [1]. One of the most important compounds obtained from food is Urolithin A, a metabolite produced by gut microbiota from ingested polyphenolic compounds that include ellagic acid (EA) and ellagitannins (ET). These compounds are highly abundant in foods such as fruits (pomegranates and certain berries) and nuts (pecans and walnuts) [2][3]. ET is transformed into EA in the upper portion of the human gastrointestinal tract and is further metabolized by gut microflora in the large intestine, resulting in the formation of compounds known as urolithins. Among these compounds, Urolithin A holds the greatest significance [3].

Individuals produce urolithin at varying rates based on their gut microbiome, which varies according to diet, age, and genetics. Those lacking bacteria, specifically from the Clostridiales and Ruminococcaceae families in their gut, are unable to produce any urolithin A whatsoever [4]. As a result, the only means of ensuring sufficient intake is through direct supplementation, which is available in various commercial products containing a highly pure form of urolithin A. More information can be found at https://www.cancer.gov/publications/dictionaries/cancer-drug/def/urolithin-a-supplement.

According to research – some of which was carried out on humans and most on animals – Urolithin A has a high list of health benefits, such as improving health span, upgrading muscle endurance and strength, decreasing myocardium dysfunction, enhancing brain neuroprotection, diminishing joint cartilage degeneration, improving gut barrier integrity and glucose intolerance in the liver and pancreas, and many other benefits [5][6][7]. All of these effects may be attributed to the most consistent effect of UA, which is driven by the clearing and recycling of dysfunctional mitochondria in a selective autophagy process called mitophagy, as well as its role in improving endoplasmic reticulum (ER) stress and regulating gene expression [8]. Additionally, UA attenuates detrimental inflammatory responses; it was reported to decrease the inflammatory marker cyclooxygenase 2 and plasma levels of proinflammatory cytokines interleukin 1 beta (IL-1β), interleukin 6 (IL-6), and tumor necrosis factor-alpha (TNFα) in many sites of the animal body [8]. Furthermore, it's a promising therapeutic antioxidant agent with potential pharmaceutical or food applications for the prevention of oxidative stress-associated disorders, probably through the improvement of the cell's antioxidant capacity [9].

All of this information about the health benefits of UA for the body, especially its antioxidant and anti-

 doi.org/10.32388/BXMNT4.2

inflammatory role, leads us to wonder if UA can participate directly or indirectly in curing or at least lessening the symptoms of COVID-19. This is especially interesting given that many WHO-recommended supplements that prevent or help in the treatment of COVID-19, such as vitamin C, D, and zinc, also share UA's antioxidant and anti-inflammatory properties [10][11]. Until now, there have been no studies about UA's role in curing any viral infection.

And that may also be related to the fact that Urolithin A was first identified as an EA metabolite in rats more than 40 years ago. Subsequently, scientists noticed that a similar gut microbiome that converts the ETs to UA was present across many species, including flies and mice, extending to humans.

References

1. ^*Menza, V., & Probart, C. (2013). Eating well for good health. Food and Agriculture Organization of the United Nations, Rome.*
2. ^*Singh, A., D'Amico, D., Andreux, P. A., Dunngalvin, G., Kern, T., Blanco-Bose, W., Auwerx, J., Aebischer, P., & Rinsch, C. (2022). Direct supplementation with Urolithin A overcomes limitations of dietary exposure and gut microbiome variability in healthy adults to achieve consistent levels across the population. European Journal of Clinical Nutrition, 76(2), 297–308. https://doi.org/10.1038/s41430-021-00950-1.*
3. a, b*Bialonska, D., Kasimsetty, S. G., Khan, S. I., & Ferreira, D. (2009). Urolithins, Intestinal Microbial Metabolites of Pomegranate Ellagitannins, Exhibit Potent Antioxidant Activity in a Cell-Based Assay. Journal of Agricultural and Food Chemistry, 57(21), 10181–10186. https://doi.org/10.1021/jf9025794.*
4. ^*Allison, L. (2022, March 15). What is urolithin A and how can you benefit from it? Longevity Technology. https://longevity.technology/lifestyle/what-is-urolithin-a-and-how-you-can-benefit-from-it/*
5. ^*Li, K., Xiao, Y., Bian, J., Han, L., He, C., El-Omar, E., Gong, L., & Wang, M. (2022). Ameliorative Effects of Gut Microbial Metabolite Urolithin A on Pancreatic Diseases. Nutrients, 14(12). https://doi.org/10.3390/nu14122549.*
6. ^*Nishimoto, Y., Fujisawa, K., Ukawa, Y., Kudoh, M., Funahashi, K., Kishimoto, Y., & Fukuda, S. (2023). The effect of urolithin A on the improvement of vascular endothelial function depends on the gut microbiota. Frontiers in Nutrition, 9. https://doi.org/10.3389/fnut.2022.1077534.*
7. ^*Liu, S., D'Amico, D., Shankland, E., Bhayana, S., Garcia, J. M., Aebischer, P., Rinsch, C., Singh, A., & Marcinek, D. J. (2022). Effect of Urolithin A Supplementation on Muscle Endurance and Mitochondrial Health in Older Adults: A Randomized Clinical Trial. JAMA Network Open, 5(1), e2144279. https://doi.org/10.1001/jamanetworkopen.2021.44279.*
8. a, b*D'Amico, D., Andreux, P. A., Valdés, P., Singh, A., Rinsch, C., & Auwerx, J. (2021). Impact of the Natural Compound Urolithin A on Health, Disease, and Aging. Trends in Molecular Medicine, 27(7), 687–699. https://doi.org/10.1016/j.molmed.2021.04.009*
9. ^*Cásedas, G., Les, F., Choya-Foces, C., Hugo, M., & López, V. (2020). The Metabolite Urolithin-A Ameliorates Oxidative Stress in Neuro-2a Cells, Becoming a Potential Neuroprotective Agent. Antioxidants (Basel, Switzerland), 9(2). https://doi.org/10.3390/antiox9020177.*
10. ^*Prasad, A. S. (2014). Zinc is an Antioxidant and Anti-Inflammatory Agent: Its Role in Human Health. Frontiers in Nutrition, 1, 14. https://doi.org/10.3389/fnut.2014.00014. PMID: 25988117; PMCID: PMC4429650.*
11. ^*Pisoschi, A. M., Pop, A., Iordache, F., Stanca, L., Geicu, O. I., Bilteanu, L., & Serban, A. I. (2022). Antioxidant, anti-inflammatory and immunomodulatory roles of vitamins in COVID-19 therapy. European Journal of Medicinal Chemistry, 232, 114175. https://doi.org/10.1016/j.ejmech.2022.114175. PMID: 35151223; PMCID: PMC8813210.*

Declarations

Funding: No specific funding was received for this work.
Potential competing interests: No potential competing interests to declare.