Berberine: Pharmacological Features in Health, Disease and Aging

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Source: Current Medicinal Chemistry, Volume 31, Number 10, 2024, pp. 1214-1234(21)

Publisher: Bentham Science Publishers

DOI: https://doi.org/10.2174/0929867330666230207112539

Abstract

Background: Berberine is the main active compound of different herbs and is defined as an isoquinoline quaternary botanical alkaloid found in barks and roots of numerous plants. It exhibits a wide range of pharmacological effects, such as anti-obesity and antidiabetic effects. Berberine has antibacterial activity against a variety of microbiota, including many bacterial species, protozoa, plasmodia, fungi, and trypanosomes.

Objective: This review describes the role of berberine and its metabolic effects. It also discusses how it plays a role in glucose metabolism, fat metabolism, weight loss, how it modulates the gut microbiota, and what are its antimicrobial properties along with its potential side effects with maximal tolerable dosage.

Methods: Representative studies were considered and analyzed from different scientific databases, including PubMed and Web of Science, for the years 1982-2022.

Results: Literature analysis shows that berberine affects many biochemical and pharmacological pathways that theoretically yield a positive effect on health and disease. Berberine exhibits neuroprotective properties in various neurodegenerative and neuropsychological ailments. Despite its low bioavailability after oral administration, berberine is a promising tool for several disorders. A possible hypothesis would be the modulation of the gut microbiome. While the evidence concerning the aging process in humans is more limited, preliminary studies have shown positive effects in several models.

Conclusion: Berberine could serve as a potential candidate for the treatment of several diseases. Previous literature has provided a basis for scientists to establish clinical trials in humans. However, for obesity, the evidence appears to be sufficient for hands-on use.