

Bioactivity, Health Benefits, and Related Molecular Mechanisms of Curcumin: Current Progress, Challenges, and Perspectives.

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Curcumin is a principal curcuminoid of turmeric (*Curcuma longa*), which is commonly used as a spice in cooking and a yellow pigment in the food processing industry.

Recent studies have demonstrated that curcumin has a variety of biological activities and pharmacological performances, providing protection and promotion of human health.

In addition to presenting an overview of the gut metabolism of curcumin, this paper reviews the current research progress on its versatile bioactivity, such as antioxidant, anti-inflammatory, and immune-regulatory activities, and also intensively discusses its health benefits, including the protective or preventive effects on cancers and diabetes, as well as the liver, nervous system, and cardiovascular systems, highlighting the potential molecular mechanisms.

Besides, the beneficial effects of curcumin on human are further stated based on clinical trials. Considering that there is still a debate on the beneficial effects of curcumin, we also discuss related challenges and prospects.

Overall, curcumin is a promising ingredient of novel functional foods, with protective efficacy in preventing certain diseases. We hope this comprehensive and updated review will be helpful for promoting human-based studies to facilitate its use in human health and diseases in the future.