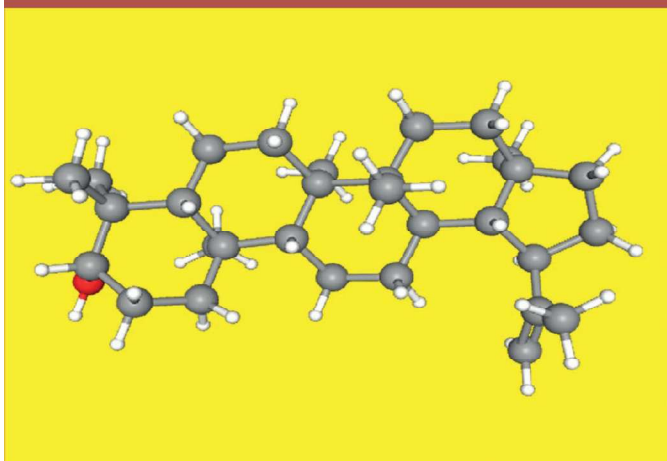


EDITED BY HIFZUR R SIDDIQUE

# LUPEOL

THERAPEUTIC APPLICATIONS  
IN HUMAN HEALTH AND DISEASE



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## Preface

Globalization has influenced different disease patterns, although it has its own merit in some contexts. Since most diseases are linked to a lack of exercise, lifestyle changes, poor dietary habits, and increased stress levels, bioactive compounds can be important in devising future healthcare strategies. Natural products such as Chinese, Ayurvedic, and Unani treatment systems have been important therapeutic aids for alleviating human ailments since ancient times. With advancements in modern science, our understanding of the mechanism of action of different natural molecules at the molecular level has increased immensely. Sustained research is being carried out worldwide to study their efficiency and mechanism of action, among many other aspects. Lupeol, a triterpene, is found in the skin of lupin seeds, latex of fig trees, rubber plants, olive, aloe vera, and many edible fruits, vegetables, and medicinal plants. Lupeol is also an active component of various herbal medicines such as Japanese Kampo medicine, Chinese Traditional Medicine, Unani, to name a few. The importance of lupeol is understandable from the fact that more than 1400 papers published within the last three decades in PUBMED have revealed that lupeol has potential in the treatment of a wide variety of diseases such as cancer, diseases, arthritis, diabetes, cardiovascular, neurodegenerative diseases, skin diseases, parasitic diseases, nephrotic diseases, hepatic diseases, and so forth, through modulation of numerous molecular targets. Based on published research, it is important to bring all this information related to the different beneficial effects of lupeol in a book form. This is the first book to deal specifically with this subject.

In light of the popularity of herbal products and their relationship with modern health care, this book will present a compilation of topics on the beneficial effects of lupeol against various human ailments. The book chapters summarize lupeol's current state and future direction against different human diseases from a translational point of view. They will enlighten all who have a stake in health care, the quest for knowledge, and wish to do further research. The book also covers the mechanistic studies of lupeol, which could lead to discoveries and facilitate clinical application. The present book is a compilation of 18 chapters from leading experts worldwide. Each chapter summarizes the current state and future direction of using lupeol against multiple diseases from a translational point of view, making this reference a valuable source of information for a large audience, including researchers and healthcare providers interested in herbal remedies. In addition, detailed studies have been explained with the help of figures, images, and tables to make it even more exciting and descriptive. Even after my best efforts, I feel there may still be scope for improvement and addition to this work, especially given this field's rapidly evolving and ever-advancing nature. Helpful criticism and suggestions from the readers are dearly welcome. Finally, I thank CRC Press for their keen interest and attention in publishing this book in its present form.

**Hifzur R Siddique**

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# 6 Beneficial Hepatoprotective Effect of Triterpene Lupeol

## *Present Status and Future Perspectives*

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### 6.1 INTRODUCTION

The liver is a crucial organ that performs different tasks, like storing, metabolizing, and detoxifying endogenous and foreign chemicals (Dezsó et al., 2024). Liver or hepatic diseases pose a major threat to human beings; for example, liver cirrhosis shares a burden of 2.4% of total global deaths (Feng et al., 2024). Although marked advancements have been made in modern medicine, there is a need to develop safe medicines that are less harmful to treating liver diseases based on phytochemicals (Rodríguez-Negrete et al., 2024). Hepatic diseases, different cancers of the bile duct, liver cells, or hepatocellular carcinoma can be caused by viruses like hepatitis A, B, or C. Consumption of alcohol or drug abuse may also lead to fibrosis and cirrhosis of the liver (Gupta et al., 2024). To treat terminal or high-grade liver disease, liver transplantation is usually adopted (Brahmania et al., 2024). Administered drugs, based on their dose and duration, can also cause hepatotoxicity (Singh et al., 2024; Zhu et al., 2024). Production of reactive oxygen species (ROS) also causes metabolic imbalance, leading to liver damage (Singh et al., 2022; Khan et al., 2023a; Galicia-Moreno et al., 2024). When the liver's regenerative potential decreases, it may lead to cirrhosis or persistent damage (Ashmore-Harris et al., 2024).

Liver diseases involve changes in the flourishing and growth of healthy microbes, leading to the compromised gut barrier, which causes the outflow of toxic metabolites in the portal vein system, leaching up to the liver and subsequently upsetting bile acid metabolism and accumulation of fat

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