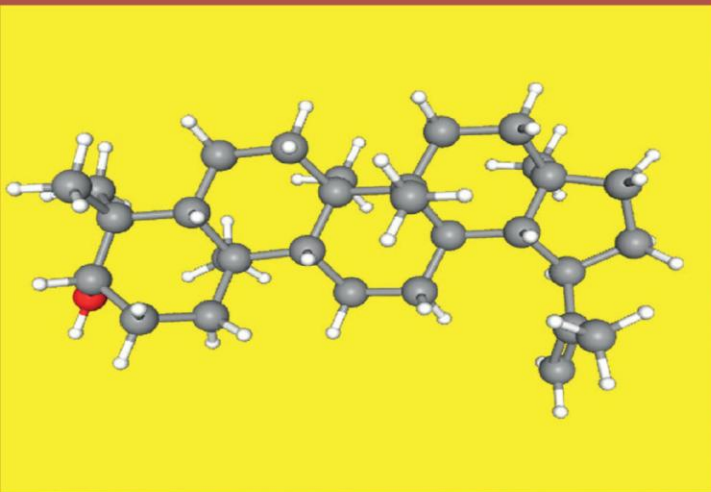


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LUPEOL

THERAPEUTIC APPLICATIONS
IN HUMAN HEALTH AND DISEASE



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Contents

Preface.....	ix
Acknowledgments.....	xi
About the Editor.....	xiii
Chapter 1 Chemical Alchemy of Lupeol: Synthesis, Derivatives Variability and Physiochemical Properties	1
<i>Mohamad Irfan, Anjali Saxena, and Biswajit Saha</i>	
Chapter 2 The Cardioprotective Effect of Pentacyclic Triterpene Lupeol: Current Status and Future Prospects.....	19
<i>Chohelee Choudhury, Mahuya Sengupta, and Hifzur R Siddique</i>	
Chapter 3 Beneficial Effects of Lupeol Against Different Skin Diseases: Current Research and Future Direction	33
<i>Zainab Ibrahim and Nabihah Yusuf</i>	
Chapter 4 Antioxidant and Anti-Inflammatory Role of Triterpene Lupeol.....	39
<i>Aman Kumar Patra, Shelly Garg, Maryam Sarwat, and Hemlata Nimesh</i>	
Chapter 5 Chemopreventive Effect of Lupeol and Lupeol Nanoparticles	51
<i>Syed Mohd Hasan Abedi, Deepti Singh, Dinesh, Abhisek Karn, and Mohammad Afsar Khan</i>	
Chapter 6 Beneficial Hepatoprotective Effect of Triterpene Lupeol: Present Status and Future Perspectives.....	65
<i>Tahmeena Khan, Shahla Tanveer, Kulsum Hashmi, Saman Raza, Nidhi Mishra, and Abdul Rahman Khan</i>	
Chapter 7 The Therapeutic and Protective Potential of Lupeol in Immune Modulation and Disease Prevention.....	81
<i>Saima Khan and Mohd Khubaib</i>	
Chapter 8 The Beneficial Effect of Lupeol against Diabetes and Obesity	93
<i>Faaz Bin Razi and Hamid Ashraf</i>	
Chapter 9 Chemosensitivity and Radiosensitivity of Triterpene Lupeol: Current Status and Future Perspective	102
<i>Afiya Wahab and Hifzur R Siddique</i>	

Chapter 10	Cell Growth Regulation and Molecular Targets of Lupeol.....	116
	<i>Sana Parveen, Mariyam Fatma, and Snober S. Mir</i>	
Chapter 11	The Neuroprotective Effects of Lupeol.....	131
	<i>Samanvya Ajmani, Hemlata Nimesh, and Maryam Sarwat</i>	
Chapter 12	Lupeol as Antimicrobial Agent.....	145
	<i>Tahmeena Khan, Shahla Tanveer, Kulsum Hashmi, Ekhlakh Veg, Mohammad Imran Ahmad, and Nidhi Mishra</i>	
Chapter 13	Antitumor, Anti-Angiogenesis, Anti-Invasion, and Antimetastatic Effects of Lupeol.....	161
	<i>Mohd. Jameel, Homa Fatma, and Hifzur R Siddique</i>	
Chapter 14	Roles of Lupeol-Rich Food on Gut Microbiota and Postbiotics in Human Diseases.....	176
	<i>Mohd Aamir Qureshi, Shahper Nazeer Khan, Saleem Javed, and Snober S Mir</i>	
Chapter 15	Lupeol: A Natural Supplement for Enhanced Health	188
	<i>Sameen Shafi, Hafizurrahman Khan, and Preeti Bajpai</i>	
Chapter 16	Safety and Toxicological Studies of Lupeol in Different Experimental Models	205
	<i>Mohd Amir, Bushra Ansari, and Saleem Javed</i>	
Chapter 17	Importance of Lupeol Containing Plants and Plant Products in Traditional Medicine with an Emphasis on the Unani System of Medicine	234
	<i>Sumbul Rehman, Aisha Siddiqui, and Sana Rehman</i>	
Chapter 18	Future Perspectives of Lupeol for Clinical Trials and Improvement of Activity	270
	<i>Homa Fatma, Mohd. Jameel, and Hifzur R Siddique</i>	
Index	291

7 The Therapeutic and Protective Potential of Lupeol in Immune Modulation and Disease Prevention

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ABBREVIATION

EMT	Epithelial-mesenchymal transition	NF-κB	Nuclear factor kappa-light-chain-enhancer of activated B cells
IFN	Interferon	ROS	Reactive oxygen species
IL	Interleukin	TLR	Toll-like receptor
iNOS	Inducible nitric oxide synthase	TNBC	Triple-negative breast cancer
JNK	c-Jun NH ₂ -terminal kinases	TNF	Tumor necrosis factor
MAPK	Mitogen-activated protein kinase	TPA	12-o-tetradecanoyl-phorbol acetate
MMPs	Matrix metalloproteinases	VEGF	Vascular endothelial growth factor

7.1 INTRODUCTION

Triterpenes are naturally occurring compounds in the human diet's phytosterol family (Moreau et al., 2002). These are a prevalent class of phytochemicals of substantial practical use. They are synthesized by producing squalene epoxide followed by condensation (Liby et al., 2007). Cholesterol stabilizes phospholipid bilayers in animal cell membranes, while free triterpenes provide a similar function in plant cell membranes (Liby et al., 2007). The Western world estimates that the average human consumption of triterpenes is about 250 mg per day. However, in Mediterranean countries, where olive oil is a part of the staple diet, individuals may consume more than 400 mg/kg per day (Moreau et al., 2002). Over the past 10 years, an unexpected surge of interest in triterpenes has occurred. Despite most studies focusing on triterpenes' ability to decrease cholesterol, much-published data indicate that triterpenes may be useful for treating many medical disorders (Ovesna et al., 2004; Liby et al., 2007; Fatma & Siddique, 2023). A dietary triterpene called lupeol is one such substance that has drawn the interest of researchers, medical professionals, and pharmaceutical companies worldwide (Saleem, 2009; Fatma et al., 2024). This book chapter provides a detailed account of lupeol's role in immune modulation.

The immune system is crucial for fighting infections and maintaining balance. An effective immune response to threats is essential for preserving homeostasis (Russo & McGavern, 2016; Garofalo et al., 2020; Nakajima et al., 2021). However, an amplified and uncontrolled immune