



Current Molecular Pharmacology

Content list available at: <https://benthamscience.com/journal/cmp>



REVIEW ARTICLE

A Comprehensive Review of Essential Aspects of Molecular Pathophysiological Mechanisms with Emerging Interventions for Sarcopenia in Older People

Priyanka Prajapati¹, Anand Kumar¹, Rishabh Chaudary¹, Shubhada Mangrulkar², Malti Arya¹ and Sapana Kushwaha^{4*}

¹Department of Pharmaceutical Sciences, School of Pharmaceutical Sciences, Babasaheb Bhimrao Ambedkar University, Vidya Vihar, Raebareilly Road, Lucknow, Uttar Pradesh-226025, India

²Department of Pharmacology, Smt. Kishoribai Bhojar College of Pharmacy, Kamptee, Nagpur-441002, India

³Chandra Shekhar Singh College of Pharmacy, Allahabad, India

⁴Department of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research, Bijnor-Sisendi Road, Near CRPF Base, Sarojini Nagar, Lucknow, Uttar Pradesh-226002, India

Abstract:

Background:

As people age, physical impairments may have a deleterious role on skeletal muscles. Sarcopenia Clinical Practice Guidelines 2017 and the European Working Group on Sarcopenia in older people are two organizations that have published essential guidelines on the definition of "Sarcopenia". Sarcopenia is a geriatric syndrome, characterized by skeletal muscle mass degeneration brought on by ageing, which lowers muscular function and quality. Moreover, Sarcopenia can be classified as primary or age-associated Sarcopenia and secondary Sarcopenia. Also, secondary Sarcopenia occurs when other diseases such as diabetes, obesity, cancer, cirrhosis, myocardial failure, chronic obstructive pulmonary disease, and inflammatory bowel disease also contribute to muscle loss. Furthermore, Sarcopenia is linked with a high risk of negative outcomes, considering a gradual reduction in physical mobility, poor balance, and increased fracture risks which ultimately leads to poor quality of life.

Objective:

In this comprehensive review, we have elaborated on the pathophysiology, and various signaling pathways linked with Sarcopenia. Also, discussed the preclinical models and current interventional therapeutics to treat muscle wasting in older patients.

Conclusion:

In a nutshell, a comprehensive description of the pathophysiology, mechanisms, animal models, and interventions of Sarcopenia. We also shed light on pharmacotherapeutics present in clinical trials which are being developed as potential therapeutic options for wasting diseases. Thus, this review could fill in the knowledge gaps regarding Sarcopenia-related muscle loss and muscle quality for both researchers and clinicians.

Keywords: Sarcopenia, Clinical trials, Pathophysiology, Signalling mechanisms, Preclinical models, Interventions.

Article History

Received: November 11, 2022

Revised: January 18, 2023

Accepted: January 26, 2023

1. INTRODUCTION

"Muscle loss" is a Greek phrase that was named by Irwin Rosenberg in 1989 and is known as "Sarcopenia". Sarcopenia describes a physiological injury to the skeletal muscle that impairs its bulk, such as low walking speed, distance, or grip strength [1]. The widespread effects of Sarcopenia have a substantial impact on daily life quality of older people [2].

Older adults who suffer from Sarcopenia are more likely to suffer from physical weakness and mishaps. Further known factors for Sarcopenia include inactivity, hormonal imbalance, impaired neuronal signaling, cytokines production, and high amounts of macromolecule breakdown that lead to inadequate protein synthesis [2]. Two main types of Sarcopenia may be distinguished: "primary" Sarcopenia, exclusively related to ageing, and "secondary" Sarcopenia, caused by an underlying disease process [3, 4]. Primary Sarcopenia is diagnosed when no other particular cause is identified. It is related to decreased anabolic hormone production or sensitivity, anorexia of ageing,

* Address correspondence to this author at the Department of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research, Bijnor-Sisendi Road, Near CRPF Base, Sarojini Nagar, Lucknow, Uttar Pradesh-226002, India; E-mail: sapana.k@niperraebareilly.edu.in