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Benefits of L-Arginine supplementation on body composition: A mini review

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Abstract

Body composition Improvement has numeral desired effect in controlling the risk of chronic disease, and several compounds are use as adjunct therapy for this purpose. We review the effect and mechanism caused by l-arginine in fat mass and muscle mass as body composition components.

Introduction

Imbalance of body composition (BC), with emphasis on excess body fat accumulation, causes many metabolic disorders and result in negative effect on health outcomes; treatments to improve BC can be considered as a target of therapy in cardiometabolic risk management [1,2]. Several measures have been proposed and investigated to reduce fat mass (FM) and increase muscle mass (MM), none of which have been effective alone [3,4]. In general, combination of exercises plus the use of various agents is an accepted strategy to improve BC. L-arginine supplementation (LS) has been reported to be beneficial as an adjunct therapy in FM reduction and MM enhancement which is backed by a numerous biochemical and molecular mechanisms [5,6]. In the present mini review, we report the effect of LS on BC by focusing on FM and MM.

Fat mass

Most of published studies indicate FM reduction with LS at different doses, ranging from 2 to 8 g or above [7]. The mechanisms by which LS exert these metabolic benefits are still not fully understood. One suggested mechanism is that l-arginine serve as source for nitric oxide (NO) production by NO synthase. NO elevation can activate AMP-activated protein kinase, which in turn increase hepatic and skeletal muscle fatty acid oxidation, ketogenesis, and inhibition of lipogenesis; possibly, ketosis state lead to appetite suppression [5,8,9]. The net effect is changing body energy balance against of adiposity.

Muscle mass

L-arginine, when provided either alone or in combination with essential amino acids, increase myofibrillar protein synthesis in muscle [10]. Enhancement of microvascular blood flow (MBF) due to NO production as a consequence of LS is suggested to be partially responsible for this phenomenon. NO increase microvasular blood volume through dilatation of micro vessels, accordingly, delivery of insulin and transference of nutrients including amino acids to myocytes would be facilitated [11,12]. Regardless of chosen strategy, MBF modulation cause anabolic state and enhance protein synthesis in muscles [13].

In sum, L-arginine supplementation can improve BC. This improvement is characterized by FM reduction and MM increase. Although all the involved mechanisms are not well known, the major part of these changes seems to be mediated by increase in NO production. Studies have also continued to investigate the long-term effects of LS, but to date, taking this supplement is considered to be safe an effective along with other strategies to improve BC.

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