

Nutritional strategies for optimizing protein signalling and muscle growth.

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Nutrition influences the impact of training on muscle mass and function. The metabolic basis for changes in muscle mass is the balance between protein synthesis and breakdown of muscle contractile proteins, such as actin and myosin. The net balance (NBAL) between synthesis and breakdown over any given time determines changes in muscle mass. Accretion of muscle proteins occurs during periods of positive balance, i.e. when synthesis exceeds breakdown, and muscle proteins are lost during periods of negative balance.

Exercise and nutrition influence muscle mass through changes in muscle protein synthesis and breakdown that will increase (or decrease) NBAL. It is clear that protein ingestion is critical for increased muscle mass. However, the optimal amount of dietary protein – both on a chronic or acute level – for optimization of muscle mass is unclear. Furthermore, it is clear that factors other than the total amount of protein in the diet influence muscle mass and function. Dietary factors other than total amount of protein that influence muscle mass and function include energy intake, intake of other nutrients, timing of nutrient intake and the interaction of these factors. Whereas most of the attention on muscle mass has been given to gaining muscle, athletes and exercisers in many situations may want to maintain or even lose muscle mass. Nutritional interventions influence the adaptations to particular situations, e.g. weight loss or immobilization.