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Control of skeletal muscle mass during calorie restricted weight loss in obese women: Protein synthesis vs degradation

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Skeletal muscle (SM) not only plays an important role in locomotion, it is now recognized as an integral part of whole-body metabolism and overall health. However, during weight loss, the main treatment strategy for obesity, loss of fat free (lean muscle) mass is frequently reported. Maintenance of skeletal muscle mass is dependent upon nutrient stimulation of protein synthesis via the mTOR signaling pathway, however, during caloric restriction a decrease (atrophy) in SM may be driven by a homeostatic shift favoring protein degradation. Therefore elucidating the mechanisms that control protein synthesis and degradation during weight loss is required. Increased dietary protein in a calorie restricted (CR) diet may provide additional benefit by preserving fat free mass compared to a standard-protein, high-carbohydrate diet. Our study has investigated the potential effect of weight loss diets on gene expression in skeletal muscle, particularly focusing on biosynthesis, degradation and how increased dietary protein may influence the expression of genes in the ubiquitin proteosome (UPP) and mTOR signaling pathways to minimize muscle loss. The identification of the physiological and biological molecular mechanisms underlying the metabolic disturbances observed in obesity and how weight loss affects these mechanisms will be a key step in developing better weight management regimes to combat the obesity epidemic.

Biography

Cassandra McIver completed her Ph.D in 2006 from The Queen Elizabeth Hospital and The University of Adelaide, Australia examining molecular markers in colorectal cancer using microarrays. Dr. McIver is currently a postdoctoral research fellow at The University of Adelaide and The Basil Hetzel Institute for Translational Research (BHI).

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