Biochemical and metabolic mechanisms by which dietary whey protein may combat obesity and Type 2 diabetes

Daniela Jakubowicz, Oren Froy

Abstract

Consumption of milk and dairy products has been associated with reduced risk of metabolic disorders and cardiovascular disease. Milk contains two primary sources of protein, casein (80%) and whey (20%). Recently, the beneficial physiological effects of whey protein on the control of food intake and glucose metabolism have been reported. Studies have shown an insulinotropic and glucose-lowering properties of whey protein in healthy and Type 2 diabetes subjects. Whey protein seems to induce these effects via bioactive peptides and amino acids generated during its gastrointestinal digestion. These amino acids and peptides stimulate the release of several gut hormones, such as cholecystokinin, peptide YY and the incretins gastric inhibitory peptide and glucagon-like peptide 1 that potentiate insulin secretion from β-cells and are associated with regulation of food intake. The bioactive peptides generated from whey protein may also serve as endogenous inhibitors of dipeptidyl peptidase-4 (DPP-4) in the proximal gut, preventing incretin degradation. Indeed, recently, DPP-4 inhibitors were identified in whey protein hydrolysates. This review will focus on the emerging properties of whey protein and its potential clinical application for obesity and Type 2 diabetes.

Abbreviations: GMP, glycomacropeptide, DPP-4, dipeptidyl peptidase-4, GIP, glucose-dependent insulinotropic polypeptide, GLP-1, glucagon-like peptide-1, BCAAs, branched-chain amino acids, PYY, peptide YY, CCK, Cholecystokinin