Role of protein level and types in weight management

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Over the past few decades several nutritional platforms have been popularized to support healthy weight loss and maintenance. Manipulations in the level of calories along with manipulations in fat and/or carbohydrate energy (total and percent) were and still are prominent in various programs. Along the way one of the most important macronutrients emerged in the form of protein and as some interesting benefits with regard to weight loss and body leaning was revealed. Historically, protein has long been recommended in a more restricted sense and as a more minor contributor of daily calories often positioned as problematic if “too much” is consumed. However, today protein is recognized for its unique and strategic applications to weight control. For instance, protein is the most thermogenic energy nutrient leading to more calories expended in response to a meal and potentially daily. Plus, protein is more satiating than carbohydrate and fat potentially leading to food volume and choice control benefits. Furthermore, research suggests that the base protein recommendations (e.g. RDA) are elevated during weight reduction and body leaning. Based on the heightened awareness of the importance of protein, many health care practitioners, nutritionists and personal trainers want more guidance for daily protein targets and distribution along with a better understanding of differences between protein types. In this presentation the benefits of different protein types along with daily targets and distribution will be presented based on the most current, research-based information.

A fast and highly efficient hiPSCs-adipocytes differentiation method: Patient specific cell models for adipogenesis and obesity research

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Obesity epidemic is a growing global health threat. So far there is no safe and effective way to prevent obesity, as weight loss does not simply depend on diet or physical exercises. Obesity is characterized by an excessive accumulation of adipose tissue; therefore understanding the biological features of adipocytes is one of the keys to find the cure for obesity. Several in vitro models, such as 3T3-L1, primary pre-adipocytes or some adult multi-potent stem cells, contribute to our understanding of adipogenesis and the mechanisms of obesity. However, they are either murine origin cell lines or primary cells with limited expansion, which caused many contradictory results. In present study, we developed an improved method to get human induced pluripotent stem cells (hiPSCs) derived mesenchymal stem cells (MSCs) with high capacity of adipocyte differentiation (80-95% efficiency) after one day adipocyte differentiation treatments. The gene expression signatures of the adipocytes differentiated from the hiPSCs-MSCs is highly similar to primary mature adipocytes with sensitive insulin response and function of adipokines secretion. Our previous study demonstrated that C10orf116 and miR-148a facilitated adipogenesis in primary pre-adipocyte or MSCs. We use these two factors to test the application of our newly developed hiPSCs-MSCs-adipocyte model in adipogenesis research. In addition, by comparing iPSCs lines from donors with different body mass index (BMI), we found the efficiency of adipogenic differentiation was highly related to BMI of the donors. In conclusion, this hiPSCs-MSCs-adipocyte model we developed is fast, highly efficient and with patient specific genetic background and can be a great tool for adipogenesis research and other obesity mechanism or clinical research.