

Effects of Soy Protein Isolate and Milk Protein Isolate on Metabolic Health and Bone Outcomes
in Sedentary, Adolescent Male OLETF Rats

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ABSTRACT

Obesity is a growing epidemic and it is associated with a variety of chronic diseases. Recently, it has been recognized that excess adiposity and associated metabolic dysregulation during skeletal growth may also negatively affect bone health. The spontaneously hyperphagic, Otsuka Long Evans Tokushima Fatty (OLETF rat) has emerged as model for studying the effects of obesity and insulin resistance on skeletal development and maintenance. Here, we examined the effects of isocaloric, isonitrogenous diets containing milk protein isolate (MPI), soy protein isolate (SPI), or a 50/50 combination of the two (MIX) on metabolic health indicators, maximum muscle tension, bone turnover markers, and trabecular, cortical and biomechanical properties of the tibia in spontaneously hyperphagic, insulin resistant, adolescent male OLETF rats. SPI significantly reduced serum cholesterol concentration and decreased Tb.Sp compared to MIX, while MPI significantly reduced fasting insulin compared to MIX and SPI. These results suggest that a diet containing SPI is not detrimental to metabolic health or skeletal development in spontaneously hyperphagic, adolescent male OLETFs rats, but it might in fact be beneficial for trabecular bone development and maintenance. In addition, these results suggest that a diet containing a combination of animal and plant-based proteins sources, such as MPI and SPI, might promote the most favorable ratio of bone formation to resorption during skeletal growth.