

## Anti-Obesity Effect of Calcium

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### **Introduction:**

Obesity is today's most blatantly visible yet most neglected public health problem. Once considered a problem only in high income countries, overweight and obesity are now drastically on the rise in low- and middle-income countries, particularly in urban settings. Paradoxically coexisting with undernutrition, an escalating global epidemic of overweight and obesity- 'globesity' is taking over many parts of the world. Obesity is a complex condition, one with serious social and psychological dimensions, that affects virtually all ages and socio-economic groups and threatens to overwhelm both developed and developing countries. The identification of factors that influence energy balance is an important issue in the research field of nutrition and becomes a growing necessity in the context of obesity epidemic throughout the world.

It is far too simplistic to believe that interventions such as smaller portions sizes, low-energy-density foods and more physical activity are sufficient to prevent obesity. But there are many other putative etiological factors such as impaired sleep, mental stress, television viewing and dietary factors such as energy from sugar in soft drinks and insufficient intake of certain nutrients such as protein or calcium. Although much of effort has been devoted to studying the effects of macronutrients on weight control, the role of micronutrients has not been well studied.

It is well understood that thermodynamics and energy balance are core factors involved in the obesity epidemic, with small increase in energy intake coupled with declining physical activity resulting in a net positive energy balance and progressive weight gain. It has consequently become axiomatic to reduce the obesity epidemic to a simple question of energy balance and to invoke various strategies to induce negative energy balance to address the problem. However, it is equally well understood that obesity is a complex genetic trait, with multiple genes interacting to confer relative resistance or susceptibility to positive energy balance. Similarly, specific micro or macronutrients, dietary patterns or both may modulate the same metabolic pathways affected by these genetic factors and thereby alter nutrient and energy partitioning. There are multiple pathways by which a micronutrient deficiency could impair appetite regulation and energy metabolism, and these areas are poorly investigated in relation to human energy balance and obesity.

### **Micronutrients and Obesity**

Micronutrients are a key part of nutrition, and while they are not directly related to weight loss, they play a vital role in keeping body healthy. Some micro nutrients are closely involved in specific body functions related to weight management. For example, Vitamins B1, B5, and B6 aid in metabolism, while chromium aid in

insulin action and selenium and iodine contribute to thyroid hormone function. Metabolism, insulin and thyroid hormones can all have an effect on body weight and appetite. Lack of micronutrients or small portions of vitamins and minerals in diet has been linked to an increased risk of obesity (Calton, 2010). Micronutrients work in specific ways to enhance the loss of body fat, preserve muscle mass, and regulate levels of blood sugar and insulin.

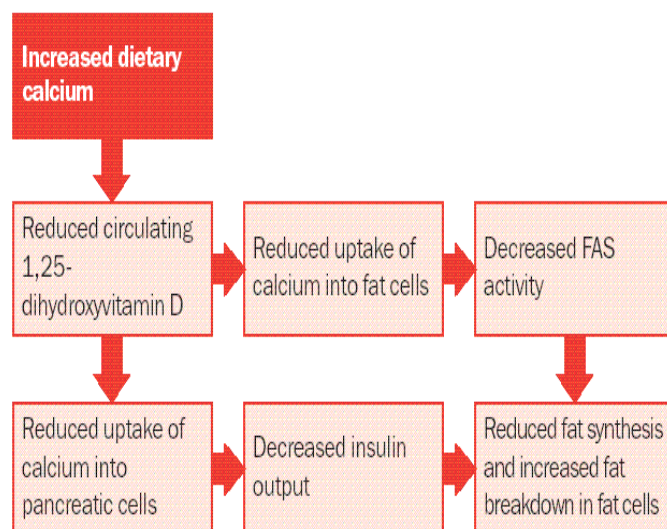
### Calcium & Weight Loss:

Calcium is the newest weight-loss secret. Recent studies provide more evidence that calcium can fight body fat and help to keep weight under control. This ‘antiobesity effect’ was first observed accidentally, during a study in the 1980s while investigating the antihypertensive effect of dairy products in obese African American men. Increasing dietary calcium produced expected decrease in blood pressure that was accompanied by an unexpected reduction in body fat (Shi *et al.*, 2001). Calcium and weight loss have been positively associated. It has been shown that more dietary calcium intake may help to facilitate fat loss, prevent fat storage, help to raise metabolism and reverse gradual weight gain. Although energy balance is the most critical factor in weight regulation, recent studies suggest that Ca contribute to shifting the energy balance and thus play a vital role in weight regulation (Teegarden, 2003).

### Mechanism:

Vitamin D acts as both a vitamin and chemical messenger, and one of its jobs is to stimulate calcium uptake into the cells of the body when blood calcium levels are low. However, when

blood calcium levels are high (for example on a high-calcium diet), levels of a particular *metabolite* of vitamin D (1,25-dihydroxyvitamin D) fall, and this in turn reduces the rate at which calcium is transferred into cells, including fat cells and pancreatic cells.



\*Source:

[www.pponline.co.uk/encyc/calcium-metabolism-1043](http://www.pponline.co.uk/encyc/calcium-metabolism-1043)

### Link between Calcium And Fat Reduction

A reduced calcium level in fat cells decreases the activity of a fat storage enzyme called fatty acid synthase (FAS), which in turn leads to reduced fat synthesis and subsequent storage. Reduced FAS activity also leads to increased lipolysis (the breakdown of fat for energy).

At the same time, reduced calcium concentrations in pancreatic cells lead to lower insulin output which, in turn, results in reduced fat synthesis and enhanced fat breakdown in fat cells.

## References:

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