

## Exercise to lose that belly!

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*A fascinating clinical study reports that regular physical exercise is associated with a reduction in the amount of abdominal fat, a phenomenon which depends on the secretion from muscles of a molecule called interleukin-6.*

Fundamentally, excess weight is the result of an imbalance caused by a consumption of calories which exceeds the energetic needs of the body.

In theory, losing weight should be relatively simple: one needs only re-establish a balance between the intake and the expenditure of calories, such as by eating less and moving more.

In reality, losing weight (and particularly keeping weight off over the long run) represents an objective that is so difficult to attain that the majority of overweight individuals are not successful in accomplishing this.

This difficulty is principally due to the fierce resistance of our metabolism against all weight loss, whether it is caused by decreased intake of food or increased physical activity. We are programmed to maintain a stable weight: a caloric loss is immediately compensated for by a corresponding decrease in the energy burned by the body, for example by diminishing the basal metabolism, whereas an increase in physical activity will provoke an increased appetite in order to recover the greater number of calories that have been expended.

Trying to lose weight by performing more exercise is particularly frustrating because it requires a very intense effort to burn off the excess calories that we consume.

For example, a person of average size must walk about 6.5 km to expend the 400 calories from a simple piece of cake, which is practically impossible to perform routinely.

For all these reasons, the current scientific consensus is that exercise alone does not allow major weight loss and thus a parallel decrease in ingested calories is required to achieve this. Contrary to what is often claimed, the level of physical activity today is very similar to what it was 30 years ago<sup>1</sup>, and so there is no decrease in activity which could explain the worldwide epidemic of obesity, but rather our overconsumption of industrially processed foods stuffed with empty calories.

### ABDOMINAL FAT

Though exercise is not a panacea for weight loss, it remains however very important in our battle against obesity. For one thing, it has been demonstrated that regular exercise is very important for maintaining weight loss caused by dieting. For another thing, research over the past few years has shown that exercise can specifically target certain fat reserves, particularly around the abdomen<sup>2</sup>. This mass of abdominal fat is very bad for



the health, because it leads to the development of pro-inflammatory conditions which alter the metabolism and increase the risk for cardiovascular diseases, type 2 diabetes, certain cancers and even dementias. Any reduction of this mass of abdominal fat by exercise could thus have very positive effects on health.

### ROLE OF INTERLEUKIN-6

The results of a randomized clinical study indicate that this positive effect from exercise is due to interleukin-6, a cytokine molecule secreted by muscle cells during physical activity<sup>3</sup>. In this study, 53 sedentary participants who exhibited abdominal obesity (waist size greater than 88 cm for women and 102 cm for men) were recruited. They were treated with or without an antibody which neutralized interleukin-6 (tocilizumab) then were (or were not) subjected to a 12-week program of intensive exercise (with several 45 minute sessions on stationary bicycles each week). This experimental design allowed the researchers to show that regular exercise effectively reduced the visceral fat (225g on average, about 8%).

However, no reduction was observed in volunteers who had received the anti-interleukin-6 antibody. As well, the scientists also found that, in inactive individuals, the blockage of the interleukin by the antibody caused an increase in the visceral adipose mass (by over 300 g). According to the authors, these results clearly demonstrate that interleukin-6 represents the principal factor responsible for lipolysis (destruction of fat) within the abdominal adipose tissue.

Decreasing abdominal adipose tissue is thus added to the long list of health benefits from regular physical activity. Whether in terms of reducing the risk of cardiovascular diseases, diabetes, several cancers or from dementias, exercise remains crucial to living a long life in good health.

- (1) Westerterp KR and JR Speakman. Physical activity energy expenditure has not declined since the 1980s and matches energy expenditures of wild mammals. *Int. J. Obes.* 2008; 32: 1256-63.
- (2) Verheggen RJ et al. A systematic review and meta-analysis on the effects of exercise training versus hypocaloric diet: distinct effects on body weight and visceral adipose tissue. *Obes. Rev.* 2016; 17: 664-90.
- (3) Wedell-Neergaard AS et al. Exercise-induced changes in visceral adipose tissue mass are regulated by IL-6 signaling: a randomized controlled trial. *Cell Metab.*, published online December 18 2018.