

How building muscle reduces adipose tissue and improves health

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The human body is a complex organism that begins working at the moment of conception and does not stop working until the moment of death. As cells divide and a being begins to take shape, the human body sets in motion a network of organs and functions that will allow the growing individual to operate. Each of the functions that the human body undertakes requires energy, and this energy is manufactured via the substances that are ingested by the organism. Food and drink are to a human being what gasoline is to a car: the fuel by which everything runs.

The term that best describes the fuel needed for humans to work is “calorie,” and calories are needed to perform every function the body undertakes—even sleeping. It would be terribly inconvenient to own a car that had a one-gallon gas tank: trying to get most places would require constant fill-ups, and long trips would be out of the question. The human body is no different: it has space to store calories for later use, so that long periods of time can pass between “fill-ups.

“Unfortunately, the size of the human fuel “tank” is almost unlimited, and this is where excess fat comes into play. As the body ingests calories, these calories are turned into fuel, but what is left over is stored in the body, and “surplus calories [. . .] are ALL converted to body fat and stored as adipose tissue” (Collins 27). This is not a healthy situation. “Americans are increasing in body fat as they become more sedentary. Obesity has reached epidemic proportions” (Cummings, Parham, and St. Rain 1145).

The good news is that resistance training is one of the most effective ways for an individual to reduce his or her excess body fat: not only does the

exercise itself burn calories, but resistance training increases the body's amount of muscle mass in the body, and the more muscle tissue an individual has, the more calories he or she will burn (Phillips and D'Orso passim). The relationship between muscle mass and the burning of calories has to do with the body's metabolism: " the process by which substances come into the body and are used" (132).

Depending on the type of activity an individual is involved with, the body's metabolism will respond by going into the calorie stores and providing the requisite fuel. The more strenuous the activity, the more fuel that is required, and the more fuel that is required, the fewer the number of calories that end up remaining in the body's fat " tank. " Remember, everything the body does requires the use of fuel, and that includes calories that are burned while an individual is sedentary.

Each person has a Basal Metabolic Rate (BMR) which is " the turnover of energy in a fasting and resting organism using energy solely to maintain vital cellular activity, respiration, and circulation" (" Basal Metabolic Rate"). An individual's Basal Metabolic Rate will determine, in part, the number of calories that are burned each day—no matter what that person does. Muscle is the most active tissue in the human body and is essential to life. It is estimated that one pound of muscle requires 50 to 100 calories per day to function.

Increasing a person's muscle mass by as little as three to five pounds can have a profound effect on daily caloric expenditure by raising Basal Metabolic Rate (BMR), or the number of calories needed by the body to carry

out basic daily functions. (Serraino) With this information in mind, it is clear that increasing one's muscle tissue will increase the number of calories one burns each day, and resistance training increases one's muscle tissue. Resistance training is key to muscle building: " Muscle is spared at the expense of other tissues if there is a need for it" (Serraino).

In other words, the body functions in terms of supply and demand: as the body receives a demand for fuel, it will create the energy needed; however, not all calories are the same. " Our food fuel comprises the protein, carbohydrate, fat and alcohol we eat. [. . .] There is an ' order of priority' that dictates which fuels are burned first. Alcohol calories are burned first [. . . then] protein, then carbohydrates, then fat" (Collins 27). Consider the emaciated look of people who are calorie deficient: this is due to their body's turning to its own organs and tissues for fuel.

It is an awful image, but it does illustrate the way in which the body seeks fuel to continue operating. If the external sources of fuel are insufficient, the body will burn whatever is available, but aside from deficiency, because of the " order of priority," even a fully fueled body seeks out protein calories before carbohydrate or fat calories. High-intensity resistance training offers the stimulus necessary to tell the body it requires muscle. The body maintains protective margins against stress, and exercise is a stressor.

When a muscle is taken to failure (the point where continued contraction is impossible), an alarm is triggered, telling the body its protective margins are in danger and it must adapt to maintain itself. Hence, muscle will be spared at the expense of fat. (Serraino) Resistance training builds muscle, changes

the body's "order of priority" in terms of the type of calories burned, and increases an individual's BMR—all of which result in fat loss and decreased production of adipose tissue.

Many people undertake a resistance training program to lose weight due to dissatisfaction with their physical appearance; however, as things improve on the outside (i. e. one appears to be less fat), things are also improving on the inside. Thus the benefits of resistance training for fat loss are not limited to one's physical appearance. Breast cancer is a serious concern for women, but the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) has some positive news.

The Women's Health Initiative, a federal study that was begun in 1993 and was ongoing in 2002, involved data that was collected from "66,568 American women age 50 and up." The data show that study participants who worked out vigorously for three or more hours each week were 13 percent less likely to develop breast cancer than non-exercisers. Women who worked out the most and burned the most fat were 22 percent less likely to develop breast cancer, possibly because lower levels of body fat do not store as much cancer-promoting estrogen. (American Alliance for Health)

Although this study does not define what "worked out vigorously" entailed, what is significant is the connection between reduced body fat and reduced breast-cancer risk. Given the direct link between increased muscle mass and decreased body fat, the potential link between resistance training, fat loss, and reduced breast-cancer risk should not be ignored. Type 2 Diabetes also a serious health threat, and as it manifests itself over time, generally striking

during one's "elderly" years, a long-term resistance training program that reduces body fat can help prevent the onset of this disease.

In their study, Ibanez, et al. found: Prolonged resistance training [. . .] led to significant increases in muscle strength, decreases in abdominal fat, and improvements in insulin sensitivity. [. . .] These observations suggest that two sessions per week of PRT are safe and could serve as a potential adjunct therapy in the management of type 2 diabetes in older men. This particular study specifically addresses "PRT" or prolonged resistance training when making the connection to health improvements with lower body fat.

The human body is an organism designed to operate much like an automobile: it needs fuel to survive. Obviously, the human body differs from a car in a variety of ways, but the two relevant differences are that the fuel-storage capacity of a person far exceeds that of an automobile; and even at rest, the human organism requires fuel to continue to operate. When a reasonable limit of fuel storage is exceeded in a person, the body turns this into adipose tissue. A body that contains excess fat is like a car with a clogged fuel line: it simply does not function well.

Not only is excess adipose tissue a threat to one's physical appearance, it is a threat to one's overall health. "If three to five pounds of muscle are added to the body, BMR will increase by 250 to 500 calories per day—regardless of activity level"; therefore, there are numerous benefits to resistance training for fat loss and overall health (Serraino). Works Cited American Alliance for Health, Physical Education, Recreation and Dance. The Women's Health

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