

Body Fat Control

Lee Chee Pheng, Ph.D.

10 SCIENTIFIC WAYS TO REDUCE YOUR BODY FAT WITHOUT CUTTING FOOD INTAKE

Fat has always been considered the culprit that disfigures our shape, proportion and general outlook. The fact is that other than what is mentioned, fat plays a very important physiological role in humans. They are not the inert lumps we think they are, but active dynamic tissues undergoing continuous breakdown and re-synthesis.

The objective of this paper is to minimize body fat while simultaneously preserving our lean body tissue, metabolic rate and health.

Before we proceed any further, I would like to explain why we need to preserve our lean body tissue, metabolic rate and health. Lean body tissue here refers to our muscles. There are over 600 pairs of muscles in our body and its main function is to generate force and bring about movement through the joints. Movements increase circulation and allow the transportation of nutrients and gases to all the tissues. The ability to preserve lean tissues will ultimately enable us to maintain our metabolic rate as muscle tissues become metabolically more active at rest and burns at a higher rate.

Fat has the highest energy content (over 9 calories per gram) among the 3 major nutrients – namely Carbohydrate, Protein & Fat. It is deposited in cells and can be stored in very large amounts in the adipose tissue. They provide more than half the energy requirements of some organs like the liver, heart and resting skeletal muscle.

Fat is also the transporting agent for fat soluble vitamins A, D, E & K. It serves as cushion and insulator for internal organs. In all the human tissues, fat makes up the major part of the structure of cell membrane. They are also the precursors from which many hormones are made.

Fats in the body are divided into STRUCTURAL (essential) and NEUTRAL (non-essential fats). *Structural* fats are an inherent part of the membranes and often parts of cells. They are usually found in organs and tissues including nerves, brain, heart, lungs, liver and the mammary glands. This type of fats is usually preserved. *Neutral* fats are the

type we are concerned about. It is stored in the adipose cells of the fat depots. Non-essential fat contributes to our potbelly and saddlebags.

Besides these biological functions of fat, excess body fat is associated with heart diseases, cardiovascular diseases, various forms of cancer and metabolic diseases. People who have a higher percentage of body fat have been documented to have a higher mortality rate.

Remember that everything we eat is broken down, digested and absorbed into the digestive system. During these processes, many biochemical reactions will take place and many enzymes will be secreted. It is only after these processes that our food will be:

- i. utilized for growth and repair
- ii. excreted
- iii. stored as GLYCOGEN (this is the storage form of carbohydrates) and FATS

Once these fats have been stored, many biochemical reactions are required to mobilize it from the depots. After being mobilized from its storage, these fats have to be converted into its usable form – *fatty acids* in the liver and that will circulate to the muscle cells for energy or liver for other metabolic conversions.

After leaving the liver, free fatty acids will be transported to the muscle cells to be burnt to produce energy, carbon dioxide and water. Before these fats are combusted, it has to be oxidized to another form called the *Acetyl-CoA*. From here, it will be carried to the mitochondria where a carrier substance called *carnitine* will carry the *Acetyl-CoA* across the mitochondrial membrane and into the last phase, where it will be completely combusted.

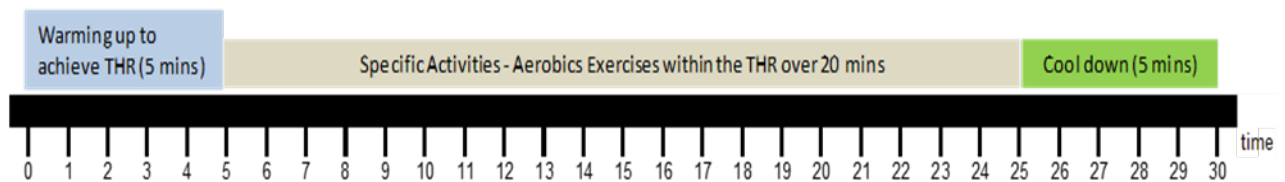
1) Create a relative caloric deficit - burn more calories than you take in
--

In this method, you can first of all increase daily caloric expenditure through exercise. Exercise requires energy and energy comes from food. Food taken in but not used will be stored. Now that you need them to perform exercises, your body will be able to tap them from the depots and convert them into usable form to produce energy for your exercises.

Exercising alone can elevate your metabolic rate while restricting food will slow it down. What exercises should you do then? Well, the only types of exercise that can

mobilize fats as the main source of energy are *aerobic exercises*. These types of exercises are generally performed at the intensity where you are able to talk while exercising. This is termed as “conversational intensity”.

Examples of aerobic exercises are cycling, jogging, dancing and generally any exercise that is moderate in intensity and done for at least 30 minutes continuously at your Target Heart Rate. Attaining this heart rate (dosage) is the key to elevating your basal metabolic rate for 24 to 48 hours post-exercise. The 30 minutes exercise can include 5 minutes warming up and 5 minutes cool down.



Your frequency should be a minimum of 3 sessions per week to achieve the sustained metabolic effect. Choose any exercises as mentioned but the most important point is that the exercises should be safe and low impact, convenient and not weather related, as well as easy to monitor your heart rate. I usually recommend the stationary cycle which takes into consideration all the factors above.

You can monitor your intensity by monitoring your heart rate and making sure that it is within your Target Heart Rate (THR). You can calculate your THR by using the formula below:

$$220 - \text{Age} = \text{Maximal Heart Rate (MHR)}$$

$$\text{MHR} \times 60\% \text{ to } 75\% \text{ (according to the level of activity)} = \text{Target Heart Rate (THR)}$$

60% for sedentary people

65% for those who exercise once or twice a week

70% for those who exercise at least 3 times a week

75% for those who exercise 3 times or more per week

Apart from the aerobic exercise, get involved in a proper weight training program to improve your posture and strength. Strength improved due to weight training is beneficial to your bone density and helps to prevent osteoporosis especially among the females. As you improve your muscular system, needless to say, your metabolic rate will constantly be in high gear and fat will be the predominant fuel used at rest.

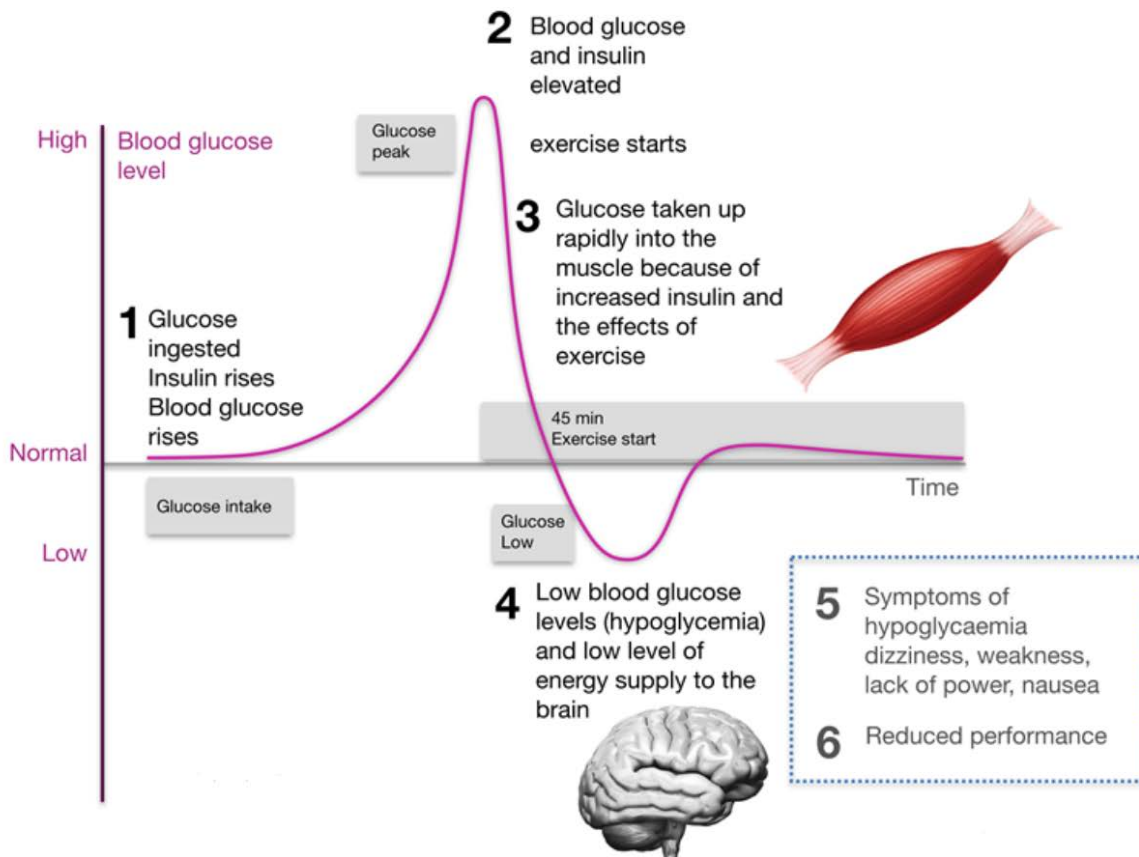
All exercise in your weight training program should be at least 15 repetitions and above, but should NOT exceed 25 repetitions. Take a short 5-10 second rest between sets before proceeding to the next exercise. Your poundage should be adjusted to suit your ability to perform the number of repetitions required.

2) Eliminate Empty Calories

Empty calories are all from fast food, snack etc. and are usually high in fats and/or sugar/salts. Sugary food is what we are concerned about. Sugars from these types of food are easily digested in our body and because of that, the sugar content is absorbed into the blood stream at a very fast rate. This causes a spike in our blood sugar and our body will respond by secreting a hormone called Insulin.

When this hormone is secreted, its job is to draw all blood sugar into the cells and will; be utilized as energy. When this happens, the body stops burning fat completely! At this stage, insulin also promotes the conversion of liver sugar into fatty acids (fats) which is subsequently transported to the adipose tissue and deposited as fat!

The presence of insulin after sugary food causes the muscle to utilize the sugars in the body over fats. Once the sugars are depleted, it will leave you extremely exhausted, breathless and tired. At this stage you are going through what is termed a *Hypoglycaemic Dip*. This means that your blood sugar level is below its normal level.



3) Consume the correct proportion of food – High Carbohydrates, Medium Protein and Low Fat!

Is this surprising? Now that the trend is to cut down on carbohydrates to lose weight, it must be surprising to see the above proportion. The fact is, carbohydrates, proteins and fat are all fattening if you eat more than you should. In fact, carbohydrates can help to control fat! How so you ask? In the metabolic mill, within the mitochondria, the breakdown of fat happens in 2 stages:

- Stage 1: Fatty acids after being converted from the storage form of fats by the liver will be broken down to *Acetyl-CoA* by an oxidation process called ***Beta Oxidation***.
- Stage 2: *Acetyl-CoA* will then enter into the last phase (Kreb's Cycle) of the metabolic mill where fat will be completely oxidized and release energy, carbon dioxide and water.

It is important to note that ONLY if there is sufficient *Oxaloacetic Acid*, then *Acetyl-CoA* will be oxidized. *Oxaloacetic Acid* is a by-product of the breakdown of carbohydrates, which if insufficient, *Acetyl-CoA* will not be completely combusted! If this happens, the *Acetyl-CoA* will reverse back to fat or circulate in the blood. The acetate fragments produced in beta oxidation begin to build up in the extracellular fluids because they cannot be accommodated in the *Krebs Cycle*. These fragments are readily converted to *ketone bodies*, some of which are excreted in the urine. If this condition of ketosis persists, the acid quality of the body fluids can increase to a potentially toxic level.

So – **Fats burn in the flame of carbohydrates.** High ratio of carbohydrates also helps to spare protein, which is your lean tissue. During intense physical exertion, carbohydrates are used as the primary source of energy. Insufficient carbohydrates will only lead to the breakdown of lean tissues for energy.

Medium protein should be consumed because excessive intake of protein may possibly stress our internal organs as protein is utilized mainly for growth and repair of tissues.

Low fat is obviously acceptable because this is what we are trying to control. When the food we eat is low in fats, food moves more quickly through the intestines, decreasing the amount of food absorbed. Food with a higher fat content slows down the rate of transit and body is able to absorb more fat into the gut.

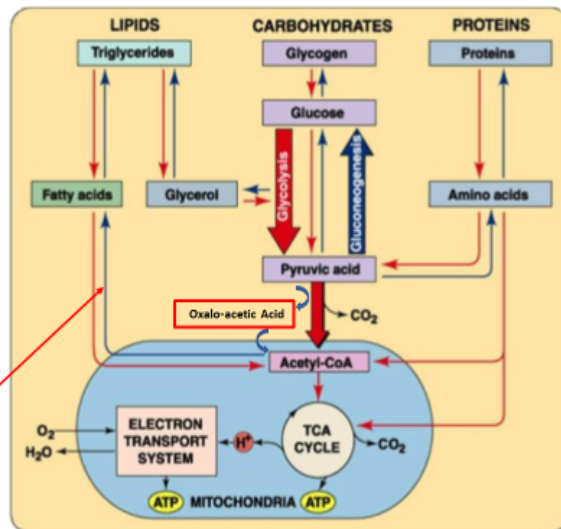
METABOLIC MILLS



Since oxalo-acetate is formed from pyruvate (a metabolite of glucose), a certain level of carbohydrate is required in order to burn fats. Otherwise, fatty acids cannot be completely broken down and ketones will be produced.

(notice the reverse arrow in blue)

- On recommended plate portion should be:
- 60-65% Carbohydrates
- 25-30% Proteins
- 10-15% Fats



OVERVIEW OF GENERAL METABOLIC PATHWAY

4) High Fibre Diet

High fibre diet decreases fat absorption. The fibre content increases food transit and binds fat to make it into one big fat molecule which cannot be absorbed into the blood.

A good way of preparing a high fibre meal:

- Select all the salad you want
- Add in 1 to 2 egg whites or some water based tuna fish
- Add slices of fruits and raisins

This will be a very good and healthy dinner!

5) Eat less as the day goes on:- “Breakfast like a king, Lunch like a prince and Dinner like a pauper.”

Our body’s metabolic rate is most efficient in the morning and tapers off during the course of the day. Based on this, your breakfast should be the largest meal of the day followed by lunch and dinner. This will decrease the chances of calories being stored as fats.

At the end of the day, the metabolic rate slows down and food intake should be adjusted in quantity. Research has found that the metabolic rate begins to dip at about 6 p.m., so try to restrict food at night and have an earlier dinner. Food taken at the later part of the day has a greater predisposition to be stored as fats. You can try to reschedule your training time to the evening and follow the post workout meal of carbohydrates and protein to capitalize the biochemical event as in (7).

6) Eat small, frequent meals; Eat until comfortably full only

Substantial scientific research has documented that metabolic rate spikes after each meal. The increase in feeding frequencies will constantly stimulate the metabolism. It will also increase the rate of transit of food through the intestine, food will be processed more efficiently and fat absorption will be decreased. In addition, it will also increase the efficiency of nutrients absorption.

Frequently eating small amounts of food will also help maintain a more constant blood sugar level, so as not to induce any insulin response. It will also keep your blood glucose level elevated and results in a decrease in biological hunger. Your frequent chewing and salivation, as well as the enzyme activities associated with it, will help control your appetite!

7) Timed feedings to capitalize on biochemical events (the Training Effect)

A workout requires mental concentration, muscular contraction, sweating, heavy breathing and a lot of hard work which results in a partial depletion in glycogen, the storage form of carbohydrates that fuel our training.

Protein requirements increase tremendously for repairs and other nutrients are also in need for other biological recuperation, replenishment and repairs.

Our body's requirements for nutrients is very specific to its needs, therefore to capitalize on the biochemical processes, ***you should eat only carbohydrates 20 to 30 minutes after your training.*** At this time, there is a 'window of opportunity' where all carbohydrates ingested will be stored as glycogen for your future training needs. Carbohydrates taken in at this time should be easily digestible, regardless whether it is simple or complex carbohydrates.

Then, ***protein foods should be ingested approximately 90 to 120 minutes after training.*** This is the time when the body goes through the recuperation and reparation phase. Good sources of protein should be ingested in the form of steamed chicken breast, boiled broccoli, protein powder or any other good sources of protein supplements.

8) Adjust training time

Research has found that the body is able to mobilize fat into the blood stream if training time is scheduled in the early morning on an empty stomach. The mobilization of fat from its depots into the blood circulation will enhance fat metabolism. If you are able to wake up early and train in the early hours especially aerobic exercises.

9) Ergogenics

Ergogenics refers to any element, whether physically tangible or intangible, that is able to improve performance, recuperation or enhance one's training regimen in one way or another.

Caffeine, as found in coffee has an ergogenic effect towards fats mobilization! Even though caffeine is a central nervous system stimulant which makes people lose their coordination, cause headaches, migraine and many other adverse reactions for those who can't tolerate coffee.

But coffee, with its caffeine content can serve as an ergogenic aid to utilize fat. Say you are consuming 3 cups of coffee per day, all you have to do is to shift one cup to 30 minutes prior to your workout. This cup should preferably be black coffee.

Numerous research data have concluded that 30 minutes after ingestion of coffee, free fatty acids level are much higher in blood as compared to control subjects. These circulating fatty acids indicate that caffeine mobilizes fat from its depots into the blood and serve as the main source of energy during your training.

10) Reduce fat uptake while eating the same amount of calories

The body responds to calories deficit by initiating a defense mechanism to slow down the metabolic rate so as to preserve body fat for physiological functions. Because of this phenomenon, we should not in any way reduce our total caloric intake but alter the source of calories instead. For example, calories from carbohydrates and proteins need a certain amount of energy (approximately 30% of the nutrients energy) and a series of complex biochemical processes during digestion until storage as fats.

Select foods that are low in fats. Sources of calories should be from complex carbohydrates (this will not induce insulin response). Protein sources should be from white meat. Because of the fibre content in carbohydrates, it makes the food more caloric economical. For example, the caloric density of an orange is lower than a glass of orange juice from the same orange. Therefore, it is imperative to learn about the food you are eating and evaluate what they are made of.

To monitor your progress of body fat control, there are a few methods. The most commonly used one is the weighing scale but I advise you to use it only once a week because it can be misleading and discouraging. This is because our body weight fluctuates one to five pounds a day due to glycogen content, sodium intake and hormonal changes.

Other ways to measure body fat include using *bioelectrical impedance analyzers*, *ultrasound measuring device*, *hydrostatic weighing* and *skinfold measurement*.

The suggested healthy parameters of body fat percentage are 10%–22% for men and 20%–33% for women. Athletes however, tend towards considerably lower fat ratios in the 10 to 15% range.

Fat cells, once produced by the body through excessive eating, can never be lost. At a certain body fat level, the internal thermostat creates a set-point that prevents the muscle and organs from using the fat as energy. These increased numbers of fat cells may become smaller through proper eating and exercise but they can never be removed except through surgery.