Factors that influence basal metabolic rate are:

* Body size: Metabolic rate increases as weight, height, and surface area increase.
* Body composition: Fat tissue has a lower metabolic activity than muscle tissue. As lean muscle mass increases, metabolic rate increases.
* Gender: The basal metabolic rate (BMR) averages 5 to 10 percent lower in women than in men. This is largely because women generally possess more body fat and less muscle mass than men of similar size.
* Age: A decrease in lean muscle mass during adulthood results in a slow, steady decline of roughly 0 3 percent per year in BMR after the age of about 30. This can be largely avoided by strength training throughout adulthood.
* Climate and body temperature: The BMR of people in tropical climates is generally 5 to 20 percent higher than their counterparts living in more temperate areas because it takes energy to keep the body cool. Exercise performed in hot weather also imposes an additional metabolic load. Body fat content and effectiveness of clothing determine the magnitude of increase in energy metabolism in cold environments; it takes energy to keep the body warm if you work or exercise in very cold weather.
* Hormonal levels: Thyroxine (T4), the key hormone released by the thyroid glands has a significant effect upon metabolic rate. Hypothyroidism is relatively common, especially in women near or after menopause. Everyone with a weight problem should have their thyroid function checked by their doctor and treated appropriately if it turns out to be low.
* Health: Fever, illness, or injury may increase resting metabolic rate two-fold.

# 10 Factors that Affect your Metabolism

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*How we eat can have a lasting impact on our metabolism*

To stay alive and functioning, your body has to carry out millions of chemical processes, which are collectively known as your metabolism.

Your metabolism can play a role in weight gain by influencing the amount of energy your body needs at any given point. Excess energy is then stored as fat.

Don’t be too quick to blame a ‘slow metabolism’ for weight gain as better food choices and exercise have the biggest impact.

The biggest component of your metabolism, (50-80%) of the energy used, is your basal metabolic rate (BMR), which is the energy your body burns just to maintain functioning at rest.

**Here are ten factors that affect BMR and metabolism:**

1. **Muscle mass.** The amount of muscle tissue on your body. Muscle requires more energy to function than fat. So the more muscle tissue you carry, the more energy your body needs just to exist. (Resistance or strength training is most effective for building and maintaining mass.)

2. **Age.** As you get older, your metabolic rate generally slows. This is because of a loss of muscle tissue and changes to hormonal and neurological processes. During development children go through periods of growth with extreme rates of metabolism.

3. **Body size.** Those with bigger bodies have a larger BMR because they have larger organs and fluid volume to maintain.

4. **Gender.** Men generally have faster metabolisms than women.

5. **Genetics.** Some families have faster BMR than others with some genetic disorders also affecting metabolism.

6. **Physical activity.** Exercise increases muscle mass and powers up your metabolic engines burning kilojoules at a faster rate, even when at rest.

7. **Hormonal factors.** Hormonal imbalances such as hypo & hyperthyroidism can affect your metabolism.

8. **Environmental factors.** Environmental changes such as increased heat or cold forces the body to work harder to maintain its normal temperature and increases BMR.

9. **Drugs.** Caffeine and nicotine can increase your BMR whilst medications such as antidepressants and steroids increase weight gain regardless of what you eat.

10. **Diet.** Food changes your metabolism. What and how you eat has a big influence on your BMR.

This list shows us that some things you can change to alter your BMR and some things you can’t. The good news is that you can do plenty to alter the balance.

Chiropractic principles tell us that working to create a body that works well without interference will powerfully affect health. The food, exercise and activity choices that we make can also increase BMR and reduce interference to the nervous system allowing your body to thrive. A win-win situation.

**Basal Metabolic Rate (BMR): Definition, Factors and Significance**

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**Let us make an in-depth study of the basal metabolic rate (BMR). After reading this article you will learn about 1. Definition of BMR 2. Factors Influencing BMR and 3. Significance of BMR.**

**Definition of BMR:**

Basal metabolic rate is the energy released when the subject is at complete mental and physical rest i.e. in a room with comfortable temperature and humidity, awake and sitting in a reclining position, 10-12 hours after the last meal. It is essentially the minimum energy required to maintain the heart rate, respiration, kidney function etc.

The B.M.R. of an average Indian man is 1750-1900 Kcal/day. In terms of oxygen consumption it would amount to about 15 litre/hr. Heavily built persons have higher BMRs, but the BMR per unit body weight is higher in the smaller built individuals ex. although the BMR of a man as given above is higher than that of a boy of 15 kg body weight that spends about 800 Kcal/day for its basal metabolism, the BMR per kg/day of man is about 30 Kcal, while that of the boy is about 53 Kcal/kg/day.

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The variable that correlates most with the BMR is the surface area of the body. Thus in case of both boy and man the BMR is around 1000 Kcal/m2 body surface/day.

**In case of human beings body surface area can be calculated by the following formula:**

S = 0.007184 x W0.425 x h0.725

where

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S = surface area in sq metres

W = body weight in kg and

H = height in cm

**Factors Influencing BMR:**

There are many factors that affect the BMR. These include body temperature, age, sex, race, emotional state, climate and circulating levels of hormones like catecholamine’s (epinephrine and norepinephrine) and those secreted by the thyroid gland.

**1. Genetics (Race):**

Some people are born with faster metabolism and some with slower metabolism. Indians and Chinese seem to have a lower BMR than the Europeans. This may as well be due to dietary differences between these races. Higher BMR exists in individuals living in tropical climates. Ex. Singapore.

**2. Gender:**

Men have a greater muscle mass and a lower body fat percentage. Thus men have a higher basal metabolic rate than women. The BMR of females declines more rapidly between the ages of 5 and 17 than that of males.

**3. Age:**

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BMR reduces with age i.e. it is inversely proportional to age. Children have higher BMR than adults. After 20 years, it drops about 2 per cent, per decade.

**4. Weight:**

The heavier the weight, the higher the BMR, ex. the metabolic rate of obese women is 25 percent higher than that of thin women.

**5. Body surface area:**

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This is a reflection of the height and weight. The greater the body surface area factor, the higher the BMR. Tall, thin people have higher BMRs. When a tall person is compared with a short person of equal weight, then if they both follow a diet calorie-controlled to maintain the weight of the taller person, the shorter person may gain up to 15 pounds in a year.

**6. Body fat percentage:**

The lower the body fat percentage, the higher the BMR. The lower body fat percentage in the male body is one reason why men generally have a 10-15% higher BMR than women.

**7. Diet:**

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Starvation or serious abrupt calorie-reduction can dramatically reduce BMR by up to 30%. Restrictive low-calorie weight loss diets may cause BMR to drop as much as 20%. BMR of strict vegetarians is 11% lower than that of meat eaters.

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**8. Body temperature/health:**

For every increase of 0.5° C in internal temperature of the body, the BMR increases by about 7 percent. The chemical reactions in the body actually occur more quickly at higher temperatures. So a patient with a fever of 42° C (about 4° C above normal) would have an increase of about 50 percent in BMR. An increase in body temperature as a result of fever increases the BMR by 14-15% per degree centigrade which evidently, is due to the increased rate of metabolic reactions of the body.

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**9. External temperature:**

Temperature outside the body also affects basal metabolic rate. Exposure to cold temperature causes an increase in the BMR, so as to create the extra heat needed to maintain the body’s internal temperature. A short exposure to hot temperature has little effect on the body’s metabolism as it is compensated mainly by increased heat loss. But prolonged exposure to heat can raise BMR.

**10. Glands:**

Thyroxine is a key BMR-regulator which speeds up the metabolic activity of the body. The more thyroxine produced, the higher the BMR. If too much thyroxine is produced (thyrotoxicosis) BMR can actually double. If too little thyroxine is produced (myxoedema) BMR may shrink to 30-40 percent of normal rate. Like thyroxine, adrenaline also increases the BMR but to a lesser extent. Anxiety and tension may not show on the face but they do produce an increased tensing of the muscles and release of norepinephrine even though the subject is seemingly quiet. Both these factors tend to increase the metabolic rate.

**11. Exercise:**

Physical exercise not only influences body weight by burning calories, it also helps raise the BMR by building extra lean tissue. (Lean tissue is more metabolically demanding than fat tissue.) So more calories are burnt even when sleeping.

**12. Pregnancy:**

The BMR is not changed during pregnancy. The higher value of BMR in late pregnancy is due to the BMR of the foetus.

**Significance of BMR:**

1. The determination of BMR is the principal guide for diagnosis and treatment of thyroid disorders.

2. If BMR is less than 10% of the normal, it indicates moderate hypothyroidism. In severe hypothyroidism, the BMR may be decreased to 40 to 50 percent below normal.

3. BMR aids to know the total amount of food or calories required to maintain body weight.

4. The BMR is low in starvation, under nutrition, hypothalamic disorders, Addison’s disease and lipoid nephrosis.

5. The BMR is above normal in fever, diabetes insipidus, leukemia and polycythemia.