

## **Basal metabolic rate**

Basal metabolic rate (BMR) is often used interchangeably with resting metabolic rate (RMR). While BMR is a minimum number of calories required for basic functions at rest, RMR — also called resting energy expenditure (REE) — is the number of calories that the body burns while it's at rest.

### **How to estimate your BMR**

One popular way to estimate BMR is through the Harris-Benedict formula, which takes into account weight, height, age, and gender.

#### **Women:**

$$\text{BMR} = 655 + (9.6 \times \text{weight in kg}) + (1.8 \times \text{height in cm}) - (4.7 \times \text{age in years})$$

#### **Men:**

$$\text{BMR} = 66 + (13.7 \times \text{weight in kg}) + (5 \times \text{height in cm}) - (6.8 \times \text{age in years})$$

## **Specific dynamic action or Thermic Effect of Food**

Specific dynamic action, also called the thermic effect of food (TEF) and dietary induced thermogenesis, is the amount of energy expenditure above the RMR due to the ingestion and digestion of food for use as energy or conversion to a storage form. It is one of the components of overall daily energy metabolism and energy expenditure. A commonly used TEF estimate is 10% of daily caloric intake, though the magnitude varies substantially with the different food constituents consumed. For example, dietary fat is relatively easy to process physiologically and has very little thermic effect, while protein is harder to process and has a much larger thermic effect.

## **Glycemic index**

The glycemic index, simply put, is a measure of how quickly a food causes our blood sugar levels to rise.

The measure ranks food on a scale of zero to 100. Foods with a high glycemic index, or GI, are quickly digested and absorbed, causing a rapid rise in blood sugar. These foods that rank high on the GI scale are often — but not always — high in processed carbohydrates and sugars.

Meanwhile, foods with a low GI are digested and absorbed at a slower rate, and subsequently, cause a slower rise in blood sugar levels. These are typically rich in fiber, protein and/or fat. Examples of these include apples with a glycemic index of 28, and peanuts at seven.

### **Dietary fiber**

Fiber, also known as roughage, is the indigestible part of plant foods that travels through our digestive system, absorbing water along the way and easing bowel movements.

Dietary fiber refers to nutrients in the diet that are not digested by gastrointestinal enzymes but still fulfil an important role.

Mostly found in vegetables, fruits, whole grains, and legumes, fiber has a host of health benefits, including reducing the risk of heart disease and diabetes.

### **Balanced diet**

A balanced diet is a diet that contains an adequate quantity of the nutrients that we require in a day. A balanced diet includes six main nutrients, i.e. Fats, Protein, Carbohydrates, Fibre, Vitamins, and Minerals.

All these nutrients are present in the foods that we eat. Different food items have different proportions of nutrients present in them. The requirements of the nutrients depend on the age, gender, and health of a person.

### ***Importance of a Balanced Diet***

The following are the importance of a balanced diet :

- Balanced Diet leads to a good physical and a good mental health.
- It helps in proper growth of the body.
- Also, it increases the capacity to work
- Balanced diet increases the ability to fight or resist diseases.

Components of a balanced diet

Some components of a balanced diet are as follows :

### **Fats**

Some part of our energy requirement is fulfilled by fats. Fats can be found in fatty foods such as butter, ghee, oil, cheese, etc.

## Proteins

We need proteins for growth purposes and to repair the wear and tear of the body. Protein also helps in building muscle. It is found in dairy products, sprouts, meat, eggs, chicken, etc

## Carbohydrates

We need the energy to process and it is fulfilled by carbohydrates. Carbs provide us energy. Carbohydrates can be found in rice, wheat, chapati, bread, etc. Cereals are our staple food.

## Minerals and Vitamins

Vitamins, Minerals, and Fibre improve the body's resistance to disease. We mainly obtain it from vegetables and fruits. Deficiency diseases like Anemia, Goitre, etc can be caused due to lack of mineral in the body.

**Protein–energy malnutrition (PEM)** is a form of malnutrition that is defined as a range of pathological conditions arising from coincident lack of dietary protein and/or energy (calories) in varying proportions. The condition has mild, moderate, and severe degrees.

Kwashiorkor (protein malnutrition predominant).

Marasmus (deficiency in calorie intake).

Marasmic kwashiorkor (marked protein deficiency and marked calorie insufficiency signs present, sometimes referred to as the most severe form of malnutrition)

## Minerals

Dietary elements (commonly known as dietary minerals or mineral nutrients) are the chemical elements required by living organisms, other than the four elements carbon, hydrogen, nitrogen and oxygen present in common organic molecules.

Vitamins are generally categorized into

1. Macrominerals
2. Microminerals

Macrominerals

### Calcium

- **Deficiency:** Long-term inadequate intake can result in low bone mineral density, rickets, osteomalacia and osteoporosis.
- **Toxicity:** Will cause nausea, vomiting, constipation, dry mouth, thirst, increased urination, kidney stones and soft tissue calcification.
- **Sources:** Green leafy vegetables, legumes, tofu, molasses, sardines, okra, perch, trout, Chinese cabbage, rhubarb, sesame seeds

## Phosphorus

- **Deficiency:** Very rare. Those at risk include premature infants, those who use antacids, alcoholics, uncontrolled diabetes mellitus and refeeding syndrome.
- **Toxicity:** Very rare. May result in soft tissue calcification.
- **Sources:** Legumes, nuts, seeds, whole grains, eggs, fish, buckwheat, seafood, corn, wild rice

Consume iron rich foods with vitamin C rich foods to enhance absorption.

## Iron

- **Deficiency:** Anemia with small and pale red blood cells. In children it is associated with behavioral abnormalities.
- **Toxicity:** Common cause of poisoning in children. May increase the risk of chronic disease. Excessive intake of supplemental iron is an emergency room situation. Cardiovascular disease, cancer, and neurodegenerative diseases are associated with iron excess.
- **Sources:** Almonds, apricots, baked beans, dates, lima beans, kidney beans, raisins, brown rice, green leafy vegetables, broccoli, pumpkin seeds, tuna, flounder, chicken meat, pork

## Iodine

- **Deficiency:** Impairs growth and neurological development. Deficiency can also result in the decreased production of thyroid hormones and hypertrophy of the thyroid.
- **Toxicity:** Rare and occurs in doses of many grams. Symptoms include burning mouth, throat and stomach. Fever and diarrhea can also result.
- **Sources:** Sea vegetables, iodized salt, eggs, strawberries, asparagus, green leafy vegetables.
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## PH homeostasis

A variety of buffering systems exist in the body that helps maintain the pH of the blood and other fluids within a narrow range—between pH 7.35 and 7.45.

A buffer is a substance that prevents a radical change in fluid pH by absorbing excess hydrogen or hydroxyl ions.

Most commonly, the substance that absorbs the ion is either a weak acid, which takes up a hydroxyl ion ( $\text{OH}^-$ ), or a weak base, which takes up a hydrogen ion ( $\text{H}^+$ ).

Several substances serve as buffers in the body, including cell and plasma proteins, hemoglobin, phosphates, bicarbonate ions, and carbonic acid.

The bicarbonate buffer is the primary buffering system of the IF surrounding the cells in tissues throughout the body.

The respiratory and renal systems also play major roles in acid-base homeostasis by removing  $\text{CO}_2$  and hydrogen ions, respectively, from the body.