Energy density X nutrient density

- Energy density and nutrient density are important terms to understand when making food choices. Foods that are energy-dense contain a higher number of calories per serving, while foods that are nutrient-dense contain a higher level of vitamins, minerals with the other important nutrients(Amino acids,) with little or no added sugars or fats that raise calories.
- Think of the difference between potato chips and plain baked potato, or sweetened yogurt and plain yogurt, or creamed spinach and steamed spinach. Adding fat or sugar to foods increases the calorie content, making these foods more energy-dense.
- choosing nutrient-dense foods more often allow us to consume a higher number of essential vitamins and minerals that promote good health, while avoiding consuming too many calories that can lead to overweight or obesity.
- Another benefit of nutrient-dense foods is that they are often high in water and fiber, which increases their volume without increasing calories. For example, compare the volume of 100 calories of a raw apple to 100 calories of apple juice. About 2 cups of sliced raw apples contains 100 calories, while 1 cup of unsweetened apple juice 113 calories. You'll feel more satisfied by eating the apples instead of drinking the juice because the total volume of food that we consume is the primary reason for satiety. We can eat a larger volume of low- energy, nutrient-dense foods and lose weight feeling satisfied

The organic and the inorganic molecules that are required by the cells are referred to as nutrients. Whereas the process by which these nutrients are transformed in an organism so that the cells can use them is known as nutrition.

Nutrients that are needed in large amounts are called macronutrients. Macronutrients include carbohydrates, lipids (fats), proteins, and water.
Carbohydrates, lipids, and proteins provide energy (calories) which can be used ("burned") by your body to perform basic functions. A gram of carbohydrate has 4 calories. A gram of protein has 4 calories. A gram of fat has 9 calories.
someone on a diet high in nutrients will consume fewer calories. They'll also have a lesser impact on blood sugar levels and subsequent insulin response. You can actually lose weight by eating more if you focus on nutrient-rich foods.
Foods that supply generous amounts of one or more nutrients compared to the number of calories they supply are called **nutrient dense**
a nutrient balanced diet always trumps one based on calorie count.
Studies have shown that diets solely based on calorie count can actually lead to malnutrition. This is why it's important you know about the essential nutrients your body needs.
Examples of calorie-rich foods include: Proteins: Red meats, pork, chicken with skin on, salmon or other oily fish, beans, whole milk, eggs, cheese, full-fat yogurt.
fats and oils.
Carbohydrates: potatoes, brown rice, whole grain pasta, whole grains, whole grain breads

100-calorie snacks

- Another way to think about the idea of nutrient-dense and calorie-dense foods is to look at a variety of foods that all provide the same calories. Let's say that you wanted to have a small snack. You might choose:

- A 7- or 8-inch banana
- 20 peanuts
- 3 cups low-fat popcorn
- Two regular chocolate-sandwich cookies
- 1/2 cup low-fat ice cream
- One scrambled large egg cooked with oil
- 2 ounces baked chicken breast with no skin

- These choices all have about 100 calories but provide different amounts of nutrients. The right choice for you may depend on what else you're eating throughout the day.
- Eating healthy is not just about how much you eat, it's also about what you eat.
- Older adults should try to eat foods that are packed with nutrients while limiting foods that are high in calories but provide few nutrients.
- Swapping out snacks and beverages with nutrient-dense alternatives can help you get the nutrients you need while staying within your recommended number of calories.

What is Nutrition Labeling?

Nutrition labeling is **a requirement from the FDA on most beverages and packaged foods**. These labels, also called the Nutrition Facts label, show the nutrient content of a food product to consumers and guide them in food selection.

Nutrient density identifies the amount of beneficial nutrients in a food product in proportion to e.g. energy content, weight or amount of detrimental nutrients. Terms such as **nutrient rich** and **micronutrient dense** refer to similar properties.

According to the World Health Organization, nutrient profiling classifies and/or ranks foods by their nutritional composition in order to promote human health and to prevent disease. Ranking by nutrient density is one such nutrient profiling strategy. Ordering foods by nutrient density is a statistical method of comparing foods by the proportion of nutrients in foods. Some such comparisons can be the glycemic index and the overall nutritional quality index.

When the density is defined in proportion to energy contents, nutrient-dense foods such as fruits and vegetables are the opposite of energy-dense food (also called "empty calorie" food), such as alcohol and foods high in added sugar or processed cereals.

Beyond its use to distinguish different *types* of food from each other, nutrient labelling allows comparison to be made for different examples or samples of the same kind of food.

The foods and drinks that contain primarily empty calories are:

- Soft drinks, sports drinks, sweet tea, lemonade and energy drinks.
- Alcohol.
- Junk food and fast food.
- Candy, including hard candies and sweet or sour chews.
- Cakes and donuts.
- One of the most effective ways to avoid empty calories is by ensuring your diet is **full fiber rich, low calorie fruits and vegetables**. Fruits and vegetables not only provide the body with necessary vitamins and minerals but they also contain a wide variety of other nutrients that have many different effects on the body ...

BMR Definition: Your Basal Metabolic Rate (BMR) is **the number of calories you burn as your body performs basic (basal) life-sustaining function**. Commonly also termed as Resting Metabolic Rate (RMR), which is the calories burned if you stayed in bed all day.

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. sex

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:

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:

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:

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.

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

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 (myxedema) 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 fetus.

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.