



N.B.K.R. INSTITUTE OF SCIENCE AND TECHNOLOGY (AUTONOMOUS)

HEALTH AND WELLNESS, YOGA AND SPORTS

Department of Physical Education



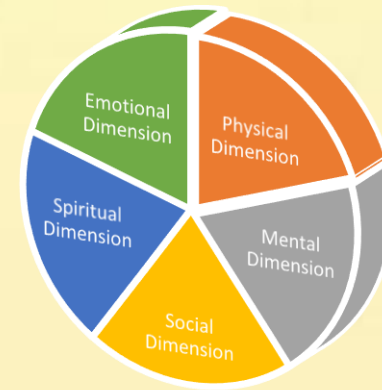
Unit - 01

Health

Health is a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity. It encompasses a holistic balance of various factors that contribute to an individual's overall vitality and quality of life. This multidimensional concept extends beyond just the absence of illness to encompass elements such as emotional resilience, social connections, environmental factors, and access to healthcare services.

Dimensions of Health :

- Physical Dimension
- Mental dimension
- Social Dimension
- Spiritual Dimension
- Emotional Dimension



Fitness

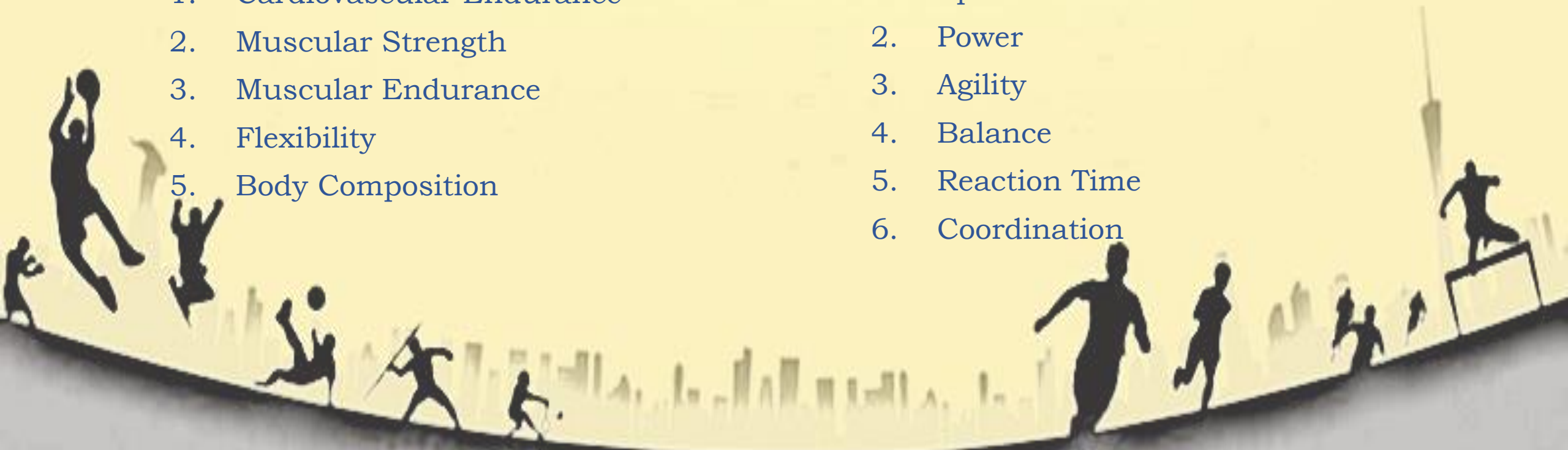
The physical fitness definition is the ability to perform daily tasks with ease, without becoming tired, and with extra energy to enjoy leisure-time activities such as hobbies and extra daily tasks. Physical fitness is when a person can execute daily activities with maximum performance, endurance, and strength. A person that is physically fit can also manage some health-related diseases, exhaustion, and undue stress.

Health related fitness components

1. Cardiovascular Endurance
2. Muscular Strength
3. Muscular Endurance
4. Flexibility
5. Body Composition

Skill related fitness components

1. Speed
2. Power
3. Agility
4. Balance
5. Reaction Time
6. Coordination

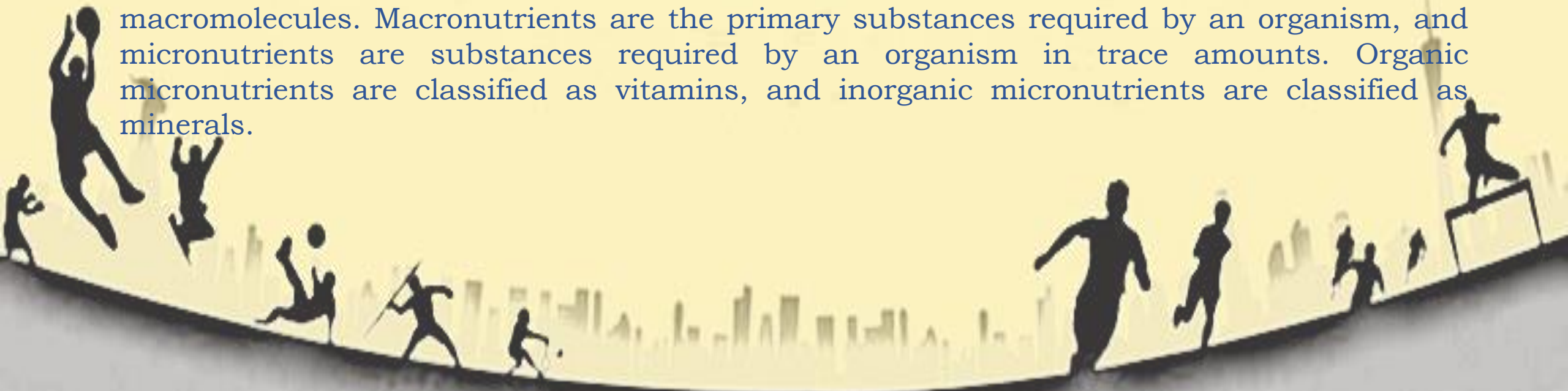


Nutrition

Nutrition is the biochemical and physiological process by which an organism uses food to support its life. It provides organisms with nutrients, which can be metabolized to create energy and chemical structures. Failure to obtain sufficient nutrients causes malnutrition. Nutritional science is the study of nutrition, though it typically emphasizes human nutrition.

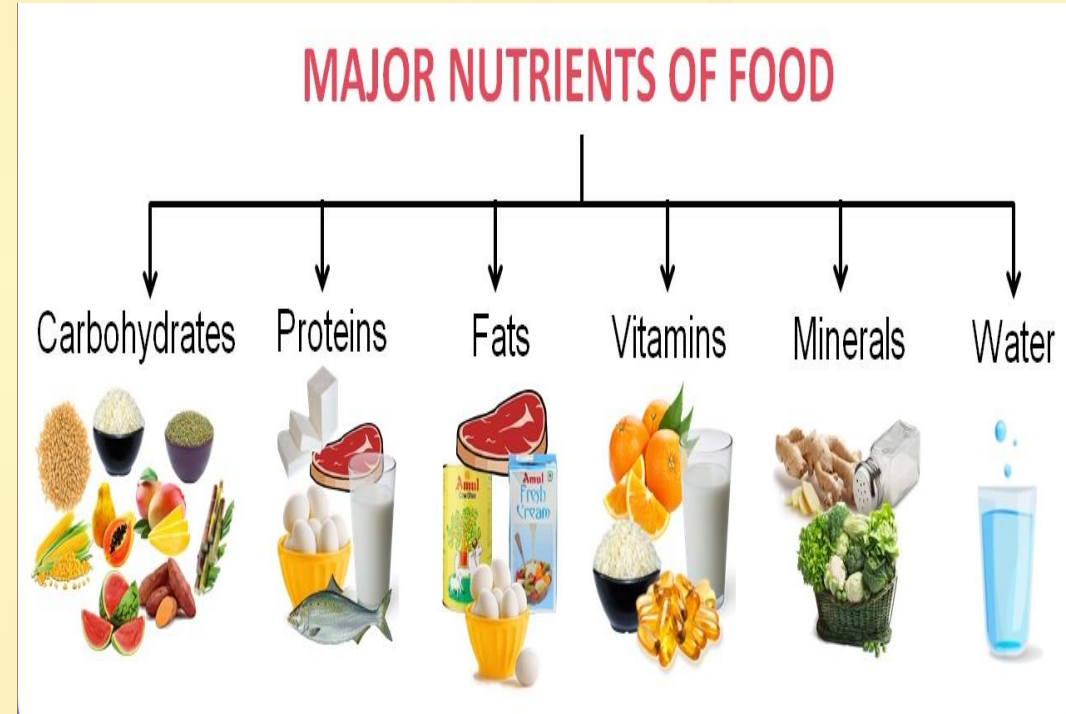
Nutrients

Nutrients are substances that provide energy and physical components to the organism, allowing it to survive, grow, and reproduce. Nutrients can be basic elements or complex macromolecules. Macronutrients are the primary substances required by an organism, and micronutrients are substances required by an organism in trace amounts. Organic micronutrients are classified as vitamins, and inorganic micronutrients are classified as minerals.



Types of Nutrients

- Carbohydrates
- Fats
- Proteins
- Vitamins
- Minerals
- Water



Carbohydrates

Carbohydrates are your body's primary source of energy. They are usually found in food as sugars, fibers, and starches, which are processed by the digestive system into glucose which is used to fuel the body.

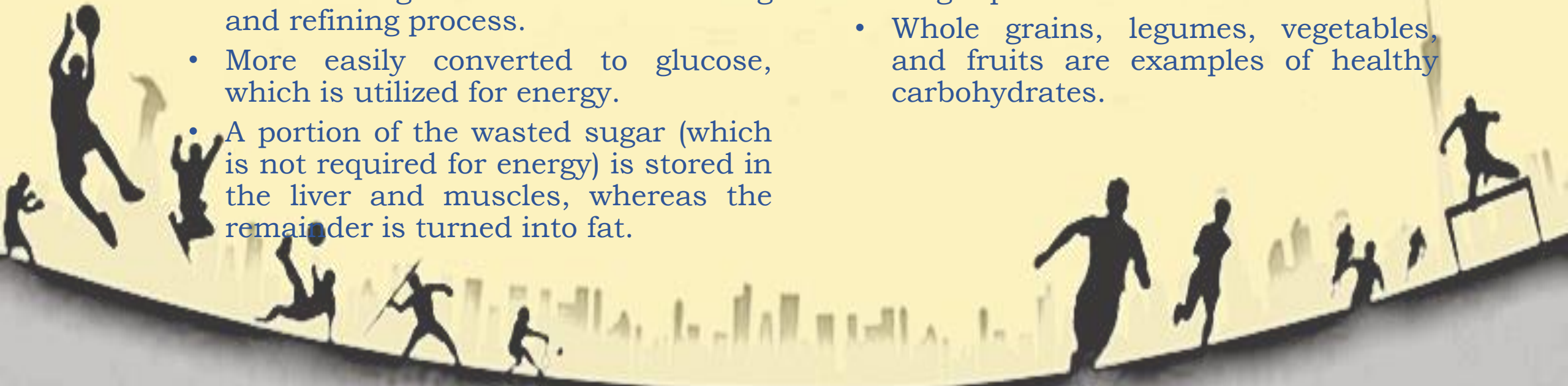
Carbohydrates are classified into two types.

Simple carbs

- Includes naturally sweet foods, such as fruits, vegetables, and milk as well as foods that have sugar added to them throughout the manufacturing and refining process.
- More easily converted to glucose, which is utilized for energy.
- A portion of the wasted sugar (which is not required for energy) is stored in the liver and muscles, whereas the remainder is turned into fat.

Complex or starchy carbs

- Complex or starchy carbohydrates take longer to digest, providing less energy and keeping you satisfied for a longer period of time.
- Whole grains, legumes, vegetables, and fruits are examples of healthy carbohydrates.



Fats

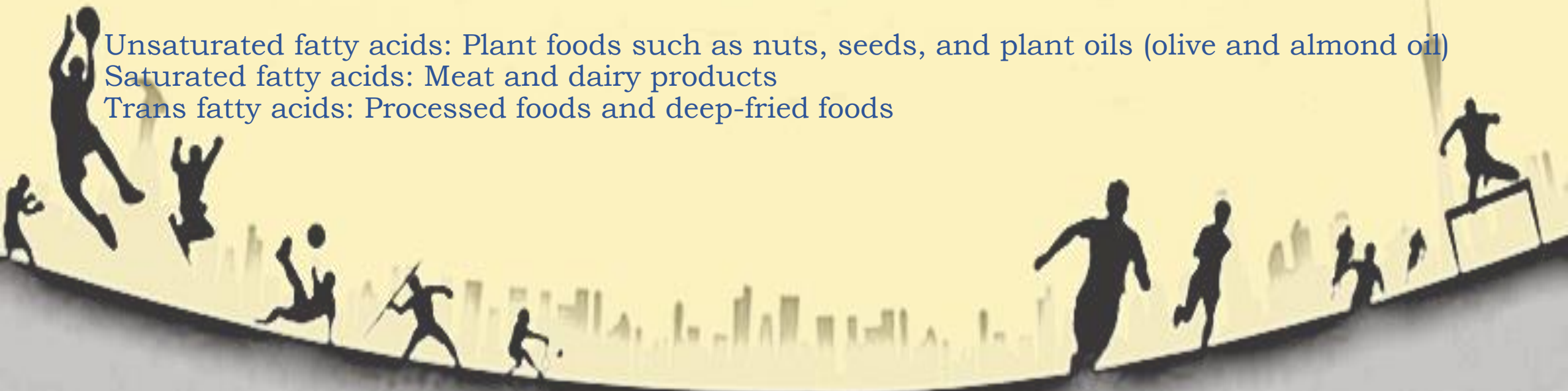
Fats are necessary to sustain a healthy body. Also called lipids or fatty acids, fats exist in a three-molecule structure called triglyceride and can be classified as healthy or unhealthy based on their advantages or risks to the body.

Healthy fats help lower blood pressure, combat heart disease, and help the body absorb micronutrients, such as vitamins and minerals. Certain types of fat can be produced by the body, whereas others must be obtained through diet or supplements. External fats are referred to as essential fats, and they are further classified into three types.

Unsaturated fatty acids: Plant foods such as nuts, seeds, and plant oils (olive and almond oil)

Saturated fatty acids: Meat and dairy products

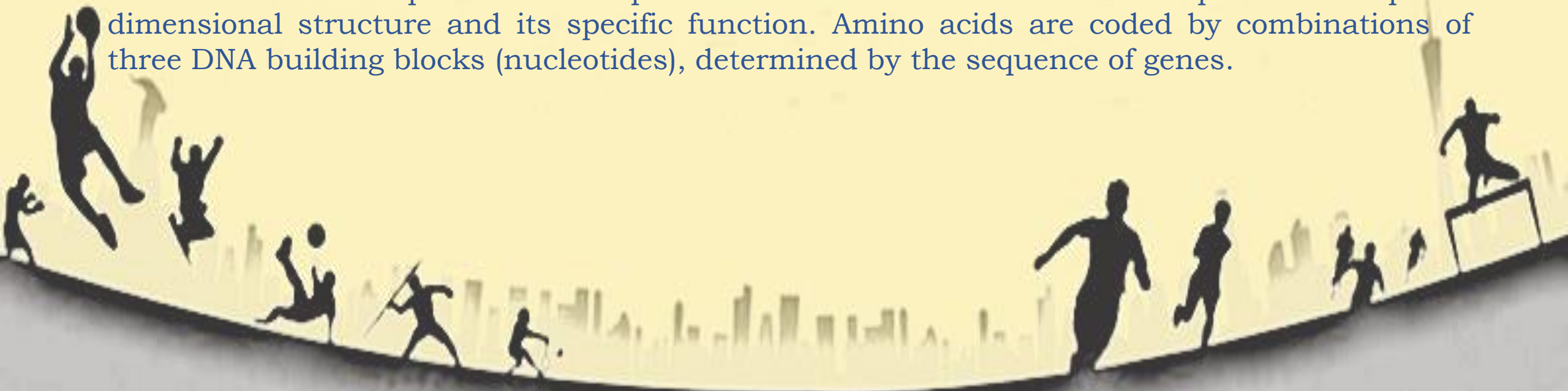
Trans fatty acids: Processed foods and deep-fried foods



Proteins

Proteins are large, complex molecules that play many critical roles in the body. They do most of the work in cells and are required for the structure, function, and regulation of the body's tissues and organs.

Proteins are made up of hundreds or thousands of smaller units called amino acids, which are attached to one another in long chains. There are 20 different types of amino acids that can be combined to make a protein. The sequence of amino acids determines each protein's unique 3-dimensional structure and its specific function. Amino acids are coded by combinations of three DNA building blocks (nucleotides), determined by the sequence of genes.



Vitamins

The vitamins are natural and essential nutrients, required in small quantities and play a major role in growth and development, repair and healing wounds, maintaining healthy bones and tissues, for the proper functioning of an immune system, and other biological functions. These essential organic compounds have diverse biochemical functions.

There are thirteen different types of vitamins and all are required for the metabolic processes. The discovery of the vitamins was begun in the year 1912 by a Polish American biochemist Casimir Funk.

Based on the solubility, Vitamins have been classified into two different groups:

- Fat-Soluble Vitamins.
- Water-Soluble Vitamins.



Minerals

Minerals in food are the elements present in food that are required by our body to develop and function properly. From the above definition, we can deduce that minerals are inorganic substances required by the human body to function correctly. The human body requires varying amounts of minerals daily in order to build strong bones and muscles. It also helps to maintain various bodily functions.

There are many examples of minerals in food; these include:

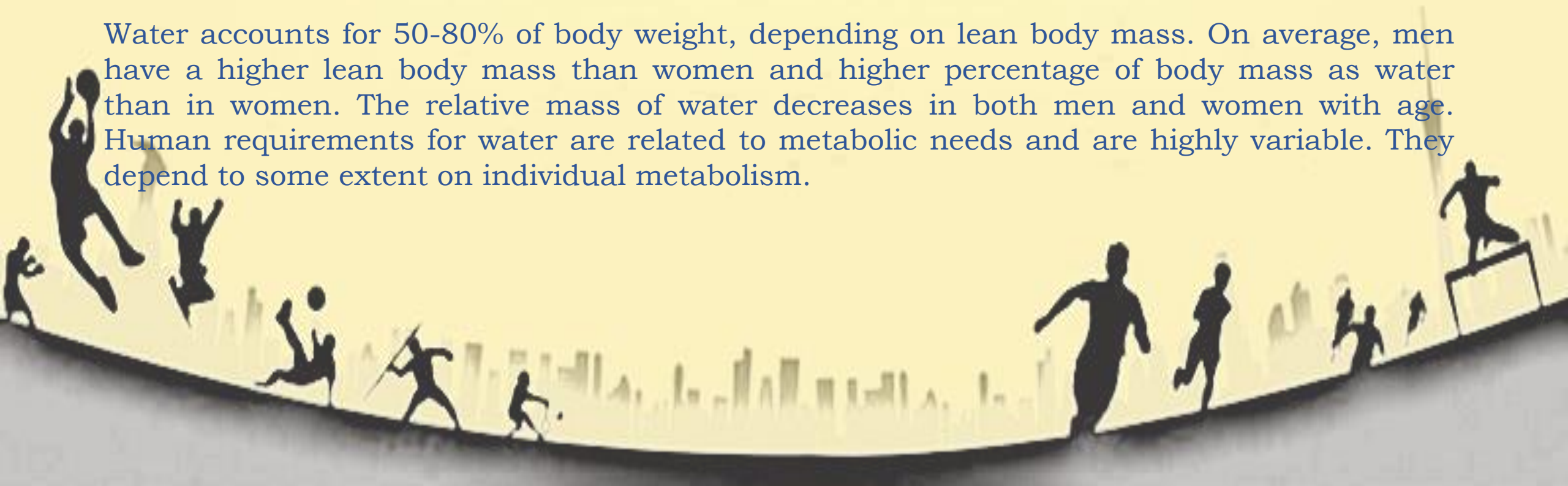
- Calcium
- Phosphorus
- Potassium
- Sodium
- Iodine
- Iron
- Magnesium



Water

Water is defined as an essential nutrient because it is required in amounts that exceed the body's ability to produce it. All biochemical reactions occur in water. It fills the spaces in and between cells and helps form structures of large molecules such as protein and glycogen. Water is also required for digestion, absorption, transportation, dissolving nutrients, elimination of waste products and thermoregulation.

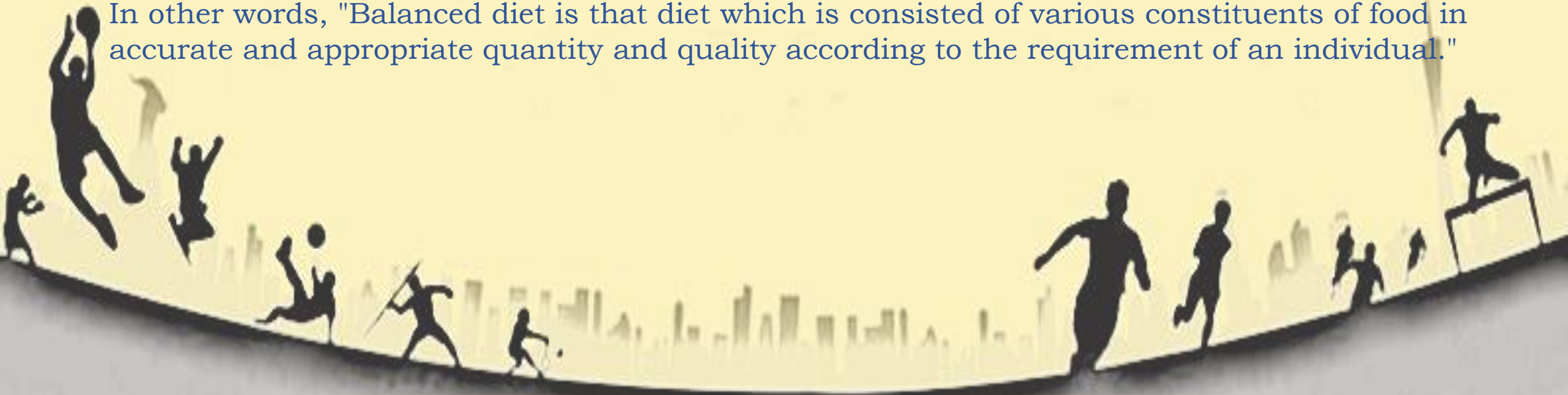
Water accounts for 50-80% of body weight, depending on lean body mass. On average, men have a higher lean body mass than women and higher percentage of body mass as water than in women. The relative mass of water decreases in both men and women with age. Human requirements for water are related to metabolic needs and are highly variable. They depend to some extent on individual metabolism.



Balanced Diet

A balanced diet refers to the intake of edibles which can provide all the essential constituents necessary for growth and maintenance of the body in definite amount in which they are required by the body. A balanced diet means eating the right amount of foods from all food groups. "A diet which consists of all the essential food nutrients viz. proteins, carbohydrates, fats, vitamins, minerals and water in correct proportion is called balanced diet."

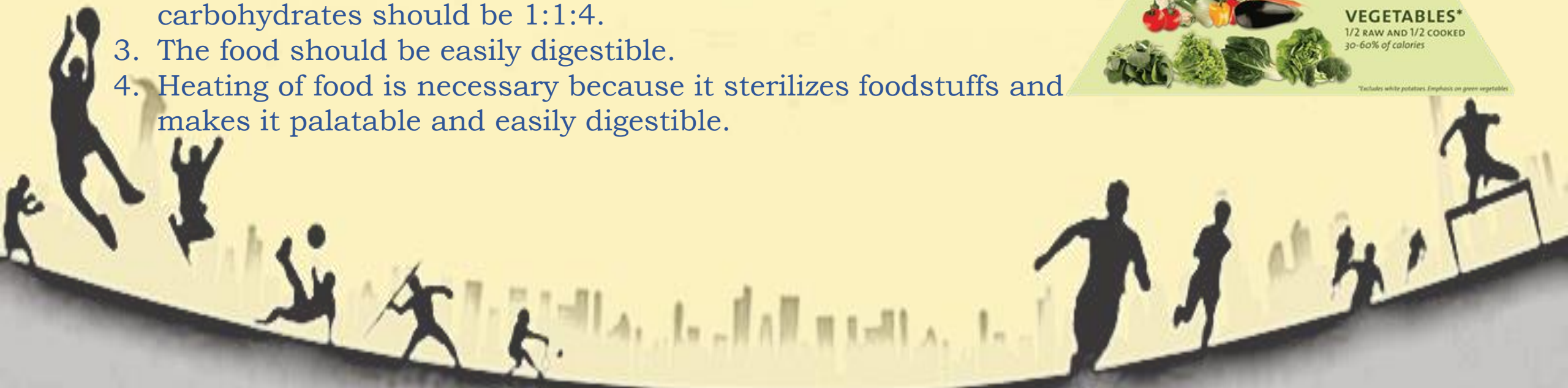
In other words, "Balanced diet is that diet which is consisted of various constituents of food in accurate and appropriate quantity and quality according to the requirement of an individual."



In fact, every individual does not require same type of diet. It differs from individual to individual.

The following points are essential to note for balanced diet:

1. It must contain all the essential constituents in adequate amount.
2. There must be definite proportion between the different constituents of food. The proper ratio between proteins, fats and carbohydrates should be 1:1:4.
3. The food should be easily digestible.
4. Heating of food is necessary because it sterilizes foodstuffs and makes it palatable and easily digestible.



Immunity

Immunity is the ability of the body to defend itself against disease-causing organisms. Everyday our body comes in contact with several pathogens, but only a few results into diseases. The reason is, our body has the ability to release antibodies against these pathogens and protects the body against diseases. This defence mechanism is called immunity.

There are two major types of immunity:

1. Innate Immunity or Natural or Non-specific Immunity
2. Acquired Immunity or Adaptive Immunity

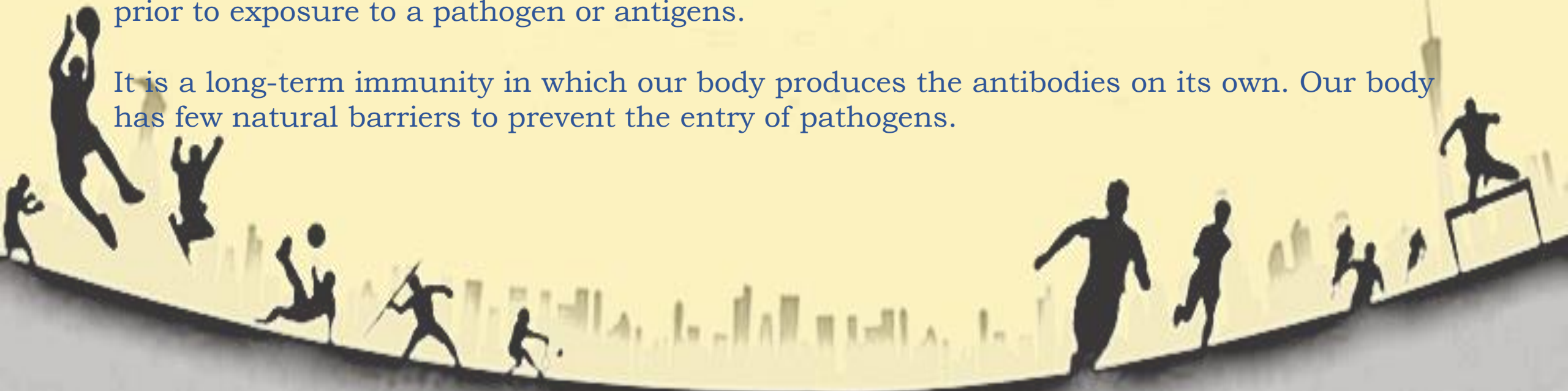


Innate Immunity

This type of immunity is present in an organism by birth. This is activated immediately when the pathogen attacks. Innate immunity includes certain barriers and defence mechanisms that keep foreign particles out of the body.

Innate immunity refers to the body's defence system. This immunity helps us by providing the natural resistance components including salivary enzymes, natural killer cells, intact skin and neutrophils, etc. which produce an initial response against the infections at birth prior to exposure to a pathogen or antigens.

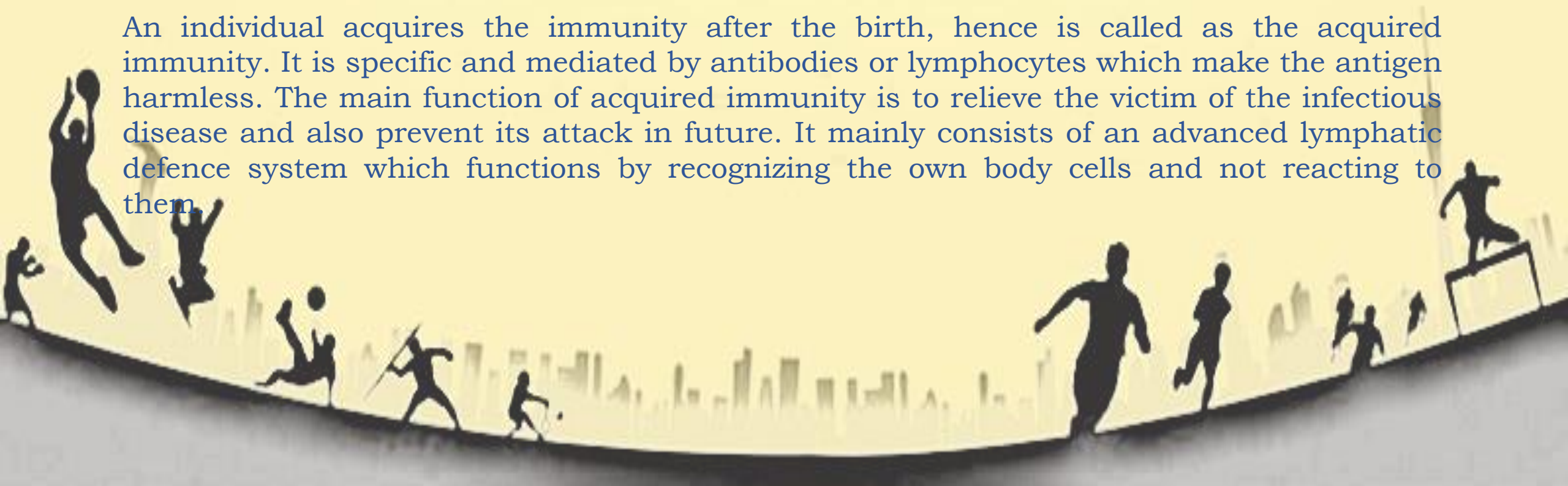
It is a long-term immunity in which our body produces the antibodies on its own. Our body has few natural barriers to prevent the entry of pathogens.



Acquired Immunity

Acquired immunity or adaptive immunity is the immunity that our body acquires or gains over time. Unlike the innate immunity, this is not present by birth. The ability of the immune system to adapt itself to disease and to generate pathogen-specific immunity is termed as acquired immunity. It is also known as adaptive immunity.

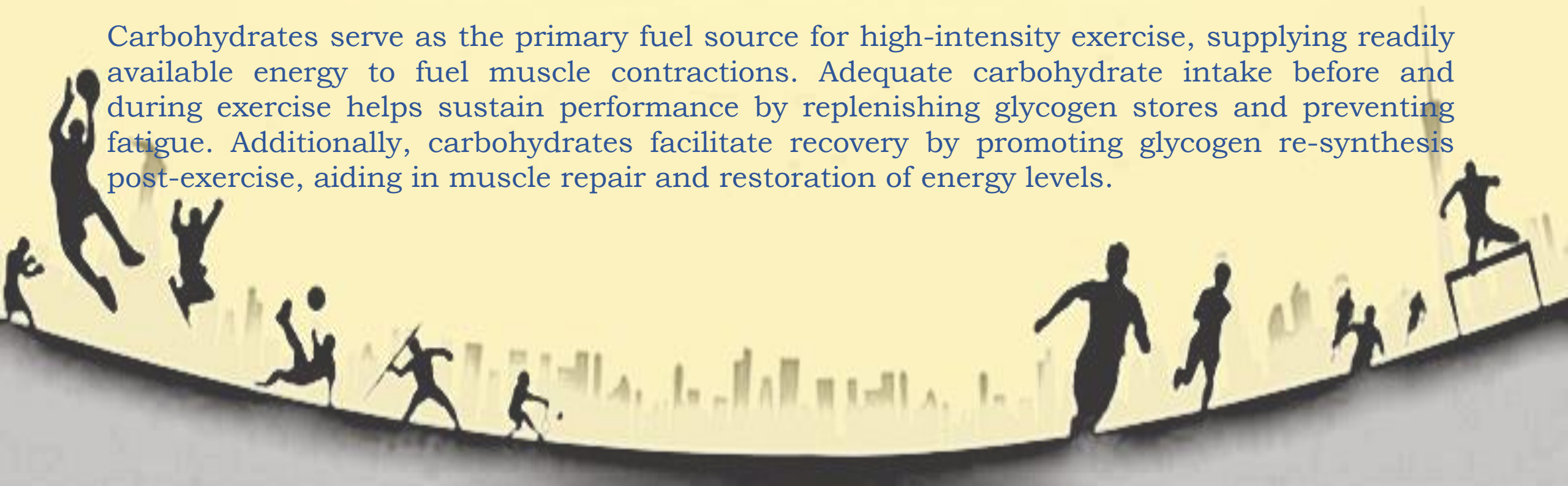
An individual acquires the immunity after the birth, hence is called as the acquired immunity. It is specific and mediated by antibodies or lymphocytes which make the antigen harmless. The main function of acquired immunity is to relieve the victim of the infectious disease and also prevent its attack in future. It mainly consists of an advanced lymphatic defence system which functions by recognizing the own body cells and not reacting to them.



Relation Between Diet and Fitness

The relationship between diet and fitness is intricate and profound, with dietary choices exerting a significant impact on physical performance, recovery, and overall fitness levels. Each macronutrient and micronutrient plays a distinct role in supporting exercise and muscle growth, contributing to the optimization of athletic performance and the attainment of fitness goals.

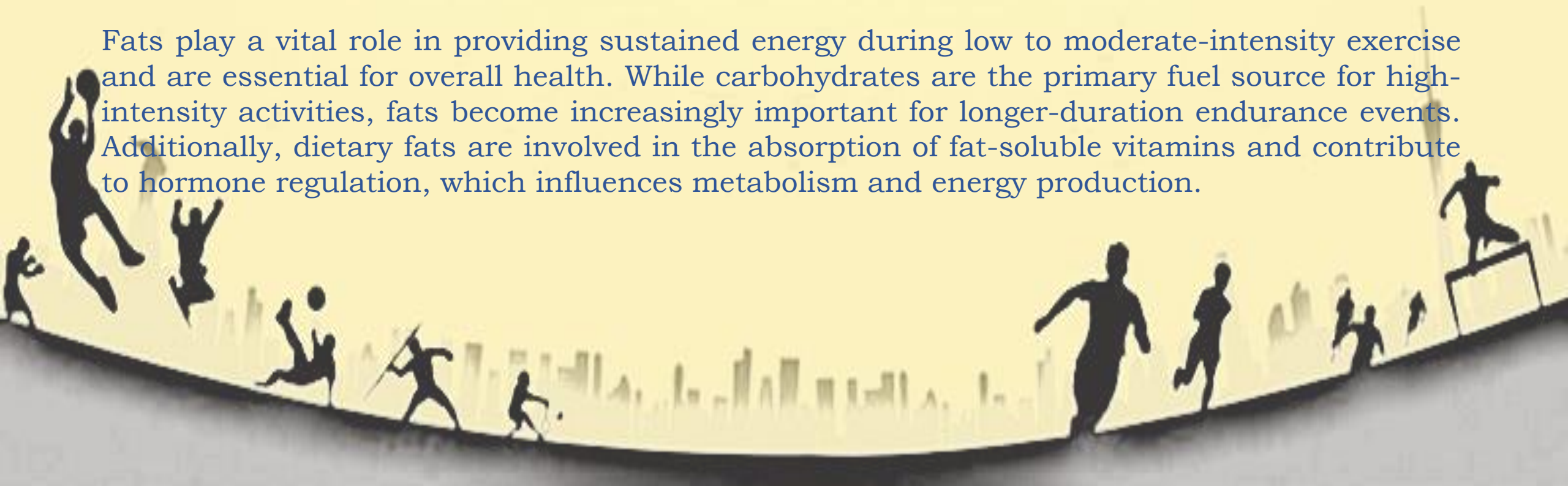
Carbohydrates serve as the primary fuel source for high-intensity exercise, supplying readily available energy to fuel muscle contractions. Adequate carbohydrate intake before and during exercise helps sustain performance by replenishing glycogen stores and preventing fatigue. Additionally, carbohydrates facilitate recovery by promoting glycogen re-synthesis post-exercise, aiding in muscle repair and restoration of energy levels.



Relation Between Diet and Fitness

Proteins are essential for muscle repair, maintenance, and growth, making them crucial for athletes and fitness enthusiasts. Consuming an adequate amount of protein supports muscle protein synthesis, helping to rebuild and repair muscle tissue damaged during exercise. Furthermore, protein intake post-exercise stimulates muscle recovery and adaptation, optimizing gains in strength and muscle mass.

Fats play a vital role in providing sustained energy during low to moderate-intensity exercise and are essential for overall health. While carbohydrates are the primary fuel source for high-intensity activities, fats become increasingly important for longer-duration endurance events. Additionally, dietary fats are involved in the absorption of fat-soluble vitamins and contribute to hormone regulation, which influences metabolism and energy production.



Globalization and its impact on health

Globalization has brought about significant changes in various aspects of health, with both positive and negative effects on individuals and populations worldwide. Understanding these impacts across different dimensions of health is essential for developing strategies to mitigate potential negative consequences while maximizing the benefits

Positive Effects

- Improved access to health care
- Improved awareness and education
- Enhanced disease control and prevention

Negative Effects

- Altered Dietary Patterns
- Health Inequalities
- Increased Disease Transmission
- Cultural Perceptions of Health and Wellness

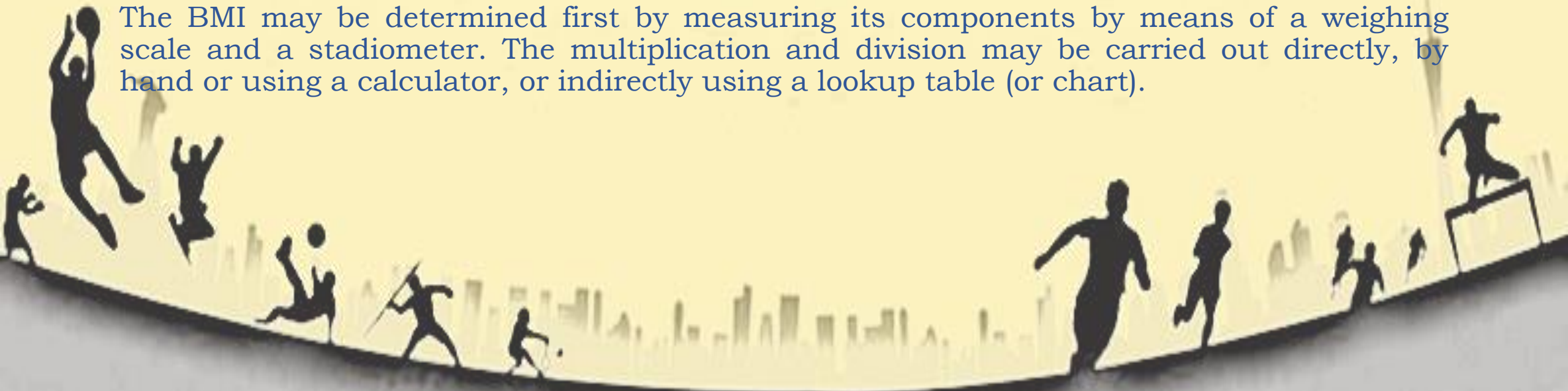


Body Mass Index (BMI)

Body mass index (BMI) is a value derived from the mass (weight) and height of a person. The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m², resulting from mass in kilograms (kg) and height in metres (m). If pounds and inches are used, a conversion factor of 703 (kg/m²)/(lb/in²) is applied.

$$BMI = \frac{Weight_{(kg)}}{Height_{(m)}^2} = \frac{Weight_{(lb)}}{Height_{(in)}^2} \times 703$$

The BMI may be determined first by measuring its components by means of a weighing scale and a stadiometer. The multiplication and division may be carried out directly, by hand or using a calculator, or indirectly using a lookup table (or chart).



BMI Chart

The BMI is a convenient rule of thumb used to broadly categorize a person as based on tissue mass (muscle, fat, and bone) and height. Major adult BMI classifications are underweight (under 18.5 kg/m²), normal weight (18.5 to 24.9), overweight (25 to 29.9), and obese (30 or more). When used to predict an individual's health, rather than as a statistical measurement for groups, the BMI has limitations that can make it less useful than some of the alternatives, especially when applied to individuals with abdominal obesity, short stature, or high muscle mass.

WEIGHT STATUS	BODY MASS INDEX (BMI), kg/m²
Underweight	<18.5
Normal range	18.5 – 24.9
Overweight	25.0 – 29.9
Obese	≥ 30
Obese class I	30.0 – 34.9
Obese class II	35.0 – 39.9
Obese class III	≥ 40