What are the Nutrients and Science of Nutrition?

To keep a healthy body, and prevent disease, one has to have practical, functional knowledge of Nutrients and Nutrition.

Nutrition – It is the science of foods, their action, interaction in health, and disease. Knowledge of nutrition helps us to preserve health and prevent disease.

Hippocrates, father of modern allopathic medicine in 350 BC, correctly stated: "*Let food be thy medicine; thy medicine be thy food.*"

Ayurveda, the science of life has also emphasized the role of Nutrition in the preservation of health and prevention of diseases.

What are Nutrients – These are life-sustaining elements present in foods and fall into 2 two broad categories:

- 1. **Macronutrients** As the name implies, macronutrients are the food elements required by the body in a large amount. The three macronutrients are:
 - **Carbohydrates (Body's fuel)** These are broken down to glucose in the digestive tract. Glucose serves as a source of the fuel (energy) in the body; both for immediate use and as reserve energy of fat and glycogen for later use. The body uses glycogen and fats reserves when the glucose from the digestive tract is unavailable- between meals and during starvation.
 - **Proteins (Building blocks)** Broken down to amino acids in the digestive tract. These get used for growth and repair of body tissues, especially the muscles.
 - *Fats (Needed for, hormones, nerves, and brain health)* Fats are broken down into fatty acids which get stored in the liver. Fatty acids are essential to nerve-muscle health and synthesizing many hormones and nerve tissues. The fatty acids also serve as a back-up fuel source when glucose from food is not available.
- Micronutrients As the name implies, micronutrients are the elements which are required by the body in smaller amounts. These include; Vitamins. Minerals, Phytonutrients, and Antioxidants. The micronutrients perform several functions in the body:
 - **Assist with life-sustaining metabolic reactions** These reactions are necessary for growth repair and energy generation. The metabolic processes in the body require several vitamins and minerals.
 - *Keeping the body cells free of toxic waste products* The metabolic reactions in the body create waste products. The energy synthesis in the trillions of the body cells occurs in tiny structures called mitochondria. The mitochondria are micro-factory

units within the cells which burn glucose and oxygen for making energy essential for cell survival. This process of energy generation creates toxic waste called oxygen free radicals, which must get removed. The phytonutrients and antioxidants do the work of eliminating waste and oxygen-free radicals from the cells. These are vital to keeping the cells healthy, and their deficiency leads to cell death and disease. The Phytonutrients and antioxidants are present only in the fresh colored vegetables and fruits. Animal foods and commercial foods are zero in cleansing antioxidants. When diet is deficient in the essential phytonutrients and antioxidants, the body gets into a food-seeking behavior called "Nutrient Deficiency Hunger."

"Nutrient deficiency hunger leading to overeating and obesity is a common problem in people who do not consume plant foods in sufficient amounts and live off primarily on synthetic commercial foods devoid of life-sustaining micronutrients."

- *Slowing down of the aging process* Maintaining a youthful look and energy level requires micronutrients
- **Boost Body's immune system** Micronutrients, including vitamin D and sunlight, are essential to keep the body's immune system robust. A robust immune system is critical for:
 - 1) *Fighting infections from foreign invader* Such as bacteria, viruses, and parasite.
 - Elimination of the cancer cells Cancer cells get consistently produced in the body. An active and robust immune system destroys these abnormal cells as soon as these appear in the body.
 - Prevention of autoimmune diseases Autoimmune diseases are the diseases where the body's immune system becomes overactive and attacks body tissues causing damage. The well-known autoimmune disorders are:
 - i. Hashimoto thyroiditis A common cause of reduced thyroid function in the urban population who are deficient on fresh plant foods rich in micronutrients, sunlight, and vitamin D.
 - ii. Hyperthyroidism A condition of excessive thyroid gland activity.
 - iii. Type1 Diabetes The incidence of Type1 Diabetes is on the rise amongst the young population in the cities. The urban city dwellers in India prefer an indoor lifestyle. Type 1 diabetes is more common in children who live in countries where sunlight is scarce. A study

done in Finland showed that administration of Vitamin D- the sunlight vitamin reduced the incidence of Type1 diabetes.

- iv. Inflammatory bowel diseases The rate of Crohn's disease and ulcerative colitis are on the rise.
- v. Rheumatoid arthritis
- vi. Fibromyalgia (generalized muscle ache)
- vii. Guillain-Barre syndrome
- viii. Psoriasis and atopic dermatitis (eczema)