

# Introduction to Nutrition

# What is Nutrition?

- Nutrition is the process of providing or obtaining the food necessary for health and growth.

Food is a made up of something we call nutrients

Nutrients are divided into two categories **Macronutrients** and **Micronutrients**.

# Macronutrients

- Macronutrients are the main foods we eat and supply us with energy.
- They are also important for the structure of our body and its functions.
- Macronutrients include: fats, carbohydrates and proteins.

# Carbohydrates

- Carbohydrates are our bodies main fuel source. It is the most important nutrient other than water.
- Carbohydrates are split into two groups **simple carbohydrates** and **complex carbohydrates**

- **Complex carbs** are digested and absorbed at a slower rate than simple carbs.
- Complex carbs often contain many vitamins, minerals, proteins and fibre we need.
- examples of complex carbs include: fruits and vegetables, whole grain bread and pastas and nuts and seeds.



- **Simple carbs** are digested and absorbed at a quicker rate than complex carbs and cause larger fluctuations in blood sugar levels.
- Examples of simple carbs include : soft drinks, table sugar, fruit juices, processed food and junk food.





# Glycemic Index

- Is a measure used to see how foods will affect our blood sugar.
- Certain foods are represented by a number.
- Low GI= 55 or less
- Medium GI= 56-69
- High GI= 70 or more

**Low GI**

Cherries	22
Plums	24
Grapefruit	25
Peaches	28
Peach, canned in natural juice	30
Apples	34
Pears	41

**Medium GI**

Croissant	67
Hamburger bun	61
Pita, white	57
Wholemeal Rye	62

**High GI**

Instant White Rice	87
Glutinous Rice	86
Short Grain White Rice	83
Tapioca	70
Fresh Mashed Potatoes	73
French Fries	75
Instant Mashed Potatoes	80

# Fats

- Most energy dense macronutrients.
- Main source of energy during rest and low intensity activity.
- It **insulates** and **protects** the body and organs.
- Enables transportation of fat soluble vitamins (**A, D, E, K**)
- Contributes to **texture** and **flavor** of food

# Fat types

- **Unsaturated fats:** divided into 2 categories:
- **Mono-unsaturated fats** and **Poly-unsaturated fats**
- **Mono- unsaturated fats** are missing one hydrogen pair on their chain.
- They help lower LDL cholesterol and total cholesterol while at the same time increasing the production of HDL cholesterol.
- Sources include: canola oil, peanut oil, olive oil as well as nuts.
- Liquid at room temp

**Poly- unsaturated fats** are missing two or more hydrogen pairs on their chain.

- Lower LDL cholesterol as well as HDL cholesterol.
- Sources include: vegetable oils such as: corn, sesame, sunflower, soy bean and in fatty fish.
- Also liquid at room temp

# Saturated fats

- **Saturated fats** are fat molecules that don't have any double bonds between carbon molecules.
- They are solid at room temp
- Sources include: beef, lamb, chicken, pork, egg yolks and dairy foods.
- Plant derived fats: coconut oils, hydrogenated margarine and vegetable shortening.

# Trans fats

- Are similar to saturated fats and are harmful to our health. They also increase the amount of LDL cholesterol in our blood and reduce the amount of HDL cholesterol.
- To limit our intake of trans fat we need to reduce our fat intake, reduce the amount of food with hydrogenated vegetable oils (chips, candy bars and pastries).

# Protein



# Functions

- Can be used as an energy source ( Long-term oxidative)
- **Buffer and assists** with maintenance of **acid-based balance.**
- **Build and repair** muscle tissue
- Maintenance of fluid and electrolyte balance

# Protein Requirements

- 10- 35% of total calories should be protein.
- General population should consume approximately 0.8 gram of protein per 1 kg of bodyweight.

# Amino Acids

- Amino acids are the building blocks of proteins.
- There are 20 different amino acids.
- **9** of these amino acids must be supplied by foods we eat. (**Essential amino acids**)
- **11** of them can be produced by our body. (**Non-essential amino acids**)
- Amino acids are simple organic compounds that contain an amino group ( $\text{NH}_2$ ) and a carboxyl group ( $\text{COOH}$ )

- Essential 9

- Histidine
- Phenylalanine
- Isoleucine
- Lysine
- Methionine
- Threonine
- Tryptophan
- Valine
- Leucine

- Non-essential 11

- Alanine
- Cysteine
- Glycine
- Arginine
- Asparagine
- Cystine
- Proline
- Serine
- Aspartic Acid
- Glutamic Acid
- Glutamine
- Tyrosine

# Complete vs. Incomplete Proteins

- **Complete** proteins are proteins that contain **ALL** the essential amino acids.
- These proteins generally come from animal meat and fish products.
- E.g: meat, fish, poultry, cheese, eggs, yogurt and milk
  
- **Incomplete** proteins lack one or more essential amino acids in the correct proportions. Also known as partial proteins.
- E.g: grains, nuts, beans, seeds, peas and corn.

# Water

- Water is needed for all body functions.
- Functions of water: regulating body temperature, nutrient transport to cells, eliminating waste and aids in the digestive process
- Men require around 3L a day and women require around 2.2L per day.
- If you go to the washroom every 2-4 hours you are probably drinking enough

# Micronutrients

- Are found in small amounts of food.
- They consist of vitamins and minerals, which help in energy transfer and tissue synthesis.
- They do not provide energy but play an important role in these processes.

# Vitamins

- Vitamins help the body in performing several important processes. Most vitamins come from foods we eat. (except vitamin D)
- Vitamins include: A,B,C,D,E and K, as well as well as thiamine and Riboflavin.
- Vitamins help to regulate metabolic reactions in the body.



- Vitamins facilitate energy release and are important for the synthesis of bone and tissue.
- Fat soluble vitamins include A, D, E and K, an excess amount of these vitamins **can** be toxic when they accumulate in fat tissue.
- Water soluble vitamins include C and B complex vitamins. An excess amount is considered to be **non** toxic as long as they are not consumed in excessive doses.
- Excreted through urine

<b>Vitamin</b>	<b>Function</b>	<b>Food source</b>
Vitamin A	Bone formation, healthy skin/ hair	Liver, egg yolk, whole milk, butter
Vitamin B3 (Niacin)	Coenzyme for carb, protein and fat metabolism and nervous system function	Soy protein, whey protein, beef, peanuts, sunflower seeds
Vitamin C	Wound healing, resistance to infection, serves as an antioxidant	Sweet peppers, citrus fruits, broccoli, Brussels sprouts, berries, spinach
Vitamin D	Helps in calcium absorption, building bone mass,	Fish, milk, egg yolks
Vitamin E	Antioxidant and for normal growth and development	Wheat germ, whole grain bread and cereals, green leafy vegetables
Vitamin K	Normal blood clotting and bone health	Kale, Brussels sprouts, spinach, Swiss chard, turnip

# Minerals

- Minerals come from the Earth's waters and soil and are absorbed by the plants we eat.
- They help produce bones, proteins and blood.
- **Electrolytes** are minerals that generate an electrical charge when dissolved in the body.
- They are in all the fluids of our body, in blood and in and around cells.
- Electrolytes balance fluid levels in the body, maintain blood pressure and conduct nerve impulses.
- The three types are: **sodium, chloride** and **potassium**
- **Iron** deficiency or anemia are common among athletes (especially women).
- Iron is necessary for the transport of oxygen.

<b>Mineral</b>	<b>Function</b>	<b>Food source</b>
Calcium	Develops and maintains healthy bones and teeth, helps blood clotting and muscle contraction and conduction of nerve impulses.	Cheese, milk, fruit juices and milk products.
Sodium	Electrolyte in the body, required to make hydrochloric acid in stomach and protects against infection.	Salt, marinade, broth and cheese.
Potassium	Building muscle, transmission of nerve impulses and heart activity.	Meat, fruits and vegetables, milk and cereals.
Iron	Red blood cell formation, and function	Liver, heart, kidney, meat, poultry, fish and leafy green vegetables.