THE MINERALS

Mineral	Physiological Role within the Body	Food Sources	Deficiency Symptoms, Syndrome or Condition associated with inadequate intake of the mineral
Calcium*	-One of the most important minerals in the human body! -Important for the formation, growth and maintenance of strong bones and teeth. - Necessary for optimal immune system function, nerve activity, and for the function and maintenance of muscle contractions -Additionally, involved in blood pressure regulation, hormone and enzyme secretions, and necessary for blood clotting	-milk and milk products (DAIRY!!), -fortified soy beverages, -green leafy vegetables – in particular: cooked bok choy & broccoli, -tofu, - soybeans, -navy beans, -white beans	-Hypocalcemia – this condition results when calcium levels in the blood are too low. Long term, this has potential to lead to osteoporosis.
Chloride	-A very important electrolyte found in one's blood that helps to control various bodily processes such as: the balance of fluid inside and outside one's cells, and enables the maintenance of appropriate blood volume, blood pressure and pH of various bodily fluids	-seaweed, -rye, -tomatos, -olives, -lettuce, -celery	Hypochloremia (or Hypochloraemia) - electrolyte interference in which there is an irregularly low level of chloride in one's blood, symptoms include – dehydration, fluid loss, diarrhea or vomiting
Chromium	-Plays a key role in breakdown of fats and carbohydrates -Works with insulin to control and regulate blood sugar (glucose) levels.	-broccoli -potatoes, -green beans, -poultry, -beef, -whole-grain products, -apples, -bananas, -milk and dairy products.	-Lack of chromium in the diet hinders the body's ability to utilize glucose to meets its energy requirements, resulting in increased insulin requirements
Copper	-Heavily reliant on iron – involved in the formation of red blood cells, the synthesis of various proteins and enzymes, the metabolism of glucose, and the absorption of iron.	-liver, - oysters, -spirulina, -lobster, -shiitake mushrooms, -leafy green vegetables,	-Symptoms include: low white blood cell count, anemia, paleness, issues with connective tissue, neurological problems, and muscle weakness.

		-legumes, -nuts and seeds, -dark chocolate	-There is a very rare genetic disorder known as Menkes disease which is a disease that interferes with copper absorption.
Fluoride	- Involved in the formation of teeth and bones – helps to prevent tooth decay	- The content present in foods is low, but is found in drinking water, some teas and fish.	- Tooth decay and increased dental caries, brittle or weak bones.
Iodine	- Involved in the synthesis of thyroid hormones which are created by the thyroid gland – this helps to regulate growth, metabolism, and development.	-Seafood – cod, tuna, seaweed, shrimp, -Dairy products – cheese, yogurt, milk -Grains – breads and cereals	Deficiency symptoms are very similar to those of hypothyroidism or low thyroid hormones and include: weight gain, weakness, fatigue, swelling of the neck, learning difficulties, pregnancy-related issues, and heavy or irregular periods
Iron	-An essential component of hemoglobin -a protein found in red blood cells that transports oxygen throughout the body -Needed for cell growth and differentiation -Necessary for energy metabolism -An important component of myoglobin – a protein which provides oxygen to muscles	-Red meats (liver, beef, pork), -organ meats, -chicken, -oysters and clams, -leafy green vegetables (broccoli, spinach, swiss chard), - legumes (lentils, peas, dried beans) -tofu, -dried fruits (prunes, figs), - egg yolks, -fortified cereals and whole grain products	-The development of anemia – symptoms include: general fatigue, shortness of breath, dizziness, pale skin, pica (cravings for substances that are not food)
Magnesium*	-Main role in the body is as a cofactor for various **enzymatic** reactions -Plays a vital role in protein synthesis and energy metabolism, regulating blood sugar levels, and helping to optimize immune system health -Additionally, magnesium is necessary for many physiological functions such as muscle contraction	-Green leafy vegetables, -nuts and seeds (sesame, sunflower, pumpkin), -legumes (lentils, peas, dried beans), -seafood, -chocolate, -artichokes, -whole grain products	Symptoms include: loss of appetite, fatigue, nausea, weakness, muscle cramps and spasms, and vomiting.

	and relaxation, heart rhythm, and vascular tone.	-milk & yogurt, -tofu, -fortified soy beverages	
Manganese	-Main role is to metabolize various nutrients - Necessary for a range of chemical processes such as aiding in the metabolism of cholesterol and carbohydrates -Additionally, involved with the utilization and digestion of amino acids and protein.	-Green leafy vegetables, -nuts & seeds, - legumes, -whole grains – often added to breakfast cereals and fortified foods -Generally speaking, foods containing dietary fibre provide magnesium thus it is widespread in foods	-Hindered glucose tolerance, and altered metabolism of carbohydrates and lipids which has potential to result in impaired growth and reproductive function
Molybdenum	-Helps to activate various enzymes that are needed to prevent the build-up of toxins in the body – In addition, assists in the breakdown of various sulfites	-Legumes are the richest source, -whole grains, -nuts, -leafy vegetables, -beef liver, and -cereal grains	- Deficiency is extremely rare and only occurs in individuals with a rare genetic disorder known as molybdenum cofactor deficiency resulting in encephalopathy, leading to seizures and brain damage
Phosphorus*	-Necessary for the formation of bones and teeth -Plays a key role in carbohydrate and fat metabolism -Needed for the generation of protein, in order to aide in repair of cells and tissues -Additionally, an important component of the maintenance of acid-base balance within cells	-Milk and milk products, -meat, -poultry, - fish, -seeds and nuts, -whole grains, -eggs	Hypophosphatemia – which can result in bone diseases such as rickets in children and Osteomalacia in adults
Potassium*	-Main function within the body is for proper fluid balance, working to maintain osmotic pressure and acid-base balance - Also helps to regulate nerve signals and muscle contractions	-Bananas, -oranges, -apricots, -potatoes, -sweet potatoes, -beets, -broccoli, -squash, -legumes -milk products, -nuts, -whole grains	Hypokalemia – results when potassium levels in the blood serum are too low - this frequently results in vomiting, diarrhea, and adrenal gland disorders. -Often Hypokalemia leads to the use of diuretics, muscle weakness, twitching and cramping, and abnormal heart rhythms

Selenium	-Main purpose is to act as an antioxidant. Reminder: antioxidants are chemical compounds that help to protect cells from free radicals, preventing them from cell damage - Additionally, important for DNA production, reproduction and thyroid gland function	-Turkey, - pork, -beef, -chicken, -fish, -shellfish, -eggs, -various whole grains - various dairy products	-Deficiency symptoms include: muscle weakness, fatigue, hair loss, mental fog and confusion, and negatively impacts both growth and reproduction
Sodium*	-An electrolyte involved in the maintenance of homeostasis and blood pressure, and the regulation of electrolyte and fluid balance, - Helps to control acid-base balance by regulating the amount of water that's in and around your cells (osmotic pressure) - Additionally, needed for muscle contraction and nerve transmission	-Salt, -pickles, -cured meats such as bacon, ham or corned beef -soya sauce, -salted or seasoned seeds and nuts, -processed foods	-Hyponatremia – this occurs when the concentration of sodium in the blood is abnormally low -this is pretty common – especially within older adults. -Frequent symptoms include loss of energy, muscle weakness, headaches, nausea, and lethargy -in severe cases, seizures or a coma can result.
Sulfur	-Necessary for the production of key proteins within the body such as glutathione and insulin -Needed for the synthesis of connective tissue	-Meat & poultry, -fish and seafood, -eggs, -milk, -nuts, -legumes	-Results in reduced protein synthesis given there is little sulfur available for amino acids -Additionally, inadequate intake can lead to joint pain
Zinc*	-Plays a vital role in many physiological functions such as: DNA and protein synthesis, carbohydrate metabolism, cell growth, cell division, production of sperm, sexual maturation, fetal development, immune function, and wound healing - Needed for sense of smell and taste -Structural component of insulin	-Milk products, -whole grains, -poultry, -red meat, -oysters, -chickpeas, -nuts and seeds – in particular: almonds, cashews, -baked beans	-Symptoms include: hair loss, weight loss, skin and eye sores, issues with wound healing and loss of appetite.