

Glossary

Aluminium production – Aluminium is extracted from bauxite ore in a complex chemical process. Producing one ton of raw aluminium results in up to four tones of toxic waste – so called ‘red mud’ which is stored in huge open ponds. The dry mass of red mud can have a content of 110ppm arsenic, 1.3 ppm mercury and 660ppm chromium. Wastes that pollute the air from aluminium production include particulates matter such, as fluorite compounds, sulphur dioxide, hydrogen sulfide and multi-ring aromatics that merge with the dust and smoke produced during melting. Some counties in the USA, such as Harford and Maryland, continue to source their chemical fluoride from the toxic gaseous discharge from aluminium factories as stated in their 2021 water quality report but most Aluminium Companies no longer supply chemical fluoride for water fluoridation companies as their fluoride waste goes to producing synthetic cryolite called fluorsid.

(Ref: Paul Connett - www.fluoridealert.org) and (Ref: airqoon.com/aluminum-industry-and-environment-impacts) and (Epoch Times, article by Christy Prais 13th April 2023 updated 22nd January 2024).

Alveolar – that part of the jawbone containing the roots of the teeth.

Ameloblasts – are cells present only during tooth development that deposit tooth enamel, which makes the hard outer layer of the tooth forming the surface of the crown.

Amylogeneisi Impectecta – a disorder of tooth development. This condition causes teeth to be unusually small, discoloured, pitted, grooved, and prone to rapid wear and breakages.

Anaphylaxis – an increased susceptibility to a substance or food, protein or non-protein, brought about by a previous introduction of it. The resulting shock can be fatal.

Apatite – a group of phosphate minerals, usually referring to hydroxyapatite, fluorapatite and chlorapatite, with high concentration of OH⁻, F⁻ and Cl⁻ ions.

Arteriosclerosis – occurs when the blood vessels that carry oxygen and nutrients from the heart to the rest of the body (arteries) becomes thick and stiff, sometimes restricting blood flow to the organs and tissues.

Benchmark Dose Analysis (BDA) – is the lowest amount of a substance that can elicit a response or when a response can be seen.

Calcination - The process of heating a substance to a high temperature but below the melting or fusing point, causing loss of moisture, reduction or oxidation, and dissociation into a simpler substance.

Calcium Hydroxyapatite – this should be the main component of tooth enamel.

Cartilage – Cartilage connective tissue is important because it provides support, but is less rigid than bone. It also allows for some flexibility of movement, but has more stability than muscle. The extracellular matrix of cartilage is produced by cells called chondroblasts.

Collagen – is the most abundant protein in your body. It is the major component of connective tissue that make up several body parts, including tendons, ligaments, skin and muscle. Collagen has many important functions, including providing skin with structure and strengthening bones.

Chondroblasts – are cells that secrete the major component of cartilage.

Connective Tissue – includes several types of fibrous tissue that vary only in their density and cellularity, as well as the more specialised and recognised variant – bones, ligaments, tendons, cartilage, and adipose (fat) tissue.

Dental Fluorosis – white specks or streaks on teeth or a staining of the teeth that can be mild to severe, causing erosion of the enamel. This type of enamel is porous and structurally weaker having a wear resistance that is commonly 40 to 60% of normal.

Dentifrice – a paste, powder, liquid or other preparation for cleaning teeth.

Endocrine System is a system of glands which produce hormones. These hormones act as chemical messengers that travel to the blood to act on and activate certain tissues. The system of glands producing these hormones are the – hypothalamus, pituitary, pineal (these three in the brain), the thyroid, parathyroids (in the neck and upper chest), then there are the adrenals, pancreas, testes, ovaries. Together they regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep and mood, among others. The glands regulate how much of each hormone is released to stimulate specific cells or tissues into action.

Enzymes – made from amino acids by stringing together 100 to 1,000 amino acids in a very specific and unique order. There are both proteins and biological catalysts (biocatalysts). They are biological molecules that significantly speed up the rate of virtually all of the chemical reactions that take place within cells. They

are vital for life and serve a wide range of important functions in the body. They are known to catalyse more than 5,000 biochemical reaction types. These enzymes include protease that digest proteins and nucleases that digest nucleic acid. Pepsin helps break down proteins into amino acids. Trypsin, produced in the pancreas, also breaks down proteins. Pancreatic lipase is also produced in the pancreas. Amylase in saliva breaks down starch into sugar. Digestive enzymes are mostly produced in the pancreas, stomach and small intestines. Enzymes speed up chemical reactions in the body, but do not get used up in the process, therefore can be used over and over again.

Fluorosis – this occurs when fluoride interacts with mineralisation tissue causing alterations in the mineral process. In dental enamel, fluorosis causes subsurface hypomineralisation or porosity which extends towards the dentinal-enamel junction as severity increases.

Fluorsid/synthetic cryolite or granular cryolite is produced by reacting diluted hydrofluoric acid (HF) and aluminium hydrate (Al(OH)₃). The H₃AlF₆ acid is then converted into sodium salt by ion exchange reaction with a sodium chloride solution. After a solid-liquid separation, the slurry of cryolite is calcined (reduced) in an internally heated rotary kiln. The final product is in the form of pale pink granules. Milled cryolite is obtained from the granular quality after rotary milling.

Hexafluorosilicic acid – is the resulting liquid/acid after hydrogen fluoride dissolves glass. Sometimes used in place of Hydrofluorosilicic acid.

Hydrogen fluoride – is a gas and the combination of fluoride and hydrogen.

Hydrofluoric acid (HF) – is hydrogen fluoride dissolved in water. It can dissolve glass and can dissolve your skeleton without you even feeling it.

Hydrofluorosilicic acid – the resulting water liquid/acid of Hydrogen fluoride when dissolved in water and sand along with other contaminants.

Hydrogen bonds – a weak bond between two molecules resulting from an electrostatic attraction between a proton in one molecule and an electronegative atom in the other.

Hypomineralisation – is a softening and discolouration of the tooth enamel, common on the permanent first molars and incisor teeth. This softening may lead to tooth decay, cavities, or other damage to teeth. This developmental condition is caused by the lack of mineralisation of enamel during its maturation phase due to interruption to the function of ameloblasts.

Ionic – ionic bonding is the complete transfer of valence electron/s between atoms. It is a type of chemical bond that generates two opposite charged ions. In ionic bonds, the metal loses electrons to become a positively charged cation, whereas the non-metal accepts these electrons to become a negatively charged anion.

Ionic calcium – the amount of calcium carrying an electronic charge.

Odontoblasts – are the name of the cells that form dentine.

One part per million -

Just as per cent means out of a hundred, so parts per million or ppm means out of a million. Usually describes the concentration of something in water or soil. One ppm is equivalent to 1 milligram of something per liter of water (mg/l) or 1 milligram of something per kilogram soil (mg/kg).

Oral mucosa - is the mucous membrane lining or “skin” inside of the mouth, including cheeks and lip. People with oral mucosal diseases may develop painful mouth sores or ulcers on this lining.

Osteonecrosis – the death of bone tissues. This happens when the blood supply to part of the bone is disrupted, depriving bone tissue of essential nutrients and oxygen. The bone can eventually break down and the joint will collapse.

Phagocytosis – destruction by phagocytes which are white blood-corpuses that engulf bacteria and other harmful particles.

Phosphates - Public water systems (PWSs) commonly add phosphates to drinking water to prevent the release of metals in drinking water. Orthophosphate is most commonly used for lead and copper control. Polyphosphates sequester iron and manganese to prevent discolored water but are not effective to control lead and copper. Blended phosphates are a mix of orthophosphate and polyphosphate, which can potentially provide both sequestration and corrosion control.

Orthophosphate is available as phosphoric acid, in salt form (potassium or sodium), and as zinc orthophosphate. Orthophosphate reacts with lead and copper to form compounds that have a strong tendency to stay in solid form and not dissolve into water. The extent to which orthophosphates can control lead and

copper release depends on the orthophosphate concentration, pH, DIC, and the characteristics of the existing corrosion scale (e.g., whether it contains other metals such as iron or aluminium).

(Source: <https://www.epa.gov/lead/why-do-water-systems-add-phosphate-drinking-water-what-are-health-effects-drinking-water>)

Because of the major environmental impacts of agricultural phosphorus use—and the hazardous chemical gas emitted from the manufacturing process—at least 11 states in the USA have banned phosphorus fertilizer use or sale, including Illinois, Maine, Maryland, Michigan, Minnesota, New Jersey, New York, Vermont, Virginia, Washington, and Wisconsin.

(Source: Epoch Times, article by Christy Prais, 13th April 2023 updated 22nd January 2024.)

(<https://phosphatesfacts.org/wp-content/uploads/2015/09/The-Use-of-Phosphates-For-Potable-Water-Treatment.pdf>).

Silica – a hard, unreactive, colourless compound which occurs as the mineral quartz and as a principal constituent of sandstone and other rocks. In many parts of the world silica is the major constituent of sand.

Stomatitis - is inflammation of the oral mucosa, which presents with ulcers that can cause pain and difficulty drinking and eating. Ulcer(s) can be present on the inner lips and cheeks, on the gums, or on the tongue and are caused by infection, irritants, trauma, or allergic reactions.

Vitamin K2 and D3 – are synergistic partners working together to increase and enhance calcium absorption and distribution throughout the body in the teeth and bones. Vitamin D encourages calcium into the blood and Vitamin K2 gets it into the teeth and bones. Without K2, calcium builds up in soft tissues such as arteries and leads to increased instances of heart disease. There are two varieties of Vitamin K2 supplements; MK4 and MK7. MK4 is a synthetic type of K2 that is somewhat effective but requires multiple doses per day to achieve health benefits. On the other hand, MK7 is the whole food variation of K2 (from natto, a plant-based food, that only needs to be taken once a per day).

(Ref: 'Vitamin K2 and the Calcium Paradox' by Kate Rheaume-Bleue.)