Lessons on minerals

Lesson on electrolytes, minerals and trace elements

Electrolytes – our conductors
Electrolytes are substances, e.g. minerals, which can conduct electric current in aqueous solutions. They decompose into **positively charged particles, so-called cations**, or into **negatively charged particles, so-called anions**. The charged particles are called ions. **Most minerals in the body occur as electrolytes, i.e. in the form of ions**, and are therefore dissolved in the body fluids.
The most important ions in the body are:

Positively charged ions	chemical symbol	negatively charged ions	chemical symbol
Hydrogen	H^+	Fluoride	F^-
Sodium	Na^+	Chloride	Cl^-
Potassium	K^+	Iodide	J^-
Ammonium	NH_4^+	Hydroxyl	OH^-
Hydronium	$H3O^+$	Nitrate	NO_3^-
Magnesium	Mg^{2+}	Bicarbonate	HCO_3^-
Calcium	Ca^{2+}	Oxide	O_2^-
Iron II	Fe^{2+}	Sulphate	SO_4^{2-}
Iron III	Fe^{3+}	Phosphate	PO_4^{3-}

In the cells (intracellular) there is a different concentration of the different ions than outside the cells, the so-called extracellular space or extracellular matrix. The active and passive transport of ions takes place across the boundary of the cell, at the cell membrane. This ion transport changes the voltage at the cell membrane. These voltage changes in turn enable the control of all processes that take place on the cell level.

The nervous system and its information transfer are also based on the exchange and concentration change of ions between the cell interior (intracellular space) and extracellular space. The regulation of the water balance functions via ion transports and is closely linked to the electrolyte balance. Disturbances of the electrolyte concentrations can cause various problems.

Minerals are vital inorganic nutrient elements

Minerals are chemical elements that occur naturally in the earth and sea. Minerals whose function is known in the body include calcium, phosphate, potassium, sulfur, sodium, chlorine, magnesium, iron, iodine, manganese, copper, cobalt, zinc, fluorine, selenium and chromium. Minerals have many different functions in the body and are vital for the good functioning of the organism: they release the energy of food so that the body can use them.

Chemical compounds from minerals can decompose into electrically charged particles (ions) in aqueous solutions, which are then called electrolytes. In this way a positively charged sodium ion and a negatively charged chloride ion are formed from table salt (NaCl) in water.

Trace elements are the catalysts of life

The trace elements, as the name suggests, are minerals that occur in minute quantities, i.e. in traces.

The trace elements are the catalysts of the biological

functions of the organism. Without them there would be no functional activity, i.e. no life.

It is biological, i.e. logical in the sense of life, to use the elements which keep our metabolic processes naturally functional.

Trace elements are components of our body
The trace elements are naturally components of the organism and are not regarded as foreign bodies, but are integrated into the organism in order to act on the biologically intended active site

The following trace elements are catalysts:
Calcium (Ca), magnesium (Mg), phosphorus (P), sulphur (S), manganese (Mn), copper (Cu), cobalt (Co), iron (Fe), molybdenum (Mo), zinc (Zn), nickel (Ni), chromium (Cr), selenium (Se), iodine (I), vanadium (V).

Quantitatively they represent 0.01 % of our body weight. Therefore, they were probably called “oligoelements” (trace elements), from Greek for “little”.

Ionized minerals and trace elements go the direct way
The trace elements and minerals from food must first pass through the digestive tract in order to be processed and assimilated. The trace elements in the water are ionized, i.e. directly assimilable, or pre-digested, so to speak. The ionized form is inevitably a solution. The ionized trace elements penetrate quickly into the bloodstream. They do not have to be digested first, in order to be assimilated. Their assimilation speed is thus increased.

Systemic principle of mineral action
No metabolism can be limited to a single reaction independent of the rest of the organism. Disturbed complex functions such as digestion, the immune system, the nervous system, etc. cannot be restored by the supplementation of a single mineral or trace element.

Assimilation means metabolizing up to the most intimate part of our organism, i.e. integrating active substances, i.e. trace elements, into specific active sites within our cells.

When an organism is out of balance, it is because it no longer functions normally. In order to bring it back into balance, it makes biological sense to use those elements that make the organism function normally.