IYPT
INTERNATIONAL YEAR OF THE PERIODIC TABLE

Periodic Graphics

A collaboration between C&EN and Andy Brunning, author of the popular graphics blog *Compound Interest*

More online

To see more of Brunning's work, go to **compoundchem.com.** To see all of C&EN's Periodic Graphics, visit **cenm.ag/periodicgraphics.**

ESSENTIAL ELEMENTS FOR HUMANS

There are 118 elements in the periodic table, but which of them are essential for human life? Here we zero in on the ones we can't live without and the roles they play.

THE ELEMENTAL COMPOSITION OF THE HUMAN BODY BY MASS

OXYGEN	CARBON	HYDROGEN	NITROGEN	OTHERS[a]
O 65%	C 18%	H 10%	N 3%	4%

a Includes Ca, P, K, S, Na, Cl, Mg, B, Cr, Co, Cu, F, I, Fe, Mn, Mo, Se, Si, Sn, V, and Zn.

BUILDING BLOCKS

H C N O P S

These elements (except phosphorus) are found in amino acids, the building blocks of proteins. With the exception of sulfur, they all also combine to make up DNA, our genetic code.

ENZYMES

Mg Mn Cu Zn Se Mo

Metal ions help many enzymes in the body function. Enyzmes have many important roles in the body, including in respiration, digestion, metabolism, and the immune system.

NERVES AND CONTROL

Na Cl K Ca I

Sodium, potassium, and calcium ions play roles in transmitting nerve signals. Chloride ions regulate fluid in and out of cells. The body uses iodine to make hormones that regulate metabolism.

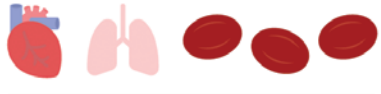
BONES AND TEETH

O P Ca Mn

Bones and teeth are mainly calcium phosphate. Calcium is essential for the growth of healthy teeth and bones. Without manganese, bones are spongier and break more easily.

BLOOD

C O Fe Co



Iron in hemoglobin carries oxygen from the lungs to the body's cells. And it carries carbon dioxide back to the lungs. Cobalt, found in vitamin B-12, is essential for making red blood cells.

RESPIRATION AND ENERGY

C N O P

Our cells use the oxygen we breathe for respiration. Respiration produces adenosine triphosphate (ATP, shown), a molecular energy source for our cells.

PERIODIC GRAPHICS