Elemental Composition of the Human Body

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The table below gives the amount of each chemical element found in the human body, from most to least abundant. For each element, there is the amount in mass units in an average (70-kilogram) person, the volume of the element, and the length of the side of a cube that would contain that amount of the pure element. Volumes of solid and liquid elements are based on density at or near room temperature (where available). For the gaseous elements (oxygen, hydrogen, nitrogen, chlorine, and fluorine), I chose to use the density of each in the liquid state at the respective boiling point.

Raw data from which this table was made are from Emsley, John, *The Elements*, 3rd ed., Clarendon Press, Oxford, 1998. This is a great trove of information, which I highly recommend for anyone wishing to learn more about the elements.

Element	Mass of element in a 70-kg person	Volume of purified element	Element would comprise a cube this long on a side:
oxygen	43 kg	37 L	33.5 cm
carbon	16 kg	7.08 L	19.2 cm
hydrogen	7 kg	98.6 L	46.2 cm
nitrogen	1.8 kg	2.05 L	12.7 cm
calcium	1.0 kg	645 mL	8.64 cm
phosphorus	780 g	429 mL	7.54 cm
potassium	140 g	162 mL	5.46 cm
sulfur	140 g	67.6 mL	4.07 cm
sodium	100 g	103 mL	4.69 cm
chlorine	95 g	63 mL	3.98 cm
magnesium	19 g	10.9 mL	2.22 cm
iron	4.2 g	0.53 mL	8.1 mm
fluorine	2.6 g	1.72 mL	1.20 cm
zinc	2.3 g	0.32 mL	6.9 mm
silicon	1.0 g	0.43 mL	7.5 mm
rubidium	0.68 g	0.44 mL	7.6 mm
strontium	0.32 g	0.13 mL	5.0 mm

bromine	0.26 g	64.2 µL	4.0 mm
lead	0.12 g	10.6 µL	2.2 mm
copper	72 mg	8.04 µL	2.0 mm
aluminum	60 mg	22 µL	2.8 mm
cadmium	50 mg	5.78 µL	1.8 mm
cerium	40 mg	4.85 µL	1.7 mm
barium	22 mg	6.12 µL	1.8 mm
iodine	20 mg	4.06 µL	1.6 mm
tin	20 mg	3.48 µL	1.5 mm
titanium	20 mg	4.41 µL	1.6 mm
boron	18 mg	7.69 µL	2.0 mm
nickel	15 mg	1.69 µL	1.2 mm
selenium	15 mg	3.13 µL	1.5 mm
chromium	14 mg	1.95 µL	1.3 mm
manganese	12 mg	1.61 µL	1.2 mm
arsenic	7 mg	1.21 µL	1.1 mm
lithium	7 mg	13.1 µL	2.4 mm
cesium	6 mg	3.2 µL	1.5 mm
mercury	6 mg	0.44 µL	0.8 mm
germanium	5 mg	0.94 µL	1.0 mm
molybdenum	5 mg	0.49 µL	0.8 mm
cobalt	3 mg	0.34 µL	0.7 mm
antimony	2 mg	0.30 µL	0.7 mm
silver	2 mg	0.19 µL	0.6 mm
niobium	1.5 mg	0.18 µL	0.6 mm
zirconium	1 mg	0.15 µL	0.54 mm
lanthanium	0.8 mg	0.13 µL	0.51 mm
gallium	0.7 mg	0.12 µL	0.49 mm
tellurium	0.7 mg	0.11 µL	0.48 mm
yttrium	0.6 mg	0.13 µL	0.51 mm
bismuth	0.5 mg	51 nL	0.37 mm
thallium	0.5 mg	42 nL	0.35 mm
indium	0.4 mg	55 nL	0.38 mm
gold	0.2 mg	10 nL	0.22 mm
scandium	0.2 mg	67 nL	0.41 mm
tantalum	0.2 mg	12 nL	0.23 mm

vanadium	0.11 mg	18 nL	0.26 mm
thorium	0.1 mg	8.5 nL	0.20 mm
uranium	0.1 mg	5.3 nL	0.17 mm
samarium	50 µg	6.7 nL	0.19 mm
beryllium	36 µg	20 nL	0.27 mm
tungsten	20 µg	1.0 nL	0.10 mm

Notes

Oxygen is the most abundant element in the earth's crust and in the body. The body's 43 kilograms of oxygen is found mostly as a component of water, which makes up 70% of total body weight. Oxygen is also an integral component of all proteins, nucleic acids (DNA and RNA), carbohydrates, and fats.

Rubidium is the most abundant element in the body (0.68 g) that has no known biological role (**silicon**, which is slightly more abundant, may or may not have a metabolic function).

Vanadium is the body's least abundant element (0.11 mg) that has a known biologic role, followed by **cobalt** (3 mg), the latter being a constituent of vitamin B_{12}.

The last of the body's elements to be discovered was **fluorine**, by Moissan in 1886.

Note (by other)

Did you notice the “Heavy Metals“ (aluminum, arsenic, antimony, cadmium, lead, mercury, selenium), are they bad or what? Apparently our bodies need all of those elements to function properly. So maybe there are different types of “Heavy Metals,” and one of those types (elemental, Ionic, monoatomic, monatomic) are not poisonous in moderate levels. It seems like the most likely source of the nontoxic type would derive from plants, because we’re really not designed to eat rocks for our mineral quotient. Plants are designed to process things that are toxic to us humans, and render a by product that we can assimilate in some fashion or another. Example: We inhale oxygen (O2) and exhale carbon dioxide (CO2), plants absorb CO2 and release O2, plants can uptake polluted water and render purified plant juices that we can consume.