

2/2024

ISBN:

- 978-83-66691-00-1
978-83-66691-91-9 (PER)
978-83-66691-87-2
978-83-66691-86-5
978-83-66691-81-0
978-83-66691-66-7
978-83-66691-65-0 (PL II)
978-83-66691-63-6
978-83-66691-55-1
978-83-66691-54-4 (SOM)
978-83-66691-51-3
978-83-66691-47-6
978-83-66691-25-4
978-83-66691-24-7 (SOM II)
978-83-66691-10-0 (ALB)
978-83-66691-01-8
978-83-66691-36-0
978-83-66691-40-7
978-83-66691-11-7 (ISR)
978-83-66691-67-4 (PL)
978-83-66691-96-4 (LIT)
978-83-66691-99-5 (UG)
978-83-66691-64-3
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Ben-Gurion University of the Negev



LITHUANIAN UNIVERSITY
OF HEALTH SCIENCES



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COMPARISON OF SOME EXACT SCIENCES HISTORY

50-100 thousand years ago	Mastering fire striking		(1799, J. Proust), the law of multiple relations	1886	Formulation of the law of osmotic
5-7 thousand years ago	Pottery (clay firing)		(1803, J. Dalton, 1808, Th. Thomson),		pressure – S. A. Arrhenius
3-5 thousand years ago	Copper metallurgy		the law of volumetric relations (1811,	1887	Discovery of the laws governing
VII-V century BC	The science of the four simple substances		J. L. Gay-Lussac)		liquid solutions – F. M. Raoult
VI – IV century BC	Primordial atomism	1803-1810	Formulation of the atomistic theory,	1889	Explanation of the formation
500 BC	First letter ever written - Queen Atossa of Persia		according to which each type of atoms		of the electrode potential – W. H. Nernst
360-350 BC	The writings of Aristotle, who recognized		and molecules is characterized	1898	Discovery of some radioactive elements
	simple substances as carriers of the basic		by a specific relative mass (atomic,	1913	– M. Skłodowska-Curie, P. Curie
	properties of bodies		particle) – J. Dalton		Discovery of the hydrogen atom – N. Bohr
about 1 thousand years ago	Ferrous metallurgy	1806	Isolating asparagine, the first amino acid	XX century	Development of laser methods allowing
IV century AD	Appearance of the name "chemistry"		– L.-N. Vauquelin and P. J. Robiquet		to study the course and mechanism
	in the writings of Zosimos	1811	Putting forward the hypothesis		of chemical reactions in real time
VII – VIII centuries AD	The Arabs assimilate Greek science		of the existence of independent		(femtoseconds) – A. Zewail
IX-XI centuries	Arabic alchemical treatises		molecules composed of two	1901	Classification of the four blood types
XII century	Translations of Arabic alchemical treatises		identical atoms – A. Avogadro		– K. Landsteiner
	into Latin	1812-1819	Formulation of the dualistic hypothesis	1916-1919	The Emergence of the Theory of Chemical
XIII-XIV centuries	Treatises of European alchemists		concerning the electrochemical structure		Bonds – W. Kossel, G. N. Lewis, I. Langmuir
1604	Publication of the work <i>Curus triumphalic antimonii</i> [triumphal chariot of antimony], attributed to Basilius Valentinus	1813	of chemical compounds – J. J. Berzelius		The first artificially induced nuclear
			The concept of fatty acid ("acide gras")		transformation – E. Rutherford
1604	Novum lumen chymicum, the most widely spread work of M. Sędziwoj, Polish alchemist	1814	introduced by M. E. Chevreul	1921	Noticing that three water-soluble compounds, acetone, β-hydroxybutyrate and acetoacetate (together called ketone bodies) were produced by the liver as a result of starvation or if man
1648	Discovery of sodium sulfate (also known as Glauber's salt) - J. Glauber	1828	Proposing the designation of roots using letter symbols (used to this day)		followed a diet rich in fat and low in carbohydrates
1661	R. Boyle's publication of <i>Sceptical Chymist</i> , in which he defined a simple substance (element) as the end of chemical analysis		– J. J. Berzelius		- endocrinologist Rollin Woodyatt
1665	The first blood transfusion in recorded history	1833-34	Undermining the theory of the life force as a result of obtaining urea (then considered an organic compound) from an inorganic compound – F. Wohler	1923	Presentation of the theory of strong electrolytes – P. Debye, E. Huckel
1665	The discovery of the cell – Robert Hooke		Formulation of the laws of electrolysis	1927	Introduction of quantum techniques to chemistry – E. U. Condon,
1667-1703	Formulation of the phlogiston theory – G. Stahl	1840	– M. Faraday		W. Heitler, F. London
1718	Summary (in the form of a table)	1847	Formulation of the laws	1929	The discovery of vitamins – F. G. Hopkins
	of chemical affinities of various substances in relation to each other – E. F. Geoffroy	1853-56	of thermochemistry – G. Hess	1931	Discovery of the role of glucose
1747	Isolation of glucose from raisins - chemist A. Marggraf		Discovery of fructose – A.-P. Dubrunfaut		in the fermentation of cancer cells – O. Warburg
1756-1774	Discovery of gases emitted during certain chemical reactions	1855	Formulation of the unitary theory of the structure of organic compounds	1932	Development of a proton-neutron model of the atomic nucleus
1777	Proving that combustion consists of combining a substance with one of the components of air – A. L. Lavoisier; Lavoisier mistakenly considered this component to be the carrier of acidic properties and called oxygene (acidobear, now oxygen)	1857	– Ch. Gerhardt		– J. Chadwick, W. Heisenberg, D. Iwanienko
1784	Identification of the composition of water – H. Cavendish	1861	The discovery of glycogen – Claude Bernard	1935	Formulation of the transition state theory – H. Eyring, M. Polanyi
1787	Specifying by French chemists, grouped around A. L. Lavoisier, which substances should be considered elements (including metals) and giving the rules for naming inorganic compounds, which they use to this day	1858	Discovery of mitochondria, often referred to as the "powerhouses of the cell"	1939	Nuclear fission – F. Strassmann, O. Hahn, L. Meitner
			- physiologist Albert von Kölliker	1949	Development of the flash photolysis technique – R. Norrish, G. Porter
1789	A. L. Lavoisier's formulation of the law of conservation of mass of individual elements during chemical and physical transformations (in "Traite elementaire de chimie")	1865	Proving the validity of Avogadro's hypothesis – S. Canizzaro	1953	Discovery of DNA – Crick, Watson
		1867	Demonstration that chemical properties depend on the structure of molecules	1965	Giving the rules for the course of the so-called concerted reactions
1792-1811	Formulation of the basic laws of chemistry: the law of stoichiometric connections (1792, J. B. Richter), the law of constant relations	1869	– A. Butlerov	1967-87	– R. B. Woodward, R. Hofmann
		1882	Giving the structure of the benzene molecule, explaining the aromatic properties of benzene and its derivatives		Development of stereoselective synthesis methods – J. M. Lehn, Ch. J. Pedersen
		1883	The Formulation of the Law of Action of the Masses – C. M. Guldberg and P. Waage		Application of the supersonic beam method to the study of reaction kinetics
		1884	Periodic table of elements – D. Mendeleev	2005	Discovery of grid cells in the brain – E. Moser, M.-B. Moser
		1886	The first telephone patent - Alexander G. Bell	2010	Discovery of the role of glutamine, along with glucose, in the fermentation of cancer cells – T. Seyfried
		1887	The first analogue computer – W. Thomson (L. Kelvin)	2016	Nobel Prize in Physiology or Medicine for discovery of autophagy - Y. Ohsumi
		1888	Discovery of platelets by Giulio Bizzozero	2024	Discovery of water on Mars
		1889	Discovery of glutamine - E. Schulze, E. Bosshard		
		1890	Discovery of the rule of contrariness – H. L. L. Le Chatelier		

COMPARISON OF SOME HUMAN BODY FLUIDS COMPONENTS

Blood components			Other		
Neutrocytes	- actively motile and phagocytic	- carry carbon dioxide, a waste product of metabolism, to the lungs, where it is excreted	Synovial fluid	Amniotic fluid	- fills and surrounds the brain and the spinal cord
- also known as neutrophils, heterophils or polymorphonuclear leukocytes	- participate in hypersensitivity and inflammatory reactions	- give a number of around 5.2 million red cells per cubic millimetre of human blood in the adult human	- also called synovia	- protective liquid contained by the amniotic sac of a gravid amniote	- provides a mechanical barrier against shock
- form of the most abundant type of granulocytes	- migrate into the tissues	- allow oxygen exchange at a constant rate over the largest possible area	- viscous, non-Newtonian fluid found in the cavities of synovial joints	- serves to facilitate the exchange of nutrients, water, and biochemical products between mother and fetus	- formed primarily in the ventricles of the brain
- make up 40% to 70% of all white blood cells in humans	- also known as eosinophils	- developed in the erythropoiesis process	- reduce friction between the articular cartilage of synovial joints during movement	- present from the formation of the gestational sac	- supports the brain and provides lubrication between surrounding bones and the brain and spinal cord
- formed from stem cells in the bone marrow	Basocytes	- developed from the precursor known as nucleated red blood cell	- contains hyaluronan secreted by fibroblast-like cells of a synovial membrane	- generated from maternal plasma	- helps to maintain pressure within the cranium at a constant level
- highly mobile	- the least common type of granulocyte	- developed from Hemoglobin (HGB)	- contains lubricin (proteoglycan 4; PRG4) secreted by the surface chondrocytes of the articular cartilage	- passes through the fetal membranes by osmotic and hydrostatic forces	- transports metabolic waste products, antibodies, chemicals, and pathological products of disease away from the brain and spinal-cord tissue into the bloodstream
- can enter parts of tissue where other cells/molecules cannot	- represent about 0.5% to 1% of circulating white blood cells	- facilitates the transport of oxygen in red blood cells	- possesses rheopectic properties	- is absorbed through the fetal tissue and skin	- is slightly alkaline
- differentiated into subpopulations of neutrophil-killers and neutrophil-cagers	- discovered in 1879 by German physician Paul Ehrlich	- iron-containing protein in the blood of many animals	Aqueous humour	- may contain proteins, carbohydrates, lipids and phospholipids, urea and extracellular matrix (ECM) components including collagens and glycosaminoglycans, including hyaluronic acid and chondroitin sulfate	- is about 99 percent water
- along with eosinophils and basophils, constitute a group of white blood cells known as granulocytes	- also known as basophils	- forms a bond with oxygen - linked with the Bohr effect	- transparent water-like fluid similar to blood plasma		- probably filtered through the nervous-system membranes (ependyma)
	- responsible for inflammatory reactions during immune response	- enables aerobic respiration, which powers the animal's metabolism	- secreted by the ciliary body, a body supporting the lens of the eyeball		- is continually produced
	- synthesize and store histamine, a natural modulator of the inflammatory response	- makes up about 96% of a red blood cell's dry weight (excluding water)	- continually produced by the ciliary processes		- is affected by the downward pull of gravity, the continual process of secretion and absorption, blood pulsations in contingent tissue
Lymphocytes	- incite immediate hypersensitivity reactions in association with platelets, macrophages and neutrophils	- increases the total blood oxygen capacity seventy-fold	- prevents eye dryness	Umbilical blood	respiration, pressure from the veins and head
- a type of white blood cell (leukocyte) in the immune system	Platelets (PLT)	Fibrinogen	- maintains the intraocular pressure and inflates the globe of the eye	- is blood that remains in the placenta and in the attached umbilical cord after childbirth	and body movements
- make up between 18% and 42% of circulating white blood cells	- also known as thrombocytes	- glycoprotein complex, produced in the liver	- provides nutrition for the posterior cornea, trabecular meshwork, lens and anterior vitreous	- contains various types of stem and progenitor cells, mostly hematopoietic stem cells	- may diagnose a number of diseases
- formed in lymphopoiesis process	- colourless, nonnucleated blood component	- described in 1905 by Paul Morawitz	Cytosol		- is being produced by specialised ependymal cells in the choroid plexus of the ventricles of the brain, and absorbed in the arachnoid granulations
- determine the specificity of the immune response	- found only in the blood of mammals	- converted to fibrin, which helps to form a stable blood clot	- part of the cytoplasm	Cytoplasm	- occupies the subarachnoid space (between the arachnoid mater and the pia mater)
- originate from stem cells in the bone marrow	- store and transport several chemicals, including serotonin, epinephrine, histamine and thromboxane	- bivalent molecule with two symmetrical halves	- is where some chemical reactions of metabolism take place	- contains all of the organelles	- and the ventricular system around and inside the brain and spinal cord
- able to bind antigens through receptor molecules on their surfaces	- the smallest cells of the blood	- can bind simultaneously to two platelets	- contains more than 10 000 different kinds of molecules that are involved in cellular biosynthesis	- contains the mitochondria, which are the sites of energy production through ATP (adenosine triphosphate) synthesis	- nearly protein-free compared with plasma
- have a nucleus that occupies most of the cell	- incapable of cell division	- links platelets together (aggregation) through the glycoprotein IIb-IIIa complex that serves as the fibrinogen receptor	- contains an organized framework of fibrous molecules that constitute the cytoskeleton, which gives a cell its shape, enables organelles to move within the cell, and provides a mechanism, by which the cell itself can move	- the endoplasmic reticulum, the site of lipid and protein synthesis	- has a lower chloride level than plasma
- found in large numbers in the lymph nodes, spleen, thymus, tonsils and lymphoid tissue of the gastrointestinal tract	- formed in the bone marrow by segmentation of the cytoplasm of megakaryocyte cells	Other potential components		- contains Golgi apparatus, sorted for transport to their cellular destinations	- has a higher sodium level than plasma
- enter the circulation through lymphatic channels	- occur in higher concentration in the spleen than in the peripheral blood	- serotonin	Vitreous body	- contains lysosomes and peroxisomes	- is normally free of red blood cells and at most contains fewer than 5 white blood cells per cubic millimetre
- regulate or participate in the acquired immunity to foreign cells and antigens	Bilirubin	- sodium	- is a transparent, colorless, gelatinous mass		- creates neutral buoyancy for the brain
	- secreted by the liver in vertebrates	- potassium	- fills the space in the eye between the lens and the retina	Serous fluid	- allows for the homeostatic regulation of the distribution of substances between cells of the brain and neuroendocrine factors
Monocytes	- produced in bone marrow	- ammonia	- surrounded by a layer of collagen called the vitreous membrane (or hyaloid membrane or vitreous cortex)	- typically pale yellow or transparent and of a benign nature	- has a composition slightly different from blood plasma
- the largest type of leukocyte in blood	- has no known function other than that of a colouring agent	- calcium	- makes up four-fifths of the volume of the eyeball	- fills the inside of body cavities	- described by Hippocrates as "water surrounding the brain"
- produced by the bone marrow from precursors called monoblasts	- not present in the blood of dogs, sheep and rats	- phosphorus	- fluid-like near the centre	- originates from serous glands, with secretions enriched with proteins and water	- rediscovered by Emanuel Swedenborg between 1741 and 1744
- migrate from blood to an inflammatory site to perform their functions	Red blood cells (RBC)	- globulins	- gel-like near the edges	- as a fluid plays a role in assisting digestion, excretion and respiration	- used in treatment by W. Essex Wynter in 1891
- make up about 7 percent of the leukocytes	- also known as erythrocytes	- albumins			- turns over at a rate of three to four times a day
- actively motile and phagocytic	- stay for around 45% of blood volume	- oxygen			
- have relatively big nucleus	- give the blood its characteristic colour	- glucose			
- tend to be indented or folded rather than multilobed	- contain hemoglobin	- fructose			
	- small, round, and biconcave	- carbon dioxide			
	- appear dumbbell-shaped in profile	- omega-3 fatty acids			
Eosinocytes	- covered with a membrane composed of lipids and proteins	- omega-6 fatty acids			
- responsible for combating multicellular parasites and certain infections	- lack a nucleus	- ketones			
- type of white blood cell	- is being developing in bone marrow in several stages	- lipoproteins			
- produced in the bone marrow	- carry oxygen from the lungs to the tissues	- stem cells			
- involved in defense against parasites		- many other components		Cerebrospinal fluid	Other
				- clear, colourless liquid	

COMPARISON OF SOME OF THE CHEMICAL ELEMENTS

Calcium - discovered by H.B. Davy in 1808 - soft, very chemically active metal - present in calcite, apatite, anhydrite, dolomite and other minerals - present in bones and body fluids - present in the amount of around 1 kg in the human body (70 kg) - used as reductor in metallurgy - used as alloy additive Phosphorus - extracted in 1669 by H. Brand - nonmetal - present in the amount of around 780 g in the human body (70 kg) - present in nucleic acids - present in ATP - present in teeth and bones Sodium - obtained in 1807 by H. B. Davy - very soft metal - very chemically active - has a melting point of 97 °C - present in sea water - used in sodium lamps - essential for proper functioning of muscles - essential for proper functioning of nerves Iodine - discovered in 1811 by B. Courtois - nonmetal - present in sea water - present in thyroid gland - used as radioactive isotope in thyroid gland diagnostic Hydrogen - discovered in 1766 by H. Cavendish - the lightest element - present in petroleum, natural gas and other fossil fuels - ingredient of water - ingredient of nucleic acids and proteins Lawrencium - artificially obtained in 1961 by A. Ghiorso, T. Sikkeland, and A. E. Larsch - metal - radioactive element - not present in nature Xenon - discovered in 1898 by	W. Ramsay and M. W. Travers - present in the air - noble gas - used as a fluorescent lamp filler - biological function not found Iron - known since antiquity - malleable metal - rusts in humid air - passivates in dry air - ferromagnetic - main component of Earth's core - present in hematite, magnetite, pyrite and siderite - present in hemoglobin and myoglobin Oxygen - obtained in 1722 by K. W. Scheele and independently in 1774 by J. Priestley - colourless and odourless gas - present in air and minerals - present in the amount of around 43 kg in the human body (70 kg) - used in respiration process - present in water Selenium - discovered in 1817 by J. J. Berzelius - nonmetal - present in small amounts in sulfur deposits - used for rubber vulcanization - present in around 14 mg in the human body - potentially teratogenic Argon - discovered in 1894 by W. Ramsay and Lord Rayleigh - nonmetal - chemically inert - nobel gas - present in the air - used to fill light bulbs - can cause suffocation Indium - discovered in 1863 by F. Reich and T. Richter - very soft metal - unknown biological function Rhodium - discovered in 1803 by W. H. Wollaston - unknown biological function - present in the form of alloys along with platinum	Carbon - known since the earliest times - present in the amount of around 13 kg in the human body (70 kg) - present in natural gas - present in petroleum Nitrogen - discovered in 1772 by D. Rutherford - nonmetal - colourless and odourless gas - present in the air - used for nitrating - present in the amount of around 2 kg in the human body (70 kg) - present in nucleic acids Copper - known since antiquity - soft, malleable metal - present in chalcopyrite, bornite, covelin, chalcocite, cuprite, malachite and other minerals - used for production of electrical wires Einstein - discovered in 1952 by A. Ghiorso in radioactive ash after hydrogen bomb eruption on Enewetak Atoll - metal - radioactive element - not present in nature Titanium - discovered in 1791 by W. Gregor - hard metal - corrosion-resistant - present in rutile, ilmenite and titanomagnetite Fluorine - obtained in 1886 by A. F. F. Moissan - nonmetal - present in fluorite, cryolite and fluorine apatite - present in human body in amount of around 2,6 g Tantalum - discovered in 1802 by A. G. Ekeberg - hard, ductile, chemically inert metal - biological function not found Neon - discovered in 1898 by W. Ramsay and M.W. Travers - present in the air	Gold - one of the earliest known metal - soft, ductile, malleable nobel metal - used in jewelry and electronics industry - biological function not found Sulphur - known since antiquity - nonmetal - present in the amount of around 150 g in the human body (70 kg) - used for production of matches Silica - discovered in 1882 by J. J. Berzelius - nonmetal - present in Earth's crust as aluminosilicate and silicon dioxide Tin - used since antiquity as alloy with copper - used for tinning of steel plate - present in the amount of around 15 g in the human body (70 kg) Vanadium - discovered in 1801 by A. M. del Rio and again in 1830 by N. G. Sefström - hard, malleable, ductile metal - present in vanadinite and carnotite - present in petroleum and hard coal - linked with cholesterol metabolism Promet - isolated in 1945 by C. E. Coryell, J. A. Marinsky and L. E. Glendenin - radioactive metal Helium - discovered in 1868 by P. J. Janssen and J. N. Lockyer - colorless, odorless gas Cobalt - known since antiquity - ferromagnetic - present in B₁₂ vitamin - present in smaltine Yttrium - discovered in 1794 by J. Gadolin - ignites in the air when powdered	Silver - one of the oldest known metal - soft, ductile, malleable nobel metal - used for production of coins and jewelry - present in chloargyrite, argentite and pyrargyrite Potassium - obtained in 1807 by H. B. Davy - present in sanidine, orthoclase, adular, microcline - participates in the conduction of electrochemical impulses in the cell Chlorine - discovered in 1774 by K. W. Scheele - nonmetal - has a boiling point of -34,6°C - used for bleaching - used for production of hydrochloric acid Chromium - discovered in 1797 by N. L. Vauquelin - hard metal - passivates in the air - amphoteric - used for protective and decorative coatings Zinc - known since antiquity - passivates in the air - amphoteric - plays a role in enzymatic processes Nickel - discovered in 1751 by A. F. Cronstedt - ferromagnetic - present in meteorites - used for nickel plating - present in plant tissues Tellur - discovered in 1782 by F. J. Müller von Reichenstein - brittle, chemically active metal - present in altaite, calaverite, silvanite - used for rubber vulcanization Tungsten - isolated in 1783 by J. J. and F. d'Elhuyar - has the highest melting point at 3,410 °C (6,170 °F) - gray-silver metal	Cadmium - discovered in 1817 by F. Stromeyer - poisonous as fume and compound - carcinogenic - teratogenic Mercury - known since antiquity - has a melting point of -38,87°C - used for thermometer filling - teratogenic Lead - known since antiquity - causes diseases of the nervous system - may accumulate in the body - may cause blood and blood vessels damage Aluminium - discovered in 1825 by H. Ch. Ørsted - light, malleable metal - used for production of foils and electric wires Roentgen - artificially obtained in 1994 in Helmholtz Centre for Heavy Ion Research - radioactive element Uranium - discovered in 1791 by M. H. Klaproth - chemically active metal - used as a fuel for nuclear reactors - poisonous as soluble salt Osmium - discovered in 1804 by S. Tennant - very hard metal - vapors of very volatile oxides are highly poisonous Plutonium - discovered in 1940 by G. Th. Seaborg - biological function not found - metal, highly poisonous Curium - artificially obtained in 1944 by G. Th. Seaborg, R. A. James and A. Ghiorso - metal - radioactive element - chemically active - not present in nature - accumulates in the bones - dangerous to health
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COMPARISON OF UNITS AND REFERENCE RANGE OF SOME BLOOD TESTS								
Blood marker	Unit	Reference range*	Blood marker	Unit	Reference range*	Blood marker	Unit	Reference range*
White blood cells (WBC)	cells/ μ L	4500 - 11000	Vitamin B12	pg/mL	160-950	Total protein	g/dL	6,0-8,3
Red blood cells (RBC)	cells/mcL	4,7 - 6,1 million	Folic acid	nmol/L	6,12 - 38,52	Fibrinogen	mg/dL	200-400
Hemoglobin (HGB)	g/dL	14,0-18,0	Ferritin	ng/mL	24-307	D-dimer (DD)	ng/mL	0-500
Hematocrit (HCT)	%	40,0-54,0	Transferrin	mg/dL	204-360	Chloride	mEq/L	96 - 106
Mean corpuscular volume (MCV)	fL	80,0-97,0	Immunoglobulin E (IgE)	u/mL	1,53-114	Antithrombin III	%	80 - 120
Aluminum	μ g/L	0-15	Glucose/ketone Index (GKI)	-	>0	PF4	U/dL	< 400
Mean corpuscular hemoglobin concentration (MCHC)	g/dL	32,0 - 36,0	Acid-base balance	pH	7,35-7,45	Total platelet nucleotide content	nmol/ 10^8	5,5 - 9,6
Adrenocorticotrophic hormone (ACTH)	pg/mL	7,2-63,3	Erythropoietin (EPO)	mU/mL	2,6-18,5	ATP content of platelets	nmol/ 10^8	0,6-8,5
Platelets (PLT)	platelets/ μ L	150,000 - 450,000	Choline	mcmol/L	7-20	Copper	μ g/dL	70-140
Platelet count (PCT)	%	0,12-0,36	Lead	mcg/dL	0-10	ADP content of platelets	nmol/ 10^8	1,9 - 3,8
Cadmium	ng/mL	<5,0	Apolipoprotein B	mg/dL	0-90	Plasminogen activator inhibitor-1	AU/mL	0-10
Mean platelet volume (MPV)	fL	6,1-11,0	5-nucleotidase	IU/L	2-17	Antistreptolysin O (ASO)	U/mL	2-15
Billirubin	mg/dl	0,2-1,2	Phospholipids	mg/dL	150-250	Strontium	μ g/L	20-31
Neutocytes (NEU%)	%	45,0-70,0	Rubella IgG	IU/ml	0-7	Thyroid-stimulating hormone (TSH)	mU/L	0,45-4,12
Lymphocytes (LYMPH%)	%	20,0-45,0	Gastrin	pg/mL	0-180	Selenium	ng/mL	70-150
Monocytes (MON%)	%	3,0-8,0	Tryptophan	μ mol/dL	3,10-8,30	Total iron-binding capacity (TIBC)	μ g/dL	240-450
Eosinocytes (EOS%)	%	1,0-5,0	Fructosamine	umol/L	200-285	Erythrocyte sedimentation rate (ERC)	mm/h	0-15
Basocytes (BASO%)	%	0,0-1,0	Candida albicans	IU	0-3,49	CA-50	mg/dl	~0
Atypical lymphocytes (ALY%)	%	0,0-1,5	Serotonin	ng/mL	50-200	CA-125	mg/dl	~0
Large immature cells (LIC%)	%	0,0-1,5	Myoglobin	ng/mL	25-72	Chromogranin A	ng/mL	<36,4
Neutocytes (NEU)	neutocytes/ μ L	2500 - 6000	Tryptase	ng/mL	0-11,4	Collagen 1A1 polymorphism	-	-
Lymphocytes (LYMPH)	cells/ μ L	4400 - 11000	Apolipoprotein A-1	mg/dl	101-205	Collagen S100	μ g/L	<0,2
Monocytes (MON)	monocytes/ μ L	200-800	Factor V	%	50-150	Vitamin E	μ g/mL	5,5-17
Eosinocytes (EOS)	cells/ μ L	0-500	Plasma osmolality	mOsm/kg	285-295	Vitamin K2 MK7	ng/mL	0,2-3,2
Basocytes (BASO)	basocytes/ μ L	0-300	Thallium	ng/mL	<2	Vitamin B6	nmol/L	40-100
Atypical lymphocytes (ALY)	%	0-1	Arsenic	ng/dL	0-10	Vitamin B1	μ g/dL	2,5-7,5
Large immature cells (LIC)	%	1-2	Mercury	ng/mL	0-10	Vitamin B2	μ g/L	1-19
Sodium	mmol/L	136-146	Carbon dioxide	mEq/L	23-30	Waller-Rose test	IU/L	0-14
Potassium	mmol/L	3,5-5,1	Derivatives-Reactive Oxygen Metabolites	Carratelli Units	250-300	CA-72-4	U/ml	0-7
Blood urea nitrogen (BUN)	mg/dL	10,0-50,0	Cytomegalowirus (CMV) IgG	U/mL	0-0,59	CA-19,9	U/mL	0-37
Creatinine	mg/dL	0,7-1,2	Folate	ng/mL	1,8-9,0	CA-15,3	U/mL	<30
Silicon	μ mol/L	10-11,1	Antinuclear antibodies (ANA)	U	0-1	NSE	ug/L	<17
Total cholesterol (TC)	mmol/L	0-5,2	Thyroxine-binding globulin	μ g/mL	12-27	BTA	mmol/L	0,4-0,5
High-density lipoprotein (HDL)	mmol/L	>1,45	Amylase	U/L	25-125	Glial fibrillary acidic protein	pg/mL	0,0-87,1
Low-density lipoprotein (LDL)	mmol/L	0-2,59	Creatine kinase	U/L	30-135	Ubiquitin-C-terminal-hydrolase-L1	pg/mL	<327
Triglycerides (TG)	mmol/L	0-1,7	Platelet distribution width (PDW)	%	11,0-18,0	ROMA	-	0,74-1,31
Glucose	mmol/L	3,33-5,89	Cardiolipin antibodies IgG	GPLU/mL	0-10	SCCAG	pg/mL	9-52
Aspartate aminotransferase (AST)	units/L	8-36	Anti-cyclic citrullinated peptide (Anti-CCP)	EU/mL	0-20	Bence Jones protein	^oC	56
Homocysteine (HCY)	mcmol/L	5-15	Mercury	ng/mL	<10	Zinc	mcg/mL	0,60-1,20
Alkaline phosphatase (ALP)	units/L	30-130	Prostate-specific antigen (PSA)	ng/mL	0-4	Insulin	uIU/ml	2,6 - 24,9
Gamma-glutamyl transpeptidase (GGT)	units/L	0-50	Dehydroepiandrosterone (DHEA)	ng/mL	0,14-2,76	Activated partial thromboplastin time (APTT)	s	21-35
Chromium	μ g/L	<1,4	Dehydroepiandrosterone sulfate (DHEA-S04)	mcg/dL	71,6 - 375,4	Alanine transaminase (ALT)	units/L	4-36
Lipase	units/L	14-72	Ammonia	μ dL	15-45	Red blood cells distribution width (RDW)	%	11,0-15,0
Uric acid	mg/dL	1,5-6,0	Ceruloplasmin	μ g/dL	40-70	Follicle-stimulating hormone (FSH)	mIU/mL	1,5 to 12,4
Vitamin A	mg/dL	25-43	17-hydroxyprogesterone (17-OHP)	ng/dL	0-200	Glutamine	μ g/dL	32,5-78,0
Creatine phosphokinase (CPK)	units/L	30-135	Partial pressure of carbon dioxide	μ mol/dL	37,20-87,60	Anti-Müllerian hormone (AMH)	ng/mL	1,0-3,0
Magnesium	mg/dL	1,8-2,6	Bicarbonate	mmHg	35-45	Carcinoembryonic antigen (CEA)	mEq/L	23-26
Phosphate	mg/dL	2,8-4,5	Mean corpuscular hemoglobin (MCH)	pg	27,0-34,0	Manganese	nmol/L	73 - 210
Iron	μ g/dL	40-155	Androstenedione	ng/mL	0-2,5	Nickel	ng/dL	7-20
Albumin	g/dL	3,4-5,4	Sex hormone binding globulin (SHBG)	nmol/L	18-144	Total iron-binding capacity (TIBC)	μ g/dL	240-450
Anti-thyroglobulin (Anti-TG)	U/mL	0-116	Antithrombin	u/dl	80-120	Cholinesterase (ChE)	IU/L	5320-12,920
Seruloplasmin	mg/dL	20-50	Luteinizing hormone (LH)	u/L	1,24-7,8	Thyroid peroxidase antibody (Anti-TPO)	U/mL	0-34
Free tyroxine (FT 4)	ng/dL	0,8-2,8	Ketones	mmol/dL	0-5	Human epididymis protein 4 (HE-4)	pmol/l	85
Free triiodothyronine (FT 3)	pg/mL	2,0-4,4	Leucine	μ mol/L	74-196	Nicotine	ng/dL	<3
Thyroglobulin (TG)	ng/mL	1,50-38,50	Alpha fetoprotein (AFP)	ng/mL	0,6-8,5	Cotinine	ng/dL	<3
TSH Receptor Antibodies (TRAb)	U/L	0,0-1,75	Total testosterone	ng/dL	265-923	Oxygen saturation	%	95-100
Calcitonin	pg/mL	0,0-5,1	C-reactive protein (CRP)	mg/dL	0-10			
Osteocalcin	ng/mL	5,8-14	Antistreptolysin O (ASO)	U/mL	0-200			
25-hydroxy vitamin D	ng/mL	20-40	R-factor (RF)	u/mL	0-15			
Hemoglobin A1C (HbA1c)	%	4,0-5,6						
Calcium	mg/dL	8,6-10,2						
Prolactin	ng/mL	4-23						
Lactate dehydrogenase (LDH)	u/L	140-280						

COMPARISON OF PURE WATERS EFFECTS AND CONTAMINATED WATER

PURE WATERS H ₂ O		Contaminated water		Dehydration	
Archaea	- improve coffee scent	- help with brain inflammation in sheep	- reduce virulence of pathogens	- contains pathogenic bacteria	- causes thirst
- help prevent from uncontrolled spread of archaea population	- nourish organisms properly	- help with neurodegeneration in goats	- reduce toxicity of chemical compounds	- contains viruses	- causes dry lips
- play a role in nutrient cycling	- maintain paper properties	- help with synaptic dysfunction in mink	- reduce time of treatment	- contains parasites	- causes dry tongue
- play a role in carbon cycling	- improve furniture quality	- help with neuronal loss in cervids	- reduce mining pollution	- contains parasitic worms	- badly affects the brain
- play a role in sulphur cycling	- improve flora	- help with neurodegenerative disorders in felines	- reduce raw resource manufacturing pollution	- causes bacteria spread in humans	- causes fewer than six wet diapers per day in infants
- promote plant growing	- improve leaves quality	- help with prion diseases in ungulates	- reduce the leather and textile industry pollution	- causes viruses spread to humans	- causes no wet diapers or urination for eight hours in toddlers
attributes	- improve roots quality	- help with neurodegenerative disorders in ungulates	- reduce the electronics industry pollution	- causes parasitic worms detection	- causes sunken soft spot on infant's head
- promote further research on archaea	- improve symbiosis	- help with prion diseases in ungulates	- reduce the pharmaceutical industry pollution	- contributes to water retention	- causes sunken eyes
	- help liquids flow	- help with prion diseases in ungulates	- reduce the energy production industry pollution	- contributes to edemas	- causes dry skin
	- reduces dryness of plant organisms	- help with prion diseases in ungulates	- reduce the chemical industry pollution	- consists toxic hexavalent chromium	- causes wrinkled skin
Prions	Animals	Humans	- promote well being	- causes toxic cyanide	- causes deep breathing
- help to promote	- prevent lethal seizures	- help with deposits of cholesterol	- help with inorganic pollutants	- causes trypanosomiasis	- causes rapid breathing
controlled spread of prions population	- support healthy stomachs	- unclog deposits of cholesterol	- help with pathogens	- causes chagas disease	- causes cool hands
- bring relief with potentially prions-caused	- help with heart disease	- unclog deposits of salts	- help with suspended solids	- causes giardiasis	- causes blotchy hands
Creutzfeldt-Jakob disease	- help with methemoglobinemia	- normalize circulatory system	- reduce intoxication of human body	- causes abdominal pain	- causes cool feet
- help with deeper insight in prions since discovered in 1997	- help with acute bloody diarrhea	- increase dissolved oxygen level	- reduce agriculture pollution	- causes joint pain	- causes blotchy feet
- help to maintain equilibrium	- bring relief to convulsions	- stop bacteria development	- reduce microbiological contamination	- causes fever	- causes confusion
	- preserve endangered species	- enhance urine production	- help with breathing difficulties	- causes malaria	- causes headache
Protists	- improve skin problems	- improve glycemic responses in diabetics	- help with extended-spectrum betalactamase producing bacteria	- causes joint pain	- causes tiredness
- may support photosynthesis of protists	- help managing waterborne diseases	- improve insulinemic responses in diabetics	- reduce cyanobacterial blooms	- causes anaemia	- causes fatigue
- help in nutrients recycling	- improve meat quality	- improve blood lipid profile	- prevent water-based diseases	- causes amoebic dysentery	- causes dizziness
- promote planctonic algae nutritional values	- support sight health	- improve semen quality	- prevent Guinea worm disease	- causes trypanosomiasis	- causes weakness
- help build tropical reefs	- support healthy hearts	- improve antioxidant status in human	- regulate blood pressure	- causes leishmaniasis	- causes lightheadedness
- have industrial uses	- support healthy brains	- help with harmful effects of drugs on humans	- prevent water-related insect-borne diseases	- causes toxoplasmosis	- causes dry mouth
- could serve as medicine	- help with mycotoxins-induced death	- boost human body systems	- prevent dengue fever	- causes cryptosporidiosis	- causes dry cough
- form the base of aquatic food chains	- support healthy livers	- help with harmful effects of environmental pollutants on humans	- prevent chikungunya	- causes vomiting	- causes high heart rate
	- help with Lyme disease in animals	- help with harmful effects of environmental pollutants on humans	- prevent Zika	- contains physical contaminants	- causes flushed skin
Viruses	- support mitochondrial function	- improve biochemical parameters of humans	- prevent river blindness	- contains chemical contaminants	- causes swollen feet
- help prevent from dangerous subviral agents population counts	- help in fishing outcome	- help with nervous problems	- prevent yellow fever	- contains biological contaminants	- causes muscle cramps
- help managing transmission of viruses in water	- help fishes to grow	- help with ailments	- prevent filariasis	- contains radiological contaminants	- causes heat intolerance
	- support healthy instincts	- help with mastitis	- help with endocrine system disruption	- contains bisphenol A	- causes constipation
Bacteria	- improve fauna	- reduce pain	- decrease health risks	- increases risk of infection by prions	- causes loss of fluids in the body
- prevent bacteria in drinking water	- improve eggs nutritional value	- reduce swellings	- enhance human health	- causes protists infections	- causes electrolyte imbalances
- play a role in ecology system	- reduce markers of oxidative stress	- help with arthritic pain	- help with air contamination	- causes fungal infections	- causes heat-related illnesses
- help to reduce harmful effects of bacteria on humans	- help to detoxify the organism	- help with alleviating colds	- improve water management infrastructure	- causes body aches	- causes heatstroke
	- improve nutrients digestibility	- help with coughs	- unblock water-management regulators in the body	- causes muscle aches	- causes kidney issues
Plants	- help with digestive issues	- help with bronchitis	- help with disease vectors	- causes respiratory illness	- causes kidney stones
- help in forests mapping	- help with urinary problems	- help with all types of fever	- reduce humans susceptibility to pollution	- causes nervous disorders	- causes kidney failure
- improve SOC sequestration	- supports healthy offspring	- help with arthritis pain	- reduce the transport industry pollution	- causes unknown organs disease	- causes coma
- help managing soil organic carbon stocks	- prevent early death	- regulate blood pressure	- make food healthier	- causes digestive system disease	- causes cells death
- help in lining human intestines	- act in principles with Warburg theory	- help to recover from stroke	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- causes respiratory system disease	- causes rapid pulse
- promote healthy food or animals	- help fighting diseases	- regulate women's menses	- may limit glucose intake	- causes typhoid	- causes lack of sweating
- increase remediation process rate	- easier to drink	- help breaking up kidney stones	- promote healthy bathing	- causes gastroenteritis	- causes slurred speech
- stop chemical imbalance in plants	- unclog the arteries	- help breaking up gallbladder stones in small particles	- allow healthy swimming	- causes salmonellosis	- causes fainting in animals
- help in managing bacteria levels	- unclog the veins	- help with organic pollutants	- reduce risk of parasitic diseases	- causes typhoid fever	- causes low blood volume shock
- help managing fungus level	- increase rate of growth	- help with waste compounds thresholds	- often used with therapies for multitude of infectious diseases and other health issues	- causes bacillary dysentery	- causes hypovolemic shock
- help reestablish beneficial properties	- increase rate of growth	- help with arthritic pain	- help to have healthy cell in the whole body	- causes encephalitis	- causes listlessness
- revitalize forests habitats	- help prevent pathogenic microorganisms	- help with mastitis	- help with free radicals	- causes brain problem	- causes irritability
- clean up inland waters	- help prevent pathogenic microorganisms	- reduce pain	- help with endocrine system disruption	- causes body disease	- may cause nerve disactivities
- improve liquid plant oils constitution	- help prevent pathogenic microorganisms	- reduce swellings	- decrease health risks	- causes damage to human	- disregulates muscle activities
- help implement proper grounding	- help prevent pathogenic microorganisms	- help with arthritic pain	- enhance human health	- causes cholera	- impacts muscle contractility
- increase water holding capacities	- help prevent pathogenic microorganisms	- help with alleviating colds	- help with air contamination	- causes typhoid	- impacts nerve impulses transmission
- support reforestation	- help prevent pathogenic microorganisms	- help with coughs	- improve water management infrastructure	- causes nervous disorders	- doesn't help with blood coagulation
- linked to eutrophication	- help prevent pathogenic microorganisms	- help with bronchitis	- unblock water-management regulators in the body	- causes unknown organs disease	- doesn't help with bones
- improve recuperation	- help prevent pathogenic microorganisms	- help with all types of fever	- help with disease vectors	- causes digestive system disease	- doesn't help with teeth
- support aquaponic respiration	- help prevent pathogenic microorganisms	- help with arthritis pain	- reduce humans susceptibility to pollution	- causes respiratory system disease	- causes fainting in animals
- improve liquid proteins profile	- help prevent pathogenic microorganisms	- regulate blood pressure	- make food healthier	- contains radiological contaminants	- causes low blood volume shock
- support fiber values	- help prevent pathogenic microorganisms	- help to recover from stroke	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- contains biological contaminants	- causes hypovolemic shock
- improve nutritional value of fruits	- help prevent pathogenic microorganisms	- regulate women's menses	- may limit glucose intake	- contains bisphenol A	- causes listlessness
- improve nutritional values of vegetables	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- promote healthy bathing	- increases risk of infection by prions	- causes irritability
- improve nutritional values of herbs	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- allow healthy swimming	- causes protists infections	- may cause nerve disactivities
- improve wood quality	- help prevent pathogenic microorganisms	- help with organic pollutants	- reduce risk of parasitic diseases	- causes fungal infections	- disregulates muscle activities
- move through xylem	- help prevent pathogenic microorganisms	- help with waste compounds thresholds	- often used with therapies for multitude of infectious diseases and other health issues	- causes body aches	- impacts muscle contractility
- support healing actions	- help prevent pathogenic microorganisms	- help with arthritic pain	- help to have healthy cell in the whole body	- causes muscle aches	- impacts nerve impulses transmission
- improve medical value	- help prevent pathogenic microorganisms	- help with mastitis	- help with free radicals	- causes respiratory illness	- doesn't help with blood coagulation
- improve healing properties	- help prevent pathogenic microorganisms	- reduce pain	- help with endocrine system disruption	- causes nervous disorders	- doesn't help with bones
- link plants and animals kingdoms	- help prevent pathogenic microorganisms	- help with arthritic pain	- decrease health risks	- causes unknown organs disease	- doesn't help with teeth
- preserve the oldest trees on Earth	- help prevent pathogenic microorganisms	- help with coughs	- enhance human health	- contains radiological contaminants	- causes fainting in animals
- improve plant milk values	- help prevent pathogenic microorganisms	- help with bronchitis	- help with air contamination	- contains biological contaminants	- causes low blood volume shock
- influence harvests	- help prevent pathogenic microorganisms	- help with all types of fever	- improve water management infrastructure	- contains bisphenol A	- causes hypovolemic shock
- improve fat content in plants	- help prevent pathogenic microorganisms	- help with arthritis pain	- unblock water-management regulators in the body	- increases risk of infection by prions	- causes listlessness
- reduce costs of refining	- help prevent pathogenic microorganisms	- regulate blood pressure	- help with disease vectors	- causes protists infections	- causes irritability
- help with flower composition	- help prevent pathogenic microorganisms	- help to recover from stroke	- reduce humans susceptibility to pollution	- causes fungal infections	- may cause nerve disactivities
	- help prevent pathogenic microorganisms	- regulate women's menses	- make food healthier	- causes respiratory illness	- disregulates muscle activities
	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- causes typhoid	- impacts muscle contractility
	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- may limit glucose intake	- causes nervous disorders	- doesn't help with blood coagulation
	- help prevent pathogenic microorganisms	- help with organic pollutants	- promote healthy bathing	- causes unknown organs disease	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help with waste compounds thresholds	- allow healthy swimming	- contains digestive system disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- help with arthritic pain	- reduce risk of parasitic diseases	- causes respiratory system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help with mastitis	- often used with therapies for multitude of infectious diseases and other health issues	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- reduce pain	- help to have healthy cell in the whole body	- contains biological contaminants	- causes hypovolemic shock
	- help prevent pathogenic microorganisms	- help with coughs	- help with free radicals	- contains bisphenol A	- causes listlessness
	- help prevent pathogenic microorganisms	- help with bronchitis	- help with endocrine system disruption	- increases risk of infection by prions	- causes irritability
	- help prevent pathogenic microorganisms	- help with all types of fever	- decrease health risks	- causes protists infections	- may cause nerve disactivities
	- help prevent pathogenic microorganisms	- help with arthritis pain	- enhance human health	- causes fungal infections	- disregulates muscle activities
	- help prevent pathogenic microorganisms	- regulate blood pressure	- help with air contamination	- causes body aches	- impacts muscle contractility
	- help prevent pathogenic microorganisms	- help to recover from stroke	- improve water management infrastructure	- causes muscle aches	- impacts nerve impulses transmission
	- help prevent pathogenic microorganisms	- regulate women's menses	- unblock water-management regulators in the body	- causes respiratory illness	- doesn't help with blood coagulation
	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- help with disease vectors	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- reduce humans susceptibility to pollution	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- help with organic pollutants	- make food healthier	- contains digestive system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help with waste compounds thresholds	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- help with arthritic pain	- may limit glucose intake	- contains biological contaminants	- causes hypovolemic shock
	- help prevent pathogenic microorganisms	- help with mastitis	- promote healthy bathing	- contains bisphenol A	- causes listlessness
	- help prevent pathogenic microorganisms	- reduce pain	- allow healthy swimming	- increases risk of infection by prions	- causes irritability
	- help prevent pathogenic microorganisms	- help with coughs	- reduce risk of parasitic diseases	- causes protists infections	- may cause nerve disactivities
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	- help prevent pathogenic microorganisms	- help with all types of fever	- help to have healthy cell in the whole body	- causes body aches	- impacts muscle contractility
	- help prevent pathogenic microorganisms	- help with arthritis pain	- help with free radicals	- causes muscle aches	- impacts nerve impulses transmission
	- help prevent pathogenic microorganisms	- regulate blood pressure	- help with endocrine system disruption	- causes respiratory illness	- doesn't help with blood coagulation
	- help prevent pathogenic microorganisms	- help to recover from stroke	- decrease health risks	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- regulate women's menses	- enhance human health	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- help with air contamination	- contains digestive system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- improve water management infrastructure	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- help with organic pollutants	- unblock water-management regulators in the body	- contains biological contaminants	- causes hypovolemic shock
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	- help prevent pathogenic microorganisms	- regulate women's menses	- enhance human health	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- help with air contamination	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- improve water management infrastructure	- contains digestive system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help with organic pollutants	- unblock water-management regulators in the body	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- help with waste compounds thresholds	- help with disease vectors	- contains biological contaminants	- causes hypovolemic shock
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	- help prevent pathogenic microorganisms	- reduce pain	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- causes protists infections	- may cause nerve disactivities
	- help prevent pathogenic microorganisms	- help with coughs	- may limit glucose intake	- causes fungal infections	- disregulates muscle activities
	- help prevent pathogenic microorganisms	- help with bronchitis	- promote healthy bathing	- causes body aches	- impacts muscle contractility
	- help prevent pathogenic microorganisms	- help with all types of fever	- allow healthy swimming	- causes respiratory illness	- doesn't help with blood coagulation
	- help prevent pathogenic microorganisms	- help with arthritis pain	- reduce risk of parasitic diseases	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help with mastitis	- often used with therapies for multitude of infectious diseases and other health issues	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- regulate blood pressure	- help to have healthy cell in the whole body	- contains digestive system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help to recover from stroke	- decrease health risks	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- regulate women's menses	- enhance human health	- contains biological contaminants	- causes hypovolemic shock
	- help prevent pathogenic microorganisms	- help breaking up kidney stones	- help with air contamination	- contains bisphenol A	- causes listlessness
	- help prevent pathogenic microorganisms	- help breaking up gallbladder stones in small particles	- improve water management infrastructure	- increases risk of infection by prions	- causes irritability
	- help prevent pathogenic microorganisms	- help with organic pollutants	- unblock water-management regulators in the body	- causes protists infections	- may cause nerve disactivities
	- help prevent pathogenic microorganisms	- help with waste compounds thresholds	- help with disease vectors	- causes fungal infections	- disregulates muscle activities
	- help prevent pathogenic microorganisms	- help with arthritic pain	- reduce humans susceptibility to pollution	- causes body aches	- impacts muscle contractility
	- help prevent pathogenic microorganisms	- help with mastitis	- make food healthier	- causes muscle aches	- impacts nerve impulses transmission
	- help prevent pathogenic microorganisms	- reduce pain	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- causes respiratory illness	- doesn't help with blood coagulation
	- help prevent pathogenic microorganisms	- help with coughs	- may limit glucose intake	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help with bronchitis	- promote healthy bathing	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- help with all types of fever	- allow healthy swimming	- contains digestive system disease	- causes fainting in animals
	- help prevent pathogenic microorganisms	- help with arthritis pain	- reduce risk of parasitic diseases	- contains radiological contaminants	- causes low blood volume shock
	- help prevent pathogenic microorganisms	- help with mastitis	- often used with therapies for multitude of infectious diseases and other health issues	- contains biological contaminants	- causes hypovolemic shock
	- help prevent pathogenic microorganisms	- regulate blood pressure	- help to have healthy cell in the whole body	- contains bisphenol A	- causes listlessness
	- help prevent pathogenic microorganisms	- help to recover from stroke	- decrease health risks	- increases risk of infection by prions	- causes irritability
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	- help prevent pathogenic microorganisms	- help with arthritic pain	- reduce humans susceptibility to pollution	- causes nervous disorders	- doesn't help with bones
	- help prevent pathogenic microorganisms	- help with mastitis	- make food healthier	- causes unknown organs disease	- doesn't help with teeth
	- help prevent pathogenic microorganisms	- reduce pain	- regulate anthro-, anat-, arthro-, bio-, chemo-scienced parameters	- contains digestive system disease	- causes

COMPARISON OF PURE AIR AND CONTAMINATED AIR					
PURE AIR			Contaminated air	Hypoxia	
Biosphere	- prevents from headaches	in unborn babies	- helps to distribute heat around the globe	- increases mortality	- may cause cell death
- prevents from aspergillus	- prevents from dizziness	- prevents from strokes		- increases morbidity	- causes cancer
- prevents from penicillium	- prevents from fatigue		- prevents raising concentration of methane due to human activities	- disproportionately impacts women	- causes IBD
- prevents from phialophora	- prevents from cold	Litosphere			- causes cardiac disease
- prevents from geotrichium	- prevents from cough	- prevents from additional methane release	Stratosphere	- disproportionately impacts children	- causes brain damage
- prevents from bacteria	- prevents from the irritation of the eyes	- prevents limestone dissolving	- protects living things from ultraviolet radiation from the sun at 32 km above	- negatively impacts economy	- causes lung disease
- prevents from yeasts	- prevents irritation of the nose	- prevents soil acidification	- vital to life on Earth	- classified as carcinogenic	- causes kidney disease
- prevents from mycobacterium tuberculosis	- prevents irritation of the throat	- prevents increased loss of plant nutrients	- prevents from catalytic destruction from a long list of chemical substances	- violates the human right to live in a clean environment	- causes liver disease
- prevents from influenza virus	- prevents intestinal disorders in cattle	- prevents accelerated weathering of mineral components	- consists ozone layer	- violates the human right to live in a sustainable environment	- causes angiogenesis
- prevents from a. fumigates	- prevents fluorosis in deer	- prevents decreased rates of organic matter decay	- very dry	- requires urgent research	- may cause tissue hypoxia
- prevents from fungal genera	- prevents from allergies	- prevents changes in soil organism populations	- doesn't consist to many clouds	- increases the risk of preterm births	- may affect a specific area of the body
- plays an important role in maintaining mood	- prevents mercury poisoning	- prevents mobilization of aluminum ions	- prevents from water-insoluble substances pollution	- adversely affects fertility	- may affect the whole body
- plays an important role in maintaining mental health	- prevents arsenic poisoning	- prevents reduction in cation exchange capacity	Ionosphere	- lowers antral follicle count	- may cause generalized hypoxia
- enhances the bacteria-killing ability of white blood cells	- prevents nickel poisoning		- plays an important role in atmospheric electricity	- leads to a higher incidence of infant mortality	- gradually leads to chronic hypoxia
- reduces edema	- prevents manganese poisoning	Hydrosphere	- forms the inner edge of the magnetosphere	- leads to a higher incidence of maternal mortality	- affects mitochondrion
- allows new blood vessels to grow	- prevents other heavy metals poisoning	- prevents the increase of water evaporation	- influences radio propagation	- leads to a higher incidence of birth defects	- affects cytoplasm
- improves oxygen saturation of the blood	- prevents acid gases poisoning	- prevents the acceleration of the hydrologic cycle	- affects GPS signals	- leads to a higher incidence of breast cancer	- prevents normoxia
- helps in faster recovery	- prevents hydrocarbons poisoning	- prevents sea-level rise	- partially ionized	- disproportionately impacts all-class workers	- could be harmful to heart tissue
- helps to gain appetite	- prevents uranium poisoning	- restores fish health	- contains plasma	- disproportionately impacts effectiveness of all sectors	- can lead to heart failure
- improves sense of well-being	- prevents thorium poisoning	- prevents impairment to fish respiration	Mesosphere	- disproportionately impacts all kind of people	- found around solid tumors
- helps with normalization of liver function	- positively affects nervous system	- prevents microplastics from altering fish behavior	- begins at the stratopause	- has significant consequences for maternal health	- found around bladder tumors
- improves cognitive function	- positively affects muscles and joints	- prevents accumulation of pollutants in fish tissue	- ends at the coldest part of Earth's atmosphere	- has significant consequences for neonatal health	- found around brain tumors
- protects against cell death	- positively affects kidney	- prevents metals in pollution from impairing fish reproduction	- carries noctilucent clouds	- modifies the natural characteristics of the atmosphere	- found around breast tumors
- increases neurogenesis	- positively affects lungs and respiratory system	- prevents from polycyclic aromatic hydrocarbons	- linked with red sprites	- increases the risk of developing lung cancer	- found around colon tumors
- increases blood supply to the brain	- positively affects heart		- linked with blue jets	- increases the risk of developing cardiovascular diseases	- found around esophagus tumors
- increases muscle blood flow	- positively affects reproductive system	Kryosphere	- linked with density shears	- increases the risk of developing respiratory diseases	- found around head tumors
- reduces pain	- positively affects skin and blood	- prevents polyester fibers in Mount Everest	- linked with falling meteor apart	- attributable mainly to man-made sources	- found around neck tumors
- improves functionality	- positively affects all parts of the body	- prevents propylene carbon in alpine snowpit	- requires pressure suit	- contains methane	- found around liver tumors
- beneficial in cardiovascular health	- protects from acid's rain impact on urban infrastructure	- prevents polyurethane in Tibetan glacier snow	Thermosphere	- contains bacteria	- found around lung tumors
- beneficial for immunity	- protects from acid's rain impact on forests	- prevents polyvinyl chloride in alpine snowpit	- may affect degradation of the primary photoelectrons	- contains viruses	- found around pancreas tumors
- provides nourishment for the maintenance of life and for growth	- protects from acid's rain impact on waterbodies	- prevents distribution of floating microplastic particles	- maintains safe nitric oxide ions level	- contains unicellular organisms	- found around skin tumors
- fundamental to aerobic organisms	- protects from acid's rain impact on aquatic life	- may play a role in a carbon cycle	- maintains safe atomic nitrogen concentration level	- contains fungi	- found around stomach tumors
- prevents premature human deaths	- prevents corrosion	- may influence heat exchange	- plays a role in production and destruction of nitrogen atoms	- contains mites	- found around uterus cancer
- prevents child respiratory illnesses	- prevents erosion	- may influence ice-atmosphere interaction	- plays a role in transport process	- contains insect debris	- found around acute lymphocytic leukemia
- prevents chronic bronchitis	- prevents from benzene poisoning	- may influence ice-ocean coupling	- contains high energy particles heated up by the sun	- contains PM2.5	- found around liver tumors
- prevents asthma attacks	- prevents from toluene poisoning	- preserves high albedo for solar radiation	- allows orbiting of satellites	- contains PM10	- found around lung tumors
- prevents cardiovascular hospitalization	- prevents from reduced mental abilities and growth in children	- preserves low thermal conductivity	- takes care of International Space Station	- contains nitrogen oxide	- found around pancreas tumors
- prevents death of cattle	- prevents bleeding	- preserves large thermal inertia	Exosphere	- contains sulfur dioxide	- found around skin tumors
- prevents blinding of cattle	- prevents poison by ethylbenzene		- contains hydrogen and helium	- accounts for the productivity loss	- found around colon tumors
- prevents death of fallow deer	- prevents xylene poisoning	Atmosphere	- contains carbon dioxide	- accounts for the loss of biodiversity	- found around esophagus tumors
- prevents widespread sickness of horses	- prevents from neurotoxins	- shapes Earth's climate	- contains carbon monoxide	- may cause to experience greatest harm	- found around head tumors
- prevents the death of large number of birds	- improves health and productivity of crops	- shapes weather patterns	- contains carbon dioxide	- causes neonatal deaths	- found around neck tumors
- prevents death of cattle from respiratory failure	- improves ability to sequester carbon	- makes regions habitable	- shares exobase		- found around liver tumors
- prevents stomach and intestinal disorders in cattle	- improves photosynthesis		- consists of a particles which don't move very much		- found around lung tumors
	- prevents damaged airways and lung tissues		- contains exospheric neutrals		- found around brain tumors
	- prevents mental retardation		- plays a role in solar wind-magnetosphere interaction		- found around breast tumors
	- prevents brain damage				- found around colon tumors

COMPARISON OF PURE SOIL EFFECTS AND CONTAMINATED SOIL					
PURE SOIL				Contaminated soil	
Inner core	- drives plate tectonics	- promotes energy metabolism	- contains lidane	- can be carcinogenic	- genocidal character
- primarily solid ball	- redistributes heat		- contains terbufos	- contains bromoxynil	- toxifies chlorellas
- innermost layer of the Earth	- cycles chemical species	Oceanic crust	- contains diazinon	- supports cataract formation	- affects oxygen level
- affects other parts of the planet	- generates dynamic topography at the Earth's surface	- may carry a large amount of chemically bound water	- contains cis-1,2-dichloroethene	- linked with hepatocellular cancer	- may disturb sleep cycle
- has a radius relating to 70% of the Moon's radius		- affects the atmosphere	- contains trans-1,2-dichloroethene	- linked to impaired energy metabolism	- doesn't support children's performance
- has a radius relating to 20% of the Earth's radius	Asthenosphere	- affects oceanic trenches	- contains 1,1,1-trichloroethane	- causes impaired cellular function	- affects yellow algae
- believed to be made of an iron-nickel alloy with some other elements	- almost solid	- makes earthquake-causing tectonic movements	- affects molluscs	- linked with coastal dumpsite erosion	- stands against sustainable development rules
- has a temperature, which is about the temperature at the surface of the Sun	- involved in plate tectonic movement	- helps with pollution	- affects echinoderms	- affects endemic amphipod fauna	- multiplies on Scandinavian coasts
- has a heat that flows out of it	- composed of peridotite	- makes ocean salty	- contains 4-nonylphenol	- contains non-biodegradable wastes	- contains hexachlorobutadiene
- is not ferromagnetic	- called the low-velocity zone	- supports marine world heritage	- contains 17 α -ethynyl estradiol	- interferes with oncology scoring	- contains epichlorohydrin
- affects planet's geometry	- has a high seismic attenuation	- habitable by microbial life	- causes nephritis	- causes cancer in fishes	- contains cyanide
- affects Earth's mass	- most important source of magma on Earth	- linked with hydrology	- can affect the unborn child	- pollutes beaches	- contains perchlorate
- affects Earth's gravitational field	- pushes magma upward through volcanic vents	- partially mentioned in religion	- causes dermatitis	- influences the morphological status of plants	- contains beryllium
- affects angular Earth's inertia	- the repository for older and denser parts of the lithosphere	- may be linked with glucose	- decreases absolute brain weight	- influences the physiological status of plants	- contains thallium
- is thought to be slowly growing	- stays malleable due to heat from deep within Earth	- did support Omayyad dynasty	- causes immunotoxicity	- influences the biochemical status of plants	- causes thymus gland problems
- may rotate slightly more quickly or slowly than the rest of Earth	- is believed to be hot	- may affect fishes	- contains nitrotriacetic acid	- interrupts photosynthesis	- causes immune deficiencies
- affects the dynamic motions of liquid in the outer core	Continental crust	- may affect orogenic changes	- contains nitrogen anions	- contains	- induces tumors
- may help fix the magnetic field	- the most uppermost part of the lithosphere	- takes part in a water cycle	- affects zooplankton	- hepatadecafluoro-1-octanesulphonic acid	- causes bone marrow changes
- measures 2440 km (1516 miles) across	- has felsic, intermediate-to-felsic and mafic composition	- supports one ocean	- influences aquatic biota	- contains	- contains toluene
- not rigidly connected to the Earth's solid mantle	- makes up the planet's continents	- plays a role in freshwater	- affects physiochemistry	- contains	- contains monochlorobenzene
- is really hot	- makes up the continental shelves	- affects agnatha	- may move through the subsurface	- contains glyphosate	- contains styrene
- may have no radioactive elements	- formed near subduction zones	- affects chondrichthyes	- may be collected by trees	- contains 1,4-dioxane	- contains 1,2-dichloropropane
- reaches temperature of about 5430 °C (5700 K)	- formed near plate boundaries	- supports ocean circulation	- contains trichloramine	- contains perchlorosulfonic acid	- contains 1,1-dichloroethene
- the center of this planet	- formed between continental and oceanic tectonic plates	- contains pillow lavas	- contains chlorine dioxide	- contains perfluorooctane sulphonate	- contains halogenated hydrocarbons
- the central part of the planet	- linked with geothermal gradient	- contains dike complex	- contains acrylamide	- causes blue-baby syndrome	- contains vinyl chloride
- has a radius of about 1220 km	- has an average thickness of around 35 km	- the outer solid layer of the Earth beneath the oceans	- contains flocculants	- causes shortness of breath in babies	- contains 1,2-dibromomethane
- the most enigmatic part of our planet	- also known as sial	- has something to do with water on Earth	- has effects on thyroid gland function in bottle-fed infants	- reduces body weight of offspring	- contains hexachlorocyclopentadiene
- is predicted to have very high thermal conductivity	- shapes the surface and interior of our planet	- helps with cycling of dissolved components in seawater	- can cause dehydration	- causes nasal cavity tumours	- causes tooth decay
- is predicted to have very high electrical conductivity	- much thicker than the oceanic crust	- stays close to a lot of ocean species	- contains thorium-232	- contains pendimethalin	- may cause developmental malformations in fetuses
- has a nonspherical shape	- creates the Grand Canyon	- supports Arctic Ocean	- contains thorium-230	- contains terbuthylazine	- may cause testicular lesions
- likely to be the result of chemical stratification	- witnessed burned libraries	- supports Pacific Ocean	- contains polonium-210	- contains hydroxyatrazine	- may cause partial or total paralysis
- responsible for powering the geodynamo	- supports plants growth	- supports Indian Ocean	- contains uranium-234	- contains simazine	- affects heart rhythm
- may be essential for the existence of the magnetic field	- acts as home to a range of microorganisms	- supports Southern Ocean	- contains uranium-238	- contains atrazine	- causes histological changes
- may be essential for the polarity reversals	- linked to remediation techniques	- found under the oceans	- contains radium-228	- contains picloram	- causes changes in clinical parameters
	- helps with crop rotation	- formed at spreading centres on oceanic ridges	- contains radium-226	- contains dicamba	- causes cancer in humans
Outer core	- helps with integrated pest management	- is about 6 km (4 miles) thick	- causes circulatory problems	- contains endothal	- may cause organ damage
- fluid layer	- helps with aquaponics	- composed of several layers	- causes irreversible neurological symptoms	- reduces bone growth	- may cause developmental disorders
- barely influences soil	- takes care of the Hanging Gardens of Babylon	- differs from continental crust	- may accumulate in the kidneys	- contains arsenic	- causes threat to child
- hellish fire	- mentioned in TAS classification	- is destroyed in subduction zones	- causes chronic pain to bones	- linked with geogenic contaminated groundwaters	- contains carbon tetrachloride
- composed of mostly iron and nickel	- currently has about 1.7 billion cubic miles	- contains basalt	- causes chronic dental fluorosis in humans	- might negatively affect foraminifera	- contains dinoseb
- principal source of Earth's magnetic field	- has a rift zones	- contains sheet flows	- causes chronic skeletal fluorosis in humans	- poses a widespread issue	- causes reproductive difficulties
- convects turbulently	- contains magma chambers	- contains pillow lavas	- causes deformed bones structure	- affects abiotic stress factors	- causes spleen damage
- is a low-viscosity fluid	- broadly granitic	- contains gabbro layers	- causes calcification of ligaments	- affects biotic stress factors	- contains carbofuran
- has a radius of around 3483 km	- begins just under the floor	- may contain magma chambers	- causes osteoclerosis	- has already harmed food safety	- contains carbaryl
- seems to be of a partially stratified composition	- has convergent boundaries	- contains iron	- causes osteosclerosis	- alters the global cycle of nitrogen	- may cause neurological disorders
- ends at 3200 miles (5150 km) beneath the surface	- plays a role in isostatic equilibrium	- contains silica	- causes skeletal fluorosis	- affects sunflower	- may increase the risk of cancer
- starts at around 1800 miles (2900 kilometers) deep	- extends vertically from the surface	- contains magnesium	- causes skin cancers	- affects morphogenetic processes of plants	- may badly affect individuals with compromised immune systems
- has a temperature of around 4,000 to 6,000°C	- contains complex river systems	- contains olivine	- causes bladder cancers	- poses a serious hazard to human health	- may badly affect children growth
- supplies heat to the mantle	- soil faunas account for 23% of known animal species	- contains ophiolites	- causes muscle cramping	- contaminates the food	- may badly affect pregnant women
- contains light elements	- affects community composition	- relatively ephemeral	- results in acidification	- causes magnetite nanoparticles in the human brains	- contains oxaryl
- the only entirely liquid layer within the Earth	- may support instrument's wood quality	- contains pyroxene	- may cause enlarged liver	- affects wildlife	- may affect decay of natural radioactive nuclides
Lower mantle	- may affect distribution patterns	- linked with hydrothermal circulation	- inhibits synthesis of thyroid hormone	- affects tropical agriculture	- may cause health consequences
- represents approximately 56% of Earth's total volume	- has a number of continents	- stays close to sting rays	- causes skin changes	- may affect the brain	- affects crustacea
- contains three major phases of bridgmanite, ferropericlasite and calcium-silicate perovskite	- different from oceanic crust	- stays close to corals	- causes nerve damage	- causes respiratory health issue	- affects copepoda
- may contain water	- the Earth's living skin	- stays close to starfish	- contains polychlorinated biphenyls	- might not support polychaeta	- affects cirripedia
- the largest portion of our planet	- kind of a captivating segment of our planet	- stays close to jellyfish	- impact thyroid functions	- may cause lead poisoning	- affects ostracods
- heterogeneous in its composition	- causes continents not to be static	- stays close to sea turtles	- negatively impacts the male reproductive system	- contains ammonia	- affects mysidacea
- contains carbonates	- causes continents to gradually shift position over time	- stays close to sharks	- interacts directly with DNA	- contains petroleum hydrocarbon	- affects cumacea
- contains halides	- holds Earth's seven main divisions of land	- stays close to octopus	- causes vomiting	- may be linked to acid rain	- affects tanadidacea
- contains fluorides	- affects average height of the sea surface	- stays close to mussels	- supports tumor formation in animals	- contains herbicides	- affects isopoda
- contains phosphates	- may allow proper liver functions	- stays close to clams	- can cause nausea	- contains insecticides	- affects amphipods
- contains sulfates	- hosts the most populated continents in the world	- stays close to barnacles	- accelerates erosion	- causes cancers in animals	- affects acariformes
- contains oxides	- helps to cherish the sunrise	- stays close to lobsters	- responsible for acute toxicity in humans	- affects Australia	- affects pantopoda
- contains silicates	- affects seismology	- stays close to crabs	- promotes lung tumors	- causes anemia	- affects cnidaria
- contains sulfides	- supports ketones formation	- stays close to walrus	- causes anemia	- could had affect few civilisations before	- reaches Karmadec Trench at 9.9 km
- contains native elements	- influences distribution of mineral resources	- stays close to seals	- associated with soft tissue sarcoma	- can cause neuromuscular obstruction	- touches Mount Cho Oyu at 8,188m
- is a key component controlling mantle dynamics	- causes earth to regenerate	- stays close to dolphins	- associated with non-Hodgkin lymphoma	- affects Kuril-Kamchatka Trench at 10 km depth	- touches Mount Dhaulagiri I at 8,167m
- ranges from 660 km to 2890 km depth	- helps with biofuel for electric plants	- stays close to whales	- contains fenoprop	- requires phytoremediation	- touches Mount Manaslu at 8,163m
Upper mantle	- affects human sleep cycle	- may affect hadalpelagic zone	- contains diclofof-methyl	- requires bioremediation	- affects Mariana Trench at 10.9 km down
- very thick layer of rock	- holds Earth's seven main divisions of land	- may affect abyssopelagic zone	- contains dichloroprop	- requires soil vapor extraction	- might influence nematode
- causes the tectonic plates to move	- affects human sleep cycle	- may affect bathypelagic zone	- contains isoprotruron	- requires electrokinetic remediation	- causes toxic water
- reaches up to 930 degrees Celsius (1700 degrees Fahrenheit)	- home to the Sahara, world's largest desert	- plays a role in low tide zone	- contains molinate	- can cause death	- affects Mount Everest at 8,848.86m
- touches the transition zone	- tectonically active	- plays a role in middle tide zone	- contains paraquat	- contains heavy metals	- affects Mount K2 at 8,611m
- contains a pressure up to 136 GPa (1,340,000 atm)	- withstands the ambient temperatures	- plays a role in high tide zone	- contains diquat	- may cause damage to the mitochondria	- affects Mount Kangchenjunga at 8,598m above
- up to 670 km below the Earth's surface	- has been around long time ago	- plays a role in spray zone	- contains chlorotoluron	- linked to impaired mitochondrial function	- affects Mount Lhotse at 8,516m above
	- shares the ground with plants	- plays a role in aphotic zone	- contains diuron	- affects beekeepers	- affects Mount Makalu at 8,485m above
	- may help with grounding	- plays a role in photic zone	- contains fungicides	- causes non-neoplastics lesions	- linked with Parkinson's disease
	- creates hills around Piramid of Lahun	- may contain biotite	- contains organic chemicals	- increases blood cholesterol	- affects Annapurna at 8,091m above
		- may include basalt	- contains inorganic contaminants	- may be toxic	- affects Philippine Trench at 10.5 km below
		- contains hydrous minerals	- contains perfluoroalkane sulfonic acid	- may cause skin rash	- touches Mariana Trench at 10.911 meters below
		- helps with proper hydration	- might affect colostrum	- may cause nausea	- may affect Mount Nanga Parbat at 8,126m above
		- remembers ocean life in the time of dinosaurs	- contains perfluorooctanoic acid	- may cause peripheral nervous system damage	
		- helps to understand the ocean genome	- affects coral reefs	- acts as tumor promotor	
		- may affect hardness of drinking water	- linked with xenobiotic chemicals	- affect brain function	
		- is close to seafloor	- may contain naphthalene		
		- may affect ocean fauna	- may contain solvents		
		- may influence krill	- may contain microplastics		
		- affects the ocean system	- contains petroleum derivatives		
		- witnessed first ocean	- may contain electronic waste		
		- supports energy needs	- affects fish products		
		- linked with ocean health index	- may affect lungs		
		- helps with proper amniotic fluid	- may cause kidney damage		
		- supports solar-hydropower energy	- touches the continental-margin		
		- helps to make water lipid			

COMPARISON OF METABOLIC THERAPY AND CANCERS

METABOLIC THERAPY				Cancers	
Respiratory system	- improves metabolic profile	- reduces the need for medication	Nervous system	- helps to recover from trauma	- cause anorexia
- improves lung function	- increases fat breakdown	- helps control infections	- acts as neuroprotector	- improves nonmotor symptoms	- cause malabsorption
- improves symptoms in asthma	- improves lipid profiles	- enhances antioxidant capacity	- reduces effects of Parkinson's disease	- improves verbal memory performance	- cause body loss
- reduces pathogenic monocytes in the lungs	- improves overall adiposity	Endocrine system	- improves mitochondrial functions	- improves daily function	- cause anemia
- decreases levels of expired CO ₂	- reduces visceral fat	- improves hormone level among women with polycystic ovary syndrome	- improves synaptic connections	- helps with bipolar disorder	- cause fatigue
- acutely improves gas exchange	- increases ratio of <i>Bacteroidetes</i> to <i>Firmicutes</i>	- improves control of mitochondrial protection	- lowers the effects of Parkinson's disease	- helps with migraine	- increase the risk of sepsis
- acutely improves sleep apnoea	Lymphatic system	- enhances mitochondrial development	- reduces negative effects of amyotrophic lateral sclerosis	- helps with schizophrenia	- increase the risk of cardiovascular disease
- reduces inflammation of the respiratory tract	- stimulates the growth of lymphatic vessels	- increases mitochondrial respiration	- reduces symptoms of angelman syndrome	- benefits for cognitive/memory scores	- cause chronic subclinical skeletal muscle toxicity
Circulatory system	- increases repair of the lymphatic system	- improves hormonal imbalance	- reduces effects of intractable epilepsy	Skeletal system	- cause dehydration
- gives cardioprotective effect	- reduces the synthesis of reactive oxygen	- improves mitochondrial function	- may extend lifespan	- improves motor activity	- cause electrolyte imbalance
- protects against cardiovascular disease	- regulates total body water	- improves mitochondrial metabolism	- reduces the effects of myoclonic-astatic epilepsy	- improves muscle function	- cause cognitive impairments
- reduces risk of coronary heart disease	- decreases free radical damage	- lowers insulin levels in the blood	- improves defense and development of the nervous system	- prevents muscle mass loss	- cause depression
- reduces effects of type II diabetes	- regulates intracellular body water	- suppresses angiogenesis	- significantly improves emotional and social functions	- helps in higher locomotor activity	- cause ataxia
- helps with HDL markers	- helps reduce the stiffness of arteries	- reduces tumor development	- improves sleep quality	- improves muscle function	- cause insomnia
- improves energy reserves of the heart	- improves recovery	- enhances anticancer therapy	- enhances brain vascular function	- improves muscle function	- cause peripheral neuropathy
- improves skin conditions	- reduces the risk of enlarged spleen	- starves cancer cells of their prime fermentable fuels	- gains to cognitive function	- increases the number of mitochondria in muscles	- cause marrow suppression
- reduces the risk of heart disease	- helps with phosphofructokinase deficiency symptoms	- improves mitochondrial dehydrogenase	- improves language endurance	- gains to daily motor activity	- cause liver toxicity
- helps boost oxygen levels in the blood	- makes favorable impacts on cellular metabolism	- reduces metabolic disorders	- improves physical endurance	- improves muscle function	- cause damage to cells in the body
- protects against obese-related cardiovascular disease	- in many tissues	- improves absorption of vitamins	- protects the brain from cell loss	- prevents muscle mass loss	- cause damage to cells in the kidneys
- improves the transduction of oxygen consumption	Immune system	- improves absorption of minerals	- decreases neurotoxins levels	- helps in higher locomotor activity	- cause damage to cells in the bladder
Digestive system	- enhances human immunity	- reduces insulin requirements	- improves short-term memory	- prevents muscle deterioration	- cause damage to cells in the lungs
- helps the intestine to maintain a large pool of adult stem cells	- supports the immune system in combat different disease conditions	- reverses insulin resistance	- improves long-term memory	- restores muscle function	- cause damage to cells in the nervous system
- reduces glucose availability for cancer cells	- decreases chronic inflammation	- helps with congenital hyperinsulinizm	- improves synapse function	- increases the number of mitochondria in muscles	- cause fertility problems
- reduces glutamine availability for cancer cells	- exerts anti-steatogenic effects in the liver	- helps with glucose transporter type 1 deficiency	- lowers levels of anxious behaviour	- gains to daily motor activity	- cause hair loss
- helps to manage obesity	- exerts insulin-sensitizing effects in the liver	- elevates ketones levels	- helps reduce Lennox-Gastaut syndrome	- improves muscle function	- cause easy bruising
- normalizes anthropometric parameters	- delays tumor growth	Reproductive system	- improves short-term memory	- increases aerobic capacity	- cause easy bleeding
- normalizes body composition parameters	- delays angiogenesis	- improves the menstrual cycle in women	- improves long-term memory	- improves aerobic exercise endurance	- cause constipation
- increases beneficial gut microbiota	- delays vascularization of tumor environment	- improves men fertility	- improves synapse function	- benefits for knee osteoarthritis	- cause diarrhea
- improves digestion	- promotes the death of tumor cells through pro-apoptotic mechanism	- increases fertility outcomes	- increases hindlimb grip strength	- improves neuromuscular functions	- cause problems with mouth
- helps with ischemia	- reduces the tumor size	- improves pregnancy outcomes	- increases all limb grip strength	- improves motor functions	- cause problems with tongue
- helps with symptoms of nonalcoholic fatty liver disease	- reduces the production of oxidative stress markers	- significantly reduces the ejaculatory pain	- preserves lean body muscle mass	- increases hindlimb grip strength	- cause problem with throat
- reduces glucose availability for bacterias	- promotes autophagy	- significantly reduces the ejaculatory discomfort	- improves aerobic capacity	- improves motor functions	- cause sores
- adds positive changes in hunger hormones	- increases susceptibility to chemotherapy while protecting healthy cells	- improves prostatic hyperplasia	- improves aerobic exercise endurance	- improves motor functions	- cause pain with swallowing
- reduces lipogenesis	- increases susceptibility to radiation	- improves sexual dysfunction	- benefits for knee osteoarthritis	- improves motor functions	- cause nerve problems
- allows to produce greater amount of ATP	- reduces cell proliferation signals	- improves your energy levels	- improves skeletal muscle aerobic capacity	- improves motor functions	- cause numbness
					- cause tingling
					- cause pain
					- cause skin changes
					- cause nails changes
					- cause dry skin
					- cause urine changes
					- cause bladder changes
					- cause kidney problems
					- cause weight changes
					- cause chemo brain
					- affect concentration
					- affect focus
					- affect writing
					- affect reading
					- affect speaking
					- affect thinking
					- affect social life
					- change mood
					- change libido
					- change sexual function
					- cause fertility problems
					- cause organ dysfunction
					- cause organ failure
					- cause myelosuppression
					- cause mucositis
					- cause headaches
					- take away loved ones
					- cause memory problems
					- increase risk of metastasis
					- may spread

COMPARISON OF BREASTMILK COMPOUNDS AND FORMULA						
BREASTMILK				Formula		
Water		Cytokines	Non-protein nitrogens	Enzymes		Water
		- interleukin 1-β (IL-1β)	- creatine	- amylase		
		- IL-2	- creatinine	- arysulfatase		
		- IL-4	- urea	- catalase		
		- IL-6	- uric acid	- histaminase		
		- IL-8	- peptides	- lipase		
		- IL-10		- lysozyme		
		- granulocyte-colony stimulating factor (G-CSF)		- PAF-acetylhydrolase		
		- macrophage-colony stimulating factor (M-CSF)		- phosphatase		
		- platelet derived growth factors (PDGF)		- xanthine oxidase		
		- vascular endothelial growth factor (VEGF)				Minerals
		- hepatocyte growth factor - α (HGF-α)		Antimicrobial factors		- potassium citrate
		- HGF-β		- leukocytes (white blood cells)		- potassium phosphate
		- tumor necrosis factor - α		- phagocytes		- calcium chloride
	Amino acids	- interferon-γ		- basophils		- tricalcium phosphate
	- alanine	- epithelial growth factor (EGF)		- neutrophils		- sodium citrate
	- arginine	- transforming growth factor - α (TGF-α)		- eosinophils		- magnesium chloride
	- aspartate	- TGF β1		- macrophages		- ferrous sulphate
Proteins	- glycine	- TGF β2		- lymphocytes		- zinc sulphate
- whey	- cystine	- insulin-like growth factor - I (IGF-I)		- B-lymphocytes		- sodium chloride
- alpha-lactalbumin	- glutamate	- insulin-like growth factor - II		- T-lymphocytes		- copper sulphate
- HAMLET	- histidine	- nerve growth factor (NGF)		- (sigA) secretory immunoglobulin A		- potassium iodide
- lactoferrin	- isoleucine	- erythropoietin		- IgA2		- manganese sulphate
- many antimicrob factors	- leucine			- IgG		- sodium selenate
- casein	- lycine	Nucleotides		- IgD		Proteins
- serum albumin	- methionine	- 5'-adenosine monophosphate (5'-AMP)		- IgM		- whey protein concentrate
	- phenylalanine	- 3':5'-cyclic adenosine monophosphate (3':5'-cyclic AMP)		- IgE		Fats
Minerals	- proline	- 5'-citidine monophosphate (5'-CMP)		- complement C1		- palm oil
- calcium	- serine	- citidine diphosphate choline (CDP choline)		- complement C2		- soybean oil
- sodium	- taurine	- guanosine diphosphate (UDP)		- complement C3		- coconut oil
- potassium	- theronine	- guanosine diphosphate-mannose		- complement C4		- high oleic safflower oil
- iron	- tryptophan	- 3'-uridine monophosphate (3'-UMP)		- complement C5		(or sunflower oil)
- zinc	- tyrosine	- 5'-uridine monophosphate (5'-UMP)		- complement C6		- M. alpina oil (fungal DHA)
- chloride	- valine	- uridine diphosphate (UDP)		- complement C7		- C. cohnii oil (algal ARA)
- phosphorus	- carnitine	- uridine diphosphate hexose (UDPH)		- complement C8		
- magnesium		- uridine diphosphate-N-acetyl-hexosamine (UDPAH)		- complement C9		Enzymes
- copper	Sphingolipids	- uridine diposphoglucuronic acid (UDPGA)		- glycoproteins mucins		- trypsin
- manganese	- sphingomyelin	- several more novel nucleotides of the UDP type		- lactadherin		Amino acids
- iodine	- gangliosides	Oligosaccharides		- alpha-lactoglobulin		- taurine
- selenium	- GM1	(more than 200 different kinds)		- alpha-2 macroglobulin		- l-carnitine
- choline	- GM2		Peptides	- lewis antigens		
- sulphur	- GM3		- HMGF I (growth factor)	- ribonuclease		Carbohydrates
- chromium	- glucosylceramide	Carbohydrates	- HMGF II	- heamagglutinin inhibitor		- lactose
- cobalt	- glucosphingolipids	- lactose	- HMGF III	- lactoferrin		- corn maltodextrin
- fluorine	- galactosylceramide		- cholecystokinin (CCK)	- lactoperoxidase		
- nickel	- lactosylceramide		- β-endorfine	- B12 binding protein		Vitamins
Vitamins	- globotriaosylceramide (GB3)		- parathyroid hormone (PTH)	- fibronectin		- sodium ascorbate
- vitamin A	- globoside (GB4)	Hormones	- β-defensin-1			- inositol
- beta-carotene	Sterols	- cortisol	- calcitonin			- choline bitartrate
- vitamin B6	- squalene	- triiodothyronine (T3)	- parathyroid hormone-related peptide			- alpha-tocopheryl acetate
- vitamin B8 (inositol)	- lanosterol	- thyroxine (T4)		Monounsaturated fatty acids		- niacinamide
- vitamin B12	- dimethylsterol	- thyroid stimulating hormone (PTHrP)		- oleic acid		- calcium panthotenate
- vitamin C	- methosterol	- thyroid releasing hormone		- palmitoleic acid		- riboflavin
- vitamin D	- lathosterol	- prolactin		- heptadecenoic acid		- vitamin A acetate
- vitamin E	- desmosterol	- oxytocin				- pyridoxine hydrochloride
- a-tokoferol	- triacylglycerol	- insulin		Saturated fatty acids		- thiamine mononitrate
- vitamin K	- cholesterol	- corticosterone		- stearic		- folic acid
- thiamine	- 7-dehydrocholesterol	- thrombopoietin		- palmitic acid		- phyloquinone
- riboflavin	- stigmasterol	- gonadotropin-releasing hormone (GnRH)		- lauric acid		- biotin
- niacin	- campesterol	- feedback inhibitor of lactation (FIL)		- myristic acid		- vitamin D3
- folic acid	- 7-ketocholesterol	- GRH				- vitamin B12
- panthotenic acid	- sitosterol	- leptin	Fats			
- biotin	- β-lathosterol	- adiponectin	- triglicerides			Nucleotydes
Phospholipids	- vitamin D metabolites	- eicosanoids	- long-chain polyunsaturated fatty acids			- cytidine 5-monophosphate
- phosphatidylcholine	- steroid hormones	- prostaglandins	- docosahexaenoid acid (DHA)			- disodium uridine
- lisophosphatidylathanolamine		- PG-E1	- arachidonic acid (AHA)			5-monophosphate
- phopshatidylathanolamina		- PG-E2	- linoleic acid			- adenosine 5-monophosphate
- lisophosphatidylcholine	Antiproteases	- PG-F2	- alpha-linoleic acid (ALA)			- disodium guanosine
- phosphatidylinositol	- a-1-antitrypsin	- leukotrienes	- eicosopentahenoic acid (EPA)			5-monophosphate
- plasmalogens	- a-1-antichymotrypsin	- thromboxanes	- conjugated linoleic acid (rumenic acid)			
		- prostacyclins				

NON-COMPARISON

... Galileo Galilei (15.02.1564-8.01.1642)			Willis Carrier (26.11.1876-7.10.1950)	Wilbur Wright (19.08.1871-30.01.1948)	Karol Linnaeus (1707-1778)	Euclid (300 BC)
Nicolas Tesla (9.10.07.1856-7.01.1943)	James Dorsey (31.10.1848-04.01.1895)	John Logie Baird (13.08.1888-14.06.1946)	Joseph Priestley (24.03.1733-6.02.1804)	Pitagoras (570-495 BC), Willard Marriott (17.09.1900-13.08.1985)	Richard Owen (20.07.1804-12.1892)	Andreas Marggraf
Louis Nicolas Vauplquin (16.05.1763-14.11.1829)	E. Bosshard (1860-1937)	Samuel Morse (27.04.1791-2.04.1872)	Humphry Bartholomew Davy (17.12.1778-29.05.1829)	Carl Lohmann (1829-1953)	John Bardeen (29.09.1898-20.11.1976)	John Naumich
Roy Jay Glauber (1.09.1925-26.12.2018)	Damiel (462-538 AD)	Jeremias Benjamin Richter (10.03.1762-4.05.1801)	John Tobias Lowitz (25.04.1757-7.12.1804)	Trofim Denisowitsch Lysenko (23.05.1908-30.01.1991)	Clarence Leonidas Fender (10.08.1909-21.03.1991)	John Naumich
Edward Bach (1886-1936)	Justus von Liebig (12.05.1803-18.04.1873)	André-Louis Debierlt (14.07.1874-31.08.1949)	Daniel Rutherford (31.1.1749-15.11.1819)	Ernst Schulze (22.03.1789-29.06.1817)	Robert Hooke (18.07.1635-3.03.1703)	Jean Baptiste Dumas (14.07.1807-10.04.1884)
Alois Alzheimer (14.06.1864-19.12.1915)	August Comte (19.01.1798-30.09.1857)	Ejnar Hertzsprung (18.0.1873-21.10.1967)	Tenzing Norgay (15.05.1914-09.05.1996)	Antonie van Leeuwenhoek (24.10.1632-26.08.1723)	Gallus Anonimus (IX c.)	John Dalton (1766-1844)
Franz Meyer (1882, Mannheim-1975)	Luke Howard (28.11.1772-21.03.1864)	Henry Russell (1834-1909)	Axel Fredrik Cronstedt (23.12.1722-19.08.1765)	George Carlin (12.05.1937-22.06.2008)	John Dalton (1766-1844)	Hennig Brand (1630-1710)
Gabriel Farenheit (24.05.1686-16.09.1736)	Franz Ferdinand Blom (9.08.1893-23.06.1963)	Therkel Mathiasen (5.09.1892-1967)	Christian Jürgensen Thomsen (29.12.1788-21.05)	Benedictus XVI (16.04.1927-31.12.2022)	John Dalton (1766-1844)	Li Chi (12.07.1896-1.08.1979)
Jean Paul II (18.05.1920-2.04.2005)	Claude Joseph-Désiré Charnay (2.05.1828-10.1915)	Jules Quicherat (13.10.1814-8.04.1882)	Eugène Dubois (28.01.1858-16.12.1940)	Ernest Rutherford (30.08.1871-19.10.1937)	Francis Crick (8.06.1916-28.07.2004)	Gaspard de Coriolis (1792-1843)
Friedrich Miescher (13.08.1844-26.08.1895)	Claude Lévi-Strauss (28.11.1908-30.10.2009)	Karl Humann (4.01.1839-12.04.1896)	Bertram Schriek (1890-12.1945)	John Vincent Atanasoff (4.10.1893-15.06.1995)	Glen Theodore Seaborg (19.04.1912-25.02.1999)	Henry Patrick Marie (19.04.1912-25.02.1999)
John Dalton (6.09.1766-27.07.1844)	Pierre Montet (27.06.1885-19.06.1966)	Wilhelm Adolf Becker (1796-30.10.1846)	Edward Westermarck (20.11.1862-3.09.1939)	Joseph Louis Gay-Lussac (12.09.1818-26.02.1903)	Alexander Graham Bell (3.03.1847-2.08.1922)	Ernst Schulze (31.07.1840-15.06.1912)
Jöns Jacob Berzelius (20.08.1779-7.08.1848)	Leo Frobenius (29.06.1873-08.1938)	Yigael Yadin (21.03.1917-28.06.1984)	Marcellin Boule (1.01.1861-4.07.1942)	Basil Valentine (XV c.)	John Dalton (1766-1844)	George Frideric Handel (1685-1759)
Antoine-Laurent Lavoisier (26.08.1743-8.05.1794)	William Koppers (09.02.1886-23.01.1961)	Richard Lepsius (23.12.1810-1864)	Paul Broca (28.06.1824-9.07.1880)	Ernst Schulze (31.07.1840-15.06.1912)	John Dalton (1766-1844)	Dmitri Mendeleev (1834-1907)
Robert Boyle (25.01.1627-31.12.1891)	Spyridon Marinatos (04.11.1901-1.10.1974)	Manolis Andronikos (23.10.1919-30.03.1992)	André Sacharov (21.05.1921-14.12.1989)	George Frideric Handel (1685-1759)	John Dalton (1766-1844)	Heinrich Hertz (22.02.1857-1.01.1894)
Frederick Sanger (13.08.1918-19.11.2013)	Jean Price Mars (15.10.1876-2.03.1969)	Sándor Bálint (1.08.1904-10.05.1980)	Henri Breuil (28.02.1877-14.08.1961)	Maurice Wilkins (15.12.1916-5.10.2004)	John Dalton (1766-1844)	Charles Darwin (12.02.1809-19.04.1882)
Rachel Carson (27.05.1907-14.04.1964)	Lanciani (1.01.1847-21.05.1929)	Paulus Cua (1834-1907)	Jacques Boucher de Perthes (10.09.1788-5.08.1868)	Jöns Jacob Berzelius (18.08.1779-08.1848)	John Dalton (1766-1844)	Thomas Edison (11.01.1847-18.10.1931)
Mark Witold Koza (16.11.1955-30.04.2021)	W. Lloyd Warner (26.10.1898-23.05.1970)	Edward Herbert Thompson (28.09.1856-11.05.1935)	Jean-François Champollion (23.12.1790-4.03.1832)	Carl Wilhelm Scheele (9.12.1742-21.05.1786)	John Dalton (1766-1844)	Thomas Edison (11.01.1847-18.10.1931)
Hans Christian Ørsted	Vladimir Ilich (14.08.1777-9.03.1851)	William W. Howells (27.11.1908-20.12.2005)	John Reed Swanton (19.02.1873-2.05.1958)	Matteo Realdo Colombo (1515-1559)	John Dalton (1766-1844)	Thomas Edison (11.01.1847-18.10.1931)
Christopher Latham Sholes (14.02.1819-17.02.1890)	George Andrew Reisner (5.11.1867-6.06.1942)	Gertrude Belle Elion (23.01.1918-21.02.1999)	Imhotep (2640-2600 BC)	Charles Darwin (12.02.1809-19.04.1882)	John Dalton (1766-1844)	Thomas Edison (11.01.1847-18.10.1931)
Enrico Fermi (29.09.1901-28.11.1954)	Edward Sapir (26.01.1884-4.02.1938)	Ruth Benedict (15.06.1887-17.09.1948)	Queen Victoria (24.05.1819-22.01.1901)	Sir William Preece (15.02.1834-6.11.1913)	John Dalton (1766-1844)	Thomas Edison (11.01.1847-18.10.1931)
Bart G. Barrell (1944-2023)	Henry Rowe Schoolcraft (26.03.1793-10.12.1864)	Calamity Jane (1.05.1852-1.08.1903)	Erma Bombeck (21.02.1927-22.04.1996)	Guglielmo Marconi (25.04.1874-20.07.1937)		