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Parallelism between the Classical Geocentric Cosmos and the Life Chemistry Essentials

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Abstract There's a parallelism between the classical geocentric cosmos and the following essentials of life chemistry: the electron octet, the bio-elements, the amino acids, and the genetic code. The introduction contains a short summary of the chemistry of life and the classical geocentric cosmology. The research method compares the classical geocentric cosmos to the investigated essentials of life chemistry. The Earth-Sun (substrate-source of life) opposite and the inner-outer planet opposites correspond to several of these essentials. The twelve zodiac constellations correspond to the twelve macro bio-elements, the twelve polar amino acids and the twelve by doublet codons encoded amino acids. Each of the latter three zodiac chemical representatives shows the typical seven to five ratio of the twelve zodiac constellations: seven animal and five human related constellations. An original genetic code table based on third position synonyms shows the similarities and differences between the vertebrate mitochondrial and the standard genetic codes, and the parallelism with the classical geocentric cosmos. Specific zodiac constellation representatives for the life chemistry essentials are presented.

Keywords: *bio-elements, biochemistry, chemistry of life, classical geocentric cosmos, electron configuration, fixed stars, genetic code table, Ptolemaic cosmology, standard amino acids, standard genetic code, vertebrate mitochondrial code, wandering stars, zodiac constellations*

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1. Introduction

1.1. The Chemistry of Life

The chemistry of life is complex in its detailed description, but the main ideas are simple. Chemists consider chemical elements (atoms) to be the building blocks of all matter including that of living organisms. In every life process, **proteins are the most important acting molecules**. There are about ten thousand different proteins in one cell. The building blocks of proteins are carbon (C), hydrogen (H), oxygen (O), nitrogen (N) and sulfur (S). Proteins are long chain molecules in which the elemental building blocks are grouped into amino acids. Proteins have twenty different amino acids (The formulas are in Figure 8, Figure 10 and Figure 11). The twenty amino acids differ in the composition and structure of their side chain. The left part of the amino acid formulas is the side chain. The right constant part from these formulas forms the protein's main chain. Protein chemists use the same name for an amino acid as for its side chain. Protein chains differ in the sequence of the amino acids in the chain and in the chain length, which can range from a few up to several hundreds of amino acids. **The cell ribosomes produce the proteins**. How can the ribosomes know the exact amino acid sequence? The DNA of the chromosomes in the cell core has this information for all the proteins of the cell. DNA is a much longer chain of nucleotide units symbolized by A, C, G and T, which formulas of the nucleotides' nucleobases are in Figure 13. The elemental building blocks of the nucleotides are carbon, hydrogen, oxygen, nitrogen and phosphorus (P). **A sequence of three nucleotides in DNA, called a codon, encodes one amino acid**. There are sixty-four (64; 4^3) codons, which are different combinations of the four nucleotides each encoding one amino acid or a stop of the protein synthesis. Consequently, there are synonym codons. These are different codons that encode the same amino acid (some amino acids have up to six synonym codons). **How does the DNA information get to the ribosomes for protein syntheses?** A DNA fragment encoding one protein is transcribed into an mRNA, which is also a long chain molecule containing the same codon sequence as the corresponding DNA fragment, but with slightly different building blocks. Building block U is used instead of T and R is used instead of D. D and R are the sugar parts of a nucleotide. The "m" of mRNA means messenger. The mRNA message is transported from the nucleus to the ribosomes. On the ribosomes amino acids are coupled to each other in the exact sequence that is encoded by the codon sequence of the mRNA. The protein obtains its functional shape when all the codons of the

mRNA are translated into the growing protein chain. Just like for common tools, **the shape of a protein determines its function**. Some proteins additionally require non-protein components for their function. The newly born protein is transported to its place of action. Carbohydrates (sugar like molecules) and lipides (fats) are mainly the fuel molecules of the cell. Lipids are also membrane components.

1.2. Published Cosmic Parallelism to the Life Chemistry

A previous article mainly discussed the cosmic parallelism for a part of the process, the citric acid cycle, which produces energy from the fuel molecules [1]. The close correspondence between the topics in reference [1] and the properties of the zodiac motivates a further investigation searching for parallelism between life chemistry essentials and the classical geocentric cosmos. Reference [1] does not consider similarities between life chemistry and the classical solar system. The present publication relates life chemistry essentials to the zodiac and the classical solar system.

1.3. The Classical Geocentric Cosmos

Reference [1] includes an introduction to the classical geocentric cosmos [2] although mainly through references. The classical geocentric cosmos consists of the Earth, the Sun, the Moon (the Earth-Moon-Sun triplet), five wandering stars (star-like planets visible by the naked eye), and the fixed star constellations on the star shell of which the twelve zodiac constellations are representatives. **The number of classical solar system objects is eight: Earth, Moon, Venus, Mercury, Sun, Mars, Jupiter and Saturn** (the classical solar system octet). Classical antiquity considers the Moon and even the Sun as planets or moving stars.

For a better understanding of the geocentric cosmos, the following should be taken into consideration. The Sun is immensely larger than any other object of the solar system. The sun light only becomes visible when it illuminates an object. At night, we therefore see a black sky with the stars and the classical planets visible. The planets look like stars, but night after night they change their relative position to the fixed stars (the star shell). Therefore, planets were known as wandering stars. This phenomenon is most pronounced for the outer planets (Mars, Jupiter and Saturn). Their sidereal (relative to the fixed stars) orbital periods are respectively 687 days, and nearly 12 and 30 years. The longer the orbital period, the slower is the change in relative position to the fixed stars. Viewed from Earth, Mercury is always close to the sun and therefore rarely visible. Venus is often seen as morning (western elongation) or evening star (eastern elongation) positioned relatively close to the sun. Venus greatest elongation (the Sun-Earth-Venus angle) is 48°. Planets are seen on or near the zodiac. The zodiac is the path of the Sun (a moving star) through the fixed stars during a year. In the northern (southern) hemisphere, you can see at midnight in the south (north) the zodiac constellation in which the Sun moves six months earlier or later.

The Almagest [2] of Claudius Ptolemaeus (second century AD) describes the complex geocentric movements of a planet. The classical cosmos has much older Babylonian roots [3] than the Almagest. The Copernican solar system [4] is correct, but living organisms including humans do not experience the Copernican cosmos. They rather experience the geocentric cosmos while the Copernican cosmos is an abstraction. Even the chemistry of life shows parallelisms to the geocentric cosmos as we will see in the remainder of this article. **Is it not an educator's objective to help students in understanding their cosmic experiences?**

1.4. The Well-known Influence of the Classical Geocentric Cosmos on Culture

The influence of the classical cosmos is clearly visible in the division of a week in seven days and of a year in twelve months. Many languages refer in the names for the days of a week to the Sun, the Moon and the five wandering stars of the geocentric solar system. For example, in the French language Tuesday, Wednesday, Thursday and Friday are respectively mardi (Mars), mercredi (Mercury), jeudi (Jupiter) and vendredi (Venus). The correspondence for Saturday (Saturn), Sunday (Sun) and Monday (Moon) is also obvious. The twelve zodiac constellations match the twelve months of a year. The mean length of both day and night is twelve hours.

1.5. Parallelism in Properties and Article Subjects

If the classical geocentric cosmos is in accordance with the essentials of the chemistry of life, there must be a parallelism between these two. We will show that both match in numbers and that the parallelism is certainly not limited to numerology.

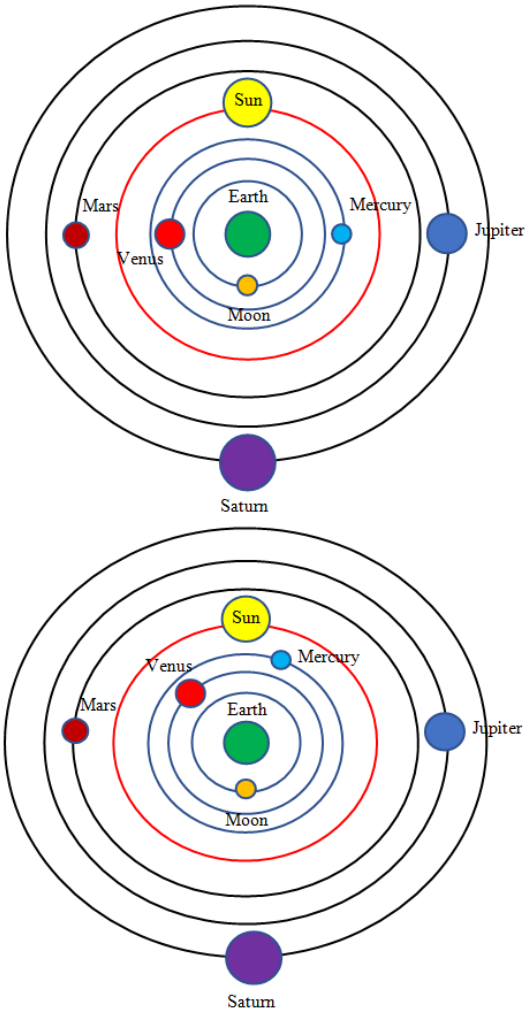
Visibility by the naked human eye of the cosmic objects and cosmic constellations is important for the parallelism discussed in this contribution. Therefore, we use the sidereal concept of zodiac constellations instead of the zodiac signs. The twelve zodiac constellations have the same names as the corresponding zodiac signs and the same typical ratios described in reference [[1], Section 1.1]. For the seasonal correspondence from [1], the zodiac signs are more appropriate. The present article presents the parallelism to the classical geocentric cosmos for the following topics: The electron configurations (Section 2), the bio-elements (Section 3), the (standard) amino acids (Section 4) and the genetic code (Section 5).

1.6. Investigation Method

Experimental research is not suitable to investigate the parallelism between the classical geocentric cosmos and the life chemistry essentials. We cannot measure experimental differences between the presence and the absence of the cosmos. The cosmos is always present. The search for this relationship requires an adapted method; the comparison method. The article searches for numerical, structural, and proportional similarities while comparing the classical geocentric cosmos to the life chemistry essentials.

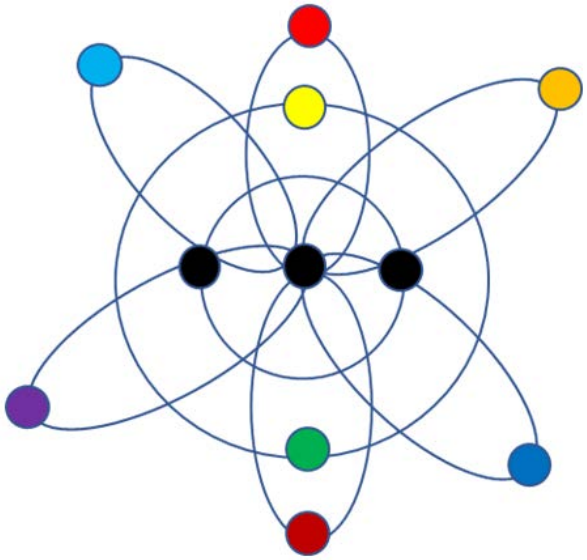
2. Parallelism between the Classical Solar System Octet and Electron Configuration Octets

The classical solar system octet corresponds with the electron octet of noble gases and the octet rule for valence shell electrons in compounds [5]. Opposite electron spin pairs the octet electrons. Similarly, we can observe opposite property pairs for the components of the classical geocentric octet. The Earth is the center of the geocentric system and the substrate of life. The Sun makes life on Earth possible. **The Sun and Earth form a source-substrate opposite pair**. The Sun is the reference between inner and outer planets and pairs each inner planet to an opposite outer planet. The Moon is the closest inner and Saturn the furthest outer planet. This opposite property forms the Moon-Saturn pair. Similarly, we distinguish the Venus-Jupiter and the Mercury-Mars pairs. For the latter two pairs we could additionally take a few mythological properties into consideration. The opposite of Venus and Mars respectively as goddess of love and god of war is well-known. Next to that, the god Mercury (Hermes) is the son of Jupiter (Zeus); a father-son opposite pair. This results in the Venus-Mars and Mercury-Jupiter opposite pairs. In line with the classical cosmology, I prefer the latter two pairs (Figure 3). Whatever we choose as criteria, **the pairing of an inner planet to an outer planet is a valid opposite property**. In the classical solar system, the Earth-Sun pair is the basis to the three inner-outer planet pairs, which results in the parallelism shown in Figure 3. The np^2_x, np^2_y and np^2_z correspondence to a specific inner-outer planet pair is speculative. The "n" is the electronic shell number. For Figure 2, the electronic shell numbers are n = 1 and n = 2.



Legend: The dimensions of the depicted celestial bodies are not representative for the real dimensions. The Sun should be immensely larger and Jupiter and Saturn should also be larger. The Earth, Moon and Sun triplet is the most visible part of the system. Jupiter, Mars, Mercury, Venus and Saturn are the wandering stars/planets of the system. The cosmic constellations depicted in Figure 1 are very specific and only intended to indicate the pairs in the classical solar system.

Figure 1. Two pictorial representations of the classical geocentric solar system: the upper figure shows symmetrical paired celestial bodies and the Earth and the figure below shows Mercury and Venus in a more realistic relative position to the Sun



Legend: Three black circles represent the atomic core and the first shell electrons (on a sphere). The remaining colored circles represent the second shell electrons (n = 2); an electron octet of which two (yellow and green) are on the outer sphere and six are on elliptical shaped spheres. The colors of the electrons correspond to those of the objects in the classical solar system depicted in Figure 1.

Figure 2. A pictorial representation of the neon atom electronic structure

Opposite Property	Substrate (Earth) and Source (Sun) of Life	Nearest "Planet" (Moon) Furthest Planet (Saturn)	Goddess of Love (Venus) God of War (Mars)	Son (Hermes) Mercury Father (Zeus) Jupiter
Solar System Octet	Earth Sun	Moon Saturn	Venus Mars	Mercury Jupiter
	ns^2	np^2_x	np^2_y	np^2_z
Opposite Property	Electron Spin Orientation	Electron Spin Orientation	Electron Spin Orientation	Electron Spin Orientation

Source-substrate "s"- pair and inner-outer planet "p"-pairs, Number *n* is the electronic shell number (*n* = 2 for the electron octet in Figure 2)

Figure 3. Opposite pairs of classical planets and octet electrons

3. Parallelism between the Classical Geocentric Cosmos and the Essential Bio-Elements

Unfortunately, the search for chemical elements that are essential for humans is not completely finished. Some elements may have only a positive influence on life. For example, chromium has a positive effect on the glucose balance, but is probably not essential [6]. Section 4 of reference [7] groups the twenty essential bio-elements for humans in four groups (hands) each of five elements. The main bond type, in which the twelve macro bio-elements are biochemically active, groups them in a seven-to-five ratio. Altogether, **the twelve macro bio-elements form 99.99% of the human body**. Seven macro bio-elements mainly form covalent bonds: Hydrogen (H), carbon (C), nitrogen (N), oxygen (O), sulfur (S), phosphorus (P) and silicon (Si) and five form ionic bonds: Sodium (Na), potassium (K), calcium (Ca), magnesium (Mg) and chlorine (Cl). The amount (mass) of magnesium (29 g) and silicon (18 g) for a 70 kg human body is of the same order of magnitude [8]. Silicon bridges glycosaminoglycans [9]. In view of these observations, silicon replaces chromium in reference [7]. **The eight essential micro-elements are:** Cobalt (Co), copper (Cu), manganese (Mn), molybdenum (Mo), iron (Fe), zinc (Zn), selenium (Se) and iodine (I).

This rather basic division of the bio-elements agrees in number to the classical cosmos of twelve zodiac constellations and eight classic solar system bodies. We note two of the three typical zodiac ratios. First, the five to seven ratio for the twelve macro bio-elements (five form ionic and seven mainly form covalent bonds). Secondly, the seven covalent bond forming macro-elements show a ratio of four-three/seven. The four basic bio-elements for biomolecules are C, H, O, and N. Three bio-elements, P, S and Si are for more specific biomolecules. Silicon has the most specific function; silicon bridges glycosaminoglycans [9]. The four-three/seven ratio is the same ratio as the seven zodiac animals of which four are mammals (Aries, Capricorn, Leo and Taurus) and three non-mammals; two arthropods (Cancer and Scorpio) and Pisces. The representation in Figure 5 of the macro bio-elements is very unusual. The twelve ribs of a cube (four on the upper square, four on the lower square and four vertical ribs) are in number equal to the number of zodiac constellations. A tetrahedron is a geometric form of the cubic system. Two different tetrahedrons can be constructed by means of the twelve cube ribs. Each tetrahedron has six ribs. Note that the Vigeland tetrahedral man is already described by the author [[10], Section 2.1] in “The Human Model for Chemistry Essentials of Life”. The connection between a tetrahedron and the five human connected zodiac constellations as to the five macro bio-elements that form ionic bonds becomes acceptable. In Figure 4, hydrogen (H) and chlorine (Cl) have a special position somewhat deviating from the ten remaining macro bio-elements who are paired two by two: Carbon-silicon, nitrogen-phosphorus, oxygen-sulfur, sodium-potassium and magnesium-calcium. The second element of each pair is the periodic octave of the first element of a pair. Hydrogen has completely different properties compared to those of the other chemical elements of group 1 (IA) and chlorine belongs to a different group than the element pairs of Figure 4. Hydrogen forms compounds with every element on the left side of Figure 5 and the chlorine anion (negative charge) forms ionic bonds to all right side cations (positive charge) from Figure 5. That is why hydrogen (H) and chlorine (Cl) are in the center of their coordinate systems (Figure 5).

1 (IA)	2 (IIA)	14 (IVA)	15 (VA)	16 (VIA)	17 (VIIA)
1 H Hydrogen					
		6 C Carbon	7 N Nitrogen	8 O Oxygen	
11 Na Sodium	12 Mg Magnesium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine
19 K Potassium	20 Ca Calcium				

Figure 4. Grouping of macro bio-elements according to the periodic table

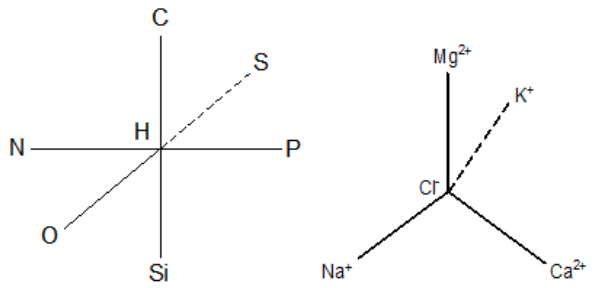
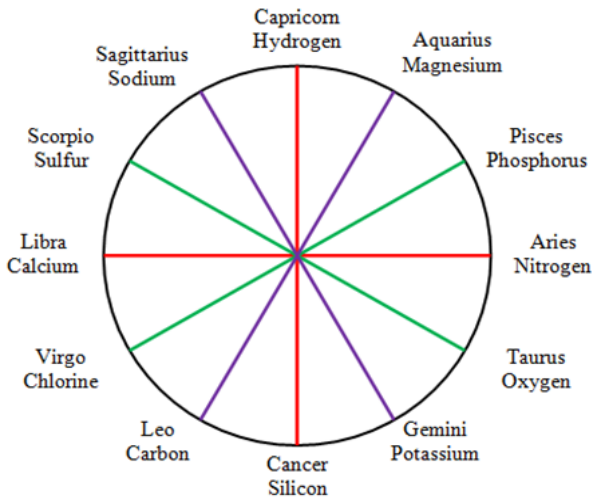


Figure 5. Grouping of the seven covalent bond forming macro bio-elements according to the cube coordinate system and grouping of the five ionic bond forming macro bio-elements according to the covalent bonds of the carbon tetrahedron



Legend:

Zodiac Constellation Opposites	Corresponding Representative Macro Bio-Elements
Capricorn - Cancer	Hydrogen - Silicon
Aquarius - Leo	Magnesium - Carbon
Pisces - Virgo	Phosphorus - Chlorine
Aries - Libra	Nitrogen - Calcium
Taurus - Scorpio	Oxygen – Sulfur
Gemini - Sagittarius	Potassium - Sodium

Figure 6. An educated guess of the zodiac constellation representatives for the twelve macro bio-elements (Section 6.1 discusses this educated guess)

Iron, 8 (VIIIB)	Copper, 11 (IB)	Molybdenum, 6 (VIB)	Manganese, 7 (VIIB)
Cobalt, 9 (VIIIB)	Zinc, 12 (IIB)	Selenium, 16 (VIA)	Iodine, 17 (VIIA)

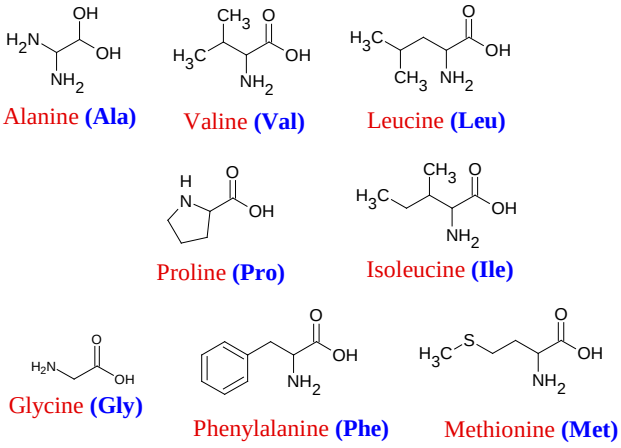
Figure 7. Grouping of micro bio-elements into pairs according to periodic table groups

Figure 7 shows the grouping of micro bio-elements into pairs according to periodic table groups. The eight micro-elements agree in number to the classical solar system octet (Earth-Moon-Sun triplet and the five wandering stars or planets visible by eye). From the eight micro bio-elements, iron Fe (4.2 g), zinc Zn (2.3 g) and copper Cu (0.07 g) have the highest mass/70 kg human body. They are the most "visible" by mass of the micro bio-elements like the Earth-Moon-Sun triplet is the most visible part of the classical geocentric system. The next micro bio-element in the ranking by mass is selenium Se (0.015 g). The iron (II) heme complex of hemoglobin causes the red blood color, which makes **iron the most visible chemical element in the human body**. Can the micro bio-elements be paired (see Figure 7)? Copper (Cu), zinc (Zn), selenium (Se) and molybdenum (Mo) respectively belong to the 11 (IB), 12 (IIB), 16 (VIA) and 6 (VIB) periodic table groups; iodine (I) and manganese (Mn) respectively belong to groups 17 (VIIA) and 7 (VIIB); and iron (Fe) and cobalt (Co) belong respectively to groups 8 and 9 (both VIIIB).

4. Parallelism between the Classical Geocentric Cosmos and the Proteinogenic (Standard) Amino Acid Side Chains

The deciphering of the standard genetic code determines the twenty standard amino acids [11]. Standard amino acid side chains can only conform to the geocentric cosmic viewpoint if they show connectable properties. Due to their relevance for biochemical function, we choose to compare the properties polarity [12] and chirality of the twenty side chains to show the parallelism. The total number of the classical solar system bodies is eight; the Earth and the seven celestial bodies of the solar system. Together with the twelve zodiac constellations the total number of classical cosmic objects including zodiac constellations is twenty, which is exactly the total number of standard amino acids.

For the classical geocentric cosmos, **the central position of the Earth correlates to the achiral property of glycine.** All the other standard amino acids are chiral. The chirality of nineteen (19) standard amino acids is a projection of the spherical structure around the Earth of solar system celestial bodies (7) and zodiac constellations (12). A chiral formula contains a carbon that forms its four bonds to four different structures (chemical element symbols or groups of chemical element symbols). In the range of the standard amino acids, polarity and chirality are properties that match the spherical influence of the classical cosmos. **Nineteen (19) is the numerical representation of the spherical classic cosmos influence on the Earth and its inhabitants. The eight nonpolar side chains** are: glycine, alanine, valine, leucine, isoleucine, phenylalanine, proline and methionine. They **are in** numerical **accordance with the solar system octet**. Five side chains are alkyls: Alanine, valine, leucine, isoleucine and proline. These match to the five wandering stars. Consequently, the Earth-Moon-Sun triplet matches to glycine, methionine and phenylalanine. The achiral and small side chain of glycine (H) is the Earth representative. Section 5.5 will also refer to methionine as a Moon representative. The pi-electron ring of the phenyl (aryl) group makes phenylalanine a logical choice for a Sun representative. Further suggested parallelism of the nonpolar amino acid side chains to specific classical solar system bodies in Figure 9 are speculative.



Legend
In skeletal formulas a nick represents a carbon (C). Each carbon has four bonds but the carbon-hydrogen bond(s) on a nick are not shown. Five amino acids have saturated hydrocarbon side chains (Ala, Val, Leu, Ile and Pro) and three have side chains (Gly, Phe and Met) that deviate from the saturated hydrocarbon structure. Glycine is nearly identical to the right side constant part of all the other amino acids.

Figure 8. Skeletal formulas of nonpolar amino acids (Chemsketch templates)

glycine (Earth)	methionine (Moon)	valine (Venus)	alanine (Mercury)
phenylalanine (Sun)	isoleucine (Saturn)	proline (Mars)	leucine (Jupiter)

Figure 9. Grouping of non-polar standard amino acid side chains by the classic solar system: three non-alkyl chains as Earth-Moon-Sun (yellow highlighted) representatives and five alkyl chains as wandering star representatives (light grey highlighted), Earth-Sun "s"-pair and three inner-outer planet "p"-pair representatives

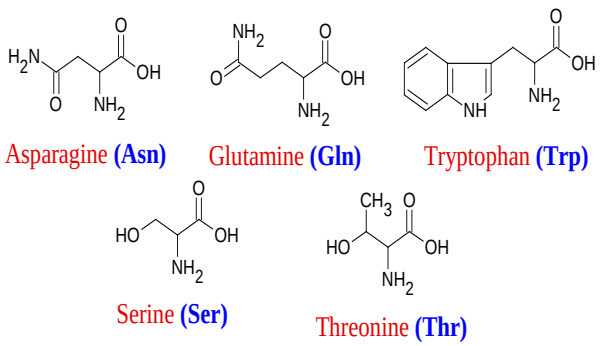


Figure 10. Amino acids with noncharged polar side chain (Chemsketch templates)

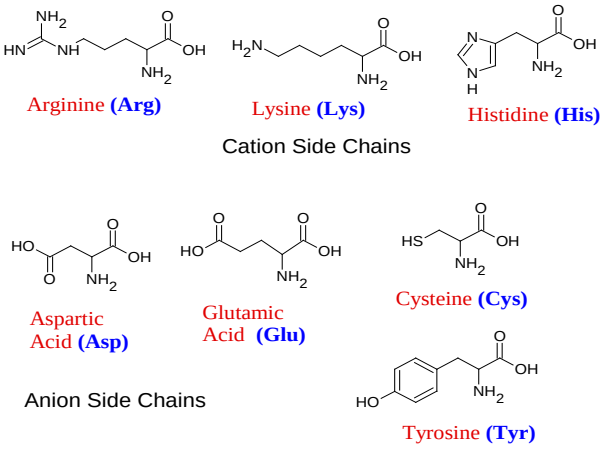
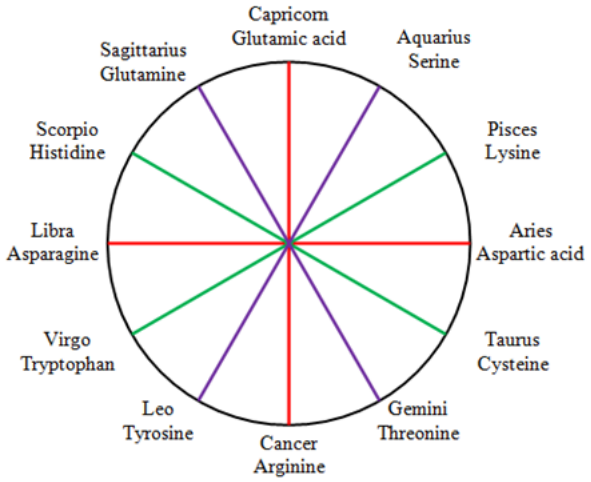


Figure 11. Amino acids that have a cationic (Arg, His and Lys), an anionic (Asp and Glu) and a partly anionic (Cys and Tyr) charge at physiologic pH (7.4). Charges are not shown on the formulas (Chemsketch templates)



Legend:

Zodiac Constellation Opposites	Corresponding Representative Polar Amino Acid Side Chains
Capricorn – Cancer	Glutamic acid - Arginine
Aquarius – Leo	Serine – Tyrosine
Pisces – Virgo	Lysine – Tryptophan
Aries – Libra	Aspartic acid - Asparagine
Taurus – Scorpio	Cysteine - Histidine
Gemini – Sagittarius	Threonine - Glutamine

Figure 12. An educated guess of the zodiac constellation representatives for the twelve polar amino acid side chains Section 6.2 discusses this educated guess

The remaining **twelve polar amino acid side chains** (Figure 10 and Figure 11) **correspond to the twelve zodiac constellations**. The polar side chains consist of noncharged polar, charged polar and polar chains that are partly charged at physiological pH. The partly charged side chains are/can be functionally active in their charged form. The pKa values based on protein studies [13] of the latter side chains are in between round brackets for cysteine (8.3), histidine (6.8) and tyrosine (9.6). At physiological pH (7.4), the contribution of even the tyrosine anions is low, but functionally not negligible especially in the nonpolar interior of a protein. Considering that charged side chains are also polar, we obtain twelve zodiac polar side chains of which five are noncharged polar side chains and seven charged or partly charged. The seven-to-five ratio is also typical for the zodiac constellations: Seven animal and five human (and human connected) constellations. The five noncharged polar side chains are asparagine, glutamine, serine, threonine, and tryptophan. Seven side chains are charged (or partly charged) of which three form cations (arginine, histidine, lysine) and four form anions (aspartic acid, cysteine, glutamic acid, tyrosine). The seven animal zodiac constellations accordingly have four mammals (Aries, Capricorn, Leo and Taurus) and three non-mammals (Cancer, Pisces and Scorpio).

5. Parallelism between the Classical Geocentric Cosmos and the Genetic Code

5.1. Introduction

If one searches for cosmic correspondence for the chemistry of life, the genetic code is certainly a main target. The standard genetic code was deciphered by M.W. Nirenberg and determines the twenty standard amino acids [11]. This section links the genetic code to the classical geocentric cosmos. Most vertebrate cells have two kinds of genetic codes: The nuclear (universal/standard) code and the mitochondrial code [14]. Reference [7] describes a developmental connection between both codes. This study integrates both codes, which enlarges and complicates the content to some extent. However, we will gain more insight in the development process. **Readers, who do not want to study this section in detail, can limit reading to the study of Figure 13, Figure 14, Figure 18, Figure 19 and Figure 20 and their legends.** We cannot expect to uncover the same cosmic correspondence based on two different but related essentials. More specifically, the classical cosmos correspondence with encoded amino acids (Section 5) cannot be identical to the correspondence with the amino acid structure and function (Section 4). Substrate differences (genetic encoded amino acids versus amino acid structure) for cosmic correspondence mostly result in amino acid differences for a specific cosmic representative.

5.2. A Genetic Code Table Based on Codon Third Position Synonyms

Cosmic correspondences to the genetic code are easier to show with a variant of the genetic code table (Figure 14) described in reference [7, Section 5.2], than by the classical genetic code tables. Figure 14 is based on third position codon synonyms for the vertebrate mitochondrial code. The asterisk (*) indicates a difference from the standard code. The lower part of Figure 14 shows these differences. The “ab” symbol represents the sixteen combinations for the first and second codon positions. Eight of the ab combinations have abN (N is IUPAC for U, C, A and G nucleotides) third position synonymous codons. This means that each abN has four synonymous codons that encode a single amino acid. For the vertebrate mitochondrial code, the other eight ab combinations have abY and abR (spliced abN) third position synonymous codons. “Y” and “R” are nucleotides with respectively a pyrimidine and a purine base. Y is the IUPAC

abbreviation for U and C and R is the IUPAC abbreviation for the two purine nucleotides A and G. The **vertebrate mitochondrial code consists of three groups of synonymous codons: The abN, the abY and the abR codons.** The abN and abY codon groups each assign eight amino acids. The abR codons assign eight coding products: Six amino acids and two stops. By this, the vertebrate mitochondrial code has three octet groups: The abN, abY and abR **coding** product **octet groups**.

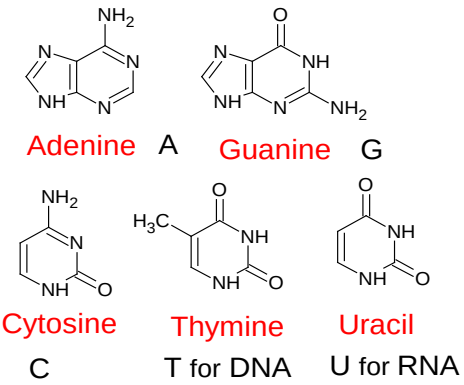


Figure 13. Nucleobases for DNA and RNA and their one letter abbreviations Nucleobases are the side chains of nucleotides and consequently also for DNA and RNA. DNA and RNA have two base complementary nucleobase pairs: the Adenine - Thymine (or Uracil) pair symbolized by the A - T (or U) and the Guanine -Cytosine pair symbolized by the G - C pair (Chemsketch templates)

Vertebrate Mitochondrial Code An asterisk (*) indicates a difference for the standard code, which is shown in the lower part of the table.				
	abN encoded AAs		abY and abR (spliced abN) encoded AAs	
ab		ab	abY	abR
UC	**Ser, S**	UU	Phe, F	**Leu, L**
CU	**Leu, L**	UA	Tyr, Y	Stop
CC	Pro, P	UG	Cys, C	Trp, W*
CG	Arg, R	CA	His, H	Gln, Q
AC	Thr, T	AU	Ile, I*	Met, M*
GU	Val, V	AA	Asn, N	Lys, K
GC	Ala, A	AG	**Ser, S**	Stop*
GG	Gly, G	GA	Asp, D	Glu, E
No of AAs	8		7 8	5 6
Differences for the standard code (encoded AAs + stop)				
	Third position nucleotides			
ab	G	A	H	R
UG	Trp, W	Stop		
AU	Met, M		Ile, I	
AG				Arg, R

Legend:
"**ab**" is the first and the second (position) nucleotide of a codon triplet.
U, C, A and G are the single letter abbreviations (IUPAC) for standard nucleotides.
N, Y, R and H represent respectively four, two pyrimidine, two purine and three (Y + A) third position nucleotides (IUPAC).
AAs is amino acids. The 20 AAs are shown in three and one letter abbreviations.
Turquoise blue and red highlights are respectively for polar and non-polar amino acids (upper part of the figure).
Pink highlight (only two numbers) is specific for the mitochondrial and **bright green** highlight is specific for the universal (standard) code.
Amino acids that have six synonymous codons are in bold text.

Figure 14. Vertebrate mitochondrial and standard genetic code table for mRNA translations

5.3. Parallelism between the Classical Solar System Octet and the abN, abY and abR Mitochondrial and abN Standard Genetic Code Octets

5.3.1. Correspondence between the Opposite Pairs of abN, abY and abR Codons (Figure 15, Figure 16, Figure 17 and Figure 18)

Each of the two octets from Section 2 (the electron octet and the classical solar system octet) have four component pairs with an opposite property. Does each of the intended code octets also form four groups of component pairs with an opposite property? Figure 15, Figure 16 and Figure 17 each show two selections (each in a separate row) of four pairs of third position synonymous codons and their associated amino acids (for Figure 17 also stops). The figures show the selections respectively for the abN, abY, and abR codons, and associated coding products. The pairs in Figure 15, Figure 16 and Figure 17 respectively consist of eight (the abN pairs in Figure 15) and four codons (the abY and abR pairs respectively in Figure 16 and Figure 17). The bottom cell row selection is the most important.

UCN Serine CUN leucine	CGN arginine GCN Alanine	ACN Threonine GUN valine	CCN Proline GGN glycine
UCN Serine ACN threonine	CGN Arginine GGN Glycine	CUN Leucine GUN valine	CCN Proline GCN alanine

Figure 15. Two groupings of abN codon pairs and their encoded amino acids for standard and vertebrate mitochondrial genetic codes, the lower row pairs have base complementary first positions and identical second and third positions, the lower cell row base complementary first positions are: one U-A ("n-pair" or Earth-Sun representative) and three C-G ("p-pair" or inner-outer planet representative) pairs

UAY tyrosine AUY isoleucine	AGY serine GAY aspartic acid	UGY cysteine CAY histidine	UUY phenylalanine AAY asparagine
CAY histidine GAY aspartic acid	UGY cysteine AGY serine	UAY tyrosine AAY asparagine	UUY phenylalanine AUY isoleucine

Figure 16. Two groupings of abY codon pairs and their encoded amino acids for the vertebrate mitochondrial genetic code, the lower row pairs have base complementary first positions and identical second and third positions, the lower cell row base complementary first positions are: one C-G ("n-pair" or Earth-Sun representatives) and three U-A ("p-pair" or inner-outer planet representatives) pairs

UAR stop AUR methionine	GAR glutamic acid AGR stop	CAR glutamine UGR tryptophan	AAR lysine UUR leucine
CAR glutamine GAR glutamic acid	UGR tryptophan AGR stop	UAR stop AAR lysine	UUR leucine AUR methionine

Figure 17. Two groupings of abR codon pairs and their encoded amino acids (and stops) for the vertebrate mitochondrial genetic code, the lower row pairs have base complementary first positions and identical second and third positions, the lower cell row base complementary first positions are: one C-G ("n-pair" or Earth-Sun representatives) and three U-A ("p-pair" or inner-outer planet representatives) pairs

Vertebrate Mitochondrial Code An asterisk (*) indicates a difference for the standard code, which is shown in the lower part of the table.				
	abN encoded AAs		abY and abR (spliced abN) encoded AAs	
ab		ab	abY	abR
UC	**Ser, S**	CA	His, H	Gln, Q
AC	Thr, T	GA	Asp, D	Glu, E
CG	Arg, R	UG	Cys, C	Trp, W*
GG	Gly, G	AG	**Ser, S**	Stop*
CU	**Leu, L**	UA	Tyr, Y	Stop
GU	Val, V	AA	Asn, N	Lys, K
CC	Pro, P	UU	Phe, F	**Leu, L**
GC	Ala, A	AU	Ile, I*	Met, M*
No of AAs	8		7 8	5 6
Differences for the standard code (encoded AAs + stop)				
	Third position nucleotides			
ab	G	A	H	R
UG	Trp, W	Stop		
AU	Met, M		Ile, I	
AG				**Arg, R**

Legend:
"**ab**" is the first and the second position nucleotide of a codon triplet.
U, C, A and G are the single letter abbreviations (IUPAC) for standard nucleotides.
N, Y, R and H represent respectively four, two pyrimidine, two purine and three (Y + A) third position nucleotides (IUPAC).
AAs is amino acids. The 20 AAs are shown in three and one letter abbreviations.
Blue highlight (only two numbers) is specific for the mitochondrial and **bright green** highlight is specific for the universal (standard) code.
Dark yellow, red, turquoise blue and pink highlights respectively mark different "ab" pairs. Each pair has base complementary first, and identical second and third codon positions. The identical second positions determine the selected color highlight.
Yellow and light grey highlights respectively mark the Earth-Sun-Moon triplet and the five wandering stars representatives for the abN encoded amino acids.
Amino acids that have six synonymous codons are in bold text.

Figure 18. Vertebrate mitochondrial and standard genetic code mRNA translations are paired by "ab" combination with base complementary first, and identical second and third codon positions. The base complementary makes the pairs opposites

The upper cell row selection groups the pairs based on opposite properties for "ab" as well as for corresponding encoded amino acids. In the two cells from the left, we note a reversal of the "ab" positions of the pairs and in the third cell a RY or YR conservative "ab" change of the pair (e.g., a RY change for ACN and GUN). The right cell shows an "ab" (with a = b) base complementary pair. For example, the Figure 15 reversal of "ab" positions for left cell one and two are respectively UCN-CUN and CGN-GCN. The RY conservative ab change of cell three is ACN-GUN. The right cell shows an "ab" (with a = b) CC-GG base complementary pair. Each encoded amino acid pair tends to have opposite polarity (polar/non-polar) properties. For example, the left cell of Figure 15 shows the serine-leucine polar/non-polar pair. A few amino acid opposites are less clear. The right cell of Figure 15 shows the opposite of chain nick (proline) and pure chain elongation (glycine). In Figure 16, the serine-aspartic acid pair is an uncharged-charged polar pair. The cysteine-histidine pair at physiological pH is an anion-cation partly charged polar pair.

The selection in the bottom row groups the pairs based on identity of the second and third codon positions. The first codon positions of a pair have a base complementary structure (U-A or A-U and C-G or G-C). First position base complementary is the opposite property of the bottom row pairs. The base complementary of the left cell pair differs from the three identical base complementary first codon positions in the three other cells of the selection. The latter content structure strongly resembles the content structure of Figure 3. Consequently, each selection in a bottom cell row corresponds to the electron octet and the classical solar system octet structure. The left cells correspond to the Earth-Sun pair and the three other cells of the same Figure correspond to inner-outer planet opposites. Yellow highlighting refers to the Earth-Moon-Sun triplet. The turquoise blue highlight refers to the transformation described in Section 5.3.5. The proposed correspondence in the bottom cell rows are based on codon structure. Section 5.3.2 presents the corresponding amino acid cosmic representatives.

5.3.2. Solar System Encoded Amino Acid Representatives

We now present the amino acid based solar system representatives. **In Figure 15**, the yellow highlighted polar amino acid triplet (arginine, serine and threonine) and the light grey highlighted quintet of non-polar amino acids (alanine, glycine, leucine, proline and valine) respectively correspond to the Earth-Sun-Moon triplet and the five wandering stars. Figure 15 is applicable to mitochondrial as well as to standard genetic codes. Figure 19 shows a comparison of the lower cell row of Figure 15 to the classical solar system and the octet electron pair opposites. Figure 16 shows the triplet composed of charged and partly charged amino acid side chains (aspartic acid, histidine and cysteine) and five non-charged side chains (asparagine, isoleucine, phenylalanine, serine and tyrosine). The contribution of the tyrosine anion is very low at physiological pH. In Figure 17, the selections are atypical because of the stop codons and the contribution to the developmental transformation described in Section 5.3.5.

The correspondence of the bottom row (amino acid/stop) octets in Figure 15-Figure 17 to the solar system octet decreases with increasing contribution of the developmental transformation (turquoise blue highlight in Figure 16 and Figure 17).

5.3.3. Correspondence for Codon Degeneracy

For **the vertebrate mitochondrial code**, the number of abN encoded amino acids with a degeneracy of six and four is respectively two (the encoded amino acids leucine and serine) and six (the encoded amino acids alanine, arginine, glycine, proline, threonine and valine). These two groups of encoded amino acids are in line with the classical solar system pairs described in Section 2 and the electron octets of two s- and six p-electrons.

The standard code also distinguishes two groups of abN encoded amino acids: Three amino acids (arginine, leucine and serine) have a degeneracy of six codons and five amino acids (alanine, glycine, proline, threonine and valine) have a degeneracy of four, corresponding in

number to the Earth-Moon-Sun triplet and the five wandering stars.

Earth Sun	Moon Saturn	Venus Mars	Mercury Jupiter
ns^2	np^2_x	np^2_y	np^2_z
UCN serine	CGN arginine	CUN leucine	CCN proline
ACN threonine	GGN glycine	GUN Valine	GCN Alanine

Legend

Figure 19 is a comparison of Figure 3 and the lower cell row of Figure 15.

The "ab" abbreviation represents different combinations for the first and the second codon positions.

The abN codon pairs have base complementary first, and identical second and third codon positions. The lower cell row base complementary first positions are: One U-A ("n-pair" or Earth-Sun representatives) and three C-G ("p-pair" or representatives for inner-outer planets) pairs.

The Earth-Moon-Sun triplet and the corresponding encoded amino acid representatives with polar side chains are highlighted yellow. The five wandering stars and corresponding encoded amino acid representatives with non-polar side chains are highlighted light grey.

Figure 19. A comparison between classical solar system opposites (upper cell row), octet electron pair opposites (middle cell row) and abN codon pairs with their encoded amino acids (lower cell row)

5.3.4. The Seven over Five Zodiac Ratio for the Vertebrate Mitochondrial only abY and abR Encoded Amino Acids

The numbers of the vertebrate mitochondrial only abY and abR encoded amino acids show the typical seven over five zodiac constellation ratio. One abY (AGY) and one abR (UUR) encoded amino acid, respectively serine and leucine are also encoded by corresponding abN codons, which reduces the number of vertebrate mitochondrial only abY and abR encoded amino acids to respectively seven and five.

5.3.5. The Developmental Transformation

The developmental transformation **from vertebrate mitochondrial into the standard code** is described in reference [[7], Section 5.2]. The turquoise blue highlighting in Figure 16 and Figure 17 refers to the developmental transformation. The weakness of the Figure 17 top cell row opposites (only the AAR lysine - UUR leucine is a polar - non-polar pair) triggers the developmental transformation from vertebrate mitochondrial into the standard code. From the three vertebrate mitochondrial code octets (Figure 15, Figure 16 and Figure 17), the standard code adopts only the abN octet (Figure 15). What happens to the standard code for abY and abR codons? Most of the transformation changes are at abR codons. **Only the AUN** (AUY + AUR) methionine-isoleucine codons **re-split** (from AUR methionine - AUY isoleucine into AUG methionine and AUH isoleucine, in which H is the IUPAC representation for U, C and A) **affects abY (UAY) codons.** From the vertebrate mitochondrial code on to the standard code, one abY (AUY) and three abR (AUR, UGR and AGR) third position synonymous codon pairs undergo the developmental transformation process. For the standard code, the result of this process is shown in the lower part of Figure 14 and Figure 18: Two singlet codons (AUG methionine and UGG tryptophan), the AGR arginine doublet and the triplet AUH isoleucine codons. **The developmental process** from vertebrate mitochondrial code into standard genetic code **results in** a twofold simultaneous structuring process of the genetic code that makes it become an expression of **the parallelism between the Earth-Moon-Sun triplet and the twelve zodiac constellations of the fixed stars**. The first structuring process results in the correspondence to the fixed stars zodiac as presented in Section 5.4.2. The second structuring process results in the correspondence to the Earth-Moon-Sun triplet as presented in Section 5.4.3 matching the UGG tryptophan, AUG methionine, and AUH isoleucine encoded amino acids.

5.4. Parallelism between the Classical Geocentric Cosmos and the Standard (Universal) Genetic Code

For the classical geocentric cosmology, the Earth-Moon-Sun triplet is the most visible part of the cosmos. This triplet relates on one hand to the wandering stars and on the other hand to the fixed stars of which the twelve zodiac constellations are representatives. The standard genetic code shows representatives for both relations. The abN codons represent the wandering stars relations (Section 5.4.1) and the spliced abN codons represent the fixed stars relations (Sections 5.4.2 and 5.4.3) of the Earth-Moon-Sun triplet (except UGA stop). Both parts of the standard genetic code have an equal number of codons, which demonstrates that both of the relations are equally important. The triplet has different interactions to the remainder part of the solar system as to the outsider fixed stars. The standard genetic code shows different triplet representatives accordingly. Figure 22 summarizes the standard genetic code classical geocentric cosmos representatives.

5.4.1. The abN Encoded Amino Acid Representatives for Earth-Moon-Sun Triplet and Wandering Stars

Figure 15, Figure 18, Figure 19 and Figure 20 show three polar and five non-polar amino acid solar system representatives for the abN codons. The three polar amino acids represent the Earth-Moon-Sun triplet, and the five non-polar amino acids represent the wandering stars.

5.4.2. Standard Genetic Code Representatives for the Twelve Zodiac Constellations: The Seven to Five Ratio of abY and abR Encoded Amino acids (Figure 20, Right Hand Middle Part)

The standard abY and abR codons (including the AGR arginine codons) show the zodiac seven to five ratio by the number of encoded amino acids: Seven by the abY, and five by the abR doublet codons or a total of twelve encoded amino acids matching the number of zodiac constellations. Remember that the twelve zodiac constellations consist of five human (and human connected) and seven animal constellations.

Standard Genetic Code Translations				
ab combinations	Polar (3)/ Nonpolar (5) AAs as Representatives for Earth-Moon-SunTriplet / Five **Wandering Stars**		abY and abR (spliced abN) Encoded AAs as Representatives for **Fixed Stars** Zodiac Constellations	
ab	abN Encoded AAs	ab	abY	abR
UC	**Ser, S**	CA	His, H	Gln, Q
AC	Thr, T	GA	Asp, D	Glu, E
CG	Arg, R	UG	Cys, C	
GG	Gly, G	AG	**Ser, S**	**Arg, R**
CU	**Leu, L**	UA	Tyr, Y	Stop
GU	Val, V	AA	Asn, N	Lys, K
CC	Pro, P	UU	Phe, F	**Leu, L**
GC	Ala, A			
No of AAs	8		7	5

Encoded Amino Acids (Earth-Moon-Sun Representatives)			
	Third position nucleotides		
ab combinations	G	A	H
UG	Trp, W	Stop	
AU	Met, M		Ile, I

Legend:
"**ab**" is the first and the second position nucleotide of a codon triplet.
U, C, A and G are the single letter abbreviations (IUPAC) for standard nucleotides.
N, Y, R and H represent respectively four (N), two pyrimidine (Y), two purine (R) and three (H = Y + A) third position nucleotides (IUPAC).
AAs is amino acids. The 20 AAs are shown in three and one letter abbreviations.
Bright Green highlight is specific for the universal (standard) code.
Yellow and light grey highlights respectively mark the Earth-Sun-Moon triplet and the representatives of the five wandering stars for the abN encoded amino acids.
Turquoise blue highlight is for representatives of the fixed stars.
Amino acids that have six synonymous codons are in bold text.

Figure 20. Standard mRNA genetic code translations paired by "ab" combination with base complementary first, and identical second and third codon positions (except UU). UGR is spliced into UGG (tryptophan) and UGA (stop). AUN codons are spliced into AUH (isoleucine) and AUG (methionine)

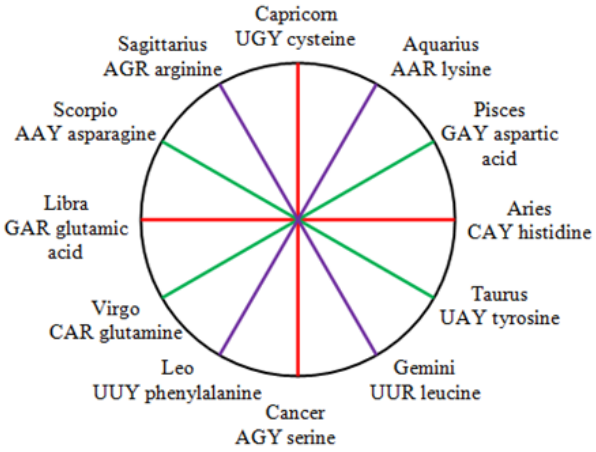
abN Encoded Amino Acids (AAs) **32 Codons**	
abN Encoded Polar AAs (3): Arg, Ser and Thr as Earth-Moon-Sun Representatives	abN Encoded Nonpolar AAs (5): Ala, Gly, Leu, Pro and Val as Wandering Star Representatives
Spliced abN Encoded Amino Acids **29 Codons + 3 Stop Codons (UGA and UAR)**	
Non abY and Non abR Spliced abN (AUH, AUG and UGG) Encoded Amino Acids (Ile, Met and Trp) as Earth-Moon-Sun Representatives	7 abY and 5 abR Spliced abN Encoded Amino Acids (12) as Representatives for Fixed Stars Zodiac Constellations

Legend:
The abN codons represent the wandering star relations (Section 5.4.1) and the spliced abN codons represent the fixed star relations (Sections 5.4.2. and 5.4.3.) of the Earth-Moon-Sun triplet (except UGA stop).
Yellow and light grey highlights respectively mark the Earth-Sun-Moon triplet and the representatives of the five wandering stars for the abN encoded amino acids.
Turquoise blue highlight is for representatives of the fixed stars.

Figure 21. Summary of the standard genetic code classical geocentric cosmos representatives

5.4.3. Earth, Moon and Sun Representatives for the Fixed Stars Interactions

This subsection presents AUH (= AUY + AUA) isoleucine, AUG methionine and UGG tryptophan as the representatives of the Earth-Moon-Sun triplet interactions to the fixed stars. The universal (standard) code complicates the rather simple structure of representatives for the classical geocentric solar octet system and the twelve zodiac constellations (right hand middle part of Figure 20) in the lower part of Figure 20, namely by the codons for methionine, tryptophan and isoleucine.



Legend:

Zodiac Constellation Opposites	Corresponding Doublet Codons and Encoded Amino Acids
Capricorn - Cancer	UGY cysteine – AGY serine
Aquarius - Leo	AAR lysine – UUY phenylalanine
Pisces - Virgo	GAY aspartic acid – CAR glutamine
Aries - Libra	CAY histidine – GAR glutamic acid
Taurus - Scorpio	UAY tyrosine – AAY asparagine
Gemini - Sagittarius	UUR leucine – AGR arginine

Figure 22. An educated guess of the zodiac constellation representatives for the standard genetic code (Section 6.3 discusses this educated guess)

5.4.4. Similarities between Ribosomal Protein Synthesis and the Birth Process

A key observation that makes the cosmic correspondence for AUG methionine clearer is the removal of the initiator methionine during the ribosomal post translation modifications of proteins. There is no convincing explanation for the fact that nearly all ribosomal protein synthesis starts with the amino acid methionine, which is mostly split off in the process to obtain the native functional protein.

A possible explanation for the removal of the initiator methionine is an analogy to the birth process. Upon birth, the organs that support conception, embryonic and fetal growth processes are split off and the navel cord is broken. Similarly, when the protein biosynthesis on the ribosome is finished, the growing protein chain gradually forms its native functional shape (conformation) and therefore has to split off the ribosome and a starting sequence of the protein chain beginning with methionine; the naval cord. The protein navel cord is broken.

Reproduction is often connected to the moon. The average human menstrual cycle is 28 days, matching the sidereal moon cycle. Protein translation from mRNA on ribosomes can be seen as a reproduction process. These similarities support the choice for AUG encoded

methionine as the moon representative for the standard genetic code.

5.5. Cosmic Representatives for Stop Codons

UGG tryptophan and UGA stop define the standard UGR coding products like two focal points define the elliptical orbit of the Earth around the sun. The Sun is one focal point. The second focal point of the Earth orbit is not occupied by a planet like the UGA codon does not define an amino acid. The UGA stop corresponds to the second focal point of the Earth's elliptical orbit around the sun. The UGG tryptophan Sun is the other focal point. What could be the cosmic meaning for both UAR stop codons? A logical choice for the cosmic representatives of the UAR stop codons are the two intersections of the ecliptic with the celestial equator. When the Sun is at these intersections, we have the equinoxes of March 21 and September 21.

6. Discussion of the Educated Guesses for Zodiac Constellation Representatives

Section 6 discusses three different educated guesses for zodiac constellation representatives of life chemistry essentials: The corresponding representatives for the macro bio-elements, the polar amino acids and the abY and abR encoded amino acids of the standard genetic code. The presentation of these representatives is a rather speculative venture. Sufficient information is necessary to realize this search successfully. For the first two guesses, the author doubts that he has enough information. Because readers probably expect such a detailed correspondence like the specific representatives, the author makes an attempt to discuss his reasoning below. The third guess is quite well substantiated. Note that the zodiac constellation representatives are not essential information for the article.

6.1. The Zodiac Representatives for the Macro Bio-Elements

The starting point for this discussion is the correspondence between the number of macro bio-elements and the number of zodiac constellations. Seven macro bio-elements mainly form covalent bonds: Hydrogen (H), carbon (C), nitrogen (N), oxygen (O), sulfur (S), phosphorus (P) and silicon (Si) and five form ionic bonds: Sodium (Na), potassium (K), calcium (Ca), magnesium (Mg) and chlorine (Cl). The covalent bond forming macro bio-elements agree in number to the seven zodiac animals and the ionic bond forming macro bio-elements accord to the five human connected constellations. Only two human connected zodiac constellations are zodiac opposites. The potassium - sodium pair has functionally opposite properties in nerve (cell) surface stimulus conduction and is therefore the best Gemini - Sagittarius representative opposite pair. Calcium represents Libra (balance scales) because the calcium contribution in bones helps the organism to maintain balance. Chlorine represents Virgo because virgins are receptable like chlorine makes ionic bonds to all four the other ionic bond forming macro bio-elements. The remaining magnesium represents the remaining Aquarius constellation. Magnesium forms complexes with the molecular energy vehicle ATP. Magnesium carries ATP like Aquarius carries a water bag. Now, we discuss the choice of each of the seven mainly covalent bond forming macro bio-elements as zodiac constellation representatives. Four (carbon, hydrogen, oxygen and nitrogen) out of these seven elements are the main elements for most biomolecules. Phosphorus, sulfur and especially silicon have a lower or a specific contribution to biomolecules. Thus, we come to a four to three ratio, which we also find in the zodiac constellations: of the seven zodiac animals (excluding the humans) we have four mammals and three non-mammals. Carbon as most important bio-element is granted the most important animal: Leo. Taurus is the most vital animal like oxygen mostly supports life. Capricorn thrives on the highest mountain tops like hydrogen strives to escape towards the cosmos. Nitrogen, the remaining one of the four main bio-elements corresponds to the remaining mammal animal constellation: Aries. The scorpion is famous for its poisonous sting like sulfur (in molecules) is a strong attacking nucleophile. Pisces have the highest reproductive forces of the zodiac animals. Accordingly, they have high phosphorus needs. The lobster and crab animals (Cancer) tend to hide in holes or in the sand. Consequently, they are familiar to silicon, which is a chemical building block of sand.

Zodiac Constellation Opposites	Corresponding Representative Macro Bio-Elements
Capricorn - Cancer	Hydrogen - Silicon
Aquarius - Leo	Magnesium - Carbon
Pisces - Virgo	Phosphorus - Chlorine
Aries - Libra	Nitrogen - Calcium
Taurus - Scorpio	Oxygen - Sulfur
Gemini - Sagittarius	Potassium - Sodium

Legend of Figure 6; An educated guess of the zodiac constellation representatives for the twelve macro bio-elements

6.2. The Zodiac Representatives for the Polar Amino Acid Side Chains

Threonine is the only polar amino acid with a chiral carbon in the side chain. Threonine has two chiral carbons (including the main chain chiral carbon), which is a typical Gemini (twin) property. The four negative side chains correspond to the four mammal zodiac animals. Leo is a carnivore and the other three are ruminants. The most deviating side chain from the latter four is tyrosine and therefore it becomes the Leo representative. Capricorn animals strive to higher locations than Aries animals, like glutamic acid is the higher homolog (one carbon more in the side chain) of aspartic acid. The remaining cysteine corresponds to the remaining Taurus constellation. The Taurus - Scorpio opposite corresponds to the opposite charges of cysteine - histidine (both partly charged). The Pisces spine corresponds to the lysine side chain carbon spine. The serine side chain resembles the water chemical structure like Aquarius carries a waterbag. Tyrosine

differs from serine by its phenyl group, which makes it less polar and therefore, similar to lions, it does not like water. The remaining positively charged arginine corresponds to the remaining non-mammal constellation Cancer. Like the Capricorn - Cancer constellations are opposites; the glutamic acid anion and the arginine cation are opposites. From the Libra and Sagittarius tools, Sagittarius is the more active like glutamine is the higher homolog (one carbon more in the side chain) of asparagine.

Zodiac Constellation Opposites	Corresponding Representative Polar Amino Acid Side Chains
Capricorn - Cancer	Glutamic acid - Arginine
Aquarius - Leo	Serine - Tyrosine
Pisces - Virgo	Lysine - Tryptophan
Aries - Libra	Aspartic acid - Asparagine
Taurus - Scorpio	Cysteine - Histidine
Gemini - Sagittarius	Threonine - Glutamine

Legend of Figure 12. An educated guess of the zodiac constellation representatives for the twelve polar amino acid side chains.

The constellation opposites Aries - Libra corresponds to the structural opposites of aspartic acid and asparagine. Tryptophan is the most moderate polar amino acid like Virgo (a virgin) is the most moderate, the least aggressive constellation.

6.3. Zodiac Representatives for abY and abR Encoded Amino Acids of the Standard Genetic Code

Section 6.3 determines the abY and abR doublet codon encoded amino acid zodiac constellation representatives, which further supports the proposed correspondence.

6.3.1. General Codon Structures

Figure 23 shows general codon structures for the abY and abR codons of the standard genetic code. Note that the first two codon positions of the general codon structures in Figure 23 indicate single specific pyrimidine (Y) or purine (R) nucleotides. Only the third positions are doublets. Column 2 shows the 7 “animal” general codon structures with Y as third codon position and column 4 shows the 5 “human and human connected” general codon structures with R as third codon position. The number of general codon structures starting with Y as first position (6) matches the mammal constellations (including the human beings: Gemini and Virgo) in the upper part of Figure 23. The number of general codon structures starting with R matches the number of non-mammals and human connected constellations (3 + 3) in the lower part of Figure 23.

6.3.2. The Grouping of Zodiac Constellations

The seven zodiac animals consist of four mammals (Aries, Capricorn, Leo and Taurus) and three non-mammals (two arthropods: Cancer and Scorpio, and Pisces). The five human constellations consist of two humans (Gemini and Virgo) and three human connected constellations (Aquarius, Libra and Sagittarius). The three human connected constellations refer to human actions and tools.

abY Codons and Encoded Amino Acids	General Codon structure	abR Codons and Encoded Amino Acids	General Codon Structure
UAY tyrosine	YRY	UUR leucine	YYR
UGY cysteine	YRY	CAR glutamine	YRR
CAY histidine	YRY		
UUY phenylalanine	YYY		
AAY asparagine	RRY	GAR glutamic acid	RRR
GAY aspartic acid	RRY	AAR lysine	RRR
AGY serine	RRY	AGR arginine	RRR

Figure 23. General codon structures for the abY and abR codons of the standard genetic code (Figure 20, middle part on the right)

Constellation Opposites	Corresponding Doublet Codons
Capricorn - Cancer	abY - abY
Aquarius - Leo	abR - abY
Pisces - Virgo	abY - abR
Aries - Libra	abY - abR
Taurus - Scorpio	abY – abY
Gemini - Sagittarius	abR - abR

Figure 24. Zodiac constellation opposites and the corresponding type of doublet codons

Zodiac Constellation Opposites	Corresponding Doublet Codons and Encoded Amino Acids
Capricorn - Cancer	UGY cysteine - AGY serine
Aquarius - Leo	AAR lysine - UUY phenylalanine
Pisces - Virgo	GAY aspartic acid - CAR glutamine
Aries - Libra	CAY histidine - GAR glutamic acid
Taurus - Scorpio	UAY tyrosine - AAY asparagine
Gemini - Sagittarius	UUR leucine - AGR arginine

Legend of Figure 22. An educated guess of the zodiac constellation representatives for the standard genetic code

6.3.3. Construction Rules for the Genetic Code Zodiac Representatives

The following is an educated guess to construct the standard genetic code zodiac. Figure 24 shows the zodiac constellation opposites and the corresponding type of opposites for doublet codons. The following rules select the opposite representative pairs. Base complementary marks the first codon position of the opposite representatives. Their second codon position is identical (or base complementary). Remember that the seven abY doublet codons are the animal and the five abR doublet codons are the human and human connected representatives.

6.3.4. Selection of Opposite Constellation Representatives

The legend of Figure 22 shows the selected opposite constellation representatives.

Aquarius - Leo

The selection of the opposite constellation representatives starts with the search for a unique general codon structure. In Figure 23, the general codon structure of UUY phenylalanine (YYY) is unique. The four mammal constellation representatives have an Y in the first codon position and consist of three ruminants and a carnivore (Leo). UUY phenylalanine deviates from the general codon structure of the three ruminant representatives (YRY). Consequently, UUY phenylalanine is the Leo representative and the threefold base complementary AAR lysine (or the first position base complementary AGR arginine) is the opposite representative matching Aquarius.

Aquarius and Leo are strongly matching zodiac opposites. Therefore, AAR lysine is by far the best choice for Aquarius.

Gemini - Sagittarius

The two human being zodiac constellations (Gemini and Virgo) match the abR codons with a Y in the first position (UUR leucine and CAR glutamine). UUR leucine matches the Gemini constellation because of the U in the first two codon positions (U twins), and leucine and isoleucine are (twin) isomers (a Gemini property). The twofold base complementary AAR lysine (to UUR leucine) is already claimed by the threefold base complementary to UUY phenylalanine. From the two remaining RRR codons, only AGR arginine is a first position base complementary match to UUR leucine. The strong positive charge of the arginine side chain (pKa 12.5) is the best choice for the Sagittarius representative. Consequently, the Gemini-Sagittarius opposite representatives are UUR leucine - AGR arginine. The UUR leucine - AGR arginine opposite Gemini - Sagittarius representatives deviate from the second position rule. Fortunately, their third positions are identical. The Sagittarius representative was already an outsider in the citric acid cycle zodiac [1].

Aries - Libra

Aquarius and Gemini are the first two human connected constellations with addressed representatives. The third human connected constellation is Libra. GAR glutamic acid is the only remaining RRR and its opposite constellation representative matching the construction rules is Aries CAY histidine. Note that Aries-Libra are constellation opposites and their doublet codon representatives have the abY-abR structure (Figure 24).

Pisces - Virgo

Remember that UUR leucine is the Gemini representative. The right side upper part of Figure 23 shows that the remaining CAR glutamine (general codon structure YRR) must be the Virgo representative. The two human constellations (Gemini and Virgo) match the YYR and YRR general codon structures of Figure 23. Virgo CAR glutamine matches the opposite GAY aspartic acid Pisces representative. From the RRY non-mammal representatives only GAY aspartic acid has a first position base complementary to CAR glutamine.

Capricorn - Cancer and Taurus - Scorpio

The two abY - abY opposite representatives that still need to be identified are Capricorn - Cancer and Taurus - Scorpio. The remaining matches for the abY - abY opposite representatives are: UGY cysteine - AGY serine and UAY tyrosine - AAY asparagine. Capricorn and Taurus are “earth”, and Cancer and Scorpio are “water” constellations. The corresponding codons are structurally very similar, and also the corresponding amino acids have a similar polarity. These corresponding structures and constellation properties (earth and water) demonstrate the match between these zodiac constellations and the standard genetic code zodiac. The choice for the specific opposite representatives for each of these constellation opposites is difficult. The solar period for each of these constellations and the molar mass of the amino acids are helpful. The solar periods are as follows: Capricorn (28) - Cancer (20) and Taurus (37) - Scorpio (25). The molar mass of the corresponding amino acids are as follows: Cysteine (121), serine (105), tyrosine (181) and asparagine (132). These data make the following choice acceptable. The UGY cysteine - AGY serine opposite matches the Capricorn (28) - Cancer (20) opposite, and the UAY tyrosine - AAY asparagine opposite matches the Taurus (37) - Scorpio (25) opposite. The Taurus and Leo amino acid representatives are respectively tyrosine and phenylalanine. Both representatives are structurally related and of relatively high molar mass. Taurus and Leo are the most impressive zodiac animals, which explains the structural connections between the representatives.

Abbreviations

“ab” is the first and the second position nucleotide of a codon triplet.

U, C, A and G are the single letter abbreviations (IUPAC) for standard nucleotides of which the nucleobases are: U (uracil), C (cytosine), A (adenine) and G (Guanine). Uracil is only an RNA component.

N, Y, R and H represent respectively four (N), two pyrimidine (Y), two purine (R) and three (H = Y + A) third position nucleotides (IUPAC).

AAs is amino acids.

The three letter abbreviations for the twenty standard amino acids are included in Figure 8, Figure 10 and Figure 11 and the corresponding one letter abbreviations are included in Figure 14, Figure 18 and Figure 20 next to their corresponding three letter abbreviations.

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