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Towards a New Paradigm in Scientific Notation **Patterns of Periodicity among Proteinogenic Amino Acids** [Abridged Version]

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Presentation

In this brief essay, the traditional order of some of the proteinogenic amino acids is critically examined. As shown in the following tables, the amino acids are presented by their names, their chemical formulas and their molecular weight.

For years, I have been questioning the presentation of the elements and their compounds as of the historically accidental names, especially when these are presented in alphabetical order: *Alanine, Arginine, Asparagine, Aspartate, Cysteine, Glutamate, Glutamine, Glycine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Proline, Serine, Threonine, Tryptophan, Tyrosine,* and *Valine*. When these accidental names and/or their alphabetical order are employed in listing the amino acids, they do not necessarily represent any particular progression of physical characteristics of the elements or their compounds. Similarly, an alphabetical list of the 92 natural elements mixes up the chemical and physical characteristics of the elements and their compounds as of their historical names. The alphabetical order of the elements that make up the amino acids or of the amino acids themselves does not obey any scientific notation.

A general practice in presenting chemical formulas of the elements and their compounds is to list them according to their supposed chemical structure and/or chemical formula. However, as is shown in this essay, the traditional notation for chemical formulas does not always reflect the chemical and physical characteristics of the elements and their compounds. For the past twelve years I have been proposing listing the elements according to their progressive atomic numbers in the chemical formulas.

In this essay, the comparison between the traditional notation of chemical formulas *and* my specific proposal effectively reveals how certain patterns and periodicity of the amino acids appear in the latter and not in the former. The following examples based on the amino acids illustrate instead of listing the amino acids as **6-C 1-H 7-N 8-O**, my proposal to list them as of **1-H 6-C 7-N 8-O**; as of the progressive atomic numbers of the elements. Structurally, chemists may argue in favor of the scientific notation with 6-C as the lead element in the chemical formulas of the amino acids. However, with my suggestion of placing the elements of the compound in their progressive numerical order, certain patterns become available that are unavailable on the traditional notation.

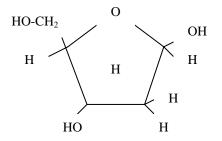
Alphabetic Order:				
Amino acid	Abbr	eviations	Molecular formula	Linear formula
Alanine	Ala	А	$C_3H_7NO_2$	CH3-CH(NH2)-COOH
Arginine	Arg	R	$C_6H_{14}N_4O_2$	HN=C(NH2)-NH-(CH2)3-CH(NH2)-COOH
Asparagine	Asn	Ν	$C_4H_8N_2O_3$	H2N-CO-CH2-CH(NH2)-COOH
Aspartic acid	Asp	D	$C_4H_7NO_4$	HOOC-CH2-CH(NH2)-COOH
Cysteine	Cys	С	$C_3H_7NO_2S$	HS-CH2-CH(NH2)-COOH
Glutamine	Gln	Q	$C_5H_{10}N_2O_3$	H2N-CO-(CH2)2-CH(NH2)-COOH
Glutamic acid	l Glu	E	C ₅ H ₉ NO ₄	HOOC-(CH2)2-CH(NH2)-COOH
Glycine	Gly	G	$C_2H_5NO_2$	NH2-CH2-COOH
Histidine	His	Н	$C_6H_9N_3O_2$	NH-CH=N-CH=C-CH2-CH(NH2)-COOH
Isoleucine	Ile	Ι	$C_6H_{13}NO_2$	CH3-CH2-CH(CH3)-CH(NH2)-COOH
Leucine	Leu	L	$C_6H_{13}NO_2$	(CH3)2-CH-CH2-CH(NH2)-COOH
Lysine	Lys	Κ	$C_6H_{14}N_2O_2$	H2N-(CH2)4-CH(NH2)-COOH
Methionine	Met	М	$C_5H_{11}NO_2S$	CH3-S-(CH2)2-CH(NH2)-COOH
Phenylalanine	e Phe	F	$C_9H_{11}NO_2$	Ph-CH2-CH(NH2)-COOH
Proline	Pro	Р	$C_5H_9NO_2$	NH-(CH2)3-CH-COOH
Serine	Ser	S	C ₃ H ₇ NO ₃	HO-CH2-CH(NH2)-COOH
Threonine	Thr	Т	$C_4H_9NO_3$	CH3-CH(OH)-CH(NH2)-COOH
Tryptophan	Trp	W	$C_{11}H_{12}N_2O_2$	Ph-NH-CH=C-CH2-CH(NH2)-COOH
Tyrosine	Tyr	Y	$C_9H_{11}NO_3$	HO-Ph-CH2-CH(NH2)-COOH
Valine	Val	V	$C_5H_{11}NO_2$	(CH3)2-CH-CH(NH2)-COOH

The following list is alphabetically presented as is common as of the names of the amino acids.

<u>Source:</u> IM MUNO GENE TICS Information System, http://www.imgt.org http://www.imgt.org/IMGTeducation/Aide-memoire/_UK/aminoacids/formuleAA/ Note that the previous alphabetical list mixes up the presentation of the corresponding data in the other columns. Note that the data in the column of Molecular Formula do not follow a progression of the number of Carbon atoms as the lead element in the notation. Note that the lead elements of the Linear Formulas are also mixed up not only as of a numerical progression but as to which particular element is the lead element in the formulas themselves. Because of these mixed-up presentations of the amino acids and their corresponding data, it is no wonder that patterns and periodicities are hidden in such presentations. In other words, there is no way to identify patterns as of these kinds of disorganized presentations.

"Amino acids are biologically important organic compounds made from amine (-NH₂) and carboxylic acid (-COOH) functional groups, along with a side-chain specific to each amino acid. The key elements of an amino acid are carbon, hydrogen, oxygen and nitrogen, though other elements are found in the side-chains of certain amino acids."..."20 of the 23 proteinogenic amino acids are encoded directly by the triplet codons in the genetic code and are known as 'standard' amino acids." [Source: www.wikipedia.com]

"DNA is a polymer—a very large molecule made up of smaller units of four components. Each monomer contains a phosphate and a sugar component. In DNA, the sugar is deoxyribose, and in RNA the sugar is ribose." [Source: www.wikipedia.com]



The structural significance of the 1-Hydrogen atom in the previous illustration is apparent.

"Deoxyribose, or more precisely 2-deoxyribose, is a monosaccharide with idealized formula H-(C=O)-(CH2)-(CHOH)3-H. Its name indicates that it is a deoxy sugar, meaning that it is derived from the sugar ribose by loss of an oxygen atom. Since the pentose sugars

arabinose and ribose only differ by the stereochemistry at C2', 2-deoxyribose and 2-deoxyarabinose are equivalent, although the latter term is rarely used because ribose, not arabinose, is the precursor to deoxyribose." [Emphasis mine. <u>Source:</u> www.wikipedia.com]

In my view, given the fact that periodicities exist within the 92 natural elements, similar periodicities must exist within compounds of the elements. By employing a scientific notation for chemical formulas and molecular formulas that mixes up the elements in their *aufbau*, progressive presentation, then the underlying periodicities and patterns derived as of the elements are made unavailable.

Years ago, I made the proposal to present the chemical formulas and molecular formulas based on the 92 natural elements in a progressive sequence. From the previous data shown, the current presentation of molecular formulas does not reflect any particular logic for presenting the first element within the formula. The chemical formulas above are presented as of the lead element 6-Carbon. But, as shown in this study neither presentation of the chemical or molecular formulas according to traditional scientific notation provide any insight into the possible patterns and periodicities of the amino acids in this case.

In *The Schemata of the Elements, [Earth/matriX Editions, 2001]*, various sets of chemical and molecular formulas have been presented in order to derive the underlying patterns and periodicities inherent in elemental compounds. In this analysis, I have chosen the amino acids to illustrate how elemental patterns and periodicities make their appearance in the corresponding chemical formulas.

Again, the theoretical posit behind this procedure is basic: given the fact that the 92 natural elements reveal patterns and periodicities in their composition and behavior, compounds of these elements should also derive further patterns and periodicities. The following tables and charts confirm this idea.

From this study, it should be now evident that a *paradigmatic shift* is required in conceptualizing the scientific notation of chemical and molecular formulas of the elements.

Aminoacid	Chemical formula	Molecular weight,
Inclausing		121 1726
Isoleucine	$C_6H_{13}NO_2$	131.1736
Leucine	$C_6H_{13}NO_2$	131.1736
Lysine	$C_6H_{14}N_2O_2$	146.1882
Methionine	$C_5H_{11}NO_2S$	149.2124
Phenylalanine	$C_9H_{11}NO_2$	165.1900
Threonine	$C_4H_9NO_3$	119.1197
Tryptophan	$C_{11}H_{12}N_2O_2$	204.2262
Valine	$C_5H_{11}NO_2$	117.1469
Arginine	$C_6H_{14}N_4O_2$	174.2017
Histidine	$C_6H_9N_3O_2$	155.1552
Alanine	C ₃ H7NO ₂	89.0935
Asparagine	$C_4H_8N_2O_3$	132.1184
Aspartate	$C_4H_7NO_4$	133.1032
Cysteine	$C_3H_7NO_2S$	121.1590
Glutamate	$C_5H_9NO_4$	147.1299
Glutamine	$C_5H_{10}N_2O_3$	146.1451
Glycine	$C_2H_5NO_2$	75.0669
Proline	$C_5H_9NO_2$	115.1310
Serine	C ₃ H ₇ NO ₃	105.0930
Tyrosine	$C_9H_{11}NO_3$	181.1894

The Traditional Order of Presentation by Molecular Formula: 6-Carbon Lead Element

g/mol

<u>Source:</u> By using this website, you signify your acceptance of Terms and Conditions and Privacy Policy. Copyright 2013 webqc.org. All rights reserved. Chemistry tools.

Note that the three columns do not present any recognizable pattern of incremental | decremental order or an alphabetical order of the amino acids. The columns of chemical formula and molecular weight are both presented in a disorganized manner, with no discernible pattern of progression in numbers, or any discernible pattern whatsoever.

Aminoacid	Chemical formula	# Atoms	<u>Molecular weight, g/mol</u>
			Incremental Progression

Glycine	$C_2H_5NO_2$	10	75.0669	
Alanine Serine Cysteine	$\begin{array}{c} C_{3}H_{7}NO_{2}\\ C_{3}H_{7}NO_{3}\\ C_{3}H_{7}NO_{2}S\end{array}$	13 14 14	89.0935 105.0930 121.1590	No discernible
Aspartate Asparagine Threonine	$\begin{array}{c} C_4H_7NO_4\\ C_4H_8N_2O_3\\ C_4H_9NO_3\end{array}$	16 17 17	133.1032 132.1184 119.1197	for for molecular
Proline Glutamate Glutamine Valine Methionine	$\begin{array}{c} C_{5}H_{9}NO_{2}\\ C_{5}H_{9}NO_{4}\\ C_{5}H_{10}N_{2}O_{3}\\ C_{5}H_{11}NO_{2}\\ C_{5}H_{11}NO_{2}S\end{array}$	17 19 20 18 20	115.1310 147.1299 146.1451 117.1469 149.2124	weight. Note progression of
Histidine Isoleucine	$C_{6}H_{9}N_{3}O_{2}$ $C_{6}H_{13}NO_{2}$	20 22	155.1552 131.1736	carbon
Leucine Lysine Arginine	$\begin{array}{c} C_{6}H_{13}NO_{2} \\ C_{6}H_{13}NO_{2} \\ C_{6}H_{14}N_{2}O_{2} \\ \hline C_{6}H_{14}N_{4}O_{2} \end{array}$	22 22 24 26	131.1736 131.1736 146.1882 174.2017	
Phenylalanine Tyrosine Tryptophan	$\frac{c_{9}H_{11}NO_{2}}{c_{9}H_{11}NO_{3}}}{c_{11}H_{12}N_{2}O_{2}}$	23 24 27	165.1900 181.1894 204.2262	

Note when the list of amino acids is presented as of the 6-Carbon element as the lead atom in the chemical formula no discernible pattern appears regarding their molecular weight.

Molecular formula	Linear formula	Amino acid	Abbr	eviations
C ₂ H ₅ NO ₂	NH2-CH2-COOH	Glycine	Gly	G
$\begin{array}{c} \mathbf{C_3H_7NO_2}\\ \mathbf{C_3H_7NO_3}\\ \mathbf{C_3H_7NO_2S} \end{array}$	CH3-CH(NH2)-COOH	Alanine	Ala	A
	HO-CH2-CH(NH2)-COOH	Serine	Ser	S
	HS-CH2-CH(NH2)-COOH	Cysteine	Cys	C
$\begin{array}{c} \mathbf{C_4H_7NO_4}\\ \mathbf{C_4H_8N_2O_3}\\ \mathbf{C_4H_9NO_3} \end{array}$	HOOC-CH2-CH(NH2)-COOH	Aspartic acid	Asp	D
	H2N-CO-CH2-CH(NH2)-COOH	Asparagine	Asn	N
	CH3-CH(OH)-CH(NH2)-COOH	Threonine	Thr	T
$\begin{array}{c} {\bf C_5H_9NO_2} \\ {\bf C_5H_9NO_4} \\ {\bf C_5H_{10}N_2O_3} \\ {\bf C_5H_{11}NO_2} \\ {\bf C_5H_{11}NO_2S} \end{array}$	NH-(CH2)3-CH-COOH	Proline	Pro	P
	HOOC-(CH2)2-CH(NH2)-COOH	Glutamic acid	Glu	E
	H2N-CO-(CH2)2-CH(NH2)-COOH	Glutamine	Gln	Q
	(CH3)2-CH-CH(NH2)-COOH	Valine	Val	V
	CH3-S-(CH2)2-CH(NH2)-COOH	Methionine	Met	M
$\begin{array}{c} {\bf C_6H_9N_3O_2} \\ {\bf C_6H_{13}NO_2} \\ {\bf C_6H_{13}NO_2} \\ {\bf C_6H_{14}N_2O_2} \\ {\bf C_6H_{14}N_4O_2} \end{array}$	NH-CH=N-CH=C-CH2-CH(NH2)-COOH	Histidine	His	H
	CH3-CH2-CH(CH3)-CH(NH2)-COOH	Isoleucine	Ile	I
	(CH3)2-CH-CH2-CH(NH2)-COOH	Leucine	Leu	L
	H2N-(CH2)4-CH(NH2)-COOH	Lysine	Lys	K
	HN=C(NH2)-NH-(CH2)3-CH(NH2)-COOH	Arginine	Arg	R
$C_{9}H_{11}NO_{2}$ $C_{9}H_{11}NO_{3}$ $C_{11}H_{12}N_{2}O_{2}$	Ph-CH2-CH(NH2)-COOH	Phenylalanine	Phe	F
	HO-Ph-CH2-CH(NH2)-COOH	Tyrosine	Tyr	Y
	Ph-NH-CH=C-CH2-CH(NH2)-COOH	Tryptophan	Trp	W

<u>1-Hydrogen Lead Element</u> <u>Molecular formula Linear formula</u>

Molecular formula		Amino acid	Abbre	eviations
$H_5C_2NO_2$	NH2-CH2-COOH	Glycine	Gly	G
$H_7C_3NO_2$	CH3-CH(NH2)-COOH	Alanine	Ala	А
$H_7C_3NO_3$	HO-CH2-CH(NH2)-COOH	Serine	Ser	S
$H_7C_3NO_2S$	HS-CH2-CH(NH2)-COOH	Cysteine	Cys	С
$H_7C_4NO_4$	HOOC-CH2-CH(NH2)-COOH	Aspartic acid	Asp	D
$H_8C_4N_2O_3$	H2N-CO-CH2-CH(NH2)-COOH	Asparagine	Asn	Ν
$H_9C_4NO_3$	CH3-CH(OH)-CH(NH2)-COOH	Threonine	Thr	Т
$H_9C_5NO_2$	NH-(CH2)3-CH-COOH	Proline	Pro	Р
$H_9C_5NO_4$	HOOC-(CH2)2-CH(NH2)-COOH	Glutamic acid	Glu	E
$H_9C_6N_3O_2$	NH-CH=N-CH=C-CH2-CH(NH2)-COOH	Histidine	His	Н
$\mathbf{H_{10}}\mathbf{C_5}\mathbf{N_2}\mathbf{O_3}$	H2N-CO-(CH2)2-CH(NH2)-COOH	Glutamine	Gln	Q
$H_{11}C_5NO_2$	(CH3)2-CH-CH(NH2)-COOH	Valine	Val	V
$H_{11}C_5NO_2S$	CH3-S-(CH2)2-CH(NH2)-COOH	Methionine	Met	Μ
$H_{11}C_9NO_2$	Ph-CH2-CH(NH2)-COOH	Phenylalanine	Phe	F
$H_{11}C_9NO_3$	HO-Ph-CH2-CH(NH2)-COOH	Tyrosine	Tyr	Y
$H_{12}C_{11}N_2O_2$	Ph-NH-CH=C-CH2-CH(NH2)-COOH	Tryptophan	Trp	W
$H_{13}C_6NO_2$	(CH3)2-CH-CH2-CH(NH2)-COOH	Leucine	Leu	L
$H_{13}C_6NO_2$	CH3-CH2-CH(CH3)-CH(NH2)-COOH	Isoleucine	Ile	Ι
$H_{14}C_6N_2O_2$	H2N-(CH2)4-CH(NH2)-COOH	Lysine	Lys	K
$H_{14}C_6N_4O_2$	HN=C(NH2)-NH-(CH2)3-CH(NH2)-COOH	Arginine	Arg	R

Aminoacid	Chemical formula	Molecular weig	ht a/mol	
Ammodeld	By 1-H Lead Atom	Wolceular weig	int, g/mor	Note
	Dy 1-11 Leau Atom			incremental
Glycine Alanine Serine Cysteine Aspartate Asparagine Threonine	$H_{5}C_{2}NO_{2} \\H_{7}C_{3}NO_{2} \\H_{7}C_{3}NO_{3} \\H_{7}C_{3}NO_{2}S \\H_{7}C_{4}NO_{4} \\H_{8}C_{4}N_{2}O_{3} \\H_{9}C_{4}NO_{3}$	75.0669 89.0935 105.0930 121.1590 133.1032 132.1184 119.1197		ncremental progression of 1-Hydrogen atoms. Note
Proline	$H_9C_5NO_2$	115.1310		no apparent
Glutamate	$H_9C_5NO_4$	147.1299		pattern in
Histidine	<u>H9C6N3O2</u>	155.1552 N	Aidpoint	molecular
Glutamine	$\mathbf{H}_{10}\mathbf{C}_5\mathbf{N}_2\mathbf{O}_3$	146.1451		
Valine	$H_{11}C_5NO_2$	117.1469		weight
Methionine	$H_{11}C_5NO_2S$	149.2124		values.
Phenylalanine	$H_{11}C_9NO_2$	165.1900	l	
Tyrosine	$H_{11}C_9NO_3$	181.1894		
Tryptophan	$H_{12}C_{11}N_2O_2$	204.2262		
Leucine	$H_{13}C_6NO_2$	131.1736		
Isoleucine	$H_{13}C_6NO_2$	131.1736		
Lysine	$H_{14}C_6N_2O_2$	146.1882		
Arginine	$H_{14}C_6N_4O_2$	174.2017		

Earth/matriX Order by 1-Hydrogen Lead Element Atomic Progression

Place aside for the moment considerations regarding the chemical structure generally cited for the amino acids in relation to their Carbon atoms. In this manner, the amino acids are listed here as of their elemental structure of the atomic numbers of the elements in a sequential order: **1-Hydrogen**, **6**-Carbon, **7**-Nitrogen, and **8**-Oxygen. I proposed following this procedure about twelve years ago when I presented *The Schemata of the Elements* [www.earthmatrix.com]. The traditional order of chemical formulas based on **6-C**, **1-H**, **7-N**, **8-O** males little sense regarding the search for progressive elemental patterns.

Earth/matriX Order by 1-Hydrogen Lead Element Atomic Progression

	By 1-H Lead	<u>Atom</u>	
Glycine	H ₅ C ₂ NO ₂	75.0669	
Alanine	$H_7C_3NO_2$	<u>89.</u> 0935	Note internal numerical progressions
Serine	$H_7C_3NO_3$	<u>105</u> .0930	
Cysteine	$H_7C_3NO_2S$	<u>121</u> .1590	
Aspartate	$H_7C_4NO_4$	<u>133.</u> 1032	A discernible
Asparagine	$H_8C_4N_2O_3$	132.1184	
Threonine	$H_9C_4NO_3$	119.1197	pattern.
Proline	$H_9C_5NO_2$	<u>115</u> .1310	
Glutamate	$H_9C_5NO_4$	<u>147.</u> 1299	
Histidine	$H_9C_6N_3O_2$	▼ 155. 1552	Midpoint
Glutamine	$H_{10}C_5N_2O_3$	146.1451	-
Valine	$H_{11}C_5NO_2$	<u>117</u> .1469	
Methionine	$H_{11}C_5NO_2S$	<u>149</u> .2124	
Phenylalanin	$H_{11}C_9NO_2$	<u>165.</u> 1900	
Tyrosine	$H_{11}C_9NO_3$	<u>181.</u> 1894	
Tryptophan	$\underline{\mathbf{H}_{12}\mathbf{C}_{11}\mathbf{N}_{2}\mathbf{O}_{2}}$	204.2262	7
Leucine	$H_{13}C_6NO_2$	<u>131.</u> 1736	
Isoleucine	$H_{13}C_6NO_2$	<u>131</u> .1736	
Lysine	$\underline{H_{14}C_6N_2O_2}$	146.1882	
Arginine	$\underline{H_{14}C_6N_4O_2}$	★ 174.2017	

Molecular weight, g/mol

Chemical formula

Aminoacid

The alphabetical names of the cited amino acids present no discernible structure. However, now the columns relating to the elemental structure and molecular weight reveal a direct relationship in progressive sequential patterns and tendencies.

Earth/matriX Order by 1-Hydrogen Lead Element Atomic Progression Capable of Hydrogen Bond Formation

Aminoacid	<u>Chemical formula</u> <u>By 1-H Lead Atom</u>	Molecular we	eight, g/mol
Glycine Alanine Serine Cysteine Aspartate	$H_5C_2NO_2$ $H_7C_3NO_2$ $H_7C_3NO_3$ $H_7C_3NO_2S$ $H_7C_4NO_4$	75.0669 89.0935 105.0930 121.1590 133.1032	
Asparagine Threonine Proline Glutamate	H ₈ C ₄ N ₂ O ₃ H ₉ C ₄ NO ₃ H ₉ C ₅ NO ₂ H ₉ C ₅ NO ₄	132.1184 119.1197 115.1310 147.1299	Of the 20 common amino acids, those with side groups capable of hydrogen bond formation are: arginine, histidine, lysine, serine, threonine, asparagine, glutamine, tryptophan and tyrosine.
Histidine Glutamine Valine Methionine Phenylalanine Tyrosine	$H_{9}C_{6}N_{3}O_{2}$ $H_{10}C_{5}N_{2}O_{3}$ $H_{11}C_{5}NO_{2}$ $H_{11}C_{5}NO_{2}S$ $H_{11}C_{9}NO_{2}$ $H_{11}C_{9}NO_{3}$	155.1552 146.1451 117.1469 149.2124 165.1900 181.1894	<u>Source:</u> http://wiki.answers.com/Q/Which_amino_acid_side_chains_are_capable_ of forming hvdrogen bonds
Tryptophan Leucine Isoleucine Lysine Arginine		204.2262 ↓ 131.1736 131.1736 146.1882 174.2017 ↓	

The alphabetical names of the cited amino acids present no discernible structure. However, now the columns relating to the elemental structure and molecular weight reveal a direct relationship in progressive sequential patterns and tendencies.

Aminoacid	<u>Chemical formula</u> <u>By 1-H Lead Atom</u>	Molecular	weight, g/mol
Glycine	$H_5C_2NO_2$	75.0669	Notice tendency to incremental progression
Alanine	$H_7C_3NO_2$	<u>89.</u> 0935	
Serine	$H_7C_3NO_3$	<u>105</u> .0930	
Cysteine	$H_7C_3NO_2S$	<u>121</u> .1590	Note
Aspartate	$H_7C_4NO_4$	<u>133.</u> 1032	discernible
Asparagine	$\underline{\mathbf{H}_{8}\mathbf{C}_{4}\mathbf{N}_{2}\mathbf{O}_{3}}$	<u>132.1184</u>	pattern.
Threonine	$H_9C_4NO_3$	119.1197	
Proline	$H_9C_5NO_2$	<u>115</u> .1310	
Glutamate	$H_9C_5NO_4$	<u>147.</u> 1299	
Histidine	$H_9C_6N_3O_2$	155. 1552	Midpoint
<u>Glutamine</u>	$\underline{\mathbf{H}_{10}\mathbf{C}_{5}\mathbf{N}_{2}\mathbf{O}_{3}}$	<u>146.1451</u>	
Valine	$H_{11}C_5NO_2$	<u>117</u> .1469	
Methionine	$H_{11}C_5NO_2S$	<u>149</u> .2124	Of the 20 common amino acids, those with side groups capable of
Phenylalanine	$H_{11}C_9NO_2$	<u>165.</u> 1900	hydrogen bond formation are:
Tyrosine	$H_{11}C_9NO_3$	<u>181.</u> 1894	arginine, histidine, lysine, serine, threonine, asparagine, glutamine,
<u>Tryptophan</u>	$\underline{\mathbf{H}_{12}\mathbf{C}_{11}\mathbf{N}_{2}\mathbf{O}_{2}}$	204.2262	tryptophan and tyrosine.
Leucine	$H_{13}C_6NO_2$	<u>131.</u> 1736	C. C
Isoleucine	$H_{13}C_6NO_2$	<u>131</u> .1736	<u>Source:</u>
Lysine	$\underline{\mathbf{H}_{14}\mathbf{C}_{6}\mathbf{N}_{2}\mathbf{O}_{2}}$	<u>146.1882</u>	http://wiki.answers.com/Q/Which_amino_acid_side_chains_are_capable_
Arginine	$\underline{\mathbf{H}_{14}\mathbf{C}_{6}\mathbf{N}_{4}\mathbf{O}_{2}}$	<u>174.2017</u>	of forming hydrogen bonds

Note tendency of alternate pattern in relation to even|odd numbers of 1-H series as lead element $[H_5, H_7, H_9, H_{11}, H_{13}]$ and, $H_8, H_{10}, H_{12}, H_{14}]$. There are two sub-sets of progressive patterns as noted on the previous tables.

Earth/matriX Order by 1-Hydrogen Lead Element Atomic Progression With Atomic Numbers Instead of Accidental Historical Names of the Elements

Aminoacid	<u>Chemical formula</u> <u>By</u> 1-H Lead Atom	Molecular weight, §	g/mol
Glycine	1 <u>5627 82</u>	75.0669	
Alanine	1 ₇ 6 ₃ 7 8 ₂	<u>89.</u> 0935	Notice internal incremental progressions.
Serine	1 ₇ 6 ₃ 7 8 ₃	<u>105</u> .0930	
Cysteine	1 ₇ 6 ₃ 7 8 ₂ S	<u>121</u> .1590	
Aspartate	1 ₇ 6 ₄ 7 8 ₄	<u>133.</u> 1032	
Asparagine	$1_86_47_28_3$	132.1184	
Threonine	1 ₉ 6 ₄ 7 8 ₃	119.1197	
Proline	1 ₉ 6 ₅ 7 8 ₂	<u>115</u> .1310	
Glutamate	1 ₉ 6 ₅ 7 8 ₄	<u>147.</u> 1299	
Histidine	1 ₉ 6 ₆ 7 ₃ 8 ₂	▼ 155. 1552	Midpoint
Glutamine	$1_{10}6_57_28_3$	<u>146.1451</u>	
Valine	1 ₁₁ 6 ₅ 7 8 ₂	<u>117</u> .1469	
Methionine	1 ₁₁ 6 ₅ 7 8 ₂ 16	<u>149</u> .2124	
Phenylalanine	$\mathbf{1_{11}6_97} \ \mathbf{8_2}$	<u>165.</u> 1900	
Tyrosine	1 ₁₁ 6 ₉ 7 8 ₃		
Tryptophan	$1_{12}6_{11}7_28_2$	204.2262	
Leucine	$1_{13}6_678_2$	<u>131.</u> 1736	
Isoleucine	$1_{13}6_67 8_2$	<u>131</u> .1736	
Lysine	$1_{\underline{14}}6_{\underline{6}}7_{\underline{2}}8_{\underline{2}}$	146.1882	
Arginine	1 <u>14</u> 6 <u>6</u> 7 <u>4</u> 8 <u>2</u>	▼ 174.2017	

Numerous additional observations are in order regarding the proposed structuring of the chemical formulas and the relationships to the molecular weights of the amino acids. For now, comments are limited to the patterns cited here. Much more is to follow.

Earth/matriX Order by 1-Hydrogen Lead Element Atomic Progression

Aminoacid	<u>Chemical formula</u> <u>By 1-H Lead Atom</u>	Molecular weight, g/mol
Glycine	H ₅ C ₂ NO ₂	75.0669
Alanine	$H_7C_3NO_2$	<u>89.</u> 0935
Serine	$H_7C_3NO_3$	<u>105</u> .0930
Cysteine	$H_7C_3NO_2S$	<u>121</u> .1590
Aspartate	$H_7C_4NO_4$. <u>133.</u> 1032
Asparagine	$H_8C_4N_2O_3$	132.1184
Threonine	$H_9C_4NO_3$	119.1197
Proline	$H_9C_5NO_2$	<u>115</u> .1310
Glutamate	$H_9C_5NO_4$	<u>147.</u> 1299
Histidine	$H_9C_6N_3O_2$	<u>155.</u> 1552
Glutamine	$H_{10}C_5N_2O_3$	146.1451
Valine	$H_{11}C_5NO_2$	<u>117</u> .1469
Methionine	$H_{11}C_5NO_2S$	<u>149</u> .2124
Phenylalanine	$H_{11}C_9NO_2$	<u>165.</u> 1900
Tyrosine	$\mathbf{H}_{11}\mathbf{C}_9\mathbf{NO}_3$. <u>181.</u> 1894
Tryptophan		204.2262
Leucine	$H_{13}C_6NO_2$	<u>131.</u> 1736
Isoleucine	$H_{13}C_6NO_2$	<u>131</u> .1736
Lysine	$\underline{\mathbf{H}_{\underline{14}}}\underline{\mathbf{C}_{\underline{6}}}\underline{\mathbf{N}_{\underline{2}}}\underline{\mathbf{O}_{\underline{2}}}$	146.1882
Arginine	$\underline{\mathbf{H}_{\underline{14}}\mathbf{C}_{\underline{6}}\mathbf{N}_{\underline{4}}\mathbf{O}_{\underline{2}}}$	174.2017

A discernible pattern.	

The alphabetical names of the cited amino acids present no discernible structure. However, now the columns relating to the elemental structure and molecular weight reveal a direct relationship in progressive sequential patterns and tendencies. The existence of elemental patterns and periodicities is hereby confirmed.

Earth/matriX: SCIENCE TODAY

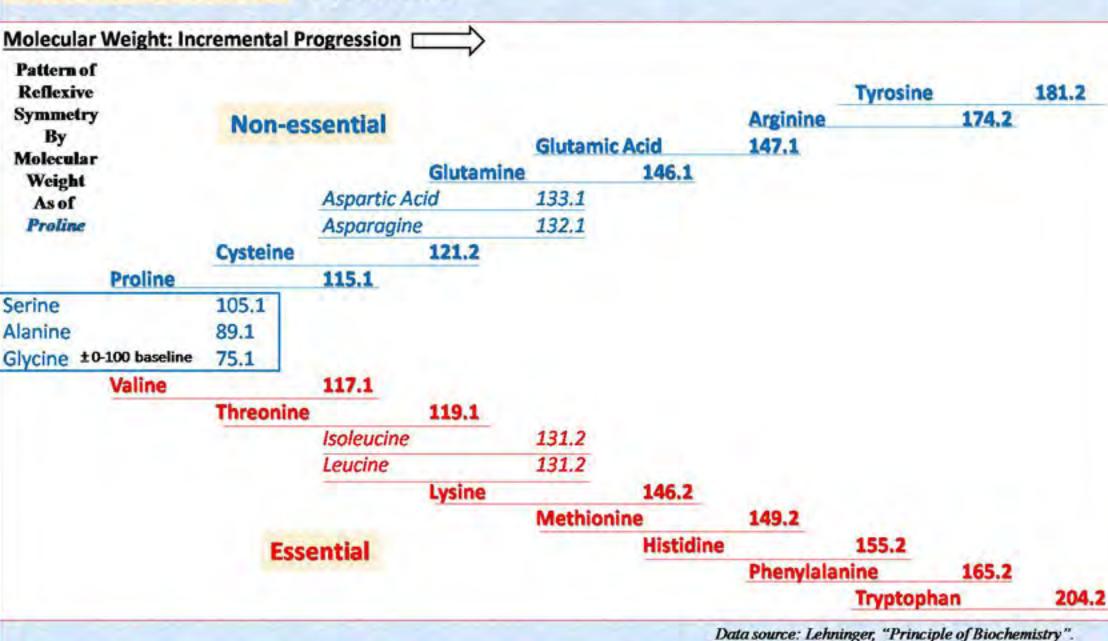
Towards a New Paradigm in Scientific Notation **Patterns of Periodicity among Proteinogenic Amino Acids** [Abridged Version]

By Charles William Johnson

Earth/matriX Editions P.O. Box 231126 New Orleans, Louisiana 70183-1126, USA

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Essential | Non-essential Amino Acids



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Essentia	Non-e	essentia	Amino A	cids		19-	Lysine to	6-Aspara	gine L	417N
Molecular	Weight: In	crement	al Progression				Essent	ial to Non	essentia	al
Pattern of Reflexive Symmetry By Molecular		Non	-essential		Glutamic	and the second second	Arginine 147.1	Tyrosine	174.2	181.2
Weight				Glutamine		146.1				
As of Proline			Aspartic A		133.1		Trans and	6.9-3-1 C		1 7 12 12
Froune		Cystei	Asparagin	121.2	792.7		19-Lysine to	6-Asparagine		L417N
	Proline	cysten	115.1	464.6			7-Threenine	ter 119-Lysline		TERM
Serine Alanine Glycine	Clauna	105.1 89.1 75.1	±0-100 baseline				12.22	is 20-Arglinihus skil ite 1-Gilys	liner	LASSAR DANARG
c. / c c.	Valine		117.1				84Prediline to 3	201. /Specificalization		POINTR
		Three	nine Isoleucine	119.1	131.2		1.1	velel (es 6-Auspa	regliwa	DOSTIN
			Leucine	r 	131.2					
				Lysine		146.2	10.00			
					Methioni	ne	149.2			
		1.0	Essential			Histidi		155.2	Sec. 1	
							Phenyla		165.2	
								Tryptop	han	204.2

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Essentia	Non-e	essentia	Amino A	cids		7-Threonine to 19-Lysine T478K						
Molecular	Weight: In	crementa	al Progression	\Rightarrow			Essentia	al to Esse	ntial			
Pattern of Reflexive Symmetry By Molecular Weight		Non	-essential	Glutamine	Glutamic A	cid 146.1	Arginine 147.1	Tyrosine	174.2	181.2		
Asof			Aspartic Ad	cid	133.1							
Proline			Asparagine	2	132.1	19-Lysline	e lie 6-Aupaneg	linte	11.451718			
		Cysteir	ne	121.2		-			-			
	Proline		115.1			7-Threo	nine to 19-Ly	sine	T478K			
Serine		105.1				194Leurd	linia (izo 200-Augilia	lime	LASZIR			
Alanine		89.1	±0-100 baseline			the Management	lic Acid to 1-6	Muorovikanovi	06146			
Glycine	Malter	75.1				arsisathsana	nes neosansi nosi deelo	will countra	67401-0-24234			
	Valine	These	117.1	110.1		8-Presiline	a lice 200-Aurgibuliu	B	POBIN			
		Threon	Isoleucine	119.1	131.2	S-Acapterie	un and the sa	aparaglina	10000000H			
			Leucine	-	131.2					-		
			Contraction of	Lysine		146.2						
					Methionin		149.2					
			Issential			Histidine		155.2				
							Phenylalar	ine	165.2			
								Tryptopha	in	204		

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APA

Essentia	Non-e	ssentia	Amino A	cids		19-Le	ucine to 20-Argin	nine L452	R
Molecular	Weight: In	crementa	al Progression [\Rightarrow			Essential to Non-	essential	
Pattern of Reflexive Symmetry By		Non	-essential		Glutamic A	cid	Arginine 147.1	181 174.2	1.2
Molecular Weight				Glutamine		146.1			
Asof			Aspartic A	cid	133.1				
Proline			Asparagina	2	132.1	18-Lysins	i fici & Asparagline	此名前加肉	
		Cystei		121.2		W WILLIAM	Interio Pero 4700 Il scondinico	141471000002	
	Proline		115.1			Terra a luncación	line to 194Lysline	LENGK.	
Serine		105.1	Lo content			19-Leuci	ne to 20-Arginine	L452R	
Alanine		89.1	±0-100 baseline			S.A.monthili	c Authol den V-Gillyndiana	DEPOS	
Glycine	Valine	75.1							
	valine	Threor	117.1	119.1		19-17 Wolfing	is 29-Anghalas	19689412	
		Threor	Isoleucine	119.1	131.2	5-Aspand	le Andid its 6-Asparagilme	DISSION	
			Leucine		131.2				
				Lysine		146.2			
					Methionin	8	149.2		
			Essential			Histidine	155.2		
							Phenylalanine	165.2	
							Tryptoph	an 2	204

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Essentia	Non-e	ssentia	Amino A	Acids		5-Aspan	tic Acid	to 1-Gly	cine De	614G
Molecular	Weight: In	crement	al Progression			1	Non-Esse	ential to No	n-essent	ial
Pattern of Reflexive Symmetry By Molecular Weight As of		Non	-essential	Glutamin	Glutamic/	Acid 146.1	Arginine 147.1	Tyrosine	174.2	81.2
Proline			Asparagi		132.1	199-4 wester	e in 6-Aspan	activa	LEOM	1
	-	Cystei		121.2			nime to 1944	-	TENEX	
	Proline		115.1			11-11111068	anning inde a constraint.	Assesses	0.001320-0	
Serine		105.1				1814Lound	ilmia ilas 269-Aug	glimines	世纪国家	
Alanine Glycine		89.1 75.1	±0-100 baseline			5-Aspa	rtic Acid to	1-Glycine	D614G	
aryene	Valine	1314	117.1				e is 29-Augilu		POBIR	
		Threor	nine	119.1					a cours	
			Isoleucine	2	131.2	S-Aspan	dike Akciki ka 6	6-Aspanaghue	口线预制	
			Leucine	A	131.2					
				Lysine		146.2				
					Methionin	ne	149.2			
		Essential				Histidine	1	155.2		
							Phenyla		165.2	
								Tryptoph	an	204.2

Data source: Lehninger, "Principle of Biochemistry".

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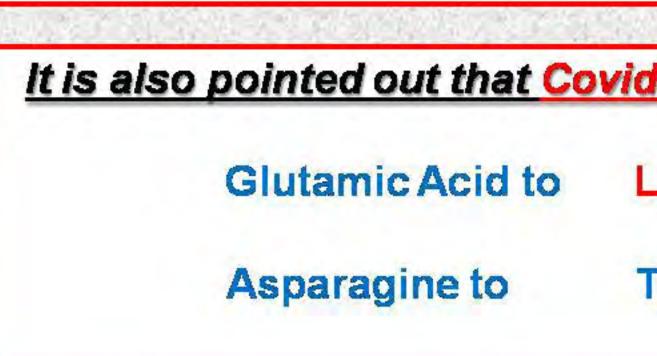


Gly 7	Ala 10	Cys 11	Ser 11	AspA 13	Aspg 14	Thre 14	Prol 14	GltmA 16	Valn 16	Hstd 17	Gltm 17	Mthn 17	Islc 19	Lcn 19	Phnl 20	Tyrs 21	Lys 21	Argn 23	Trpt 24	7 Gly 10 Ala
		enti 5 r	19- 7-T 19- 5-A 8-P 5-A	Lysine hreon Leucir sparti roline spard nino a essen	e to ine to ne to c Acid to ic Acid ic Acid ic Acid ic acid	to d to and 3 nino	6-As 19-Ly 20-An 1-Gly 20-An 6-As non-e	ginine	ne ne tial ar esse	nino	acids amin	subs	417 478 452 0614 2681 0950 stitut	K R G R N te to		Pro	ton	Numt	bers	11 Cys 11 Ser 13 Asp 14 Asp 14 Three 14 Three 14 Prol 16 Gitm/ 16 Valn 17 Hsto 17 Gitm 19 Isic 19 Lcn 20 Phn 21 Lys 22 Association
			9-	Glutar	nic Ad	cid to	19-L)	sine			E484	IK			1					23 Arg 24 Trp
			6-	Aspar	agine	to 15	5-Tyro	sine			N50*	Y			Es			Non-		ential

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Selected Amino Acid Replacements in Covid-19 Delta Variant:

Lysine to Threonine to Leucine to Aspartic Acid to Proline to Aspardic Acid to Asparagine Lysine Arginine Glycine Arginine Asparagine



One could propose color-coding the particular mutations according to essential | non-essential amino acids as shown.

L417N T478K L452R D614G P681R D950N

It is also pointed out that Covid-19 Delta does NOT have mutations

Lysine

E484K

Tyrosine

N501Y

Essential | Non-Essential Amino Acids

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Amino Acid	Chemical For	nula Molecular	Numerical Value	Genetic
1		Weight	of Monomer	Code Letters
Glycine	H.C.NO.	75,0669	441-444	GGU-GGG
Alanine	H,C3NO2	89.0935	421-424	
Serine	H,C,NO	105.0930	121-124, 341-34	2
Cysteine	H,C,NO,S	121.1590	141-142	
Aspartate	H,CANOA	133.1032	431-432	
Asparagine	HaCAN,O	132.1184	331-332	AAU-AAC
Threonine	H ₀ C ₄ NO ₃	, 119, 1197	321-324	
Proline	H.C.NO.	115.1310	221-224	
Glutamate	H ₉ C ₅ NO ₄	147.1299	433-434	
Histidine	HaCsNaO2	155.1552	231-232	
Glutamine	HINC.N.O.	146.1451	233-234	CAA-CAG
Valine	HIICSNO2	117.1469	411-414	
Methionine	HILC NOS	149.2124	314	
Phenylalanine	HIICONO2	165.1900	111-112	
Tyrosine	H ₁₁ C ₉ NO ₃	181.1894	131-132	
Tryptophan	H.,C. N.O.	204.2262 *	144	UGG
Leucine	H13C8NO2	131.1736	113-214	1.4
Isoleucine	HI3CENO2	131.1736	311-313	
Lysine	H14C8N202	146.1882	333-334	
Arginine	HIACON402	174.2017	241-244	Opposing Pattern o

Earth/matriX Classification O.

Amino Acids

Tables from 2013 Essay

I-Hydrogen is the lead element in the molecular formulae of the amino acids. Two main incremental progressions of molecular weight appear indicated by the red and blue highlights/arrows.

A proposal.

mino Acid	Chemical Form	nula Molecular	Numerical Valu	e Genetic
		Weight	of Monomer	Code Letters
lycine	H ₂ C ₂ NO ₂	75.0669	441-444	GEU-GEG
sparagine	H ₂ C ₄ N ₂ O ₃	132.1184	331-332	AAU-AAC
lutamine	H ₁₀ C ₅ N ₂ O ₃	146.1451	233-234	CAA-CAG
yptophan	H12C11N2O2	204.2262	144	UGG

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On this list, numbers were assigned to the genetic code letters

The arrows emphasize the incremental progression of Molecular weight.

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Edited 23 August 2019

The Earth/matriX Classification of the Non-essential Amino Acids

_	_		-		1,5	62	7,	82	_		0	siyci	ine [C	H.	NO2		_		
1-H 3 5	241e 6	34U 10	48e 13	5-8 16	6-C 18 2	7-N 21 1	8-0 24 2	9.F 28	10-He 30	11.Ha 34	12.Mg 36	13-AI 40	14-Si 42	15.P 46	16-S 48	17-CI 52	18-Ar 58	194K 58	29-C 60
				1	, 6,	7,	8,				Ala	une j	C,H	NO	J	-	0		
1-H					6-C	7-N													
3 7	2-He 6	343 10	48e 13	5-B 16	18 3	21	24	9F 28	10-Mc 30	11-Na 34	12-149	13-AJ 40	14-51 42	15-P 46	15-3 48	17-CI 52	18-Ar 58	19-K 58	20-C 60
		_		1,	63	7,	8,	16	i,		Cysta	dine	C ₃ H	NO	s]				
1.11					6-C	7-N	8-0								16-S			1	
37	2-He 6	341 10	4-Be 13	58 16	18	21	24	94F 28	10-Ne 30	11-Na 34	12. M g 36	13-AI 40	14-51 42	15-P 46	48 1	17-CI 52	18-Ar 58	19-K 58	20-Ca 60
			1,	6 ₃	7,	8,					-	S	erin	e [C3	H,NC	D-]			
1-11	2-He	341	480	5-8	6-C	7-N		9.F	10-Ne	11-Na	12-10	13-41	14.51	15.P	16-5	17-CI	18-Ar	19-K	20-0
3 7	6	10	13	16	18	21	24 3	28	30	34	36	40	42	46	*	52	58	58	60
E	_	_		1	, 6	, 7	. 8		1	ispa	rtic e	cid [C,H,	NO.	1	-			
1-H	2.He	341	4Be	5-B	6-C	7-N	8-0	SF	10-Nc	11-Na	12-840	13-41	14.51	15-P	16.5	17-CI	18-Ar	19-K	25-0
37	6	10	13	16	18	21	24 4	28	30	34	36	40	42	46	*	52	58	58	60
				-	-	-	_	-	-					-	_				-
					1, (54	72	83	4	Lspe	rogi	ne [(Hal	V203	1				
1-H	244				6-C	7-N	8-0								1		-	1	-
1-H 3 8	2-He 6	341 10	4Be 13	5-B 16	-			83 54F 28	10-No 30	11-Na 34	12-10g 36	næ ((13-A) 40	14-94 42	15.P 46	15-3 49	17-CI 52	18-Ar 58	19-K 58	1.00
3	1 C C C C C C C C C C C C C C C C C C C	10		5-B 16	6-C 18	7-N 21 2	8-0 24	9-F	10-No	11-Na	12-Mg	13-AJ 40	14-5i 42	15-P 46	15-5	52			1000
3 8 1-H	6	10 1.,	13 6 ₅	5-8 16 7	6-C 18 4 6-C	7-N 21 2 7-N	8-0 24 3 8-0	9-F 28	10-No 30	11.Ha 34	12-Mg 36	13-AJ 40 P210	14-54 42 (((ne)	15-P 46 [C ₃ H	15-3 49 9NO;	52 2	58	58	60
38	1 C C C C C C C C C C C C C C C C C C C	10	13	5-B 16	6-C 18 4	7-N 21 2	8-0 24 3	9-F	10-No	11-Na	12-Mg	13-AJ 40	14-5i 42	15-P 46	15-3 49	52	58		25-0
3 8 1-H 3	6 2.He	10 1.9 341 10	13 6 ₅ 48e 13	5-8 16 7 5-8 16	6-C 18 4 6-C 18	7-N 21 2 7-N	8-0 24 3 8-0 24	9-F 28 9-F	10-Ho 30	11.Na 34	1249 36 1249 36	13.Al 40 P200 13.Al 40	1431 42 (inc. 1431 42	15P 46 [C,H 15P 46	15-5 49 gNO; 16-5	52 17-ci 52	58 18-Ar 58	58 19-K	60
3 8 1-H 3 9	6 241e 6	10 1., 341 10	13 6 ₅ 48e 13	5-B 16 7 5-B 16	6-C 18 4 6-C 18 5 8 6-C	7-N 21 2 7-N 21 1	8-0 24 3 8-0 24 2 2 8-0	9-F 28 9-F 28	10-Mc 30 10-Mc 30	11.85 34 11.85 34	1248g 36 1248g 36	13.AJ 40 P210 13.AJ 40	14-51 42 14-51 42 14-51 42	15.P 46 [C.,H 15.P 45 pcid	15-8 40 9 <mark>NO</mark> 16-8 49	52 17-ci 52	58 18-Ar 58	58 19-K 58	20-4 60
3 8 1-H 3 9	6 2.He 6	10 1.9 341 10	13 6 ₅ 48e 13	5-8 16 7 5-8 16	6-C 18 4 6-C 18 5	7-N 21 2 7-N	8-0 24 3 8-0 24 2	9-F 28 9-F	10-Ho 30	11.Na 34	1249 36 1249 36	13.Al 40 P200 13.Al 40	1431 42 (inc. 1431 42	15P 46 [C,H 15P 46	16-5 49 9NO; 16-5 49	52 17-ci 52	58 18-Ar 58	58 19-K	20-4 60 20-4
3 8 1-H 3 9 1-H 3 9	6 24ie 6 1 24ie	10 1.9 341 10 5 6 341	13 6 ₅ 48e 13 5 48e	5-8 16 7 5-8 16 1 5-8	6-C 18 4 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C	7-N 21 2 7-N 21 1	8-0 24 3 8-0 24 2 8-0 24 2 8-0 24 4 8-0 24 8-0 8-0 8-0 24 8-0 24 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0	94F 28 94F 28 94F 28	10-Mc 30 10-Mc 30	11.Na 34 11.Na 34	12-89 36 12-89 36 12-89	13 Al 40 13 Al 40 13 Al 13 Al 40	14-51 42 14-51 42 14-51 42 14-51 42	15-P 46 15-P 45 15-P 45	16-5 49 9NO; 16-5 49	52 17-Cl 52 NO, 17-Cl 52	58 18-Ar 58 18-Ar	58 19-K 19-K	20-4 60 20-4
3 8 1-H 3 9 1-H 3 9	6 2.41e 6 2.41e 6	10 1.0 3.0 10 3.0 5 6 3.0 10	13 6 ₅ 48e 13 5 48e	5-8 16 7 5-8 16 1 5-8 16 1 111	6-C 18 4 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 6-C 18 6-C 18 6-C 18 18 18 18 18 18 18 18 18 18 18 18 18	7-N 21 2 7-N 21 1 7-N 21 1 7-N 21 1 7-N 21 1 7-N 7_1 7-N 7_1	8-0 24 3 8-0 24 2 8-0 24 4 8-0 24 8-0	9.F 28 9.F 28 9.F 28	10-He 30 10-He 30	11-Ma 34 11-Ma 34 11-Ma 34	12489 36 12489 36 12489 36	13 Al 40 13 Al 40 13 Al 13 Al 40	14-54 42 14-54 42 14-54 42 14-54 42 14-54 42	15-P 46 15-P 45 15-P 45	165 6 165 6 165 6 165 6 165 165	52 17-ci 52 17-ci 52 17-ci 52	58 18Ar 58 18Ar 58	58 19-K 58 19-K 58	20-C 60 20-C 60
3 8 1-H 3 9 1-H 3 9	6 24ie 6 1 24ie	10 1.9 341 10 5 6 341	13 48c 13 48c 13	5-8 16 7 5-8 16 1 5-8 16	6-C 18 4 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C	7-N 21 2 7-N 21 1 7-N 21 1 7-N 21 1 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7-N 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	8-0 24 3 8-0 24 2 8-0 24 2 8-0 24 4 8-0 24 8-0 8-0 8-0 24 8-0 24 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0 8-0	94F 28 94F 28 94F 28	10-Mc 30 10-Mc 30	11.Na 34 11.Na 34	12-89 36 12-89 36 12-89	13.AJ 40 P270 13.AJ 40 13.AJ 40 13.AJ 40	14-51 42 14-51 42 14-51 42 14-51 42	15P 46 15P 45 15P 45 15P 45	165 a a b b c c c c c c c c	52 17-Cl 52 NO, 17-Cl 52	58 18Ar 58 18Ar 58	58 19-K 19-K	20-C 60 20-C 60
3 8 1-H 3 9 1-H 3 9	6 24e 6 24e 6 24e 6	10 1., 3.1, 10 3.1, 10 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 3.	13 48e 13 48e 13 48e 13 48e 13	5-8 16 7 5-8 16 1 1 1 1 5-8 16 5-8 16	6-C 18 4 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18	7-N 21 2 7-N 21 1 7-N 21 1 7-N 21 1 7-N 21 1 7-N 7_1 7-N 7_1	8-0 24 3 8-0 24 2 8-0 24 4 8-0 24 8-0 24	9+F 28 9+F 28 9+F 28 9+F	16.He 30 16.He 30	11-Ha 34 11-Ha 34 11-Ha 34	12489 36 12489 36 12489 36 12489 36	13.AJ 40 P200 13.AJ 40 13.AJ 40 Tyrr 13.AJ	14-54 42 14-54 42 14-54 42 14-54 42 14-54 42	15P 46 15P 45 15P 45 15P 46 15P 46	165 6 165 6 165 6 165 48	52 17-ci 52 17-ci	58 18Ar 58 18Ar 18Ar	58 194 58 194 58	50 20-0 60 20-0 60
3 8 1-H 3 9 1-H 3 9	6 24te 6 24te 6 24te 6	10 1., 3.1, 10 3.1, 10 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 1., 3.1, 3.	13 48e 13 48e 13 48e 13 48e 13	5-8 16 7 5-8 16 1 1 1 1 5-8 16 5-8 16	6-C 18 4 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 5 6-C 18 9	7-N 21 2 7-N 21 1 7-N 21 1 7-N 21 7 1 7-N 21 1	8-0 24 3 8-0 24 2 8-0 24 4 8-0 24 3	9+F 28 9+F 28 9+F 28 9+F	16.He 30 16.He 30	11-Ha 34 11-Ha 34 11-Ha 34	12489 36 12489 36 12489 36 12489 36	13.AJ 40 P200 13.AJ 40 13.AJ 40 Type 13.AJ 40	14-54 42 14-54 42 14-54 42 14-54 42 14-54 42	15P 46 15P 45 15P 45 15P 46 15P 46	165 6 165 6 165 6 165 48	52 17-ci 52 17-ci	58 18-Ar 58 18-Ar 58	58 194 58 194 58	20-0 60 20-0 60 20-0 60

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0.000	16-6 12 6 1(7 12)-6 8 8 1Serine	UCU 121
Original	16-6 12 6 1(7 12)-6 8 8 1Serine	UCC 122
Chart	16-6 12 6 1(7 12)-6 8 8 1 Serine	UCA 123
	16-6 12 6 1(7 12)-6 8 8 1 Serine	UCG 124
Sequential	16-6 12 6 1(7 12)-6 8 8 1 Serine	AGU 341
Vertical	16-6 12 6 1(7 12)-6 8 8 1 Serine	AGC 342
		J 241
Presentation		242
		243
		G 244
		343
	17-6(7 12)-7 1-(6 12)3-6 1(7 12)-6 8 8 1 Arginine AGO	3344
	18-6, 1, -6 1, -6 1(7 1)-6 8 8 1Tyrosine UAU	1 131
	18-6 15-6 12-6 1(7 12)-6 8 8 1Tyrosine UAU	J 132
	Stop	UAA 133
	Stop	UAG 134
	1886-6 12-6 1(7 12)-6 881 Aspartic Acid GAL	J431
	1886-6 12-6 1(7 12)-6 881 Aspartic Acid GA0	3432
Earth/matriX	1886-(612)-61 (712)-688 1Glutamic Acid GAA	A433
	1886-(6 12)-61 (7 1 2)-6881 Glutamic Acid GAG	5434
Genetic Code by	1 16-6 12-6 1(7 12)-6 8 8 1Cysteine	UGU 141
Numbers	1 16-5 12 -6 1(7 12)-6 8 8 1Cysteine	UGC 142
U=1	Stop	UAG 143
C=2	127-(6 12) +6 1 (7 12)-6 8 8 1Lysine	AAA 333
774 574	127-(6 12) e-6 1 (7 12)-6 8 8 1Lysane	AAG 334
A=3	127-6 8-6 12-6 1(7 12)-6 8 8 1Asparagine	AAU 331
A=3 $G=4$	127-6 8-6 12-6 1(7 12)-6 8 8 1 Asparagine	AAC 332
	127-68-(612) 2-61(712)-6881Glutamine CAA	233
	127-68-(612) 2-61(712)-6881Glutamine CAG	5 234
	6 1 ₃ -6 1(7 1) ₂)-6 8 8 1 Alanine	GCU 421
	6 13-6 1(7 1) 2)-6 8 8 1 Alanine	GCC 422
	6 1 ₃ -6 1(7 1) 2)-6 8 8 1 Alanine	GCA 423
	6 13-6 1(7 1) 2)-6 8 8 1 Alanine	GCG 424
	6 13 6 1(8 1)-6 1(7 12)-6 8 8 1Threonine	ACU 321
	6 1 ₂ 6 1(8 1)-6 1(7 1 ₂)-6 8 8 1Threonine	ACC 322
	6 13 6 1(8 1)-6 1(7 12)-6 8 8 1Threonine	ACA 323

Amino Acids Listed on the Genetic Code

	U = 1		C = 2		A = 3		G = 4]
U	111 112 113 114	Phenykakan in e Phenykakan in e Leucin e Leucin e	121 122 123 124	Serine Serine Serine Serine	131 132 133 134	Tyrosine Tyrosine Stop Stop	141 142 143 144	Cysteine Cysteine <mark>Stop</mark> Tryptophan	UCAG
С	211 212 213 214	Leucine Leucine Leucine Leucine	221 222 223 224	Proline Proline Proline Proline	231 232 233 234	Histidine Histidine Glutarnine Glutarnine	241 242 243 244	Arginine Arginine Arginine Arginine	UCAG
A	311 312 313 314	Isoleucine Isoleucine Isoleucine Methionine (Start)	321 322 323 324	Threonine Threonine Threonine Threonine	331 332 333 334	Asparagine Asparagine Lysine Lysine	341 342 343 344	Serine Serine Arginine Arginine	UCAG
G	411 412 413 414	Valine Valine Valine Valine	421 422 423 424	Alanine Alanine Alanine Alanine	431 432 433 434	Aspartic Acid Aspartic Acid Aspartic Acid Aspartic Acid	44 1 44 2 44 3 44 4	Glycine Glycine Glycine Glycine	U C A G

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