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The Atomic Genetic Code

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Abstract

The modern science mainly treats the biochemical basis of sequencing in bio-macromolecules and processes in biochemistry. One can ask weather the language of biochemistry is the adequate scientific language to explain the phenomenon in that science. Is there maybe some other language, out of biochemistry, that determines how the biochemical processes will function and what the structure and organization of life systems will be? The research results provide some answers to these questions. They reveal to us that the process of sequencing in bio-macromolecules is conditioned and determined not only through biochemical, but also through cybernetic and information principles.

Keywords: Digital genetics; Genetics code; RNA code; Amino acids code; Evolution

Methods

The genetic code tables used by the modern science are characterized and determined by principles of biochemistry. However, if in those tables, instead of the UCAG nucleotides we put the number of atoms of those nucleotides, we will get the new tables of the genetic code characterized and determined by programmatic and information principles. Therefore, biochemistry can be explained through a phenomenon out of biochemistry. Particularly interesting results we will get when determining numeric values for the information content of atoms and molecules. We will then find out that those values express physical and chemical characteristics of molecules. For example: in a DNA molecule, the polynucleotide chains are connected through an exact cyber-information connections. In those molecules there are also mathematical matrixes of DNA, represented by the number of atoms of four ATCG bases. These matrixes determine the positioning of nucleotides in that molecule. With this, the biological particularities of DNA are determined. Similar mathematical matrixes determine the positioning of nucleotides in the RNA molecule. In the amino acid proteins, they are interconnected into the respective mathematical chains. In those chains are also matrixes where particular mathematical principles apply, the principles that determine the positioning of each amino acid in the chain.

Results

The herewith discussed research results show that the process of sequencing in bio-macromolecules is conditioned and determined not only through biochemical, but also through cybernetic information principles.

We would particularly like to stress here that the genetic, as well as biochemical information in a broader sense of the word, is determined and characterized by very complex cybernetic and information principles. The constantans in those principles are: the number of atoms and molecules, atomic numbers, atomic weight, physical and chemical parameters, even and odd values, codes and analogue codes, standard deviations, frequencies, primary and secondary values, and many other things. How functioning of biochemistry is determined through cybernetic information principles, will be discussed further in this text.

The Atomic Genetic Code (RNA)

A = 15 atoms; U = 12 atoms; C = 13 atoms; G = 16 atoms;

Number of atoms

UUU=36 Phe=23	UUC=37 Phe=23	CUC=38 Leu=22	UUA=39 Leu=22	UUG=40 Leu=22	CUG=41 Leu=22	CGC=42 Arg=26	GAU=43 Asp=16	GAC=44 Asp=16	CGG=45 Arg=26	AGA=46 Arg=26	AGG=47 Arg=26	GGG=48 Gly=10
	UCU=37 Ser=14	UCC=38 Ser=14	AUU=39 Ile=22	AUC=40 Ile=22	UGC=41 Cys=14	AUA=42 Ile=22	AUG=43 Met=20	UGG=44 Trp=27	AAA=45 Lys=24	AAG=46 Lys=24	GGA=47 Gly=10	
	CUU=37 Leu=22	CCU=38 Pro=17	CCC=39 Pro=17	CUA=40 Leu=22	CCA=41 Pro=17	CCG=42 Pro=17	AAC=43 Asn=17	ACG=44 Thr=17	GGC=45 Gly=10	GAA=46 Glu=19	GAG=47 Glu=19	
			UAU=39 Tyr=24	GUU=40 Val=19	GUC=41 Val=19	GCC=42 Ala=13	GUA=43 Val=19	GUG=44 Val=19	GCG=45 Ala=13			
				UCA=40 Ser=14	UCG=41 Ser=14	UAA=42 STOP	AGU=43 Ser=14	AGC=44 Ser=14				
				ACU=40 Thr=17	ACC=41 Thr=17	AAU=42 Asn=17	ACA=43 Thr=17	GGU=44 Gly=10				
				UAC=40 Tyr=24	GCU=41 Ala=13		UAG=43 STOP	GCA=44 Ala=13				
				CAU=40 His=20	CAC=41 His=20		CAA=43 Gln=20	CAG=44 Gln=20				
				UGU=40 Cys=14	CGU=41 Arg=26		UGA=43 STOP	CGA=44 Arg=26				

Number of atoms in triplets UCAG

UUU 36	UUC 37	CUC 38	UUA 39	UUG 40	CUG 41	CGC 42	GAU 43	GAC 44	CGG 45	AGA 46	AGG 47	GGG 48
	UCU 37	UCC 38	AUU 39	AUC 40	UGC 41	AUA 42	AUG 43	UGG 44	AAA 45	AAG 46	GGA 47	
	CUU 37	CCU 38	CCC 39	CUA 40	CCA 41	CCG 42	AAC 43	ACG 44	GGC 45	GAA 46	GAG 47	
			UAU 39	GUU 40	GUC 41	GCC 42	GUA 43	GUG 44	GCG 45			
				UCA 40	UCG 41	UAA 42	AGU 43	AGC 44				
				ACU 40	ACC 41	AAU 42	ACA 43	GGU 44				
				UAC 40	GCU 41		UAG 43	GCA 44				
				CAU 40	CAC 41		CAA 43	CAG 44				
				UGU 40	CGU 41		UGA 43	CGA 44				

.(36+48) = (37+47) = (38+46) = (39+45) = (40+44) = (41+43) etc.

In fact, we discovered that the *mathematical balance* in the distribution of codons and amino acids in the genetic code is achieved.

Mathematical Position of the Nucleotides in Codon

The development of prediction methods based on digital theory is focused on the exploration of new digital formulas and algorithms. The genetic code is stored in DNA molecules as sequences of bases: adenine (A) which pairs with thymine (T), and cytosine (C) which pairs with guanine (G), The analog of DNA in a digital genetic algorithm is a number of atoms, atomic numbers, analog codes, etc.

At mathematical evolution of genetic processes, nucleotides TCAG are being transformed to codons UCAG and later to amino acids and various organic composition.

Number of atoms

Second Position of Codon				
T	**C**	**A**	**G**	
13,13,15 **41** Pro 13,13,13 **39** Pro 13,13,15 **41** Pro 13,13,16 **42** Pro **163**	15,16,15 **46** Cys 15,16,13 **44** Cys 15,16,15 **46** *Ter* 15,16,16 **47** Trp **183**	15,15,15 **45** Tyr 15,15,13 **43** Tyr 15,15,15 **45** *Ter* 15,15,16 **46** *Ter* **179**	16,15,15 **46** Asp 16,15,13 **44** Asp 16,15,15 **46** Glu 16,15,16 **47** Glu **183**	**708**
15,16,15 **46** Ser 15,16,13 **44** Ser 15,16,15 **46** Arg 15,16,16 **47** Arg **183**	15,15,15 **45** Phe 15,15,13 **43** Phe 15,15,15 **45** Leu 15,15,16 **46** Leu **179**	15,13,15 **43** Ser 15,13,13 **41** Ser 15,13,15 **43** Ser 15,13,16 **44** Ser **171**	13,16,15 **44** Arg 13,16,13 **42** Arg 13,16,15 **44** Arg 13,16,16 **45** Arg **175**	**708**
15,15,15 **45** Ile 15,15,13 **43** Ile 15,15,15 **45** Ile 15,15,16 **46** Met **179**	13,15,15 **43** Leu 13,15,13 **41** Leu 13,15,15 **43** Leu 13,15,16 **44** Leu **171**	16,16,15 **47** Gly 16,16,13 **45** Gly 16,16,15 **47** Gly 16,16,16 **48** Gly **187**	13,15,15 **43** His 13,15,13 **41** His 13,15,15 **43** Gln 13,15,16 **44** Gln **171**	**708**
16,15,15 **46** Val 16,15,13 **44** Val 16,15,15 **46** Val 16,15,16 **47** Val **183**	1613,15 **44** Ala 1613,13 **42** Ala 16,13,15 **44** Ala 16,13,16 **45** Ala **175**	15,13,15 **43** Thr 15,13,13 **41** Thr 15,13,15 **43** Thr 15,13,16 **44** Thr **171**	15,15,15 **45** Asn 15,15,13 **43** Asn 15,15,15 **45** Lys 15,15,16 **46** Lys **179**	**708**
708	**708**	**708**	**708**	

Diagonal D1 = **708;** Diagonal D2 **= 708;**

The digital genetic code describe a genotype, which is translated into an organism a phenotype by the processes of cell division.

Mathematical evolution of genetic processes is manifested in different ways. Evolution of groups of atoms is especially interesting. Here are some examples

Digital Codon Square

A digital codon square of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant. A digital square contains the integers from 1 to n^2. The term "digital square" is also sometimes used to refer to any of various types of word square.

Number of atoms

163	**183**	**179**	**183**	**708**
183	**179**	**171**	**175**	**708**
179	**171**	**187**	**171**	**708**
183	**175**	**171**	**179**	**708**
708	**708**	**708**	**708**	

D1 = (163+179+187+179) = 708;
D2 = (183+171+171+183) = 708;

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The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, *M*.

163	183	179	183
183	179	171	175
179	171	187	171
183	175	171	179

(163+183+183+179)=708;
(179+183+171+175)=708;
(179+171+183+175)=708;
187+171+171+179)=708;

163	183	179	183
183	179	171	175
179	171	187	171
183	175	171	179

↓

708

163	183	179	183
183	179	171	175
179	171	187	171
183	175	171	179

↓

708

etc.

Analogue Atomic Genetic Code

How could we adapt the program, ciberfnetic, and informational system to convey more information? Here's one way. This is an analogue code.

"Theoretically the ancient book of DNA could have been analogue. But, for the same reason as for our analogue armada beacons, any ancient book copied and recopied in analogue language would degrade to meaninglessness in very few scribe generations. Fortunately, human writing is digital, at least in the sense we care about here. And the same is true of the DNA books of ancestral wisdom that we carry around inside us. Genes are digital, and in the full sense not shared by nerves"(20).

Correlation of the Code and Analogue Code

The atomic and analogue genetic code is the set of rules by which information encoded in genetic material (DNA or RNA sequences) is translated into proteins (amino acid sequences) by living cells. Specifically, those codes defines a mapping between tri-nucleotide sequences called codons and amino acids; every triplet of nucleotides in a nucleic acid sequence specifies a single amino acid. Because the vast majority of genes are encoded with exactly the same code.

Those codes are universal. The same codons are assigned to the same amino acids and to the same START and STOP signals in the vast majority of genes in animals, plants, and microorganisms.

Analogue Code | | Code Code

Example:

Analogue Code of the number 12 is number 21:

21 | | 12;

Analogue Code of the number 15 is number 51:

51 | | 15;

etc.

At this stage of our research we replaced nucleotides from the Amino Acid Code Matrix with analogue numbers of the atoms in those nucleotides.

A = 15 atoms; T = 15 atoms; C = 13 atoms; G = 16 atoms

A = 51; T = 51; C = 31; G = 61;

Analogue Codon Table

Mathematical position of the nucleotides in codon

Second Position of Codon				
T	**C**	**A**	**G**	
31,31,51 **113** Pro 31,31,31 **93** Pro 31,31,51 **113** Pro 31,31,61 **123** Pro **442**	51,61,51 **163** Cys 51,61,31 **143** Cys 51,61,51 **163** *Ter* 51,61,61 **173** Trp **642**	51,51,51 **153** Tyr 51,51,31 **133** Tyr 51,51,51 **153** *Ter* 51,51,61 **163** *Ter* **602**	61,51,51 **163** Asp 61,51,31 **143** Asp 61,51,51 **163** Glu 61,51,61 **173** Glu **642**	**2328**
51,61,51 **163** Ser 51,61,31 **143** Ser 51,61,51 **163** Arg 15,16,16 **173** Arg **642**	51,51,51 **153** Phe 51,51,31 **133** Phe 51,51,51 **153** Leu 51,51,61 **163** Leu **602**	51,31,51 **133** Ser 51,31,31 **113** Ser 51,31,51 **133** Ser 51,31,61 **143** Ser **522**	31,61,51 **143** Arg 31,61,31 **123** Arg 31,61,51 **143** Arg 31,61,61 **153** Arg **562**	**2328**
51,51,51 **153** Ile 51,51,31 **133** Ile 51,51,51 **153** Ile 51,51,61 **163** Met **602**	31,51,51 **133** Leu 31,51,31 **113** Leu 31,51,51 **133** Leu 31,51,61 **143** Leu **522**	61,61,51 **173** Gly 61,61,31 **153** Gly 61,61,51 **173** Gly 61,61,61 **183** Gly **682**	31,51,51 **133** His 31,51,31 **113** His 31,51,51 **133** Gln 31,51,61 **143** Gln **522**	**2328**
61,51,51 **163** Val 61,51,31 **143** Val 61,51,51 **163** Val 61,51,61 **173** Val **642**	61,31,51 **143** Ala 61,31,31 **123** Ala 61,31,51 **143** Ala 61,31,61 **153** Ala **562**	51,31,51 **133** Thr 51,31,31 **113** Thr 51,31,51 **133** Thr 51,31,61 **143** Thr **522**	51,51,51 **153** Asn 51,51,31 **133** Asn 51,51,51 **153** Lys 51,51,61 **163** Lys **602**	**2328**
2328	**2328**	**2328**	**2328**	

Diagonal D1 = 2328; Diagonal D2 = 2328;

Row 1 = Column 1; Row 2 = Column 2; Row 3 = Column 3; Row 4 = Column 4;

Analogue Codon Square

A analogue codon square of order *n* is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the *n* numbers in all rows, all columns, and both diagonals sum to the same constant.

442	642	602	642	2328
642	602	522	562	2328
602	522	682	522	2328
642	562	522	602	2328
2328	2328	2328	2328	

D1 = (442+602+682+602) = 2328;

D2 = (642+522+522+642) = 2328;

The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, *M* = 2328;

Correlation:

442	642	602	642
642	602	522	562
602	522	682	522
642	562	522	602

(442+642+642+602) = 2328;

(602+642+522+562) = 2328;

etc.

442	642	602	642
642	602	522	562
602	522	682	522
642	562	522	602

↓

2328

442	642	602	642
642	602	522	562
602	522	682	522
642	562	522	602

↓

2328

Determinants in Digital analogue Genetic Code

DET (4 x 4)

442	642	602	642
642	602	522	562
602	522	682	522
642	562	522	602

↓

2681856000

2681856000 = (2328 + 2328 + 2328…, + 2328);

There is a mathematical balance within all of the phenomena in the analogue genetic code matrix**.**

Mathematical correlation of groups of nucleotides are a proof that genetic processes have evolved from one mathematical shape to another one. They are a proof that we can uncover some of hidden secrets in that science, with the help of mathematics.

		Atomic numbers			
		U	**C**	**A**	**G**
First position	**U**	58,58,58 **174** Phe 58,58,58 **174** Phe 58,58,70 **186** Leu 58,58,78 **194** Leu **728**	70,78,58 **206** Ser 70,78,58 **206** Ser 70,78,70 **218** Arg 70,78,78 **226** Arg **856**	58,70,58 **186** Tyr 58,70,58 **186** Tyr 58,70,70 **198** *Ter* 58,70,78 **206** *Ter* **776**	58,78,58 **194** Cys 58,78,58 **194** Cys 58,78,70 **206** *Ter* **3168** 58,78,78 **214** Trp **808**
	C	78,70,58 **206** Asp 78,70,58 **206** Asp 78,70,70 **218** Glu 78,70,78 **226** Glu **856**	58,58,58 **174** Ser 58,58,58 **174** Ser 58,58,70 **186** Ser 58,58,78 **194** Ser **728**	58,70,58 **186** His 58,70,58 **186** His 58,70,70 **198** Gln 58,70,78 **206** Gln **776**	58,78,58 **194** Arg 58,78,58 **194** Arg 58,78,70 **206** Arg **3168** 58,78,78 **214** Arg **808**
	A	70,58,58 **186** Ile 70,58,58 **186** Ile 70,58,70 **198** Ile 70,58,78 **206** Met **776**	70,58,58 **186** Thr 70,58,58 **186** Thr 70,58,70 **198** Thr 70,58,78 **206** Thr **776**	78,78,58 **214** Gly 78,78,58 **214** Gly 78,78,70 **226** Gly 78,78,78 **234** Gly **888**	58,58,58 **174** Leu 58,58,58 **174** Leu 58,58,70 **186** Leu **3168** 58,58,78 **194** Leu **728**
	G	78,58,58 **194** Val 78,58,58 **194** Val 78,58,70 **206** Val 78,58,78 **214** Val **808**	78,58,58 **194** Ala 78,58,58 **194** Ala 78,58,70 **206** Ala 78,58,78 **214** Ala **808**	58,58,58 **174** Pro 58,58,58 **174** Pro 58,58,70 **186** Pro 58,58,78 **194** Pro **728**	70,70,58 **198** Asn 70,70,58 **198** Asn 70,70,70 **210** Lys **3168** 70,70,78 **218** Lys **824**
		3168	**3168**	**3168**	**3168**

Diagonal D1 = **3168;** Diagonal D2 **= 3168;**

The atomic genetic code describe a genotype, which is translated into an organism a phenotype by the processes of cell division.

Mathematical evolution of genetic processes is manifested in different ways. Evolution of groups of atoms is especially interesting. Here are some examples.

Digital Codon Square

A atomic codon square of order *n* is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the *n* numbers in all rows, all columns, and both diagonals sum to the same constant. A digital square contains the integers from 1 to n^2. The term "digital square" is also sometimes used to refer to any of various types of word square.

Number of atoms

728	**856**	**776**	**808**	**3168**
856	**728**	**776**	**808**	**3168**
776	**776**	**888**	**728**	**3168**
808	**808**	**728**	**824**	**3168**
3168	**3168**	**3168**	**3168**	

D1 = (728+856+776+808) = 3168; D2 = (808+776+776+808) = 3168;

The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, *M*

728	856	776	808
856	728	776	808
776	776	888	728
808	808	728	824

↓

3168

728	856	776	808
856	728	776	808
776	776	888	728
808	808	728	824

↓

3168

728	856	776	808
856	728	776	808
776	776	888	728
808	808	728	824

↓

3168

etc.

At this stage of our research we replaced nucleotides from the Amino Acid Code Matrix with analogue of the atomic numbers in those nucleotides.

Analogue Codon Table

First Position	U	C	A	G
	Atomic numbers			
U	85,85,85 **255** Phe 85,85,85 **255** Phe 85,85,07 **177** Leu 85,85,87 **257** Leu **944**	07,87,85 **179** Ser 07,87,85 **179** Ser 07,87,07 **101** Arg 07,87,87 **181** Arg **640**	85,07,85 **177** Tyr 85,07,85 **177** Tyr 85,07,07 **99** *Ter* 85,07,87 **179** *Ter* **632**	85,87,85 **257** Cys 85,87,85 **257** Cys 85,87,07 **179** *Ter* **3168** 85,87,87 **259** Trp **952**
C	87,07,85 **179** Asp 87,07,85 **179** Asp 87,07,07 **101** Glu 87,07,87 **181** Glu **640**	85,85,85 **255** Ser 85,85,85 **255** Ser 85,85,07 **177** Ser 85,85,87 **257** Ser **944**	85,07,85 **177** His 85,07,85 **177** His 85,07,07 **99** Gln 85,07,87 **179** Gln **632**	85,87,85 **257** Arg 85,87,85 **257** Arg 85,87,07 **179** Arg **3168** 85,87,87 **259** Arg **952**
A	07,85,85 **177** Ile 07,85,85 **177** Ile 07,85,07 **99** Ile 07,85,87 **179** Met **632**	07,85,85 **177** Thr 07,85,85 **177** Thr 07,85,07 **99** Thr 07,85,87 **179** Thr **632**	87,87,85 **259** Gly 87,87,85 **259** Gly 87,87,07 **181** Gly 87,87,87 **261** Gly **960**	85,85,85 **255** Leu 85,85,85 **255** Leu 85,85,07 **177** Leu **3168** 85,85,87 **257** Leu **944**
G	87,85,85 **257** Val 87,85,85 **257** Val 87,85,07 **179** Val 87,85,87 **259** Val **952**	87,85,85 **257** Ala 87,85,85 **257** Ala 87,85,07 **179** Ala 87,85,87 **259** Ala **952**	85,85,85 **255** Pro 85,85,85 **255** Pro 85,85,07 **177** Pro 85,85,87 **257** Pro **944**	07,07,85 **99** Asn 07,07,85 **99** Asn 07,07,07 **21** Lys **3168** 07,07,87 **101** Lys **320**
	3168	**3168**	**3168**	**3168**

Diagonal D1 = 3168; Diagonal D2 = 3168;

Row 1 = Column 1; Row 2 = Column 2; Row 3 = Column 3; Row 4 = Column 4;

Analogue Codon Square

A analogue codon square of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant.

944	640	632	952	3168
640	944	632	952	3168
632	632	960	944	3168
952	952	944	320	3168
3168	3168	3168	3168	

D1 = (944+944+960+320) = 3168;

D2 = (952+632+632+952) = 3168;

The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, M = 3168;

Correlation:

944	640	632	952
640	944	632	952
632	632	960	944
952	952	944	320

3168

944	640	632	952
640	944	632	952
632	632	960	944
952	952	944	320

3168

944	640	632	952
640	944	632	952
632	632	960	944
952	952	944	320

3168

Determinants in Digital analogue Genetic Code

DET (4 x 4)

944	640	632	952
640	944	632	952
632	632	960	944
952	952	944	320

197237145600

197237145600 = (3168+ 3168 + 3168…, + 3168);

There is a mathematical balance within all of the phenomena in the analogue genetic code matrix**.**

Mathematical correlation of groups of nucleotides are a proof that genetic processes have evolved from one mathematical shape to another one. They are a proof that we can uncover some of hidden secrets in that science, with the help of mathematics.

Atomic Weight

	C	H	N	O	S	
A	5	5	5	0	0	15
U	4	4	2	2	0	12
C	4	5	3	1	0	13
G	5	5	5	1	0	16

C = 12,0111; H = 1,00797; N = 14,0067; O = 15,9994; S = 32,064;

A = 135; U = 112; C = 111; G = 151;

The Digital Genetic Code

At the first stage of our research we replaced nucleotides from the Genetic Code with atomic weight of those nucleotides.

Mathematical Position of the Nucleotides in Codon3

The development of prediction methods based on digital theory is focused on the exploration of new digital formulas and algorithms. The genetic code is stored in DNA molecules as sequences of bases: adenine (A) which pairs with thymine (T), and cytosine (C) which pairs with guanine (G), The analog of DNA in a digital genetic algorithm is a number of atoms, atomic numbers, analog codes, etc.

At mathematical evolution of genetic processes, nucleotides TCAG are being transformed to codons UCAG and later to amino acids and various organic composition.

First Position	Second Position of Codon: U				C				A				G			
U	112,111,112	335	Ser		135,151,112	398	Ser		111,135,112	358	His		112,151,112	375	Cys	
	112,111,111	334	Ser		135,151,111	397	Ser		111,135,111	357	His		112,151,111	374	Cys	
	112,111,135	358	Ser		135,151,135	421	Arg		111,135,135	381	Gln		112,151,135	398	*Ter*	6108
	112,111,151	374	Ser		135,151,151	437	Arg		111,135,151	397	Gln		112,151,151	414	Trp	
	1401				1653				1493				1561			
C	151,135,112	398	Asp		111,112,112	335	Leu		135,111,112	359	Thr		151,112,112	375	Val	
	151,135,111	397	Asp		111,112,111	334	Leu		135,111,111	358	Thr		151,112,111	374	Val	
	151,135,135	421	Glu		111,112,135	358	Leu		135,111,135	382	Thr		151,112,135	398	Val	
	151,135,151	437	Glu		111,112,151	374	Leu		135,111,151	398	Thr		151,112,151	414	Val	
	1653				1401				1493				1561			
A	112,135,112	359	Tyr		135,112,112	359	Ile		151,151,112	414	Gly		111,111,112	334	Pro	
	112,135,111	358	Tyr		135,112,111	358	Ile		151,151,111	413	Gly		111,111,111	333	Pro	
	112,135,135	382	*Ter*		135,112,135	382	Ile		151,151,135	437	Gly		111,111,135	357	Pro	6108
	112,135,151	398	*Ter*		135,112,151	398	Met		151,151,151	453	Gly		111,111,151	373	Pro	
	1497				1497				1717				1397			
G	111,151,112	374	Arg		151,111,112	374	Ala		112,112,112	336	Phe		135,135,112	382	Asn	
	111,151,111	373	Arg		151,111,111	373	Ala		112,112,111	335	Phe		135,135,111	381	Asn	
	111,151,135	397	Arg		151,111,135	397	Ala		112,112,135	359	Leu		135,135,135	405	Lys	6108
	111,151,151	413	Arg		151,111,151	413	Ala		112,112,151	375	Leu		135,135,151	421	Lys	
	1557				1557				1405				1589			
	6108				6108				6108				6108			

Diagonal D1 = **6108;** Diagonal D2 = **6108**

The atomic genetic code describe a genotype, which is translated into an organism a phenotype by the processes of cell division.

Mathematical evolution of genetic processes is manifested in different ways. Evolution of groups of atoms is especially interesting. Here are some examples.

Atomic Codon Square

A atomic codon square of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant. A digital square contains the integers from 1 to n^2. The term "digital square" is also sometimes used to refer to any of various types of word square.

Number of atoms

1401	1653	1493	1561	6108
1653	1401	1493	1561	6108
1497	1497	1717	1397	6108
1557	1557	1405	1589	6108
6108	6108	6108	6108	

D1 = (1401+1401+1717+1589) = 6108; D2 = (1561+1493+1497+1557) = 6108;

The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, M.

1401	1653	1493	1561
1653	1401	1493	1561
1497	1497	1717	1397
1557	1557	1405	1589

↓

6108

1401	1653	1493	1561
1653	1401	1493	1561
1497	1497	1717	1397
1557	1557	1405	1589

↓

6108

1401	1653	1493	1561
1653	1401	1493	1561
1497	1497	1717	1397
1557	1557	1405	1589

↓

6108

etc.

At this stage of our research we replaced nucleotides from the Amino Acid Code Matrix with analogue of the atomic weight in those nucleotides.

A = 135; U = 112; C = 111; G = 151;

A = 531; U = 211; C = 111; G = 151;

Analogue Codon Table

First Position	Second Position of Codon: U				Second Position of Codon: C				Second Position of Codon: A				Second Position of Codon: G			
U	211,111,211	533	Ser		531,151,211	0893	Ser		111,531,211	0853	His		211,151,211	573	Cys	
	211,111,111	433	Ser		531,151,111	0793	Ser		111,531,111	0753	His		211,151,111	473	Cys	
	211,111,531	853	Ser		531,151,531	1213	Arg		111,531,531	1173	Gln		211,151,531	893	*Ter*	12048
	211,111,151	473	Ser		531,151,151	0833	Arg		111,531,151	0793	Gln		211,151,151	513	Trp	
	2292				3732				3572				2452			
C	151,531,211	0893	Asp		111,211,211	533	Leu		531,111,211	0853	Thr		151,211,211	573	Val	
	151,531,111	0793	Asp		111,211,111	433	Leu		531,111,111	0753	Thr		151,211,111	473	Val	
	151,531,531	1213	Glu		111,211,531	853	Leu		531,111,531	1173	Thr		151,211,531	893	Val	1
	151,531,151	0833	Glu		111,211,151	473	Leu		531,111,151	0793	Thr		151,211,151	513	Val	
	3732				2292				3572				2452			
A	211,531,211	0953	Tyr		531,211,211	0953	Ile		151,151,211	513	Gly		111,111,211	433	Pro	
	211,531,111	0853	Tyr		531,211,111	0853	Ile		151,151,111	413	Gly		111,111,111	333	Pro	
	211,531,531	1273	*Ter*		531,211,531	1273	Ile		151,151,531	833	Gly		111,111,531	753	Pro	12048
	211,531,151	0893	*Ter*		531,211,151	0893	Met		151,151,151	453	Gly		111,111,151	373	Pro	
	3972				3972				2212				1892			
G	111,151,211	473	Arg		151,111,211	473	Ala		211,211,211	633	Phe		531,531,211	1273	Asn	
	111,151,111	373	Arg		151,111,111	373	Ala		211,211,111	533	Phe		531,531,111	1173	Asn	
	111,151,531	793	Arg		151,111,531	793	Ala		211,211,531	953	Leu		531,531,531	1593	Lys	12048
	111,151,151	413	Arg		151,111,151	413	Ala		211,211,151	573	Leu		531,531,151	1213	Lys	
	2052				2052				2692				5252			
	12048				12048				12048				12048			

Diagonal D1 = 3168; Diagonal D2 = 3168;

Analogue Codon Square

A analogue codon square of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant.

2292	3732	3572	2452	12048
3732	2292	3572	2452	12048
3972	3972	2212	1892	12048
2052	2052	2692	5252	12048
12048	12048	12048	12048	

D1 = 12048; D2 = 12048

The constant sum in every row, column and diagonal is called the magic analogue constant or magic sum, M = 12048;

Correlation:

2292	3732	3572	2452
3732	2292	3572	2452
3972	3972	2212	1892
2052	2052	2692	5252

↓

12048

2292	3732	3572	2452
3732	2292	3572	2452
3972	3972	2212	1892
2052	2052	2692	5252

↓

12048

2292	3732	3572	2452
3732	2292	3572	2452
3972	3972	2212	1892
2052	2052	2692	5252

↓

12048

etc.

Determinsants in Digital Analogue Genetic Code

DET (4 x 4)

944	640	632	952
640	944	632	952
632	632	960	944
952	952	944	320

↓

74615095296000

↓

(12048+ 12048 + 12048…, + 12048) ;

There is a mathematical balance within all of the phenomena in the analogue genetic code matrix**.**

Mathematical correlation of groups of nucleotides are a proof that genetic processes have evolved from one mathematical shape to another one. They are a proof that we can uncover some of hidden secrets in that science, with the help of mathematics.

It is obvious that digital matrix of amino acid code evolved from digital matrix of nucleotide code.

Mathematical correlation of groups of nucleotides are a proof that genetic processes have evolved from one mathematical shape to another one. They are a proof that we can uncover some of hidden secrets in that science, with the help of mathematics.

Perspectives

About Importance of the Proposal

Development of science in following period will be based on contemporary digital technology. To conquer new technology it would be far more efficient to use method of reverse engineering for comprehension of phenomen in genetics. We'll give a brief description of that method.

The genetic code tables used by the modern science are characterized and determined by principles of biochemistry. However, if in those tables, instead of the UCAG nucleotides we put the number of atoms of those nucleotides, we will get the new tables of the genetic code characterized and determined by programmatic and information principles.

Therefore, biochemistry can be explained through a phenomenon out of biochemistry.

Particularly interesting results we will get when determining numeric values for the information content of atoms and molecules. We will then find out that those values express physical and chemical characteristics of molecules. For example: in a DNA molecule, the polynucleotide chains are connected through an exact cyber-information connections. In those molecules there are also mathematical matrixes of DNA, represented by the number of atoms of four ATCG bases. These matrixes determine the positioning of nucleotides in that molecule. With this, the biological particularities of DNA are determined. Similar mathematical matrixes determine the positioning of nucleotides in the RNA molecule. In the amino acid proteins, they are interconnected into the respective mathematical chains. In those chains are also matrixes where particular mathematical principles apply, the principles that determine the positioning of each amino acid in the chain. Therefore, the herewith discussed research results show that the process of sequencing in bio-macromolecules is conditioned and determined not only through biochemical, but also through cybernetic information principles. The hypothesis here is that the processes in an organism occur only when certain mathematical conditions are met, i.e. when there is a certain mathematical correlation between parameters in those processes. That correlation is expressed by the respective methodology.

We would particularly like to stress here that the genetic, as well as biochemical information in a broader sense of the word, is determined and characterized by very complex cybernetic and information principles. The constantans in those principles are: the number of atoms and molecules, atomic numbers, atomic weight, physical and chemical parameters, even and odd values, codes and analogue codes, standard deviations, frequencies, primary and secondary values, and many other things.

Where it Might be Useful

In view of this, our findings might have a series of impacts to the aforementioned work. We are devoted to provide a digital code for each of 20 native amino acids. These digital codes should more complete and better reflect the essence of each of the 20 amino acids. Therefore, it might stimulate a series of future work by using the author's digital codes to formulate the pseudo amino acid composition for predicting protein structure class, subcellular location, membrane protein type, enzyme family class, GPCR type, protease type, protein-protein interaction, metabolic pathways, protein quaternary structure, and other protein attributes.

We can expect that this discovery will significantly speed up the research of mutational genesis of humans, molecular etymology, in applied biology and genetic engineering, and also it will provide discoveries in new medicines and methods of medicinal treatments.

Future Steps Required

1.Establish scientific-research project team for development of advanced technologies in genetics, medicine and biochemistry.

2.Project team should make concrete program of scientific-research work, where they should define goals of research, indispensable facilities for implementation of project, project duration, budget, and other conditions.

3. Define rights and duties of all participants in implementation of project.

4. To implement project defined by project documentation.

Research in the Field of Fundamental Sciences

1. Decode matrix of amino acid code and on the experimental way prove that the matrix really exists. And after that, use that matrix to conquer top technologies in the field of genetics.

2. Decode matrix of nucleotide code and digital codes which connect that matrix with matrix of amino acid code. And use that matrix to conquer top technologies in the field of biochemistry.

3. Decode matrix code in Tables of periodic system of chemical elements, and use that matrix to conquer top technologies in the field of chemistry.

4. Decode matrix code in the nature, and use that matrix to conquer top technologies in the field of all natural sciences.

5. Decode matrix code of chromosomes in human body.

6. With the help of above mentioned matrixes, decode map of human DNA.

7. Decode matrix code of processes in the field of nuclear physics.

8. Decode insulin matrix code, as well as all other codes from the field of biochemistry.

9. Other research (Matrix code in Pascal's triangle, Matrix code in astronomy, Matrix code in theoretical physics, determinism, etc.).

Paragraph of Limitations

1. Confirm that the manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.

2. Confirm that all the research meets the ethical guidelines, including adherence to the legal requirements of the study country.

3. Confirm that you have completed and sent a Copyright Transfer Agreement (CTA) to the Editorial Office.

The Obtained Results

The obtained results are valid. In this manuscript, we proposed the universal genetic code. Mathematics could confirm this fact with 100% scientific accuracy. For example, Table mathematical position of the nucleotides in codon, Digital codon square, Analogue atomic genetic code, Correlation of the code and analogue code *Analogue codon table, Analogue codon square, Determinsants in Digital analogue Genetic Code, Determinsants in Digital analogue Genetic Code, Atomic weight Atomic codon square, etc.*This mathematic system represents that very universal formula of the genetic code which 100% scientific accuracy. was looking for.

Conclusion

It is a rewarding work to translate the biochemical language of amino acids into a digital language because it may be very useful for developing new methods for predicting protein sub cellular localization, membrane protein type, protein structure secondary prediction or any other protein attributes.

This is because ever since the concept of Chou's pseudo amino acid composition was proposed many efforts have been made trying to use various digital numbers to represent the 20 native amino acids in order to better reflect the sequence-order effects through the vehicle of pseudo amino acid composition. Some investigators used complexity measure factor some used the values derived from the cellular automata, some used hydrophobic and/or hydrophilic values, some were through Fourier transform, and some used the physicochemical distance.

Now, it is going to be possible to use the completely new strategy of research in genetics. However, observation of all these relations which are the outcome of the periodic law (actually, of the law of binary coding) is necessary, because it can be of great importance for decoding conformational forms and stereo-chemical and digital structure of proteins.

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