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Genetic Code: One Pregnancy, Two Births

W B Bozegha*

*Numeration Science Literature, Development Research Project, Foubiri Sabagreia, Bayelsa State, Nigeria.

Corresponding author: W B Bozegha, Numeration Science Literature, Development Research Project, Foubiri Sabagreia, Bayelsa State, Nigeria, Tel: +2348068029860; E-mail: wbbozegha@yahoo.com

Abstract

This is a talk reporting the twin phenomenon recently encountered in the genetic code. Two different fabrics of genetic code have come out of an elongated Punnett Square as output materials for a sequence of the four RNA bases, A,U,G,C (Adenine, Uracil, Guanine, Cytosine) implanted there as input set, after base crossing involving successive collateral posting (SCP) of the four bases to two different terminal digitalities of 3 and 4. The first birth at digitality 3 is a brood of 64 mixed triplets, (24 permutations and 40 non-permutations), while the second birth at digitality 4 is a brood of 24 permutation quadruplets after de-isodigitation of 232 non-permutation quadruplets. The circumstances of the single pregnancy and the two births of the two genetic code babies were incidental to a mathematician's proposal in 1954 based on the formula, 4^3, to account for the molecular biologists' observation in 1953, that the sequence of the RNA four bases A,U,G,C in the nucleus of a cell influenced the sequence of the twenty amino acids of protein in the surrounding cytoplasm of the cell and the scientists' attempt of producing codewords to the tune of 4^3 from the four bases using Punnett Square and a subsequent revisit to the methodology of production of the desired codewords in 1990 by this author. The characteristics of the two babies are delineated in the light of combinatorial standards for permutation of 4 from 4 i.e., ${}_4P_4 = 4!$ and other properties of permutations such as potency, integrity, uniqueness and compatibility per factorial. Validation of each baby as the genetic code is made in the context of protein type proliferation and diversification, being the functional requirement of the genetic code in protein synthesis.

Keywords: Non-permutations, Permutations, Quadruplets, Triplets

INTRODUCTION

Molecular biologists observed in 1953 that the sequence of the four RNA nucleotide bases A, U, G, C (Adenine, Uracil, Guanine, Cytosine) in the nucleus of a cell influenced the sequence of the twenty amino acids of protein in the surrounding cytoplasm of the cell, as disclosed in The World of the Cell by Becker and Wayne [1]. They subsequently called the positional and quantitative relationship between the four nucleotide bases and the twenty amino acids of protein, the genetic code, as code-named in Cell Biology by Ambrose and Easty [2]. They tried to establish the relationship between the two entities in concrete terms of a code and raised a quantitative theoretical argument on how the four bases can be manipulated in form of combinations to raise enough codewords for the individual specification of the twenty amino acids of protein. The reasoning goes thus: If one base is used at a time only four words will be available. If two bases are in combination at a time, the four would give 42=4x4=16 duplex codewords, not enough for the twenty amino acids. If three bases are in combination, the four would give43 =4x4x4=64 triplet codewords; this time more than enough for the twenty amino acids, as argued in Cell Biology by, Ambrose and Easty [2]. Continuing the reasoning, using all four at a time would give 44 = 4x4x4x4=256 quadruplet codewords, far too much in excess of the twenty amino acids and therefore, discountenanced. They consequently settled on the 64 triplets and went about the generation of the needed codewords. They placed the four RNA bases A, U, G, C in a Punnett Square for genetic crossing involving collateral posting to digitality level 3 as illustrated in Table 1, thereby occasioning the pregnancy borne in our title. They enthusiastically went ahead to the laboratory to experimentally determine the allocation of the 64 triplet codewords to the respective twenty amino acids of protein and consequently declared their purported experimental allocations as illustrated in **Table 1** as the spelling of the genetic code thereby confirming the first birth of the genetic code baby made up of a brood of 64 triplets as presented in **Table 1** being the spelling adapted. The World of the Cell by Becker and Wayne [1] at digitality level 3. The body of this report carries the rest of the story relating to this baby and the birth of another genetic code baby from the same pregnancy sustained in genetic crossing extended to digitality level 4, and combinatoric examination of the two genetic code babies and their prospects in the World of Biological Sciences. But first definitions, illustrations, and annotations for easier advance.

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Table 1. The Genetic Code, a Permutation or a Combination?

S/N	Features	Genetic Code	Permutation	Combination
1	Fullset Selection, 4 from 4	Applicable	Applicable	Not applicable
2	Incarnation digitism, one output digitism replicating the input set sequence	Possible and available, because of fullset selection relative to input set	Possible and available because of fullset selection relative to input set	Not possible and not available because of absence of fullset selection relative to input set
3	Factorial complement calculation formula	$_4G_4 = 4!$ = 4x3x2x1 = 24 quadruplets	$_4P_4 = 4!$ = 4x3x2x1 = 24 quadruplets	$_4C_3 = {}_4P_3$ / 3! = 4x3x2 / 3x2x1 = 4 triplets
4	Derivation of Factorial Complement View Mixing) Displacement) Mixing	Two - way (to and fro) Applicable	Two - way (to and fro) Applicable	One - way only Not applicable

DEFINITIONS AND ILLUSTRATIONS

Combination: A group of things chosen from a larger number of dissimilar things without regard to order in the group.

Order: Means sequence of things in a set with regard to positions.

Permutation: Is anyone of the possible dissimilar objects taken all (fullset selection) or some (subset selection) at a time can be arranged in which order is important.

Pregnancy: In humans is the period during which an embryo grows within the womb. It begins at conception and ends at birth; the normal length is nine months.

Gestation: In humans is the period from fertilization to birth; has an average duration of nine months. A synonym of pregnancy.

Digitism: Digital composition of a number or simply, the set of digits in a number.

Isodigitism: Is the condition in a digitism whereby one or more digits are repeated. Isodigitism is disallowed in permutations and combinations as implied in the emphasis on dissimilarity of objects in the constituting set.

De-isodigitation: Is the elimination or removal of digitims affected by isodigitism. It is employed in the extraction of permutations from digibreed.

Digibreed: Is number population in sequence to a specified digitality generated by successive collateral posting of a given base-strength.

Caesarean Section means surgery for delivery of a baby. The second birth of the genetic code pregnancy or the second genetic code baby is a product of caesarean section.

Placenta: It is an ad-hoc infrastructure for servicing pregnancy in humans in all matters of developmental agenda of the embryo and fetus in the womb till childbirth. It grows physically with the pregnancy and must be delivered after childbirth in what is called stage-two labour for a safe delivery, as explained by Alma EG [3] Reader's Digest Association Inc in ABC's of the Human Body.

ANNOTATIONS

Input/Output Format: In the first place, divine creation as recorded in the Genesis Chapter 1 account of the Bible is the first, and supreme example of input/output format. The spoken word of God as input, and the resulting creation, the manifestation of matter, as the output material in the form of quantity (seen or unseen). It is the infrastructure for permutations and combinations. The genetic code is a striking natural example of a quantitative system featuring the input/output format and goes along with permutations in the matter of productivity and textural identity.

Input/output format is patronized by procreation in animal life and it is formally designated as pregnancy or gestation. Quantitative systems based on input/output format, such as, permutations, combinations, genetic code, pregnancy and crop farming have fixed laws governing their productivity and textural identity. Those of immediate interest include:

(i) Sameness of kind of input set and output material, e.g., yam planted, yam harvested.

(ii) Sameness of size of input set digitism and output material digitism, e.g., mango fruit planted and harvested.

(iii) Non-isodigital isodigitism set for input set and output material, e.g., permutations, combinations, and genetic code.

(iv) Increase of quantity either by size or by number of output material relative to input set. e.g., baby by size, yam by size and maize by number.

(v) Evaluation of productivity.

(a) Fullset selection nPn = n! for permutations

(b) Subset selection $nPr = \frac{n!}{(n-r)!}$ for permutations

(c) Subset selection only $nCr = \frac{nPr}{r!}$ for combinations

(d) Fullset selection 4 only $_4G_4 = {}_4P_4 = 4! = 4x3x2x1 = 24$ quadruplets for genetic code. $_4G_4$ is new

combinatorial symbol for genetic code factorial complement to mark its initiation in combinatorics.

TEXTURAL SUBPOPULATIONS OF NUMBERS

The general number population can be subdivided into three subpopulations on textural basis; namely total isodigitals, partial isodigitals and non-isodigitals. In total isodigitals, all the digits of a digitism are repetitions of one particular digit e.g., 1111, 222, 33. In partial isodigitals, some of the digits of a digitism are repetitions of one or more digits: e.g., 5050, 122, 211, or the series 1, 10, 100, 1000 … The non-isodigitals have no repetition of any digits in their digitisms, e.g., 12, 314, 4321. A number of these textural subpopulations of numbers serve special interests in Numeration and Combinatorics. For instance, the partial isodigital series 1, 10, 100, 1000, … known as Incremental Digitality Counts (IDCs) in Numeration are used in meridian place location and as meridian place values in the organization of the entire number population of whatever base-strength. Similarly, the non-isodigital subpopulation of numbers is what combinatorics uses in fixing or computing the factorial complements for permutations and combinations for all specifications of set (n) and selection (r) and$_4G_4$ i.e., fullset selection 4 for genetic code. So, the texture of the fabric of the true genetic code as an example of permutation can only be made up of non-isodigital formations of A, U, G, C per formation and not otherwise as in the 64-triplet degenerate code which includes 40 isodigital triplets (4 total and 36 partial).

MATERIALS AND METHODS

The materials consist of the four RNA nucleotide bases, A, U, G, C. The method employs genetic crossing involving successive collateral posting of the four bases in Punnett Square to two different digitalities, one of 3 and the other of 4 as clarified below under (a) and (b).

(a) Derivation of the 64-triplet genetic code by the indirect method of genetic crossing of A, U, G, C in an elongated Punnett Square to digitality level 3 without de-isodigitation **(Chart 1)**.

Chart 1. Derivation of 64-triplet genetic code from 4 RNA bases A, U, G, C using Punnett Square (Indirect method of Base 4 Neo-digibreed to Digitality 3).

Corridor	**Digibreed**	**Line No.**	**Output** **No. of Codons per line per digitality**		**Remarks**
	Col 1 Col 2 Col 3 Col 4 **Input** **A U G C**	**1**	**Codons of digitality 2**	**Codons of digitality 3**	
	OUTPUT				
	AA AU AG AC				
A	UA UU UG	2	4		
U	UC	3	4		
G	GA GU GG GC	4	4		
C	CA CU CG CC	5	4		
	4 4 4 4		16		Insufficient
	AAA AAU AAG AAC				
AA	AUA AUU AUG	6		4	
AU	AUC	7		4	
AG	AGA AGU AGG AGC	8		4	
AC	ACA ACU ACG ACC	9		4	
UA	UAA UAU UAG UAC	10		4	
UU	UUA UUU UUG	11		4	

UG	UUC	12		4	
UC	UGA UGU UGG UGC	13		4	
	UCA UCU UCG UCC				
	GAA GAU GAG GAC				
GA	GUA GUU GUG	14		4	
GU	GUC	15		4	
GG	GGA GGU GGG GGC	16		4	
GC	GCA GCU GCG GCC	17		4	
	CAA CAU CAG CAC				
CA	CUA CUU CUG	18		4	
CU	CUC	19		4	
CG	CGA CGU CGG CGC	20		4	
CC	CCA CCU CCG CCC	21		4	
Total no. of triplets per col.	16 16 16 16			64	Adopted even though surplus.

(b) Derivation of the 24-quadruplet genetic code by the method of genetic crossing of A, U, G, C in an elongated Punnett Square to digitality level 4 subjected to de-isodigitation **(Chart 2)**.

Chart 2. Derivation of 24-quadruplet genetic code from 4 RNA bases, A, U, G, C using Punnett Square with de-isodigitation (Indirect method of Base 4 Neo-digibreed to digitality 4 and subjected to de-isodigitation).

Corridor	**Digibreed**	**Line No.**	**Output** **No. of permutations per line per digitality**		
	Col 1 Col 2 Col 3 Col 4 **Input** **A U G C**	**1**	**Digitality 2**	**Digitality 3**	**Digitality 4**
	OUTPUT				
A	~~AA~~ AU AG AC	2	3		
U	UA ~~UU~~ UG UC	3	3		
G	GA GU ~~GG~~ GC	4	3		
C	CA CU CG ~~CC~~	5	3		
Total no. of permutation duplexes per col.	3 3 3 3		12		
~~AA~~	~~AAA~~ ~~AAU~~ ~~AAG~~ ~~AAC~~	6		-	
AU	~~AUA~~ ~~AUU~~ AUG AUC	7		2	
AG	~~AGA~~ AGU ~~AGG~~ AGC	8		2	
AC	~~ACA~~ ACU ACG ~~ACC~~	9		2	
UA	~~UAA~~ UAU UAG UAC	10		2	
~~UU~~	~~UUA~~ ~~UUU~~ ~~UUG~~ ~~UUC~~	11		-	
UG	UGA ~~UGU~~ ~~UGG~~ UGC	12		2	

UC	UCA ~~UCU~~ UCG ~~UCC~~	13		2	
GA	~~GAA~~ GAU ~~GAG~~ GAC	14		2	
GU	GUA ~~GUU~~ ~~GUG~~ GUC	15		2	
~~GG~~	~~GGA~~ ~~GGU~~ ~~GGG~~ ~~GGC~~	16		-	
GC	GCA GCU ~~GCG~~ ~~GCC~~	17		2	
CA	~~CAA~~ CAU CAG ~~CAC~~	18		2	
CU	CUA ~~CUU~~ CUG ~~CUC~~	19		2	
CG	CGA CGU ~~CGG~~ ~~CGC~~	20		2	
~~CC~~	~~CCA~~ ~~CCU~~ ~~CCG~~ ~~CCC~~	21		-	
Total no. of permutation triplets per col.	6 6 6 6			24	
~~AAA~~	~~AAAA~~ ~~AAAU~~ ~~AAAG~~ ~~AAAC~~	22			-
~~AAU~~	~~AAUA~~ ~~AAUU~~ ~~AAUG~~ ~~AUUC~~	23			-
~~AAG~~	~~AAGA~~ ~~AAGU~~ ~~AAGG~~ ~~AACG~~	24			-
~~AAC~~	~~AACA~~ ~~AACU~~ ~~AACG~~ ~~AACC~~	25			-
~~AUA~~	~~AUAA~~ ~~AUAU~~ ~~AUAG~~ ~~AUAC~~	26			-
~~AUU~~	~~AUUA~~ ~~AUUU~~ ~~AUUG~~ ~~AUUC~~	27			-
AUG	~~AUGA~~ ~~AUGU~~ ~~AUGG~~ AUGC	28			1
AUC	~~AUCA~~ ~~AUCU~~ AUCG ~~AUCC~~	29			1
~~AGA~~	~~AGAA~~ ~~AGAU~~ ~~AGAG~~ ~~AGAC~~	30			-
AGU	~~AGUA~~ ~~AGUU~~ ~~AGUG~~ AGUC	31			1
~~AGG~~	~~AGGA~~ ~~AGGU~~ ~~AGGG~~ ~~AGGC~~	32			-
AGC	~~AGCA~~ AGCU ~~AGCG~~ ~~AGCC~~	33			1
~~ACA~~	~~ACAA~~ ~~ACAU~~ ~~ACAG~~ ~~ACAC~~	34			-
ACU	~~ACUA~~ ~~ACUU~~ ACUG ~~ACUC~~	35			1
ACG	~~ACGA~~ ~~ACGU~~ ~~ACGG~~ ~~ACGC~~	36			1
~~ACC~~	~~ACCA~~ ~~ACCU~~ ~~ACCG~~ ~~UACC~~	37			-
~~UAA~~	~~UAAA~~ ~~UAAU~~ ~~UAAG~~ ~~UAAC~~	38			-
~~UAU~~	~~UAUA~~ ~~UAUU~~ ~~UAUG~~ ~~UAUC~~	39			-
UAG	~~UAGA~~ ~~UAGU~~ ~~UAGG~~ UAGC	40			1
UAC	~~UACA~~ ~~UACU~~ UACG ~~UACC~~	41			1
~~UUA~~	~~UUAA~~ ~~UUAU~~ ~~UUAG~~ ~~UUAC~~	42			-
~~UUU~~	~~UUUA~~ ~~UUUU~~ ~~UUUG~~ ~~UUUC~~	43			-
~~UUG~~	~~UUGA~~ ~~UUGU~~ ~~UUGG~~ ~~UUGC~~	44			-
~~UUC~~	~~UUCA~~ ~~UUCU~~ ~~UUCG~~ ~~UUCC~~	45			-
UGA	~~UGAA~~ ~~UGAU~~ ~~UGAG~~ UGAC	46			1
~~UGU~~	~~UGUA~~ ~~UGUU~~ ~~UGUG~~ ~~UGUC~~	47			-
~~UGG~~	~~UGGA~~ ~~UGGU~~ ~~UGGG~~ ~~UGGC~~	48			-
UGC	UGCA ~~UGCU~~ ~~UGCG~~ ~~UGCC~~	49			1
UCA	~~UCAA~~ ~~UCAU~~ UCAG ~~UCAC~~	50			1
~~UCU~~	~~UCUA~~ ~~UCUU~~ ~~UCUG~~ ~~UCUC~~	51			-

UCG	UCGA ~~UCGU~~ ~~UCGG~~ ~~UCGC~~	52			1
~~UCC~~	~~UCCA~~ ~~UCCU~~ ~~UCCG~~ ~~UCCC~~	53			-
~~GAA~~	~~GAAA~~ GAAU ~~GAAG~~ ~~GAAC~~	54			-
GAU	~~GAUA~~ ~~GAUU~~ ~~GAUG~~ GAUC	55			1
~~GAG~~	~~GAGA~~ ~~GAGU~~ ~~GAGG~~ ~~GAGC~~	56			-
GAC	~~GACA~~ GACU ~~GACG~~ ~~GACC~~	57			1
GUA	~~GUAA~~ ~~GUAU~~ ~~GUAG~~ GUAC	58			1
~~GUU~~	~~GUUA~~ ~~GUUU~~ ~~GUUG~~ ~~GUUC~~	59			-
~~GUG~~	~~GUGA~~ ~~GUGU~~ ~~GUGG~~ ~~GUGC~~	60			-
GUC	GUCA ~~GUCU~~ ~~GUCG~~ ~~GUCC~~	61			1
~~GGA~~	~~GGAA~~ ~~GGAU~~ ~~GGAG~~ ~~GGAC~~	62			-
~~GGU~~	~~GGUA~~ ~~GGUU~~ ~~GGUG~~ ~~GGUC~~	63			-
~~GGG~~	~~GGGA~~ ~~GGGU~~ ~~GGGG~~ ~~GGGC~~	64			-
~~GGC~~	~~GGCA~~ ~~GGCU~~ ~~GGCG~~ ~~GGCC~~	65			-
GCA	~~GCAA~~ GCAU ~~GCAG~~ ~~GCAC~~	66			1
GCU	GCUA ~~GCUU~~ ~~GCUG~~ ~~GCUC~~	67			1
~~GCG~~	~~GCGA~~ ~~GCGU~~ ~~GCCG~~ ~~GCGC~~	68			-
~~GCC~~	~~GCCA~~ ~~GCCU~~ ~~GCCG~~ ~~GCCC~~	69			-
~~CAA~~	~~CAAA~~ ~~CAAU~~ ~~CAAG~~ ~~CAAC~~	70			-
CAU	~~CAUA~~ ~~CAUU~~ CAUG ~~CAUC~~	71			1
CAG	~~CAGA~~ CAGU ~~CAGG~~ ~~CAGC~~	72			1
~~CAC~~	~~CACA~~ ~~CACU~~ ~~CACG~~ ~~CACC~~	73			-
CUA	~~CUAA~~ ~~CUAU~~ CUAG ~~CUAC~~	74			1
~~CUU~~	~~CUUA~~ ~~CUUU~~ ~~CUUG~~ ~~CUUC~~	75			-
CUG	~~CUGA~~ ~~CUGU~~ ~~CUGG~~ ~~CUGC~~	76			1
~~CUC~~	~~CUCA~~ ~~CUCU~~ ~~CUCG~~ ~~CUCC~~	77			-
CGA	~~CGAA~~ CGAU ~~CGAG~~ ~~CGAC~~	78			1
CGU	CGUA ~~CGUU~~ ~~CGUG~~ ~~CGUC~~	79			1
~~CGG~~	~~CGGA~~ ~~CGGU~~ ~~CGGG~~ ~~CGGC~~	80			-
~~CGC~~	~~CGCA~~ ~~CGCU~~ ~~CGCG~~ ~~CGCC~~	81			-
~~CCA~~	~~CCAA~~ ~~CCAU~~ ~~CCAG~~ ~~CCAC~~	82			-
~~CCU~~	~~CCUA~~ ~~CCGU~~ ~~CCGG~~ ~~CCGC~~	83			-
~~CCG~~	~~CCGA~~ ~~CCGU~~ ~~CCGG~~ ~~CCGC~~	84			-
~~CCC~~	~~CCCA~~ ~~CCCU~~ ~~CCCG~~ ~~CCCC~~	85			-
Total No. of Valid Permutation Quadruplets	6 6 6 6				24
Total No. of Permutations Per Digitality			12	24	24
The genetic code of the second birth comprising 24 permutation quadruplets					24

RESULTS

(a) The 64-triplet genetic code is presented in **Table 2** in the 'spelt' form [(a)]

(b) The new 24-quadruplet genetic code (yet to be spelt) is presented in **Table 3**

(c) The new 24-quadruplet code in linear sequence, ref. **Table 3**

Table 2. The 64-triplet genetic code (spelt 1968) as presented in The World of the Cell p. 529 by Becker and Wayne [1] representing the first-born [(b)]

S/N	Amino acid	Associated RNA codons (code words)						No. of Codons Per Amino Acid
1	Alanine /A	GCU	GCC	GCA	GCG			4
2	Arginine /R	CGU	CGC		CGG			6
3	Asparagine /N	AAU	AAC					2
4	Aspartic Acid /D	GAU	GAC			AGA	AGG	2
5	Cysteine /C	UGU	UGC					2
6	Glutamic Acid /Q	GAA	GAG					2
7	Glutamine /E	CAA	CAG					2
8	Glycine /G	GGU	GGC	GGA	GGG			4
9	Histidine /H	CAU	CAC					2
10	Isoleucine /I	AUU	AUC	AUA				3
11	Leucine /L	CUU	CUC	CUA	CUG			6
12	Lysine /K	AAA	AAG					2
13	Methionine /M	AUG				UUA	UUG	1
14	Phenylalanine /F	UUU	UUC					2
15	Proline /P	CCU	CCC	CCA	CCG			4
16	Serine /S	UCU	UCC	UCA	UCG			6
17	Threonine /T	ACU	ACC	ACA	ACG			4
18	Tryptophan /W	UGG				AGU	AGC	1
19	Tyrosine /Y	UAU	UAC					2
20	Valine /V	GUU	GUC	GUA	GUG			4
	Signals, Start/Stop	UAA	UAG	UGA				3
	Total	21	19	10	8	3	3	64

(a) Table of spelt genetic code adapted from The World of the Cell, pp: 529 by Becker and Wayne [1].

(b) List of 20 amino acids of protein adapted from The World of the Cell, pp: 529 by Becker and Wayne [1].

(c) The 24-quadruplet genetic code structure in linear form, ref. **Table 3**.

AUGC. AUCG. AGUC. AGCU. ACUG. ACGU. UAGC. UACG. UGAC. UGCA. UCAG. UCGA. GAUC. GACU. GUAC. GUCA. GCAU. GCUA. CAUG. CAGU. CUAG. CUGA. CGAU. CGUA.

Table 3. The new 24 quadruplet genetic code (yet to be spelt) representing the last-born.

S/N	Output, $_4P_4$	Source, Chart 2	Remarks
1	AUGC	Line 28 Col 4	
2	AUCG	" 29 " 3	Representing the
3	AGUC	" 31 " 4	valid 24
4	AGCU	" 34 " 2	permutation
5	ACUG	" 35 " 3	quadruplets of the
6	ACGU	" 36 " 2	Genetic Code,
7	UAGC	" 40 " 4	valid for coding
8	UACG	" 41 " 3	application upon
9	UGAC	" 46 " 4	correct spelling in
10	UGCA	" 49 " 1	full.
11	UCAG	" 50 " 3	

12	UCGA	” 52 ” 1	
13	GAUC	” 55 ” 4	
14	GACU	” 57 ” 2	
15	GUAC	” 58 ” 4	
16	GUCA	” 61 ” 1	
17	GCAU	” 66 ” 2	
18	GCUA	” 67 ” 1	
19	CAUG	” 71 ” 3	
20	CAGU	” 72 ” 2	
21	CUAG	” 74 ” 3	
22	CUGA	” 76 ” 1	
23	CGAU	” 78 ” 2	
24	CGUA	” 79 ” 1	
Total	24		

DISCUSSION

The Genetic Code Pregnancy

The input responsible for the pregnancy is the set of 4 RNA bases, A, U, G, C (Adenine, Uracil, Guanine, Cytosine) implanted in an elongated Punnett Square which serves effectively as the womb for viviparous gestation. It is in three developmental stages, just like that of humans. The human's is divided into three trimesters (stages) on time basis, each of 3 months as presented by Alma EG [3] in Reader's Digest Association Inc. in ABC's of the Human Body. whereas that of the genetic code is divided on digitality basis into three stages; first of digitality 2 for a brood of 16 duplets, given by 4^2second of digitality 3 for a brood of 64 triplets, given by 4^3, third of digitality 4 for a brood of 256 quadruplets, given by 4^4as carried in **Tables 1 and 2** before de-isodigitation. The brood of 16 duplexes at digitality 2 of the genetic code pregnancy includes a placenta of 4 isodigital duplexes; brood of 64 triplets at digitality 3 includes a placenta of 40 isodigital triplets, while the brood of 256 quadruplets at digitality 4 of the genetic code pregnancy includes a placenta of 232 isodigital quadruplets which must be successfully separated and discarded in order to bring the genetic code pregnancy to the desired birth of a genetic code of 24 quadruplet permutations of the RNA four bases (A,U,G,C) in unique sequences characterized by integrity.

(i) The Genetic Code Pregnancy: an unwanted pregnancy.

In the light of today's advances in computational combinatorics, equipped with techniques for computing permutations of specified set (n) and selection (r) e.g., 4 from 4, as in the case of deriving the genetic code from a sequence of the four nucleotide bases A, U, G, C, it is unnecessary to resort to the elongated Punnett Square for the derivation of the genetic code from the four nucleotide bases, that gave rise to the unwanted pregnancy. But in 1954 in the absence of direct permutation computation techniques, the scientists had to resort to elongated Punnett Square, the only known probable resource apparatus, whereby pregnancy is inevitable and unavoidable, but they were not also aware that this is only an indirect source of the derivation that required separation of permutations from non-permutation for validity of products as codons.

(ii) The Genetic Code Pregnancy: a mismanaged pregnancy.

The genetic code pregnancy was mismanaged, in that the first birth was prematurely induced to make delivery at digitality 3 on account of the output forecast formula, 4^3, applicable to base 4 neo-digibreed population at digitality 3, used in the scientists' derivation effort. The premature birth is evident in the immaturity of the brood of triplets as the output from a quadruplet input set of four RNA bases.

(iii) The Genetic Code Pregnancy: ended in a mismanaged delivery.

To the Numeration Scientists the first birth of the genetic code prematurely induced at digitality 3 that comprised 64 mixed triplets, 24 of permutations representing an immature baby and 40 of non-permutations, representing the placenta is a clear evidence of mismanaged delivery on two grounds: one of allowing 40 non-permutation triplets comprising the placenta in the genetic code that is only properly constituted by 24 quadruplet permutations; and the other of allowing triplets at all in a genetic code where only quadruplets are entitled to be. It is a mismanaged delivery for mistaking the placenta for a baby and thereby retaining it as part of the immature genetic code baby of 64 triplets.

MATURITY OF GENETIC CODE BIRTH

The three conditions of premature, mature and post mature (post-term) birth found in human experience as explained in ABC's of the Human Body by Alma EG [3] are also encountered in the genetic code birth phenomenon. The genetic code maturity of birth is based on the input set 4 (digitism comprising A, U, G, C) which is specific. Any output digitism less than 4 of non-isodigital digitism is premature, and any output digitism more than 4 of non-isodigital digitism is post term or post mature. Both the pre- and the post- are not tolerated, because of obvious discrepancies in digital texture and population concerning the expected babies. The 64-triplet brood of genetic code baby of the first birth at digitality level 3 is therefore premature and unacceptable, being triplets instead of quadruplets in consonance with the input set of 4 digits in the context of permutation tenets.

FIRST BIRTH OF GENETIC CODE BABY

The birth of the first genetic code baby brood of 64 triplets embodying 40 isodigital (non-permutation) triplets that represent the placenta at digitality level 3 in **Table 1** was

midwifed by molecular biologists and took place when no permutation computational techniques were available. It was premature birth emotionally induced by molecular biologists, who were not so much aware that only permutations can make the fabric of the true genetic code. They took no cognizance of the prematurity at the stage of digitality 3, nor of the mixed textual status of the brood of 64 triplets made up of 24 permutations (non-isodigitals) and 40 non-permutations (isodigitals) representing the placenta and accepted all as the genetic code baby, now known to be only the first of two babies. It is full of combinatorial discrepancies traditionally described as irregularities in genetics literature. It was nurtured to adulthood and accorded with acceptability by way of full 'spelling' carried out in 1968 and adopted thereupon since then, in spite of the prevailing irregularities which are irreconcilable with the inerrancy of NATURE, and also a miscarriage of the objective of the substitution phenomenon in protein synthesis, whereby 4 nucleotide bases were substituted for 20 amino acids of protein as input set in the input/output multiplicative replication combinatorial system for necessary protein type proliferation and diversification. By spelling it is meant the biochemical experimental determination of the allocations of the respective 64 triplets to the 20 amino acids of protein and signals. The spelt 64 triplet genetic code is another breach of truth in science, like the hitherto flat earth.

SECOND BIRTH OF ANOTHER GENETIC CODE BABY

The birth of the second genetic code baby from the one pregnancy at digitality level 4 depicted in **Table 2** was doctored by this author, a combinatorist and took place in the early 1990s. It was mature though notionally suppressed until the situation came to the notice of this author; a Numerationist turned a combinatorist who intervened. He successfully used de-isodigitation, a kind of caesarean section to bring out the baby brood of 24 permutation quadruplets alive from the genetic code pregnancy, whereby 232isodigitals (non-permutations) representing the placenta were discarded or denied parturition. The genetic code baby of the second birth is in perfect condition. It is in agreement with the combinatorial characteristics of (a) Maturity, being of digitality 4 as the input set 4; (b) Comprising non-isodigitals (permutations) only;(c) Population strength given by ${}_4G_4 = {}_4P_4 = 4! = 4x3x2x1 = 24$ quadruplets as demanded of factorial complements for fullset selection of 4 from 4 for genetic code computation as a species of permutation. This second genetic code baby is presented in **Table 2** and is yet to be spelt.

WHY THE GENETIC CODE IS A SPECIES OF PERMUTATION AND NOT COMBINATION

This distinction between permutation and combination is reminiscent of DNA test for determination of a baby's father in disputed cases of paternal identity, as depicted in **Table 1.**

The genetic code in science is in the setting of substitution phenomenon in protein synthesis, where instead of using a sequence of the 20 amino acids of protein directly as input set in the combinatorial input/output multiplicative replication system for the proliferation and diversification of protein types, a sequence of the RNA four bases is used as input set in the multiplicative replication system for turning out permutations capable of undertaking the desired proliferation and diversification. The genetic code of 24 RNA permutation quadruplets is the output of the input set of one RNA permutation quadruplet. The genetic code of 24 permutation quadruplets reflects proliferation and diversification of the RNA quadruplet to the tune of 24 times, thus justifying its substitution and use in protein synthesis requiring proliferation and diversification of protein type in moderation and adequacy.

The agreement between genetic code and permutation on all the criteria of identification and the disagreement between genetic code and combination on the same criteria used in **Table 1** clearly show that the genetic code is a species of permutation and not combination.

CHARACTERISTICS OF THE TWO GENETIC CODE BABIES

The characteristics of the two babies presented in **Table 4** are only illustrative and not exhaustive.

FINDINGS

The first baby born at digitality3 comprising a brood of 64 mixed triplets, (24 permutations and 40 non-permutations) based on 4^3 of base 4 neo-digibreed population at digitality 3 is in serious disagreement with the output of 4 from 4 permutations i.e., ${}_4P_4 = 4! = 4x3x2x1 = 24$ quadruplets and is found to be unfit to represent the genetic code of 24 quadruplet permutations derivable from a sequence of 4 nucleotide bases taken at fullset selection of 4. The second baby born at digitality 4 comprising a brood of 24 permutation quadruplets being the residue after de-isodigitation of 232 quadruplets out of the 256 quadruplets at digitality4 base 4 neo-digibreed population, is found fit to represent a genetic code sequence of 24 permutation quadruplets.

CONCLUSION AND SIGNIFICANCE

The first twin baby of 64 triplets admixed with placenta of 40 isodigital triplets being in serious structural disagreement with the true genetic code of 24 permutation quadruplets is unfit to bear the name of genetic code, not to talk of representing it anywhere in coding application in protein

Table 4. The characteristics of the two non-identical genetic code babies.

S/N	Features	First baby, 64 triplets at digitality 3	Second baby, 24 quadruplets at digitality 4	Remarks
1	When born	1954	1990	Biodata
2	Place of birth	Punnett Square at digitality 3	Punnett Square at digitality 4	
3	Evidence of birth apart from baby	No bleeding and nothing else	Surgical wound due to caesarean section, with 232 casualties of de-isodigitation ref. **Table 2** lines 22-82	
4	Parentage	A, U, G, C Sequence in 4 from 4 permutation	A, U, G, C Sequence in 4 from 4 permutation	
5	Maturity at birth	Birth at 2nd trimester of digitality 3; immature, hence triplets, in disagreement with 4 from 4 permutation	Birth at 3rd trimester of digitality 4; mature, hence quadruplets in agreement with 4 from 4 permutation	
6.	Fitness to represent a genetic code sequence derived from an input set 4 and selection 4 in terms of (i) Size of constituent codons (ii) Potency of constituent codons (iii) Integrity of constituent codons (iv) Compability of constituent codons (v) Population of constituent codons, 24 quadruplets (vi) Ability of genetic code represented to proliferate and diversify protein type in protein synthesis	(i) Unfit being triplets (ii) Unfit, as no triplets can produce $_4P_4$ = 4! = 4x3x2x1 = 24 quadruplets (iii) Unfit, for lacking sameness of base content as the input set of 4 (iv) Codon compability prevails (v) Unfit, because of superfluity, being 64 triplets instead of 24-quadruplets due to the inclusion of the placenta consisting of 40 isodigital triplets (vi) No, for lack of collinearity with protein type 64c vs 20a + 4s	(i) Fit being quadruplets (ii) Fit, as all quadruplets can produce $_4P_4$ = 4! = 4x3x2x1=24 quadruplets (iii) Fit, the sameness of base content with the input set of 4 base types (iv) Codon compability prevails (v) Fit, being 24 quadruplets given by $_4P_4$ = 4! = 4x3x2x1 = 24 (vi) Yes, because of collinearity with protein type with four spare codons for four start/stop control signals for place and time during protein synthesis 24c vs 20a + 4s	Validation
7	Defect of Degeneracy	Present	Absent	Validity
8	Inerrancy of Nature	Undermined	Upheld	Validity
9	Status (i) Spelling (ii) Adoption	(i) Spelt since 1968 (ii) Adopted since 1968	(i) New, yet to be spelt. (ii) Adoption expected, subject to successful spelling	Incumbency

*Key to **Table 4**. c = codons, a = amino acids, s = signals, vs = versus*

synthesis/studies. The second twin baby of 24 permutation quadruplets, being the output of 4 from 4 permutations, like the true genetic code, is actually the replica of the genetic code in Nature, that is engaged in protein type proliferation and diversification in protein synthesis since Creation. More importantly, this new 24-quadruplet genetic code exhibits collinearity with protein type of 20 amino acids at one codon per amino acid with four spare codons for four start/stop control signals for time and place during protein synthesis, thus qualifying as the workforce of strength 24 in protein synthesis. The collinearity between the genetic code and

protein type is to the effect of active proliferation and diversification of the latter.

The significance is that the correct version of the true genetic code of 24 permutation quadruplets is now available to the World of Science for continued utilization.

RECOMMENDATION

Let experimental experts in molecular biology and genetics work on the spelling of this new 24-quadruplet genetic code in order to render it fit for adoption in coding application in protein synthesis/studies.

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