

Generation of DNA Codes & the Hexagrams of I Ching from the Principle of Existence

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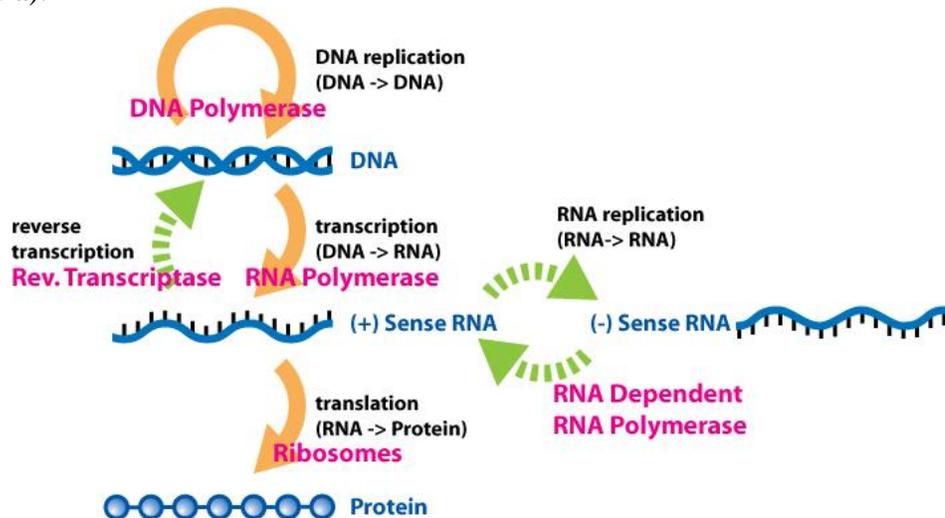
ABSTRACT

In this short paper, the authors briefly discuss their preliminary thoughts on the coding of DNA and the hexagrams of I Ching based on the principle of existence. It is shown that one may mathematically generate the DNA codes from the principle of existence. It is further shown that one may also mathematically generate the hexagrams of Chinese I Ching from the principle of existence.

Key Words: DNA, triplet codon, coding mechanism, I Ching, hexagrams.

1. Introduction

The current state of Central Dogma of molecular biology first articulated in 1958 and later re-stated in 1970 by Francis Crick (1958, 1970) is shown in the following diagram (source: Wikipedia):



From the perspective of evolutionary biology, it is widely believed that life was first RNA-based before becoming DNA-based. However, there are still many unanswered fundamental questions on the origin, nature and mechanism of RNA/DNA as discussed below.

In the early eighties of the 20th Century, the herein first author had asked and tried to answer some of these questions: (1) whether each code position of the triplet codon has unique meaning; (2) whether the triplet codon is intrinsically connected to the three dimensionality of space; and (3) whether the four bases, A, T, C & G are intrinsically connected to the four dimensionality of spacetime. Indeed, he thought that he had found the answers to these questions and wrote two unpublished papers. On reflection, the premises and conclusions in these papers were perhaps premature and/or immature just as he was young and immature himself. However, his passion to try to discovery answers to these questions plus many more such as those listed below has remained very strong. This short paper perhaps mark a new beginning for the authors.

In particulars, the following are some of the mysteries associated with DNA/RNA:

- (1) How A, U, C, G and A, T, C, G became the four bases/letters of genetic language? Why just four? Were they due to random chance as commonly accepted/believed or were their selections somehow guided by some kind of intelligent force or field?
- (2) Why the RNA/DNA codon is triplet? Was it again just random chance or was deeper principle involved? In other words, does each code and/or code position in the triplet codon has certain meaning?
- (3) Why the coding of amino acids by the RNA/DNA codons are degenerate?
- (4) Are there further coding principles and/or mechanisms involved in forming the RNA/DNA sequences?
- (5) What are all the functions of DNA? How does DNA perform all these functions?
- (6) Is DNA a program of a quantum biocomputer? How does this biocomputer compute?

2. Possible Coding Mechanism Based on the Principle of Existence

The herein authors have recently put forward the principle of existence (Hu & Wu, 2010). Based on this principle, one may mathematically generate the DNA code as follows:

$$1 = e^{i0} = e^{i0} e^{i0} e^{i0} = e^{ix-ix} e^{iy-iy} e^{iz-iz} = \left(e^{ix} e^{iy} e^{iz} \right) \left(e^{-ix} e^{-iy} e^{-iz} \right) \quad (4.1)$$

$$\rightarrow (A \quad T \quad G)_{+Condon} (T \quad A \quad C)_{-Anticoden} \text{ etc.}$$

where x, y & z are hypothesized to be three parameters for coding information in each DNA strand/sequence and the following selections and mappings are used at the code level:

e^{ix} is allowed to have the value $+1, +i, -1$ or $-i$ respectively at the code level

e^{iy} is allowed to have the value $+1, +i, -1$ or $-i$ respectively at the code level

e^{iz} is allowed to have the value $+1, +i, -1$ or $-i$ respectively at the code level (4.2)

e^{-ix} is allowed to have the value $-1, -i, +1$ or $+i$ respectively at the code level

e^{-iy} is allowed to have the value $-1, -i, +1$ or $+i$ respectively at the code level

e^{-iz} is allowed to have the value $-1, -i, +1$ or $+i$ respectively at the code level

Mapping: $\{+1, +i, -1, -i\} \rightarrow \{A, C, T, G\}$ (4.3)

Also see Figure 2 below:

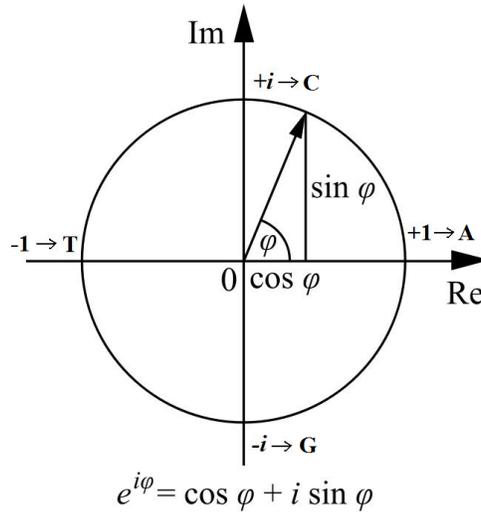


Figure 2

The above selections and mappings produce the $4^3=64$ codons and anti-codons of DNA respectively.

In this coding system, $\{A, C, T, G\}$ as a set have the following algebraic properties:

$$\begin{aligned}
 A + T + C + G &= 0 \\
 A^2 + T^2 + C^2 + G^2 &= 0 \\
 &\dots \\
 A^n + T^n + C^n + G^n &= 0
 \end{aligned}
 \tag{4.4}$$

where $n=1,2,3,4,\dots$

Further hypothesizing that x, y & z are three parameters encoding spatial information of a protein in a DNA strand, one may find meaning for each code position of the triplet codon and possible

connection between the triplet codon and the three dimensionality of space. However, these are just preliminary hypotheses/speculations at this point.

3. Generation of Hexagrams of I Ching

There are many metaphysical discussions about the connections of DNA code and the Chinese I Ching. Applying the principle of existence (Hu & Wu, 2010), one may generate the hexagrams of I Ching as follows:

$$\begin{aligned}
 1 &= e^{i0} = e^{i0} e^{i0} e^{i0} = e^{ix-ix} e^{iy-iy} e^{iz-iz} = \left(e^{ix} e^{iy} e^{iz} \right) \left(e^{-ix} e^{-iy} e^{-iz} \right) \\
 &= \frac{\begin{pmatrix} e^{ix} e^{iy} e^{iz} \\ e^{ix} e^{iy} e^{iz} \end{pmatrix}}{\begin{pmatrix} e^{ix} e^{iy} e^{iz} \\ e^{ix} e^{iy} e^{iz} \end{pmatrix}} \rightarrow \frac{\begin{pmatrix} e^{i\alpha} \\ e^{i\beta} \\ e^{i\gamma} \end{pmatrix}}{\begin{pmatrix} e^{i\psi} \\ e^{i\phi} \\ e^{i\chi} \end{pmatrix}} \rightarrow \frac{\begin{pmatrix} \text{---} \\ \text{---} \\ \text{---} \end{pmatrix} \text{Upper Trigram}}{\begin{pmatrix} \text{---} \\ \text{---} \\ \text{---} \end{pmatrix} \text{Lower Trigram}} \text{ etc.} \tag{5.1}
 \end{aligned}$$

where x , y & z are hypothesized to be three parameters for coding information in I-Ching before the separation of the outer aspect and the inner aspect; α , β & γ are three parameters for coding information of outer aspect; ψ , ϕ & χ are three parameters for coding information of inner aspect; and the following selections and mappings are used at the hexagram/code level:

$$\begin{aligned}
 e^{i\alpha} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level} \\
 e^{i\beta} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level} \\
 e^{i\gamma} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level} \tag{5.2} \\
 e^{-i\psi} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level} \\
 e^{-i\phi} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level} \\
 e^{-i\chi} &\text{ is allowed to have the value (collapse to) } +1, \text{ or } -1 \text{ respectively at the code level}
 \end{aligned}$$

$$\{+1, -1\} \rightarrow \{ \text{--- (Yang)}, \text{-- (Yin)} \} \tag{5.3}$$

The above selections and mappings produce the $2^6=64$ hexagrams of I-Ching.

In this coding system, {Yang, Yin} as a set have the following algebraic properties:

$$\text{Yang} + \text{Yin} = 0 \quad (5.4)$$

To accommodate “Changing Yang” and “Changing Yin,” the following expanded selections and mapping can be used:

$$\begin{aligned} e^{i\alpha} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \\ e^{i\beta} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \\ e^{i\gamma} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \quad (5.5) \\ e^{-i\psi} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \\ e^{-i\phi} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \\ e^{-i\chi} &\text{ is allowed to have the value (collapse to) } +1, +i, -1 \text{ or } -i \text{ respectively at the code level} \\ \{+1, +i, -1, -i\} &\rightarrow \{\text{Yang}, \text{Changing Yang}, \text{Yin}, \text{Changing Yin}\} \quad (5.6) \end{aligned}$$

The above selections and mappings produce the $4^6=4096$ hexagrams of I-Ching which include the Changing Yang and Changing Yin.

Therefore, the 64 DNA Codons and their corresponding anti-codons belong to a subset of the 4096 hexagram set.

In this expanded coding system, {Yang, Changing Yang, Yin, Changing Yin} as a set have the following algebraic properties:

$$\begin{aligned} \text{Yang} + \text{Yin} + \text{Changing Yang} + \text{Changing Yin} &= 0 \\ \text{Yang}^2 + \text{Yin}^2 + (\text{Changing Yang})^2 + (\text{Changing Yin})^2 &= 0 \quad (5.7) \\ &\dots \\ \text{Yang}^n + \text{Yin}^n + (\text{Changing Yang})^n + (\text{Changing Yin})^n &= 0 \end{aligned}$$

where $n=1,2,3,4,\dots$

4. Conclusion

In this short paper, the authors have briefly discussed their preliminary thoughts on the coding of DNA and the hexagrams of I Ching based on the principle of existence. It has been shown that one may mathematically generate the DNA codes from the principle of existence. It has been

further shown that one may also mathematically generate the hexagrams of Chinese I Ching from the principle of existence.

Therefore, this paper perhaps mark a new beginning of the authors' voyage of trying to solve the mysteries associated with DNA. We urge that all genuine truth seekers join the efforts. In closing, let us remind ourselves the fierce urgency of now. This is no time to engage in the luxury of silence or to take the tranquilizing drug of innocence. Now is the time to make paradigm-shifting progress in biological sciences & DNA research. Now is the time to rise from the dogmas of random chance and chaos of evolutionary biology to the sunlit path of living universe. Now is the time to lift Science from the quick sands of arrogance, close-mindedness & intolerance to the solid rock of sacred path to truth.

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