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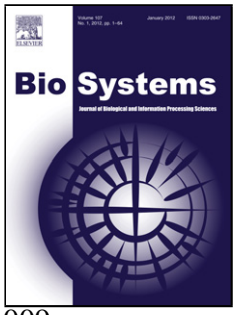

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ACCEPTED MANUSCRIPT

The Cipher of the Genetic Code

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Abstract. In the paper is presented a new approach to understanding of the genetic code. In order to overcome the key paradox (and Darwinian selection problem) that the highly complex amino acid Phe is encoded by the simplest codons (UUY), and the simplest Gly encoded by the most complex codons (GGN); as well as the paradox of the duplication of some amino acids in the encoding process (Leu, Ser, Arg), we proposed an extension of the notion (and concept) of genetic code. For a better (and lighter) understanding of genetic coding, we proposed a hypothesis after that (under the conditions of allowed metaphoricity and modeling in biology) genetic code has to be understood, analogously to understanding in cryptology, as the unity of the three entities: the code, the cipher of the code and the key of the cipher. In this hierarchy the term (and notion) "genetic code" remains what has been from the beginning: a connection between four-letter alphabet (four Py-Pu nucleotides, in form of codons) and a twenty-letter alphabet (twenty amino acids); the cipher is a specific chemical complementarity in chemical properties of molecules in the form: similarity in dissimilarity versus dissimilarity in similarity ("Sim in Diss vs Diss in Sim") and the key of cipher: the complementarity on the binary tree of the genetic code in the form: 0-15, 1-14, 2-13, ..., 6-9, 7-8. Just only with this understanding, it appears a possibility for an additional understanding that within the two main Genetic Code Tables (of the nucleotide doublets and nucleotide Triplets) exists a sophisticated nuancing and balancing in the properties of th constituents of GC, including the balance of the number of molecules, atoms, and nucleons.

Keywords. Genetic code; cipher of the code; the key of the cipher; binary tree; Gray code; protein amino acids; canonical amino acids; particles number balance.

1. INTRODUCTION

From the time when the genetic code (GC) began to be considered practically deciphered (Crick, 1966; Rumer 1966), up to the present day, on the scientific scene is a paradigm according to which, in the interpretation of genetic code, the terms (and notions) "cipher" and "code" are synonyms. The word, however, must be about that thing, that in the interpretation of the genetic code, the terms "code", "cipher" and "key of the cipher" must be distinguished, analogously as it does in cryptology and cryptography. Just this position will be the backbone of this paper.

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