

This chapter is second part of a chapter devoted for the TGD view about prebiotic evolution but gradually extended so that it became natural to drop the attribute `\blockquote{prebiotic}`.

`\begin{enumerate}`

`\item` Quantum aspects of TGD inspired biology are discussed. Number theoretic vision based on the notion of adelic physics predicts a hierarchy of Planck constants giving rise to a hierarchy of phases of ordinary matter behaving like dark matter. The notion of magnetic body (MB) as a many-sheeted structure is introduced: the number theoretic origin of many-sheetedness was not clear when this chapter was written for the first time and I proposed that the imbedding space itself could be many-sheeted. The notion of gravitational Planck constant introduced by Nottale is interpreted in the TGD framework as a source of quantum coherence at the gravitational part of MB even in astrophysical scales. Water memory and homeopathy are discussed as manifestations of MB of water and suggesting that water as such is a primitive prebiotic life form.

`\item` A great vision about biological evolution and evolution of brain is discussed on basis of the wisdom gained from the construction of the models of sensory receptor and generalized EEG.

`\item` A model for the evolution of the recent genetic code (3-codons) as a fusion of codes for which codons are nucleotides (1-codons) and di-nucleotides (2-codons) is discussed. The symmetries of the genetic code, the observation that tRNA can be seen as a fusion of two hairpin like DNA molecules, and the finding that the first nucleotides of 3-codon code for the reaction path leading from a precursors of the amino-acid to amino-acids for hydrophobic/hydrophilic dichotomy, serve as motivations of the model. 1- and 2-codes corresponding to the two forms of RNA (the exotic  $2^{\prime}$ - $5^{\prime}$  RNA and the usual  $3^{\prime}$ - $5^{\prime}$  RNA) would have prevailed in RNA world. Amino-acids would have served as catalysts for the copying of RNA on one hand, and RNA molecules would have catalyzed the formation of amino-acids from their precursors on one hand, meaning the presence of a positive feedback loop. In the transition to DNA-amino-acid era RNA began to be translated to amino-acid sequences.

`\item` TGD based view about the evolution of genetic code is compared to the views of McFadden. This section is a little bit out of date. For instance, the hypothesis that magnetic body of DNA could induce mutations purposefully is not discussed. This hypothesis is natural if one believes that magnetic flux tubes

connecting bio-molecules play a key role in bio-catalysis. This idea is discussed in the chapter devoted to protein folding.

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