

**Poster II-40**

**Quantum-Chemical Insight Into the Chemical Nature of Genetic Codes**

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An attempt of simultaneous conceptual insight into the chemical nature of dominant genetic code and “deviant” codon assignments (e.g., in mitochondrial code) is undertaken. The formation of universal and specific genetic codes could be interpreted from one general standpoint in physico-chemical evolutionary-environmental context based on interplay of thermodynamic and kinetic stability factors connected with molecular structure and symmetry of codon units and electronic nature of prebiotic archetypal attacking chemical agents. The problem is considered in the terms of codon-anticodon and attacking chemical reagent – codon units’ interaction energies, and the quantum molecular similarity measures between codons and amino acids.

The findings may be implicated in variety of biomedical phenomena including interaction of nuclear and mitochondrial genomes, oxidative stress, neurodegeneration, and aging processes.

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