**Plausible Answers to Questions Regarding Abiogenesis on Prebiotic Earth**

GRANT COOPER, Texas Tech University — Evidence indicates Earth’s surface acquired necessary life-giving volatile elements - carbon, nitrogen, sulfur - from a collision with a Mercury-like planetary embryo 4.4 billion y ago. Icy comets containing hydrocarbons collided with a cooling prebiotic Earth to create impact reactive environments that - via classical anthropic causality - introduced primordial “ribozyme-like” RNA complexes which could duplicate a few molecular units per 24 hrs. Random classical processes introduced energetically accessible duplex RNA segments containing keto-amino (-NH₂) hydrogen bonds, where hydrogen bonded amino protons were subjected to quantum uncertainty limits, \( \Delta x \Delta p_x \geq \hbar/2 \). This introduced a probability of EPR arrangement, keto-amino (entanglement) \( \rightarrow \) enol-imine, where reduced energy product protons are each shared between two indistinguishable sets of intramolecular electron lone-pairs belonging to enol oxygen and imine nitrogen on opposite genome strands. Product protons participate in entangled quantum oscillations at \( \sim 410^{13} \text{s}^{-1} (\sim 4800 \text{m s}^{-1}) \) between near symmetric energy wells in decoherence-free subspaces until measured, in a genome groove, \( \delta t < 10^{-13} \text{s} \), by an evolutionary selected Grover’s quantum bio-processor. This quantum entanglement resource for reactive evolution provides a sequence of \( \sim 12 \) incremental entanglement-enabled improvements to genome fitness, of the form: RNA-ribozyme \( \rightarrow \) RNA-protein \( \rightarrow \) DNA-protein.

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