

I have worked decades in attempting to combine various basic ideas of TGD inspired quantum biology to a single narrative about how life could have evolved at the Earth and possibly is evolving at other planets.

TGD introduces several new concepts, such as the new view of space-time and classical fields. A new quantum ontology predicts phases of ordinary particles labelled by effective Planck constant  $h_{eff}$  behaving like dark matter and residing at the field bodies. Zero energy ontology (ZEO) is part of the new quantum ontology. The basic challenge has been the fusion of these notions with the standard approach involving electromagnetic fields and biochemistry. In particular, the Pollack effect and its generalizations have turned out to be central in the development of TGD based views of living matter. Also the TGD views of cell membrane and of neuron and nerve pulse and EEG examples should be integrated with standard biochemistry- and bio-electricity based approaches.

Notions such as acids and bases and electrolysis, electronegativity, oxidation, reduction, and redox reactions belong to the basic conceptual arsenal. One should also understand how these notions relate to basic biological processes such as photosynthesis, chemical storage of metabolic energy and respiration.

Could the new physics provided by TGD provide totally new insights? The extreme efficiency of biocatalysis remains a mystery in the biochemistry based approach: where does the energy making it possible to overcome potential barriers preventing the reactions come from? How did the basic information molecules and genetic code emerge and why is the genetic code what it is? Is there some hidden new physics behind the replication of DNA, its transcription of DNA to mRNA, and translation of mRNA to proteins? How did the genetic code evolve?

In the sequel I consider the basic notions involved. I also discuss some examples related to the evidence for life on Mars and the finding of JWST that organic molecules relevant for life existed much before the planet Earth.