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Horizontal Gene Transfer: No Dice-just a Virus as Alpha and Omega

When the International Human Genome Sequencing Consortium found a set of 223 proteins similar to bacterial proteins, it was likely that the genes entered the vertebrate lineage by horizontal gene transfer (HGT) from bacteria. Once considered an extraordinary event, experimental documentation of HGT in many studies supports significant gene shuffling in "the domains Bacteria, Archaea and Eukarya - including plants, fungi and human cells." (1) Today scientists recognize HGT as a common biospheric event and "Biology's next revolution" (2). This emerging picture of microbial gene-swappers is expanding our idea of living organisms as well as revising concepts such as species barriers and evolution. HGT is no longer a random, extraordinary event, but was it ever?

Microbes on earth emerged four billion years ago (bya). Operating as vehicles for viral sex or HGT, bacteria allowed viral genes to spread widely. Around 1 bya, Bacteria, Archaea and their viruses fused into the Eukarya from which plants, animals and humans developed. (3) Theories that virus invented DNA (4) or that complex cell nuclei descended from virus (5) seem reasonable today in light of patterns of gene expression representing the history of the human lineage. As an example, the elephant shark, a jawed vertebrate diverging from the common ancestor of human and teleost fish lineages about 530 million years ago, exhibits conserved noncoding elements (CNEs) vertebrate-specific to those in the human genome. The genes associated with these CNEs are rich in protein domains such as helix-turn-helix motif and lambda-like repressor (6), suggesting that a lambdoid virus may be a deep structure in our gene pool.

The Alpha Virus

Could the alpha creator virus of life be a lambdoid bacteriophage? A recent proposal suggests this virus could be built from nothing, with one icosahedral capsid gene functioning by itself as an agent of HGT. (7)

To be the alpha world-heart, a lambdoid bacteriophage should exhibit its morphology in the Universe, preferably in the cosmic radiation afterglow from the Big Bang. A recent analysis of light data remaining from the Big Bang, observed by NASA's Wilkinson Microwave Anisotropy Probe (WMAP) determined that the shape of our universe is a dodecahedron enclosed in a hypersphere. (8) The dodecahedron is dual to the icosahedron, suggesting that the microstructure that left this imprint may be bacteriophage Lambda (phage for short). Its shape is composed primarily of an icosahedral head enclosed in a sphere.

The very abundant phage Lambda is used by genetic engineers who bond genes from plants, fungi or human cells into a specific site of its genome. Then this recombinant molecule attaches to its host *E. coli* cell, injecting its DNA inside for transformation and propagation. Within Nature, Lambda exhibits two lifestyles that may also qualify it as a world-heart: in lysogeny controlled by *cI* protein, the adsorbed DNA goes dormant on the host cell chromosome as a prophage, replicating inactively with the bacterial DNA in successive cell generations in Time. In lysis controlled by *cro* protein, the dormant genome becomes active, rising from the dead to self-assemble clones via rolling circle replication in the quantum domain. This dual potential generates two DNA-texts producing matter embedded in spacetime geometry, as well as energy embedded in quantum phenomena. When considering Lambda morphology and function, the close relationship between biology and physics becomes obvious.

More specifically, during lytic transformation the Lambda genome becomes a negatively-supercoiled structure or a left-handed form of the DNA molecule called Z-DNA. Negative supercoils arise behind a transcribing RNA polymerase, which plows straight through the DNA double helix instead of rotating around the DNA (9). A biosemiotic study of Ancient Egyptian texts provides detailed evidence that the topology of this quantum DNA magnetic field wormhole is reciprocal to the formation/evaporation processes of a tiny black hole connected to a white hole (a micro Einstein-Rosen bridge or wormhole), with the lysing progeny equivalent to escaping radiation. In this biophysical code of 870 interlinked thematic signs, a complex knowledge of modern science grounds Egyptian literature and art, explaining human potential at death for HGT and lytic transformation mediated by phage Lambda. (10)

The Omega Bridge

Beguiled by the beauty of fused biophysics, a flash of irrational zeal might cause one to remember H. G. Wells' forecast of a final viral structure for Man, one similar to his sexless machinic Martians: "They were heads-merely heads" (11). Placing all speculative science fiction aside with biosemiotic studies, we can still reason that if we descended from a virus, we may be a species capable of DNA-swapping evolutionary moves at physical death.

Since many of Nature's laws are still veiled, it is clearly illogical to argue absolutely that HGT for human DNA is not possible after death based on the absence of hard evidence. At death, genetic barriers may no longer exist that would prevent HGT and transformation mediated by phage Lambda. Would the quantum ecological niche then determine the actual pattern of life and reproduction of the lineage as has been proposed by biologists? (12; 13) Would death's uncertain environment allow us to select "evolvability" or DNA exchange with a virus (14) and transformation via a negatively supercoiled DNA wormhole, a possible parallel to backward-Time movement in a micro Einstein-Rosen bridge?

The quantum universe is random, yet we can predict a particle approaching an event horizon will bounce back or go backward in Time. The CPT theorem, with its three parameters of Charge, Parity and Time reversal, is a basic precept of particle physics. According to the theorem's logic, if there is a violation of C, there most likely will be a violation of P and T. After discussions with Stephen Hawking, Andrew Strominger investigated CPT, finding that in two dimensions, weak CPT

invariance can be restored in a sector of Hilbert space by including the possibility of white hole formation/evaporation, viz., the time reverse of black hole formation/evaporation. (15) Also, a finite probability exists that any particle approaching the event horizon will bounce back (along with CPT reversed Hawking radiation), a reflection that depends on its low energy, clockwise direction and projection on the black hole axis of rotation (16), the same conditions detailed in Egyptian texts (10).

Perhaps Einstein was right, "God does not play dice," and the description given by random quantum physics is incomplete (17), for an order may exist, that is--no Time, no dice, just a creator virus beyond a biological network of Einstein-Rosen bridges back to it.

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