Insights arising.

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Abstract

Michelson and Morley measuring the velocity of light in 1887 challenged public confidence in science. Heisenberg's uncertainty, Einstein's relativity and Le Maître's Big Bang cosmology are counterintuitive. My discovery of the phase transition in ice as an undergraduate in 1967, recently corroborated by reports of the phase transition in ice XIc at 72K, restores that confidence.

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Introduction

All the sixteen ice crystal forms now known accommodate the irregular tetrahedral shape of H2O molecules. Fluctuating temperatures during a primordial ice age caused ice XIc forming in polar pools of liquid N2 to release latent energy as λ~4μ laser light. Multiple reflections by cloud and surface ice polarised it and deoxynucleotides on tropical water surfaces were photo- phosphorylated, creating chiral DNA, basis for life's origin. 'Transport DNAs', tDNAs, tRNA analogues, were probably the first bio- active molecules. Embedding in coacervate membranes, they concentrated life's ingredients within. The resulting metabolism replicated tDNAs, signalling life's origin. DNA's greater stability than RNA favours it as life's precursor. 'Differentiation DNAs', dDNAs, selecting tDNAs is analogous to mRNAs selecting tRNAs for protein synthesis. ~2,000 tDNAs of 64 types resident in all cell membranes control nine independent metabolic pathways and deploy trace elements as carriers. tDNA mutants and dietary trace element deficits account for most morbidity [1].

The resonant cavities subcellular organelles afford for λ enable more efficient electro-mechanical coupling than thermodynamic engines. Sarcomeres contract to form ½-wave resonant cavities for muscle contraction. Chloroplast grana form resonant cavities for visible light for photosynthesis. 'Minions' are DNA/oligopeptide complexes, they counter DNA's acidity and pack chromosomes for optimal replication. Their bilateral proton-ordered H- bonds function as biological clocks, chips in the brain and safe nuclear fusion reactors. Their logic introduces new scientific axioms. The periods of their 11th, 13th and 18th coils predict daylength, Sunspot cycle period and the age of the Universe. H-bond settings store 18-letter words. Resonance between minions holding similar words enables memory recall, nerve fibres serve as wave guides.

Materials and Methods

During a Physics practical class as a Cambridge undergraduate testing the Clausius-Clapeyron relation for N2, mistakenly immersed the He thermometer. Water sealing the bung leaked in and coated the SiO2 bulb with ice. As an extract pump and Cu conductor kept it boiling, manometers recorded temperature and pressure. Plotting temperature v pressure showed hysteresis, not the expected straight line.

During a primordial ice-age, snow fell into polar pools of N2 and formed ice XIc. Temperature fluctuations drove its phase transitions, releasing 'ice- light'. Polarised by multiple reflection in cloud and surface ice like Marconi's trans-Atlantic radio signals, deoxynucleotides.

Transport DNAs

The larger complexes morphine insertion, R, creates block tDNAs, preventing pain transmission. Pain sensitivity increases when more tDNAs are recruited to compensate, explaining drug addiction.

Minions

'Minion' connotes mind and subservience. Minions comprise 189 anti- parallel β-pleated sheet oligopeptide hairpins E, their alternate neutral/basic A|L|I|V/K|R residues hold nine base pairs flat. Bacterial protein gramicidin S, F, has DFs, F, analogous to bases. P forming ~17° bends between adjacent units creates 21-unit coils. They degrade to nucleosome core particles, NCPs, on extraction, G.

Biological clocks

Light passes thrice around a minion coil in:

$$r = 3 * 189 * 7.37{*}10^{-10} * 3{*}10^{8} \approx 1.39{*}10^{-15}\ \text{secs}$$

β- sheet spacing is 7.37Å and 3∗108 the velocity of light. Formula 63Nτ, N=1 to 18, calculates periods. Those of the 11th, 13th and 18th coils predict day-length, Sunspot cycle period and the age of the Universe.

Life elsewhere

A climate enabling ice XIc, deoxy-nucleotides and coacervates to coexist suffices for life's origin. DNA and ice-light are probably unique. Alternatives need be identified before assigning scarce resources to SETI.

Nine metabolic pathways

Mutually independent metabolic pathways under endocrine control, each has associated pathologies. They predate ribosomes and enzyme catalysis and simplify those depicted in commercial charts. The ~ 2,000 tDNAs of 64 types present in all cell membranes are lost on extracting DNA for sequencing, so undetected. The α-helical barrels they complement obscure their activity. When bacterial chromosomes visit the membrane, they form pumps [2].

'Differentiation DNAs', dDNAs selecting tDNAs establish cell diet and differentiate tissues, analogous to mRNAs selecting tRNAs for protein synthesis. The width of adjacent tDNAs determines the triplet code. The pump mechanism, involves carrier/substrate complexes making a lock-and-key fit, activating the release of phosphodiester bond energy as λ from ATP by adenyl- cyclase. Membrane potential replaces the original lightning, polarising H-bonds lining the tDNA pore. λ depolarizes them and the residual electric field drives transport.

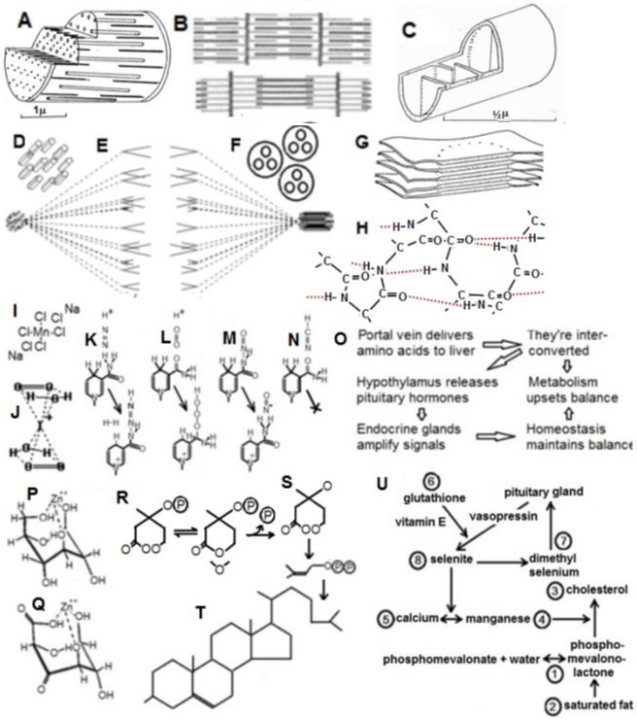

Figure 1. *Sarcomere, B Huxley's model, C mitochondrion, D centriole, E spindle.*

Results and Discussion

The Biuret test illustrates copper's high affinity for peptide bonds. Hepatic amino acid interconversion O, ensures the brain receives balanced mixture, maintaining sanity. Cu controls growth disorders: acromegaly, dwarfism and gigantism. Cu bracelets reputedly ameliorate arthritis. Copper accumulating in the eyes causes Wilson's disease. The Cu in coil contraceptives competes with Zn, reducing sperm glucose uptake and preventing their reaching ova (Table 1) [3].

Table 1. *The enable estimation of the wavelength, λ, of latent energy released as infrared laser light.*

Name	Value
Dipole moment	μ = 1.85D
Dielectric constant	ε = 3.1
Space dielectric constant	ε0 = 8.85*10-12 F-m
Planck's constant	h = 6.63*10-34 m2 kg/s
Avogadro number	N = 6.02*1023
Velocity of light	c = 3*108 m/sec

Pavlov observed his dog enjoying sweet diabetic's urine and suggested anticipating food promotes insulin secretion. Banting and Best discovered insulin, its structure has been determined. All carbohydrate metabolites feature the Zn++ binding 'triangle of sweetness'. Animal blood and plant xylem/phloem sugar concentrations are normally kept steady, failure signifies diabetes [4,5].

Conclusion

Robert Malthus wrote: 'Population increase limits the means of subsistence resulting from prosperity and when repressed misery and vice reduce it'. Pasteur established life doesn't arise spontaneously. Miller and Urey synthesized amino acids from CH4 and NH3. Michelson and Morley measuring the velocity of light compromised public faith in science. Biological clocks being in phase contradicts Heisenberg's uncertainty principle.

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