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PEACE, HEALTH AND LONGEVITY

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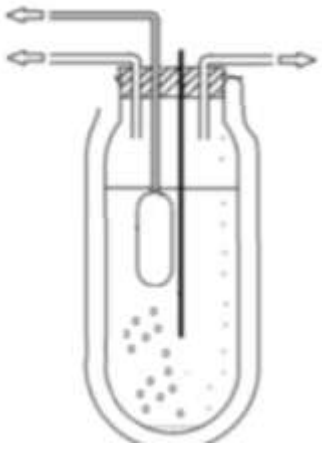
ABSTRACT

Reports of *ice XIc* corroborated my chance discovery of the phase transition at 72 K in ice crystallised in liquid N_2. Ice XIc crystallised on Earth's poles during a primordial ice age emitting ~4μ infrared laser light, *ice-light*. Polarised by multiple reflection, it activated nucleotides, turning tropical waters to chiral DNA *noodle soup*. Ice-light powered the first bioactive molecules, *transport DNAs*, selectively concentrating life's precursors in *coacervates*. Their descendants, present in all cell membranes, explain most common maladies. Chromosomal DNA isn't double helical, *minion* complexes pack DNA on chromosomes better than nucleosome core particles. They replicate efficiently, serve as biological clocks, chips-in-the-brain and molecular-scale nuclear fusion reactors. New axioms compensating for the minute discrepancies quantum theorists and cosmologists pursue may restore public confidence in science. Public education, interdisciplinary discourse and empirical verification are prerequisite for engineers to implement my proposals. Pollution, extinction and resource conservation need urgent attention.

ORIGINAL OBSERVATION

I misinterpreted instructions for a class practical confirming Clausius-Clapeyron's relation for N_2. Its replication might persuade sceptics to *think outside the box*. The He thermometer wasn't intended to be immersed, plotting P v T showed hysteresis. Water used to seal the bung had crystallised on the silica bulb. Had a phase change in ice Ic accommodating H_2O molecules' irregular shape distorted it?

Recent corroborative reports of *ice XIc* enabled publication of **Science Uncoiled**.



Manometers measure temperature and pressure, pump extracts N2, Cu wire conducts heat.

Ice, the ordering force

The *ice rule* dictates all H_2O molecules have four neighbours randomly connected O···H−O or O−H···O. Some ice forms[1] are proton ordered under extreme conditions, only ice XIc lacking Pauling's residual entropy[2] has H_2O molecules aligned at ambient pressures. Sharing diamond's structure and strength, it undergoes a phase transition at 72K[3] releasing latent energy as λ ~4μ laser light, *ice-light*, life's ordering force, Figure 1(a).

Mercury's poles and Jupiter's moons[4] are sufficiently cold to liquefy N_2. During a long primordial ice age, Earth's O_2-free atmosphere enabled ice XIc crystallising in polar liquid N_2 to coexist with Darwin's *warm tropical waters*.[5] Temperature fluctuations released ice-light, cloud and surface ice reflected and polarized it like 4μ infrared used to deice aircraft wings.[6] Deoxyribonucleotides[7] on tropical ocean surfaces with matching chirality were activated, creating *order from chaos*, DNA *noodle soup*.

Trace element nutrition

DNA accumulated, some formed tRNA analogues *transport DNAs*, tDNAs, sharing their H-bond-lined *hole*, Figure 1(b). They embedded in lightning- charged coacervate membranes and ice-light depolarised their H-bonds, now membrane potential replaces lightning and adenyl cyclase releases ATP's phosphodiester bond energy, driving a ratchet pump mechanism. The residual

electric field transports charged complexes.

Mendeleev's periodic table[8], Figure 1(c), shows essential, toxic and unused trace elements. DNA reported around sperm's entry to ovum suggested tDNAs are inherited independent of nuclear chromosomes. Table 1 lists 9 independent metabolic pathways: motility, sensitivity, excretion, respiration, growth, rigidity, assimilation, reproduction and osmoregulation deploying trace elements: Ca, K, Mn, I, Cu, F, Zn, Ag and Se as carriers.

Differentiation DNAs, dDNAs select from ~2,000 tDNAs of 64 types resident in all cell membranes, determining cell diet. mRNAs selecting tRNAs for protein synthesis are analogous. dDNAs explain tissue differentiation better than mRNA-encoded proteins and barrels of α-helices. They're membrane bound, so lost during extraction and elude detection. Substrate selection, not enzyme catalysis, differentiates tissues.

Table 1: Nine metabolic pathways.

#	SYSTEM	TISSUE	CARRIER COMPLEXES	PATHOLOGY
1	motility	muscle	Ca^{++} | Mg^{++} and $SO_3^{=}$	spasticity
2	sensitivity	nerve	Na^{+} | K^{+} and adrenalin	depression
3	excretion	kidney	Mn^{++} and salt	kidney failure
4	respiration	lung	I^{+} and $O_2.H_2O$	bipolar disorder
5	metabolism	liver	Cu^{++} and amino-acids	growth defects
6	rigidity	bone	$SiF_6^{=}$ | $AlF_6^{=}$ and apatite	Alzheimer's
7	assimilation	gut	Zn^{++} and glucose	diabetes
8	reproduction	gonads	Ag^{+} and pyrophosphate	cancer
9	water-pumping	heart	Ca^{++} | $Mn^{++}$and $SeO_3^{=}$	heart disease

Simpler than commercial charts, tDNAs constitute life's molecular vocabulary, trace elements its atomic alphabet and metabolic pathways its grammar.

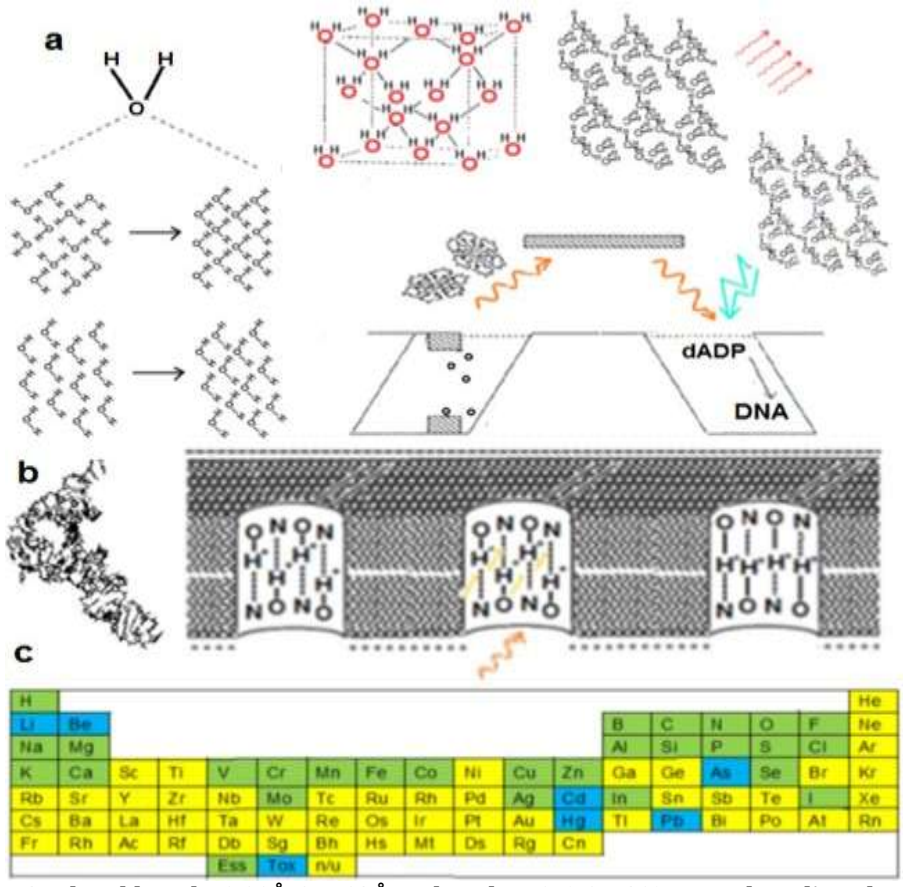


Fig 1(a): H_2O has OH bond lengths 0.96Å & 1.82Å and angles 105° & 120°. Ice Ic has aligned molecules, it forms ice XIc releasing ~4 μ laser light. 90° & true angles compared in 2D. During a primordial ice age, snow recrystallized as ice XIc in liquid N_2. Multiple reflection in cloud & surface ice polarised the ice-light released. It photo-phosphorylated deoxynucleotides on primordial soup surfaces creating DNA. (b) X-ray diffraction image[9] of $tRNA_{Phe}$ & ice-light driven pump mechanism. (c) Periodic table showing essential, toxic & un-used elements.

Motility

Subcellular organelles mediate mechano-chemical coupling more efficiently than thermodynamics, Figures 2(a, b). Sarcomeres of striated muscle form ½-wave resonant cavities for λ, explaining their contraction better than Huxley's actin-myosin cross-bridges.[10] Basal bodies trigger serial bouts of ciliary and flagellar motion.

Centrioles fire on nine cylinders and pass energy to chromosomes via the inter-twined α-helical H-bonds of spindle fibres. Protons propelled along *minion* tunnels generate alternating magnetic field. their frequencies are chromosome length dependent, repelling daughter chromosomes at cell division. If centrioles pulled chromosomes apart they'd contravenes Newton's 3rd law of motion.[11]

Mitochondria & chloroplast grana, commensurate with λ & sunlight wavelengths respectively, accommodate oxidative phosphorylation & photosynthesis and activate ATP.

Low pH inhibits liver glutathione oxidation to sulphite causing cramps. $SO^{=}$ exchanges Mg^{++} for Ca^{++}, Mg is cofactor for kinase enzymes releasing ATP's phosphodiester, $P_i \sim P_i$ bond energy as λ.

Sensitivity

tDNAs' high-voltage synaptic pores stabilize 4-/6-member catecholamine rings around Na^+/K^+, exchanging $3Na^+$ for $2K^+$ changes cell charge & metabolic rate. Na^+ resembles H_2O, the large hydrates it forms render cell sap viscous & slow metabolism, K^+ substitution binding less water increases metabolic rate, the *fight or flight* reflex[12], Figures 2(e, f, g).

The neural network model distinguishes brain areas using different neuro- transmitters, accounting for pain transmission & $_L$Dopa preventing Parkinson's disease. *Minions* exchange resonant frequencies across synaptic junctions, deploying axons & dendrites as wave-guides. Morphine/codeine substitution forms larger complexes, they block tDNAs and prevent pain transmission. Pain sensitivity increases when more tDNAs are enrolled to compensate, explaining drug addiction.

Excretion

Aldosterone, angiotensin, rennin, histamine & aspirin mediate NaCl transport, controlling pH & ionic strength. Angiotensin delivers $MnCl_3^-$, $MnCl^=$ & $MnCl_6^{4-}$, their complexes with NaCl excrete salt in urine, sweat and tears. The *chloride shift* exchanges HCO anhydrase:

$$CO2 + H2O \leftrightarrow HCO3- + H+.$$

Respiration

O2 is normally hydrated, since biological membranes are impermeable to O2.H2O, it's actively transported. The lungs exchange O2 for CO2 & erythrocyte haemoglobin distributes it. Thyroid glands pack thyroxin with iodine for distribution. Protons at target tissues release purple iodonium, I+ forming the I+[O2.H2O]2 complex for its transport, Figures 2(h & i). Littoral seaweeds use the same regime to manage tidal [O2] changes, their purple & yellow colours reflect those of I+ & I-.

Iodine deficiency causes goitre & I+[O2.H2O]2 adding water to the aqueous humor explains exophthalmos. Mutant tDNAs disrupt nerve cell oxygenation explaining bipolar disorder13, excess & deficient O2 correspond to mania & depression respectively. Li+, diagonally related to I+ in the periodic table, stabilizes O2 transport and controls mood swings but can cause kidney failure.

tDNA inheritance breaches Mendel's law, 1 in 7 siblings inherit bipolar disorder suggesting 7 types of tDNA types manage respiration and confirming the *seventh son of a seventh son* myth. Sir Winston Churchill's was manic depressive, enabling his ability to review insights gained while *high* when *low*, it helped defeat Nazism.

Figures 3(a-d) show tDNA proton transport, it links N_2, O_2 and NO with either the NH_2 or OH group of nicotinamide, driving N_2 fixation, O_2 & NO release. Biological N_2 fixation is more efficient than the Haber process.[14] O_2 release photolyzes H_2O, it oxygenates the atmosphere, enabling symbiosis between fauna & flora. NO release controls vasodilation. HCN & CO block these processes.

Growth

The Biuret test illustrates Cu's affinity for peptide bonds. tDNAs failing to feed amino-acids through cell membranes can cause gigantism, dwarfism & acromegaly.[15] tRNAs pass amino acids through endoplasmic reticulum for protein synthesis, tRNAs remain attached to mRNAs once selected. Feed-back amplifies metabolic disturbances notifying all body cells:

- Nerve signals to the hypothalamus release 3,900 hormone molecules
- Anterior pituitary incorporates Cu to 3,900 hormone molecules
- Endocrine glands synthesize 3,900 hormone molecules

Stimulating all $3{,}900^3 \approx 6*10^{10}$ body cells.

The liver inter-converts amino-acids the portal vein delivers, ensuring the brain receives a balanced mixture maintains sanity. Biotechnologists disregarding tDNAs roles and creating novelties could realize, Alexander Pope's *A little knowledge is a dangerous thing* & Mary Shelley's *Frankenstein* prophecies.

Figures 3(e & f) show nutrient-starved tDNAs feeding from blastula & gastrula at cell division *overheating*. Guanylcyclase synthesizing *hook proteins*, replaces adenylcyclase feeding substrates. Hook proteins determine tissue morphology, they inter-connect daughter cells. 1-hook leukocytes digest any 6th hooks arising, preventing tumour & cancer growth. Proving my **Five hook theorem**: *Five connections suffice to form all nature's beauty*, 3D equivalent of the 2D **Four-color**

mapping theorem might persuade innovators to exercise caution.

Cu bracelets reputedly ameliorate arthritis. Copper accumulating in the eyes can cause Wilson's disease. The Cu in coil contraceptives starves sperm of glucose, preventing them reaching ova.

Rigidity

Osteoclasts & osteoblasts deploying SiF6= as carrier transport calcium phosphate, fluorapatite & apatite, Ca10(PO4)6OH2 & Ca10(PO4)6F2 through membranes for bone & tooth maintenance. Fluorspar, CaF2, *Blue John*'s stability illustrates Ca's affinity for F. Vitamin D3 stores ~265 nm UV sunlight with the same energy16 as Si ~ F bonds. Retinal transfers it as solitons for SiF6= assembly, Figure 3(g), via the pH-sensitive reaction:

$$SiO2 + 6F- + 4H+ + UV\ light \rightarrow SiF6= + 2H2O$$

Thyroid & parathyroid glands probably evolved in parallel, both incorporate halides to hormones. Continuous secretion of parathyroid hormone, PTH prevents toxic F- accumulation. Acidity at menopause & in kidney failure promote SiF6= synthesis causing osteoporosis.

Since phosphate is scarce, plant life uses the same pathway to synthesize SiO_2 hard parts and diatomaceous earth preserves them. Acid air pollution entered the stomata of Scandinavian forest trees causing leaf-fall.[17] The ineffectiveness of liming soils reduced interest in diesel pollution control.

SOx/NOx air pollution acidifying the nasal fossa can cause inappropriate SiF6= synthesis. Passed via the olfactory nerves to the brain, it deposits alumino-silicate plaques, releasing F-. Retained by the blood-brain barrier, F- inhibits Krebs cycle, killing neurons and disrupting protein folding creating β-amyloid & τ-protein tangles, explaining all Alzheimer Disease symptoms18. Mutant tRNAs mis-interpreting mRNA sequences create similar prion disease19 tangles.

Fluorinated anaesthetics, typically administered for hip replacement, bring symptomatic relief four days later. Simultaneous with renal AlF6≡ excretion, the brain is cleared of F- Air pollution control or a pharmaceutical introducing F- to the brain could prevent dementia.

Vitamin D deficiency causes rickets & fluoridation replacing OH- with F-apatite counters childhood tooth decay20. Tea drinking provides enough F-, excess causes tooth mottling.

Assimilation

Pancreatic β-cells distribute Zn++ in insulin & α-cell glucagon recycles it. Transporting glucose keeps blood, xylem & phloem sugar concentrations steady, controlling carbohydrate metabolism, Figure 3(h). Defects cause diabetes, Zn accumulating in diabetics' vitreous humor & poor peripheral glucose distribution explain glaucoma and the kidney & foot problems diabetics suffer. An implanted Zn monitor might improve its management.

Vitamin C derivative 2-keto-$_L$gulonate takes Zn where insulin can't reach. That in limes incorporates OH-proline to collagen, prevented scurvy in ancient mariners, Calamine™ lotion works the same way. Nasal cell tDNAs afford rhinovirus entry causing colds and flu, Pauling promoted[21] vitamin C supplements preventing it.

Zn in oysters boosts appetite for food & that in caviar increases libido for sex. Zn supplements[22] prevent eating disorders anorexia nervosa & bulimia, they might also prevent obesity. Alcohol & barbiturate consumption promote transfer of Zn, cofactor for alcohol dehydrogenase[23], to the liver for de-toxification; reduced supply of Zn to the brain explains inebriety. Attention to Zn nutrition might manage alcoholism.

When neonates breathe air, adult haemoglobin replaces foetal. Zn in colostrum conjugates the bilirubin released to glucose for excretion. Failure can cause brain seizures[24] associated with neonatal jaundice. Zn in midwives' pewter spoons prevented it before blue light exposure was introduced.

Beryllium, lead & indium mimic zinc. Victorians used Be as poison, calling it 'glucinium' for its sweet taste. Romans using lead acetate as a sweetener died in consequence. Endocrine glands may deploy In, diagonally related to Zn in the periodic table, to incorporate divalent ions to hormones.

Reproduction

Phosphate's high charged prevents it passing through tDNA. The conjugated ─/= bonds of retinal transmit UV sunlight energy as soliton[25], esterifying it to pyrophosphate. Figures 4(a & b) show the $Arg_2.PP_i$ complex, its transport supplies 28H, 20C, 8N, 12O & 2P for DNA synthesis at cell division. Anti- cancer drugs[26] mimic it. Ag deficiency allows cancers to develop.

Pineal hormones serotonin & melatonin form 6-member rings around Ag+ resembling those catecholamines form with K+, Figure 4(c). Porphyrins afford natural colour: red Fe porphyrin, haemoglobin, carries O2 in erythrocytes, green Mg porphyrin, chlorophyll, performs photosynthesis and pink Ag porphyrin transfers energy from vitamin D3.for SiF6 synthesis.

Ag was commonly used in medicine before antibiotics were introduced, it repairs tissues and regulates sleep and its reinstatement could be beneficial.[27] Ag-colloid proved effective against cancers in animal trials but experts regard as a *quack remedy*.

Osmoregulation

Keshan Disease in China evidenced selenium's

essentiality. Membrane potential prevents water diffusing through membranes, conflicting with Mitchell's assumption when proposing chemiosmosis.[28] Mevalonate, residue of saturated fat breakdown[29], mediates active water transport, essential for health maintenance.

The S ~ Se bonds of posterior pituitary hormones oxytocin & vasopressin distribute Se. Animal life expends much energy exchanging mevalonate-5-phosphate for mevalonolactone-5-phosphate for H2O transport, Figures 4(d & e) show vitamin E, α-tocopherol delivering energy as solitons. It oxidises Se to selenite. SeO_3= exchanges Mn++/Ca++. *Man gains ease* is mnemonic for *Manganese controls blood pressure*.

Of the eight blood pressure controls in Figure 4(f), pandemic Se deficiency is most significant:
1 tDNA genetics 5 Exercise and Ca levels
2 Saturated fat consumption 6 S metabolism
3 Lipids transport cholesterol 7 HgMe+ versus SeMe2+
4 Mn nutrition 8 Se and vitamin E nutrition

It causes high blood pressure, heart attacks, strokes, pre-eclampsia and cancers of breast, bowel, prostate & cervix and is the prime cause of death in industrial societies, arising from:

- Water purification.
- Crops grown in Se-poor soils.
- High temperature food preparation and preservation.
- Junk food consumption.

Mn cofactors enzymes converting surplus mevalonate to cholesterol, sea-floor Mn nodules evidence its participation in early life. Se mediates exchange of Mn++/Ca++ controlling conversion of surplus mevalonate to cholesterol, feedstock for steroid hormones Figure 4(g).

Limes for scurvy, iodine for goitre, cod liver oil for rickets & fluoridation for dental caries are precedents for Se supplementation, it's not *mass medication*. *Hard* water percolating through sedimentary rocks including Se deposited by early life is preferable to *soft* water. The persistent correlation between surface geology & breast cancer incidence[30] and European royalty's longevity[31] evidence Se nutrition's importance.

Animal husbandry[32] yields best evidence:

- S in superphosphate fertilizer competes with Se causing swayback in sheep.
- Se supplements prevent hypertension in pregnant cattle.
- Se supplements protect pigs from heart failure on their way to market.

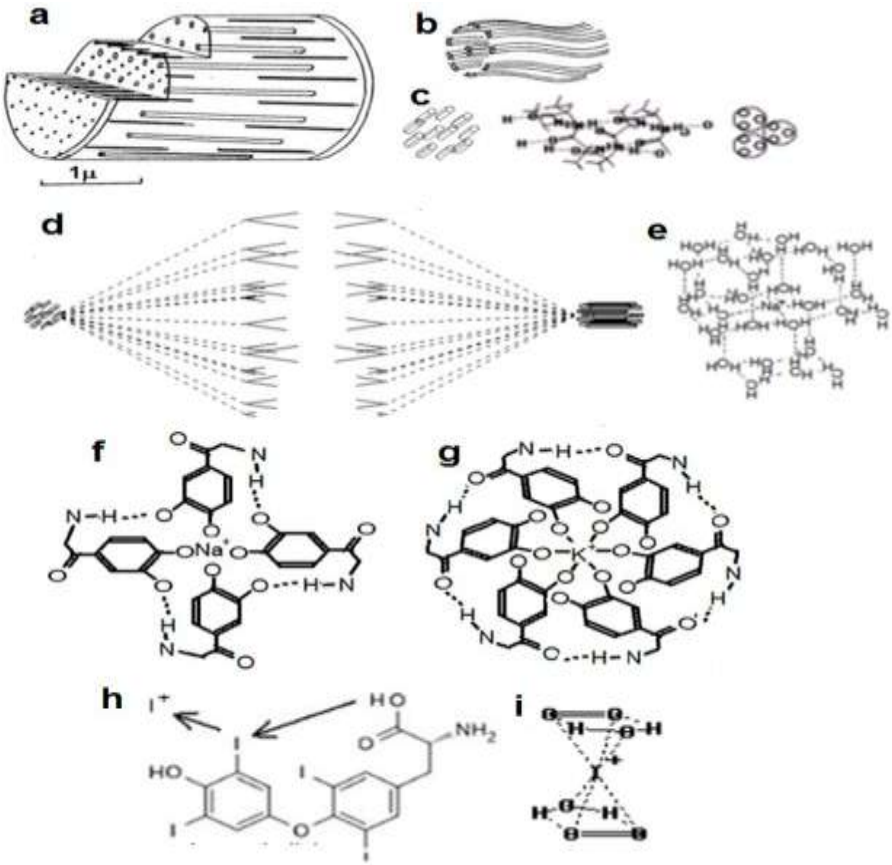


Fig 2: Energy coupling. (a) sarcomere ~½λ long, (b) basal body, (c) centriole has 9 cylinders, its 3 entwinedα-helices afford 9 conjugated···= paths, (d) spindle, (e) Na^+. $[H_2O]_{28}$, (f & g) 4-/6-member adrenaline rings around Na^+/K^+, (h) proton releases iodonium from thyroxine, (i) $I^+[O_2.H_2O]_2$ complex.

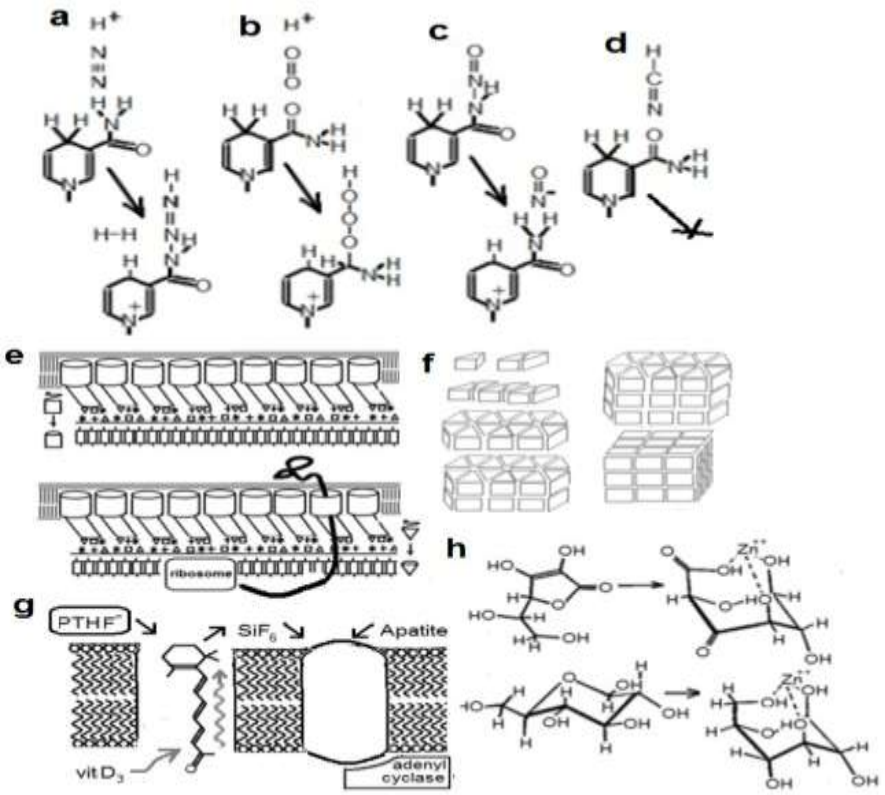


Fig 3 H^+ transport to nicotinamide mediates: (a-d) N_2-fixation, O_2 release, NO activation & HCN toxicity, (e) Guanyl- replaces adenyl-cyclase synthesising *hook proteins*, (f) Stem cells lack hooks, gametes, filaments, sponges & simple worms with 1, 2, 3 & 4, 5, form all morphologies, 1-hook leukocytes counter any 6th hook arising, (g) Vit A transmits energy from vit D forming SiF_6, carrier for apatite, (h) 2-keto-gulonate & $\beta_D$glucose bind Zn^{++}.

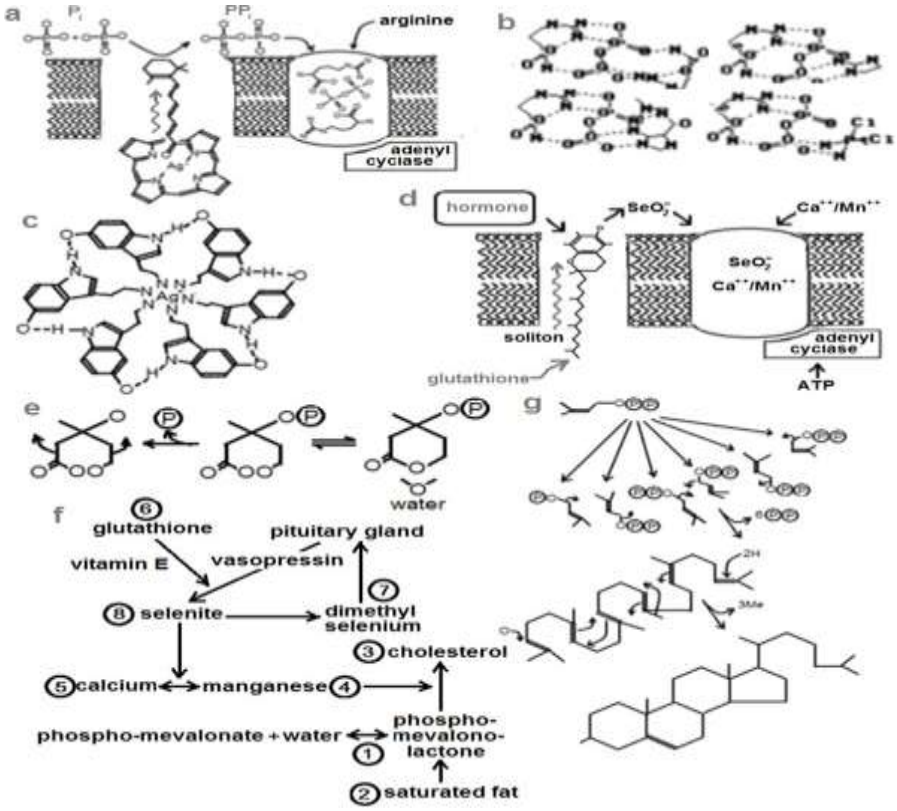


Fig 4(a) Ag-porphyrin energises esterification of Pi to PPi, it's transported as Arg2.PPi, (b) anti-cancer drugs, (c) serotonin6.Ag+ complex, (d) glutathione energises SeO3= synthesis for Ca++/Mn++ exchange, (e) mevalonate transports H2O, (f) blood pressure controls, (g) cholesterol synthesis.

Minion structure and function

Reducing computer instruction sets to nine suggested human intelligence has nine-fold symmetry. DNA is generally assumed to adopt the B-helical structure Watson and Crick deduced from Franklin's X-ray diffraction images.[33]

Figure 5(a) illustrates oligo-peptides forming *minions*. 189 anti-parallel β- pleated sheet hairpins with alternate neutral & basic A | L | I | V & K | R residues, P making 17° bends between adjacent units bind nine-base-pair DNA sections retaining B-helical spacing and overlap.

21-unit coils degrade to nucleosome core particles[34] on extraction, 9 coils complete a minion, signifying mind and subservience. Reported *beads on a string*[35] supported their existence. Minions replicate 1,701 base-pairs without engendering mutations. Gramicidin S.[36] has $_D$Fs, **F** equivalent to bases, siRNAs are also analogous.

Amino acids A, L, I & V matching bases C, G, A & T, mnemonic A LIVE CiGAreTte conserves critical sequences. Minions pack DNA on chromosomes neatly, 3 sets of H-bonds hold them together. Those between ω-amines & phosphates contribute their emergent functions as biological clocks, chips in the brain and safe nuclear fusion reactors. Minions also govern the nine biochemical pathways discussed above.

Biological clocks

Light passes thrice around a minion coil in:

$\tau = 3 * 189 * 7.37 * 10{-}10 * 3 * 108 \approx 1.39 * 10{-}15$ secs

Where '3' reflects Dekatrons™ logic used in Geiger counters, there are 189 base- pairs/coil, 7.37 Å is β-sheet spacing and $3x10^8$ the velocity of light. Using formula $63^N\tau$, N = 1 to 18, N = 11, 13 and 18 predict day-length, Sun-spot cycle period and the age of the universe respectively. Time may be a figment of our imagination.

Mathematical 0, ∞ & times < τ or > $63^{18}\tau$ are unreal. Minions' chirality & common origin determine their synchrony & the direction of time. 64 **I Ching** components and using base-60 in time-keeping correlate with 63 DNA triplets per coil and 7 days per week with its prime factors.

Chips in the brain

Minions are coiled abaci counting from 1 to $63^{18} \approx 2.444*10^{32}$, use ratios for comparisons and assign qualities to numbers. Their proton-ordered H-bonds store 18-letter words using a 64-character alphabet. The 1.8M in any human cell nucleus suffice to store the Bible, Koran and Shakespeare's works. Sense organs encode inputs as words stored holistically throughout the brain. Local brain damage leaves memories intact.

Minions storing similar word resonate, *ring a bell*, recalling memories faster than conventional neuro-transmission. Axons & dendrites serve as optic cables, synaptic junctions as gates. The neural network model[37] treats the brain as a digital computer, failing to explain the qualitative aspects of human intelligence listed in Table 2.

Table 2: Qualities associated with minion coils.

#	Quality	Period	Colour	Mass	Discipline
-9	unity	8.7 f-sec	red	electron mass/7	quantum mechanics
-8	justice	5.5 p-sec	silver	proton mass /7	physics
-7	stability	350 p-sec	blue	2 x base pair mass	chemistry
-6	progress	22 n-sec	violet	8.3 n-gram	computer processing
-5	love	1.4 µ-sec	bronze	0.033 p-gram	biochemistry
-4	peace	87 µ-sec	yellow	130 p-gram	genetics
-3	beauty	5.5 m-sec	pied	0.51 µ-gram	biology
-2	truth	350 m-sec	gold	2 m-gram	engineering
-1	goodness	22 seconds	green	8.1 gram	psychology
+1	goodness	23 minutes	green	32 k-grams	psychiatry
+2	truth	1 day*	gold	130 tons	head hunting
+3	beauty	9 weeks	pied	0.5 M tons	sociology
+4	peace	11 years*	yellow	2000 M tons	politics
+5	love	685 years	bronze	8 G tons	history
+6	progress	43 k-years	violet	31 P tons	archaeology
+7	stability	2.7 M-years	blue	1.8 x moon mass	palaeontology
+8	justice	170 M-years	silver	84 x earth mass	astronomy
+9	unity	11 B-years*	red	1 x sun mass	cosmology

± correspond to introvert/extrovert personalities, colours feature in metaphors, masses are in ratio 632, periods = 63N τ, *approximate. f, p, n, µ, m, k, M, B, G & P represent 10-15, 10-12, 10-9, 10-6, 10-3, 103, 106, 109, 1012 & 1015 respectively.

Transposing coil settings, analogous to changing key in music, accounts for lateral thinking. Artificial intelligence emulating minions would satisfy Turing's *play the imitation game* criterion[38], facilitate matchmaking, diplomacy and interdisciplinary communication. Human intelligence has evolved to exceed silicon technology.

Relativity

Figure 5(k) shows the *Tyger* equation, named after *What immortal hand or eye dare frame thy fearful symmetry?* in William Blake's synonymous poem, is a parabolic function using polar coordinates Θ and Φ, $\beta = 63^{-9}$, compensating 1 in 63^9 wrap-around *errors* minions make. Locally Newton's straight line, it describes light's apparent boomerang-like trajectory, renders plane surfaces spherical and reinterprets gravitation.

Molecular-scale nuclear fusion

Figure 5(i) illustrates plane combinations, when nested they offer a new perspective on nuclear structure, predict allotropy, reinterpret s | p | d | π electron orbitals & ─ | = | ≡ | H-bonds and afford new chemical insights. The Tyger equation replaces Einstein's relativity, resolves his *spooky action at a distance*, reinterprets Heisenberg's uncertainty & Lemaître's big-bang cosmology.

Oscillating H-bonds propel protons along adjacent tunnels with energy:

$$½ \text{ pm } (c/189)^2 \approx 13 \text{ keV}$$

Where proton mass, $p_m = 1.67 * 10^{-27}$kg and $c = 3* 10^8$ m/s. They conduct the carbon-nitrogen fusion cycle, Figure 5(j):

$^{12}C \rightarrow {}^{13}C \rightarrow {}^{14}N \rightarrow {}^{15}N \rightarrow 4He + {}^{12}C.$

Recoiling carbon-nitrogen cycle products: $^{12}CO_2$, $^{13}CO_2$, $^{14}NO_2$, $^{15}NO_2$, $^{12}CH_4$, $^{13}CH_4$, $2^{14}NH_4$ & $^{15}NH_4$ emit γ-rays, their ½-lives & frequencies correlate with those of pulsars.[39] DNA diffracts them at source & on return they manifest cosmic patterns of stars and galaxies.

Cold fusion has also been reported in electric storm clouds, collapsing bubbles and water adhering to palladium crystals[40], Figure 5(l). Humanity's $\sim 10^{28}$ minions replenish H, C, N, O, S & P, sustaining life. This argument is circular but complete.

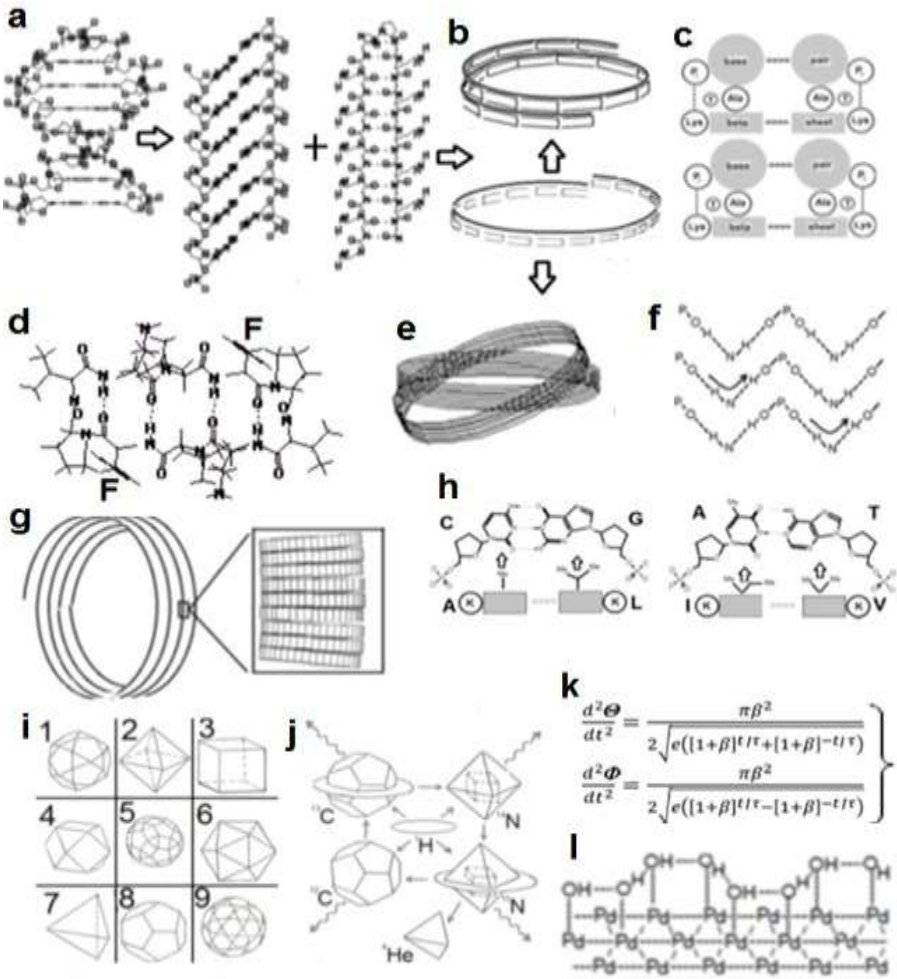


Fig 5 Minion structure (a) β-pleated sheet binds uncoiled DNA, (b) coil degrades to nucleosome core prticle, (c) 3 sets of H-bonds, (d) gramicidin S, (e) 9-coil minion replicates, (f) H-bonds between ω-amines & phosphate oscillate, (g) packing DNA on chromosomes, (h) amino acids match bases. Nuclear fusion (i) Nine plane combinations, (j) Carbon-nitrogen fusion cycle, (k) Tyger relativity equation, (l) Cold fusion under H_2O on Pd.

CALCULATION

Ice XIc's ferroelectric transition energy, E may be estimated using these parameters and H_2O coordinates.

$$E = \frac{\mu^2}{4\pi\varepsilon\varepsilon_0 r^3}$$

$$= \frac{(1.27*10^{-29})^2}{4\pi*3.1*8.85*10^{-12}*r^3}$$

Σ E ≈ 22.3 kJ/mole, ≈ ATP's P_i ~ P_i bond energy. Its wavelength:

$$\lambda = \frac{h*c*N}{\Sigma E} = \frac{6.63*10^{-34}*3*10^{8}*6.02*10^{23}}{2.23*10^{4}} = 5.37\ \mu$$

Table 2: Parameters differs from my 4μ estimate, my logic needs reappraisal.

H-bond length	H = 1.75Å
OH-bond length	b = 1.01Å
Tetrahedral angle	Θ_a = 104.5˚
H-O-H bond	Θ_b = 109.5˚
Charge cloud	Θ_c = 120˚
Dipole moment	μ = 1.27*10-^{29}
Dielectric constant	ε = 3.1
Space dielectric constant	ε_0 = 1.27*10-^{29}
Planck's constant	h = 1.27*10-^{29}
Avogadro number	N = 1.27*10-^{29}
Velocity of light	c = 3*10^{8} m/sec
Ice Ic Δ x = Δ y & Δ z	2.26 & 1.6 Å
Ice XIc Δ x = Δ y & Δ z	2.32 & 1.5 Å

CONCLUSIONS

The consequences of my chance discovery as a teenage undergraduate afford hope in a time of crises. Self-knowledge and understanding life's history enable intervention for its evolution and survival. Prompt action is necessary to avoid disaster. Unlike its competitors, my model for life's origin accounts for chirality, time, uncertainty and brain function.

Seeking life arising elsewhere is futile without identifying an alternative laser source, dynamic equilibrium and energy coupling. Earth's environment and ice XIc energetics matching DNA's may be uniquely enable life's existence.

Although minion logic and Tyger relativity are counter-intuitive like quantum mechanics & cosmology, they solve outstanding problems.

Public confidence in science is essential for implementing rational scientific, medical & engineering solutions resolving climate change, morbidity, obesity, dementia & malnutrition. Redirecting the resources particle accelerators, quantum computing and rocketry deploy would fund humanitarian projects. I'm compiling **Peace Building** a sequel to **Science Uncoiled**.

REFERENCES AND NOTES

1. Chaplin, M. F. Website: Water Structure and Science, www.lsbu.ac.uk/water.
2. Pauling, L. C. The Structure and Entropy of Ice and of Other Crystals with Some Randomness of Atomic Arrangement, J Am Chem Soc, 1935; 57: 2680-4.
3. Yen F, Chi Z, Ice XIc proton ordering phase transition at 72 K, Phys Chem. Chem. Phys, 2015; 17: 12458-61.
4. Vasavada, A. R., Paige, D. A., Wood, S. E. Near-Surface Temperatures on Mercury and the Moon and the Stability of Polar Ice Deposits, Icarus, 1999; 141: 179-93.
5. Darwin, C., The origin of species by means of natural selection, or the preservation of favoured races in the struggle for life, 6th edition John Murray, 1872.
6. McCormic, Infrared deicing: giving glycol a run for its money Wings magazine, 2008.
7. Cafferty, B. J., Fialho, D. M., Khanam, J. Spontaneous formation and base pairing of plausible prebiotic nucleotides in water, Nature Communications, 2016; 7.
8. Gordin, M. D. A Well-ordered Thing: Dmitrii Mendeleev and the shadow of the periodic table, Basic Books, 2004; 229-30.
9. Sussman, J. L. and Kim, S. 3D structure of a tRNA in two crystal forms, Science, 1976; 192: 853-8.
10. Huxley, A. F. and Niedergerke, R. Structural changes in muscle during contraction; interference microscopy of living muscle fibres Nature, 1954; 173: 971-3. and Huxley, A. F., Muscle structure and theories of contraction, Prog.
11. Biophys. Chem., 1957; 7: 255–318.
12. Newton's 1st law of motion presumes light travels in a straightline.
13. Cannon, W. B. Bodily changes in pain, hunger, fear, and rage. Appleton- Century-Crofts, 1929.
14. Scott, L. J. et al. Genome-wide association and meta-analysis of bipolar disorder in individuals of European ancestry. PNAS 106 7501-06, 2009.
15. Haber, F. Nobel Lectures, Chemistry 1901-21, Elsevier, 1920.
16. Chapman, I. M. MSD Manual: Gigantism and Acromegaly, 2018.
17. Godbold, D. L. and Hutterman, A. eds Effect of acid rain on forest processes Wiley, 1994.
18. Walsh, R. Bond dissociation energy values in silicon-containing compounds and some of their implications, Acc. Chem. Res., 1981; 14: 246–52.
19. Burns, A. Alzheimer's Disease, BMJ 338 b158, 2009.
20. Prusiner, S. B. Prion diseases and the BSE crisis, Science 278 245-51, 1997.
21. Pizzo, G, Piscopo, M. R., Pizzo, I. and Giuliana, G. Community water fluoridation and caries prevention: a critical review Clinical Oral Invest, 2007; 11: 189-93.
22. Pauling, L., Vitamin C and the Common Cold, Paperback, 1970.

23. Garner, D.M., Olmstead, M. P. and Polivy, J. Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia, Int J Eating Disorders, 1983; 2: 15-34.
24. Vallee, B. L. and Hoch, F. L. Zinc, a component of yeast alcohol dehydrogenase PNAS, 1955; 41: 327-38.
25. Slusher, T. M. Treatment of neonatal jaundice with filtered sunlight in Nigerian neonates: study protocol of a non-inferiority, randomized controlled trial, Trials, 2013; 14: 446.
26. Sinkala, Z. Soliton/exciton transport in proteins, J. Theo Biol., 2006; 241: 919-27.
27. Mai, J. et al, A synthetic peptide mediated active targeting of cisplatin liposomes to Tie2 expressing cells. J Control Release, 2009; 139: 174-81.
28. Maillard, J. Y. and Hartemann, P. Silver as an antimicrobial: facts and gaps in knowledge. Critical Rev Microbiology, 2013; 39: 373-83.
29. Mitchell, P. D. Coupling of phosphorylation to electron and hydrogen transfer by a chemi-osmotic type of mechanism, Nature, 1961; 191: 144–8.
30. Skilleter, D. N. and Kekwick, R. G. The enzymes forming isopentenyl pyrophosphate from 5-phosphomevalonate in the latex of Hevea brasiliensis, Biochem. J., 1971; 124: 407-17.
31. Kulldorff, M., Feuer, E. J., Miller, B. A., and Freedman, L. S. Breast cancer clusters in the northeast United States: a geographic analysis, Am J Epidemiol, 1997; 146: 161-70.
32. Gavrilova, N. S. et al Evolution, mutations, and human longevity: European royal and noble families, Human Biology, 1998; 70: 799-804.
33. Underwood, E. J. Trace elements in human and animal nutrition, 3rd edn, 1971.
34. Franklin, R. E. and Gosling, R. G. Molecular Configuration in Sodium Thymonucleate. Nature, 1953; 171: 740-1.
35. Richmond T. J. and Davey C. A. DNA Structure in nucleosome core particle Nature, 2003; 423: 145-50.
36. Rattner, J. B. and Hamkalo B A. Higher order structure in metaphase chromosome II. The relationship between the 250 Å fibre, superbeads and beads- on-a-string. Chromosoma, 1978; 69: 373-79.
37. Harding, M. Gramicidin S: some stages in the determination of its crystal and molecular structure, in: Structural studies of molecules of biological interest … honour Dorothy Hodgkin, Clarendon Press, 1981.
38. Fukushima, K. Neocognitron, a self-organising neural network model for pattern recognition unaffected by position, Biol Cybernetics, 1980; 36: 193-202.
39. Burnell, S. J. B. Little green men, white dwarfs or pulsars? Cosmic Search, 2004; 1: 16.
40. Fleischmann, M., Pons, S. and Hawkins, M. Electrochemically induced nuclear fusion of deuterium, 1989; 261: 301–8.