Quantum state transition from liquid to vapor water by physiological entanglement

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Abstract

A liquid water state transition to vapor at the physiological parameters is hereby described by adenylate cyclase (AC) function in neuronal membranes, across hydrophilic and hydrophobic regions. The cerebral enzymatic reactions involves Mg^{2+}exceeding ATP as a substrate reacting with polymeric liquid H_2O (n=3.4) to produce Pyrophosphate (Pi) and AMP. The closing of the ring to form cAMP releases H_2O. The individual molecules by forming entangled pairs, which could not fit into the active site, avoid reentering in a backward reaction. Thus, but still have turnover to free the enzyme from the product to interact with substrate polymeric liquid water, complete its cycle and eludes microscopic reversibility. The latter, vapor state is present at 5% concentration in exhaled air. This physiological state transition allows that the critical point for change of state, for 500ml water within the cerebrospinal fluid (CSF) occurs at 36.6ºC. The entangled pairs as a whole adopt an entanglement state. Obviously, the individual molecules could not circulate in the vapor state within the astrocytes system. However, paired occurs at a rate of 1.6×10^{16} pairs per milliseconds (ms), greater that AC operational turnover. The water paired structure could oscillate between two states, one entangled by two oxygen atoms in the pair, and the other, by two structures of two entangled hydrogen atoms in the pair. The system allows directionality propagation to the uniformly entangled pairs allows by the hierarchical of the initial effect. At a dissipative forming rate of 1.6×10^{16} pairs per ms allow a liquid state to water within the astrocytes. Individual molecules were operated by entanglement to allow a physiological function of cooling the body by releasing heat as vapor, at body temperature. Energy-Consuming Processes in the Brain by vasoactive intestinal peptide (VIP), adrenaline in tissues AC, and noradrenaline (NA) activated AC in brain. The glycogenolysis actions and the adenylate-cyclase cascade, coupled to the release of vapor out of the thermodynamic system. These create an open system preventing any metabolic reversibility even by a short time to the functional brain.

Introduction

The water molecule during its entanglement with its opposite forms a pair that conserves the momentum of molecular kinetic energy.

In general, oscillatory systems generate tension and compression that tend to align the spins, especially at resonance. This force in general, is structured within the structures and by magnification of the sound, breaks glass or bridges when soldiers march in unison. Therefore, the entanglement can be magnified to allow for an abrupt phase change when reaching the decoherent state.

This decoherent state is latent, it can emerge from structures with a resonance potential. This manifests itself when approaching the critical point of temperature, pressure, etc.

The Pauli's exclusion principle excludes 2 electrons to occupy the same quantum state, but allows in a pair if the atoms have vacant energy levels, in which the atoms can move like a gas, or as proposed here in entangled molecules.

At the critical point temperature and pressure, the liquid and gas phases (they are in a latent transition state), the spin effects propagate in the atomic substrate and form pairs that do not obey Pauli's principle, and therefore all pairs could occupy in the same quantum state, because they cannot be mutually exclusive.

The depolymerized water, which has lost the H-bonds, does not have an immobilizing structure but rather to that in equivalent to a vapor state. However, in the cerebrospinal fluid could transits in a cuasi-liquid state. Thereafter, when it loses compression along the vomeronasal organ evaporates at the oral cavity.

Results

Prigogine description of the cosmological relationship allowing open thermodynamics [1] reversing entropy apparently was in contradiction with the physical principle of microscopic reversibility. Thus, it requires description of cosmic events within thermodynamic parameters, as well that of life, within the context of its relationship to the structure and function of cellular and internal membranes (chloroplast, etc.) [2, 3, 4]. Studies of the genesis of cellular membranes by D.D. Sabatini [5, 6, 7, 8, 9] and a large number of scientists over many years have studied the structure and function of cellular membranes. The kinetic function of adenylate cyclase (AC) and several enzymes located in the cell membrane [10, 11].

However, particularly in brain [12, 13, 14, 15] could not be obtaining kinetic evidence to overcome the mandate of microscopic reversibility. A still accepted as sufficient the concept that always catalytic activity is dominated by mass action equilibrium. Thus, not allow the state transition thermodynamic system of water to bypass this principle to configure unidirectional pathways.

However, the neuronal-astrocyte system evidenced non-equilibrium [16] reactions and the need for unidirectional operative function.

From the examination of brain kinetics was inferred that H-bond consumption [17, 18] from its polymeric state was released single molecules of water evidenced intermediate states allowing alternative structural associations, allowing a circulation in liquid state to water within cerebrospinal fluid (CSF) that manifested lack of H-bonds that could be correlated to the its release as 5% vapor in exhaled air.

Therefore, outwardly to the cell, liquid water $(H_2O)_{n=3.4}$ could be process by systems inwardly uptaking H-bonds. These bonds had been loss in AC kinetics, the enzyme located in the membrane and looking to the external hydrophilic environment, catalysis the substrate MgATP (S_1) when Mg^{2+} [19] exceeds the substrate and interacting with $(H_2O)_{n=3.4}$ (S_2). However, usually, ignoring that liquid water is not homogenous at the nanoscopic level and could be released as a single molecule as a product.

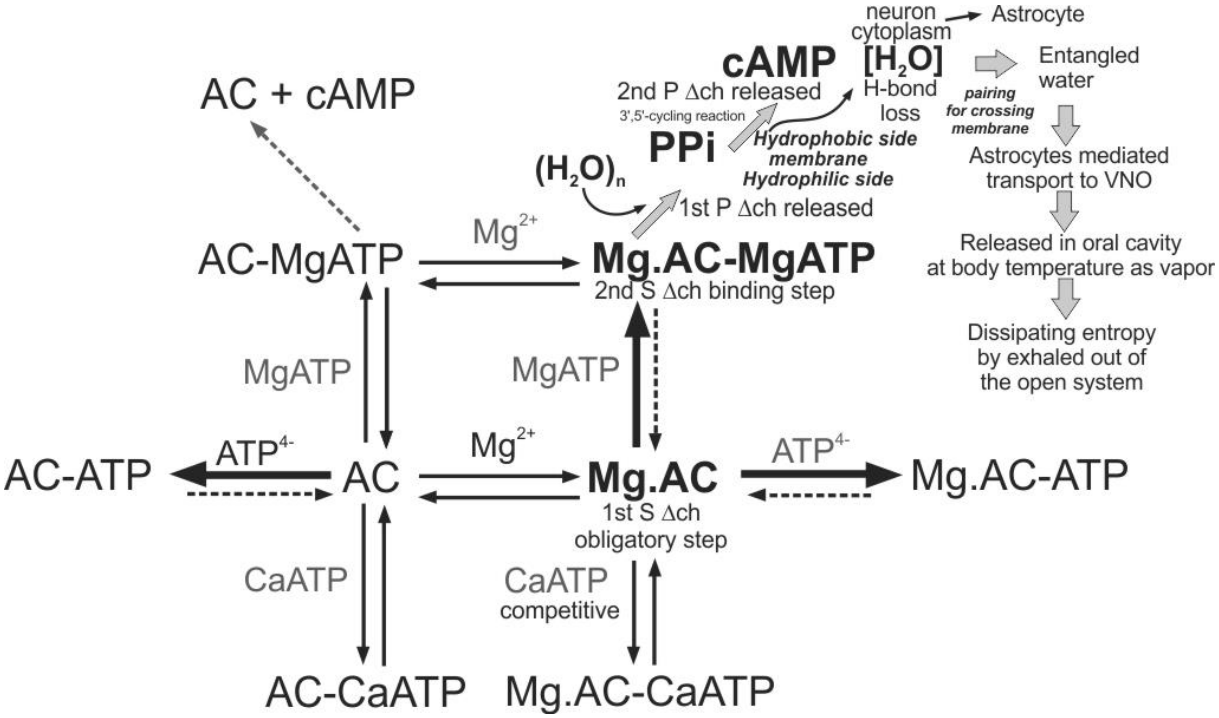
Moreover, the polymeric structure in the hydrophilic media could be dissociated to allow its entrance into the active site as a single molecule. Thus, water supports pyrophosphatase activity with product 1 (P_1) releasing PPi. Hence, a single water molecule is released as product 2 (P_2), after ring cycling activity to form P_1: 3',5'-cAMP [20, 21]. The enzyme turnover allow the measurement of BiBi kinetic constants at the test tube, but physiologically has to operate in only one sense, by the release of water to the circulatory CSF system into the oral cavity were the changing pressure allows to acquire the vapor form (scheme 1).

Pair entanglement would allow the hidden of the bipolar structure of water and mediates its dissipative transit across the neuronal membrane (scheme 1) into the meninges surrounding brain, with CSF circulatory system within astrocytes and their dysfunction affecting signaling [22]. Therefore, it potentiates that all the reactions, generating isolated molecules of water could form entangled pairs to conform a dissipative release of heat but maintaining the body physiological temperature. Hence, the dissipative arrow prevents any equilibrium state by creating a vectorial irreversible system.

Equilibrium could be measured in the test tube, which would equivalent to the enzyme to operate as a within a close system, but physiologically exclusion of a product acts to conform a dissipative release operating as an open system. The hydrophilic outside of the membrane allows to dissociate $(H_2O)_{n=3.4}$ by AC activity. Thus, releasing single water molecules which by entanglement conform into a pair state able to circulate within in CSF in liquid state at $36.6℃$. However, when reaching the oral cavity by excluding its oscillatory energy, became into 5% vapor state within the exhaled air.

The scheme shows the pathway for AC become able to avoid microscopic reversibility. The avoidance effect still preserves turnover by releasing free enzyme from out of the leaving

product isolated water. Therefore, it cannot accumulate the dissociated water to produce reversibility of the reaction by mass action.



Scheme 1: RARE BiBi (2 substrates and 2 products) ordered binding (macro mechanism) of adenylate cyclase including ATP^{4-} and CaATP as dead-end inhibitions. *E=AC; Δch=conformational change. Applying the initial rate studies for Mg^{2+} could be assumed to be equally valid for Mn^{2+}. S_1=Mg^{2+}, S_2=MgATP; $+(H_2O)_n$ product forming P_1=PPi (pyrophosphate); P_2=cAMP (3',5'-cyclic adenosine monophosphate), plus single molecules of water. Water forms entangled pairs, which would not be able to fit back into the active site.*

The change of the membrane potential between the external hydrophilic face vs internal hydrophobic environment by dissipative entanglement

Differentiable affinities between the bipolar state of polymeric water with the hydrophilic side of membranes and that of entangled pairs with the hydrophobic side regions allows coupling at the junction between neurons releasing the CSF containing pairs. Hence, the greater diffusion capability into the hydrophobic of the pair for the astrocytes environment, allows rapid circulation.

Hence, the continuous flow of pairs allows capturing heat by increasing the oscillatory kinetic of the pairs. The vapor by reaching the surface of a mirror spontaneously returns to the liquid state, usually used to detect life. Polymeric state of water $(H_2O)_{n=3.4}$ allows maintaining polarity and surrounds metallic ions in soluble state vs $H_2O{\sim}H_2O$ with hidden polarity, which results in $(H_2O)_{n=3.4}$ could not transit across the double layered membrane to the hydrophobic environment and crossing through specific gates.

Thus, polymeric water will require specific channels with modulatory control for opening and closing states by the membrane structure functional to support ion translocation.

CSF (containing entangled pairs) on the astrocytes, during circulation as a liquid transitional state from liquid to vapor could be characterized by supporting an excess of the kinetic energy (vibrational, rotational and translational), but also the pairs increased solubility into hydrophobic regions.

Thus, the hidden polarity confers the possibility to a pairing state $H_2O{\sim}H_2O$ to modify the K^+, $Na^+$and Mg^{2+}hydrated structures of ions. Thus, allows differential states between both flow senses as required to maintain oscillatory membrane potentials.

Moreover, the density change of entangled water modifies the solvation state of hydrophilic molecules like metal ions (Mg^{2+}, Na^{+}, K^{+}). Thus, during transport across the membrane could maintain the turnover of membrane potentials.

In this scheme the hydrophilic outside of membrane vs the hydrophobic inside could configure a vectorial sense to water, as a carrier of entropy that is released out.

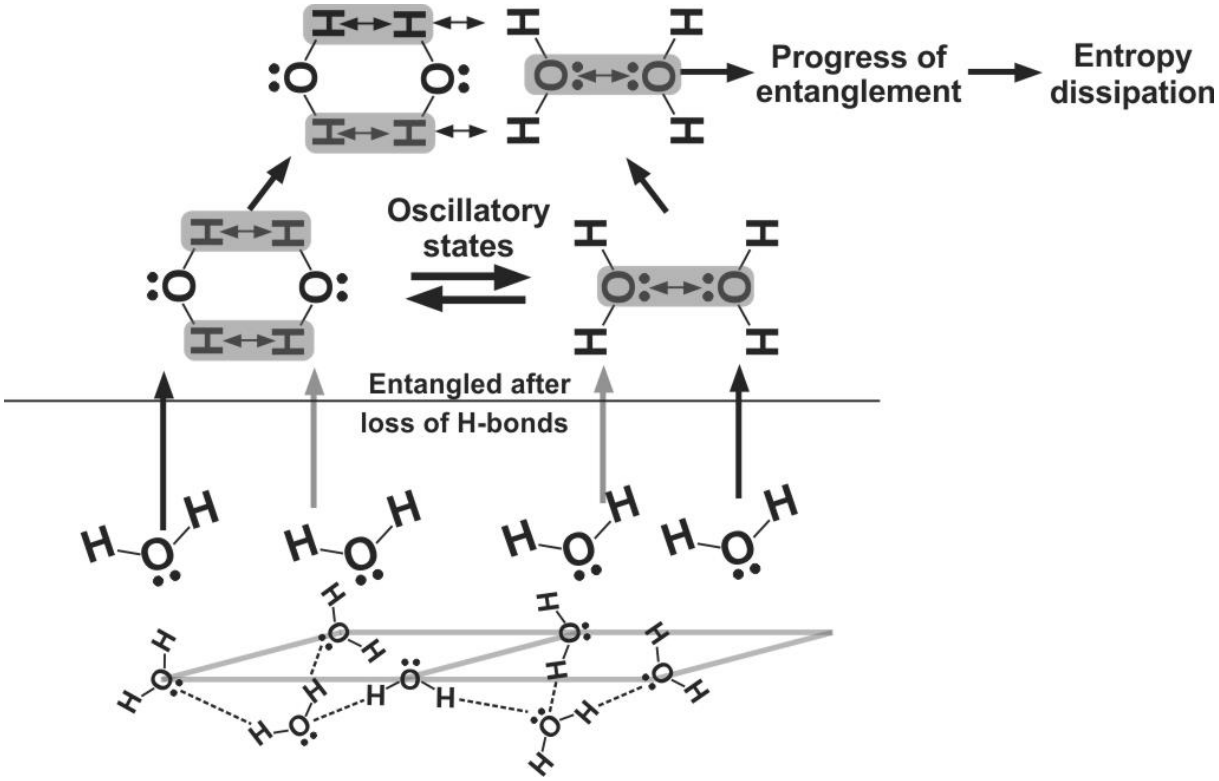


Figure 1: Molecules coherence in resonance capable by entanglement to contain energy in a latent state as liquid. Circulate in astrocyte system to reach quantum decoherence as vapor at 36.6℃, when reaching the oral cavity. Directional entanglement could be calculated to progress at about a rate of 10^{15} molecules per millisecond, for the dissipative function of 500 ml CSF per day.

The oscillatory mechanism between the two states of the pairing

Single water molecules could not have a liquid state at $(H_2O)_{n=0}$ because lacks H-bonds, suggesting the emergence of other structures in the interior of the cell.

Water entanglement has resonance effects that participates in a structure function system for thermic maintenance from muscles (temblor affecting hypothermia) a brain pulsations, etc. In perspective the rapid loss of the corporal temperature during death lead to speculations about the meaning of the effect, that at the time of death, there is an instant decrease in body weight of 26g.

Entangled by the complementary pairing between the hydrogen atoms of each water-water pair of molecules as shown: $(OH_2 \sim\sim H_2O)$, results in repulsion between the atoms of oxygen. Similarly, in the complementary oscillatory state of the pair, is shown entanglement between both oxygen atoms: $H_2O \sim\sim OH_2$, and distancing between the hydrogen atoms.

The molecular entanglement surges from the tendency to relate both vibrational configurations by not breaking the water identity. Hence, it is sustained in the first configuration by each H atom participating in vibrational state with the other opposite electron orbital to reach an oscillatory state. Thus, generates a complementary tendency to have

tendency to configure some but insufficient stability at the two electrons, resembling the orbital connections of molecular hydrogen.

The participation of only two electrons out of the six in each oxygen share entanglement by its partial orbital attraction for pairing to only approach a stable state. Thus, lacking a complete mutual sharing of orbitals, which occurs when booth oxygen atoms could acquire a molecular bonding, because each atom attractions surge from its orbitals space: "s" and "p".

These allow hybrid orbitals: $4 \times sp3$, in which two could be share, but the other two could not. Thus, the geometry of the oxygen and their bonded atoms became angular whereas their orbitals reflect a tetrahedral configuration. Thus, a changing attraction between orbitals of oxygen could explain an oscillatory attraction state by the loss of oxygen entanglement present in the hybrid transition: $(OH_2 \sim\sim H_2O)$ vs the gain of entanglement: $H_2O \sim\sim OH_2$. Hence, provide transition states between two differential symmetries, allowing the alternative disruption of the mutual attraction strength because are in an oscillatory state, coupled to molecular resonance.

These instable configurations of two singles molecules of water could be entangled when interact, or share spatial proximity in a way such that the quantum state of each molecule of the group cannot be described independently of the state of the others. Entanglement has been shown between the rotational states of a $40CaH^+$ molecular ion and the internal states of an $40Ca^+$ atomic ion. We extend methods used in quantum logic spectroscopy for pure-state initialization, laser manipulation and state readout of the molecular ion. Thus, quantum coherence of the Coulomb coupled motion between the atomic and molecular ions enable subsequent entangling manipulations [23].

Substantial interdisciplinary attention due to an intimate entanglement of spin and orbital degrees of freedom which may give rise to a novel spin–orbital Mott insulating behavior and exotic quantum spin liquid phases [24].

Hence, water in molecular pair entanglement, allows the hidden of the polarity affinity for ions, etc., which characterizes polymeric water configurations for hydration shells of ions. Hence, could allow differential properties in between the hydrophilic phase and the hydrophobic one. This is so because the hidden polarity entanglement allows unidirectional way to cross from the outside of the membrane to its inside.

Decomposition of the pairing yields a non-accumulative state (or dissipative function) allowing non-reversibility to the system thermodynamics, because the dissipative effect by loss of mass action.

Coupling of H-bonds consumption for proteins/enzymes turnover

The cerebrospinal fluid (CSF) expended H-bond water is in liquid state at 36.6ºC, allowing a transition state in which the internal (intrinsic) structure of the water molecule itself, forming pairs, allow absorption of kinetic energy: rotation, vibration and translation.

This allows an aggregate state, until the space allows the translational energy that characterizes the vapor state. In physics the phenomenon is described as a transition state of second order that became independent of the microscopic structure. In a laboratory is well known that the distilled and condensed water is highly active (energy excess on the individual molecules) and has to be stationed for 24hs, before the fitting between water molecules allows to reach normalized state as: $(H_2O)_{n=3.4}$.

Approaching a mirror to the mouth, a condensation test for vital signs, allows detection of a 5% vapor present in breath, to become evident. The thermodynamics turnover for an out of the system release of waste water, maintains a dissipative state characteristic of open systems. Thus, prevents a reversal of the metabolic flow and therefore conserve the energy capable to support the hydration shell turnover of ions and proteins, which maintains the cell membrane action potential.

Thermodynamic of cerebrospinal fluid (CSF) daily turnover

Thus, allows calculation that the system decreasing internal entropy by 288kcal per day. The system endergonic consumption to produce the exergonic reaction of vapor has an equivalent of ATP-enthalpy consumption in the decomposition of the polymeric state of water: $ATP + (H_2O)_{n=3.4} \rightarrow AMP + PPi + 3.4\,(H_2O)_{n=0}$ isolated molecules of vapor, ΔG = −45.6 kJ/mol (−10.9 kcal/mol), equivalent to 28 mol of substrate MgATP.

Astrocytes through the rapid circulation function, as a radiator, could prevent the thermogenesis at the level of brain, absorbing the entropy generated by 30% of the total caloric ingested by the individual.

Thermodynamically a donor solvation media, like CSF could be calculated on the bases of a turnover value of 500ml CSF, which could be expressed as 27.77 H_2O mol, considering an average value of 3.4 mol H-bond and -5kcal per H-bond mol $(O - H \cdots: O)$.

$$Energy = 27.77\ mol\ H_2O \frac{3.4\ mol\ H-bond}{1\ mol\ H_2O} \frac{-5kcal}{mol\ H-bond} = -472kcal$$

Flow of entangled water molecules per millisecond calculated from all daily the entanglement processes carried by 500ml CSF.

$$\frac{27.77\ mol\ H_2O}{day} = \frac{27.77 \times 6.02 \times 10^{23}\ H_2O\ molecules}{24hs}$$

$$= \frac{3.2 \times 10^{16}\ H_2O\ pairs}{millisecond}$$

Outside the body exhausted H-bond water regenerates by cooling into cluster water because is a favorable thermodynamic process.

Brain thermogenesis

The turnover per day of 500ml CSF from liquid at $36.6℃$ to vapor could have involve an increase of $60℃$, if were not prevented by entanglement.

The temperature increases $1℃$ by 1kcal/ml is calculated to 3000kcal to show that it is outside the physiological parameter. This value divided by the standard assigned to ATP breakdown: 7.5kcal the equivalent to 400mol of ATP. This is very outside a 25% of total consumption of body energy by the brain in glucose terms. Thermogenesis by H-bonds loss is equivalent to 63 mol ATP. Therefore, the release as vapor does not occur at $100℃$, but at body temperature, therefore, has not implicated $60℃$ jump of temperature.

The lab experience with water distillation and vapor cooling shows a liquid state, which requires to be stationed for 24hs to release the excess kinetic energy. Therefore, decoherence is a very slow process. In nature decoherence process couples with the day to night cycle, which release of vapor to air, coupled for decoherence changes by temperature and pressure to produce rain.

The epithelial membranes with an outside and inside confers the properties of open systems, because the depleted H-bonds from water in CSF does not have the tendency to aggregate, but by entering in the spongy tissue of the palate it rapidly became separated in individual molecules and evaporate.

Thus, exhaled air in adults of about 6 liters per minute has a 5% vapor contribution from the VNO [25, 26] conductance process of depleted H-bonds from water in CSF. This process operates for entropy dissipation.

ATP-synthase-ATPase

This propagates the effect of entanglement to support higher membrane potentials, allowing a nano-environment capable to confer conformational turnover to enzymes, changing location of the active site, from the hydrophilic outside to the inside of the membrane.

Hence, at the level of ATP-synthase(endergonic)-ATPase(exergonic), the hydrophobic environment could decrease by much the mass action of water and modifying the ATPase tendency to release from ATP^{4-} the

product of $ADP^{3-} + PO^{2-}$ and favor the nucleophilic substitution reaction of the endergonic synthase activity to form: $ATP^{4-} + H_2O$. Hence, pairing of water, absorbing kinetic energy, by facilitating the exclusion of water from access to the active site that cannot acquire ATPase configuration prevents the exergonic reaction of ATPase activity because could not release heat. The charge density on the reactants is greater than that of the products. Also, the latter are more hydrated than the reactants. Hence, the predominance of the exergonic over endergonic process is avoided, because kinetic energy is trap by water entanglement, equivalent to an orbital spin structuring of energy.

Thus, potentiate the reaction: $ADP^{3-} + HPO_4^{2-} + H^+ \rightarrow ATP^{4-} + H_2O$. The equation reflects the mass action of protons or Jagendorf A.'s Jump. This by its action over the dissociation state of amino acids R-groups of the ATPase-synthase, according to their pKa results in conformational change of the enzyme, modifying the active site in the synthase direction [27, 28]. This effect is potentiated by the rapid dissipation of water, in the hydrophobic environment, which prevents reversibility by the conversion into entangled pair, and allows only one-direction sense, bypassing microscopic reversibility and preserve turnover by still originating the state of free enzyme. Similarly, the photophosphorylation in chloroplasts does not show reversibility even if the ATP synthase activity also manifests ATPase function by uncoupling conditions.

The activity of ATP synthase in a hydrophobic environment, by transferring the generated ATP to a hydrophobic environment, prevents reversibility, and only allows one reaction sense, without going through microscopic reversibility. Thus, photophosphorylation in chloroplasts does not show reversibility even if ATP synthase activity manifests ATPase function by uncoupling conditions.

Discussion

However, in the abscense of AC activity a Pi^{2-} increment in cerebral spinal fluid (CSF), allows augmenting the uptake Pi^{2-} and glucose [29, 30] by the erythrocyte [31, 32], incrementing anaerobic glycolysis and sugar phosphates. At pH=7.4 maximal production by pyrophosphatase activity and the uptake of polymeric water and the breakdown of H-bonds, similarly to AC activity. Accordingly, results in a dissipative flow of entangled water pairs. As shown that the quantum state transition of the water into entangled pairs is a non stop process. A correspondence principle then allows the identification of momentum and angular momentum (called spin) [33] and the interpretation by J.M. Maldacena in terms of the geometrical description of quantum entanglement [34].

Conclusions

The turnover between hydrated versus hydrophobic forms of proteins involved in enzyme kinetics requires energy expenditures during the turnover of [ES], changing the enzyme hydration states into its [EP] form. A divalent metal (Mg^{2+}) when chelated by a protein loses its hydration sphere. It then releases its hydration (which is incomplete) and shows an intrinsic stronger charge.

The hydration shell of *nascent* Mg^{2+} allows capture molecules of water from the hydration sphere of Na^+ and this one replaces this loss from capture of H_2O from the hydration sphere of K^+. The sequence allows the sieve effects, required to activate the electrogenic pump [35, 36, 37, 38] and the neuronal membrane potential [39].

The dissipative energy potential is controlled within astrocytes by decreasing the concentration of H-bonds preventing feedback through rapid circulation. This is made possible by decreasing the number of H-bonds to reach the vapor state, associated with air breathing, which could also operate through the vomeronasal organ that experiences direct contact with the brain.

At the molecular level the entanglement function works through a self-decoherent phase cycle of H_2O operated by the sun, to dissipate

kinetic energy organismal without increasing their temperature, allowing life on our planet.

A coupling between entropy flow and causality, locally giving rise to life, could eventually be described cosmologically, by the thermodynamic model of the universe as an open inwardly system. This provides directionality to cosmological time in dissipative function. Therefore, the total emergent energy of the Planck bosons respond together to determine quantum primordial entangled structures, among the universe evolutionary stages, astronomically discovered by the project "*lookback on time*".

Addendum

Solar energy through the water cycle from liquid to vapor state and rain allows life by decreasing entropy (maximum disorganization). This is a unilateral tendency contrary to the principle of microscopic reversibility that figuratively equates to a bidirectional gate that calls Maxwell's demons, because these would have to be able to operationally differentiate the gate to separate the cold molecules from the hot ones, to obtain the unidirectionality of the entropy dissipation that gives rise to life.

The solution appears when imagining that entanglement allows it since when the molecule is inflated or enlarged, it cannot fit back into the door. At the molecular level the gates are enzymes that are bidirectional catalysts that allow the formation of entangled pairs as a product. These processes are identified with the polymeric structures of the water that enters the enzyme and when leaving it interlaces in pairs, to be unidirectional transporters in the dissipative direction of entropy, when evaporating and leaving the system, they cool the brain and allow its continuous operation, analogous to computers.

These systems of entangled molecular pairs through decoherence create cycles, coupled to the solar cycle the day vs night.

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