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Non-Simultaneous (Environment Participated) Quadrupole Time for the Law of Entropy Degeneration

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Abstract: ***Inversion energy is parameter-against-gravity-internal-fluctuation, non-simultaneous time is the retention of gravitational environmental backflows among surface quadrupoles, and quantizing time is the quantized degeneration of non-simultaneous time surface quadrupoles in a topological space. Environment-participated equations of Newtonian Laws, first:*** $\frac{d}{dx}\cos(nx) = -\sin(nx)$, $\frac{d}{dx}\sin(nx) = \cos(nx)$***; second:*** $\vec{F} = m \cdot \vec{a} + |m\vec{g} \int tg\theta \cdot d\theta\rangle 1\downarrow$***; third:*** *Wavelength* $= \frac{2}{n}L$, *frequency* $= nf_0$***. Bio-systems are topological spaces that degenerate entropy for offspring by repetitiveness memories, the trigonometric fluxes through the space by environmental participation is bio-inertia. The conventional origin of fixed-length quantum is believed to be Planck's mathematical skills in blackbody radiation, the new (variable-length) quantum can be re-explained by the blackbody surface non-simultaneous time degeneration that potentially issues quantum growth gravity*** $\hat{H}\psi = E\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$***. By the Law of Entropy Degeneration, life relies on negentropy procurements to physically inherit by growth turnover immunity that proliferates by sexual yolk sac (or asexual nucleus) elastic homing. The evolution of Long COVID niches and AI/BI is also unveiled from the new non-simultaneous time model.***

Keywords: Law of Entropy Degeneration, (surface environment participated) non-simultaneous (quadrupole) time, (trigonometric) environmental participation, quantizing time, inversion energy, (repetitiveness) memory, (integer) entropy-controlled/degeneration, variable quantum length, quantum growth gravity, selective permeability, growth turnover inheritance, Planck region/surface tension region, bio quantum duality, cross folded-surface tension region-flow, (sexual reproduction) yolk sac homing, (asexual cell division) nucleus homing, sexual inversion, growth turnover (resistance) tension evolution, conventional geometry/new geometry, inversion superposition, (wave superposition) internal size effect, parameter-against-gravity-fluctuation, parameter data driving system, parameter inversion driving system

1. Introduction

The origins of life [1] stand among the great challenging questions of our times. The intricate is to identify the properties that distinguish living and non-living systems by gravitational (surface processed) environmental participation. In 2019, a report revealed 10^9 levels of experimental gravitational binding between living and non-living beings [2] to propose life originated from a whirlpool; however, no (environment participated surface) non-simultaneous model presented thus the understanding of life evolution is incomplete. In 2020, new free-fall experiments of living organisms including human beings are designed for *FHD* measurements thus new understandings are presented [3]. However, these updates still do not include the mathematical equations for the modified Newtonian first law thus failing to clarify the definition of bio-inertia, non-simultaneous (quantizing) time, and repetitiveness memory, also failing to reveal quantum surface degeneration origin and quantum growth gravity $\hat{H}\psi = E\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$. This paper not only clarifies the definition of memory but also writes down the second law of thermodynamics into a gravitational higher surface tension format, the **Law of Entropy Degeneration**.

2. Results

2.1 Horizontal quantization of gravity by bio quantum paths originates the bypassed inversion energy in convention, vertical quantization of gravity by bottled liquids for repetitiveness memory (alive reference)

The bio quantum path model has been reported [2,3], as shown at the top of (**Fig. 1a**) and (**Suppl. Movie 1**). The driving forces of a ball running on paths A, and B can be written as, $dF_{forward} = F_0 + mg \cdot dtg\theta_A$, $dF_{forward} = F_0 + mg \cdot dtg\theta_B$, $dtg\theta_B$ always changes and $dtg\theta_A$ always equals 0, then $\vec{F} = m \cdot \vec{a} + |m\vec{g} \int tg\theta \cdot d\theta\rangle 1\downarrow$ .In the experiment, the ball on path B demonstrates a time advance that can't be justified by conventional physics. We then define $|m\vec{g} \int tg\theta \cdot d\theta\rangle 1\downarrow$ as parameter-against-gravity-internal-fluctuation inversion energy, which means it originates from the persistent fluctuation (geometric effects) of a physical parameter against gravity. Here, inversion energy is not a specific type of energy, any common type of energy such as oscillations, heat, lights, etc., once can persistently fluctuate against gravity will issue inversion energy (geometric energy). As in the experiment, only enough rounds of fluctuations can overcome the environment to show the effects. If these primary fluctuations can establish secondary or more rows of fluctuations (not necessarily from the same set of parameters) in that environment, the newly established fluctuation rows still follow the same rules, once attain certain fluctuation rounds against gravity then can accumulate new inversion energy levels. The restriction of continuously establishing new fluctuation rows rely on the resistant tension between the

newcomers and existing fluctuations. The efficient shape of a fluctuation falls into a certain trigonometric curve, we use the term "bio quantum path" to differ from ordinary waves without the ideal shape (In the horizontal experiment (**Fig. 1a**), a bio quantum path B is the highest gravitational binding curve, path A is the lowest, and all other wave shapes fall between these two. Mathematically, $\frac{d}{dx}cos(nx) = -sin(nx)$, $\frac{d}{dx}sin(nx) = cos(nx)$. Even in a covariant derivative state $T_{\mu\nu} = 0$, if inversion superposition is allowed, then it still can integrate with $\frac{d}{dx}cos(nx) = -\sin(nx)$, $\frac{d}{dx}sin(nx) = \cos(nx)$ inside a space).

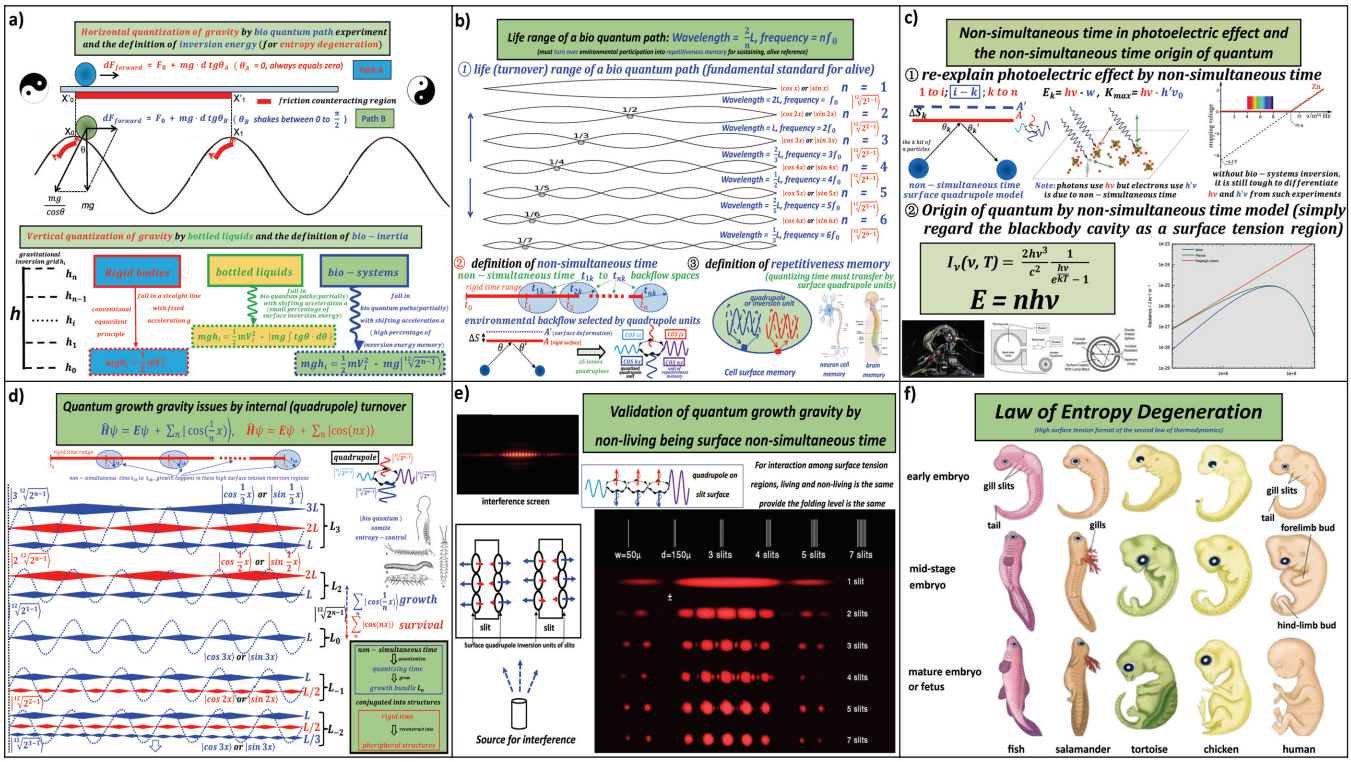

Figure 1: Horizontal/vertical quantization of gravity defines memory equivalent bio-inertia, surface inversion mechanism of quantum interference, the definition of quantum growth gravity that issues the law of entropy degeneration

a) *top: horizontal quantization of gravity by bio quantum path experiment for the definition of inversion energy, bottom: vertical quantization of gravity by falling bottled liquids to initiate repetitiveness memory based bio-inertia* ***b)***① *a general tool for life (turnover) range of the bio quantum path elastic model* ② *the quadrupole definition of geometric non-simultaneous (quantizing) time.* ③ *the definition of environmental backflow repetitiveness memory* ***c)***①*re-explain photoelectric effect by non-simultaneous time* ② *the universal non-simultaneous time origin of quantum* ***d)*** *non-simultaneous quantum growth gravity, bio-system inversion energy growth and survival mechanism* ***e)*** *validation of quantum growth gravity by conventional quantum interference* ***f)*** *embryonic evidence for the* ***Law of Entropy Degeneration***

The model of inversion energy originates "entropy-controlled" elastic reference (environmental participated) from the "entropy-generated" rigid reference system. The difference between these two types of references is the basis of parameter repetitiveness. A rigid reference system began around Galileo's time against a third-party reference, the repetitiveness of parameters is based on the large environment covered by that reference. An elastic reference system starts earlier, it only works for a relatively small group of memory-correlated parameters inside an elastic space to differ from a large environment (Given a group of parameters, x_1 to x_k, each has a "repetitiveness" number marked as integer n_1 to n_k, new input parameter y is only processed to impact the n_1 to n_k motion and not change the parameter data of x_1 to x_k, this is a parameter inversiondriving system which means n_1 to n_k turnover repetitiveness memory is more prior than parameter data x_1 to x_k to resist external y impact. For a conventional parameter data driving third-party referenced system, input parameter y only impacts data values of x_1 to x_k and never considers the effects of n_1 to n_k. Bio-system *in vivo* functions are fully sustained by repetitiveness memory at various levels. It is estimated while 10^9 levels of gravitational binding [3] are dampened by aging to 10^4 by earth environment, death will happen. Inversion is the property of geometric "alive" reference, detail in **Suppl. A1**). Crisp/Cas 9 is an example of reconstructing external DNA segments into individual topological space repetitiveness memory-processed DNAs for use. Also, genomic copy number variation (CNV) is another example. CNV means sections of the genome are repeated and the number of repeats in the genome varies between individuals. Approximately two-thirds of the entire human genome is repeats and 4.8–9.5% of the human genome can be classified as CNV [4]. CNV results from processing third-party reference-based repetitiveness into individual topological space "repetitiveness memory" thus inducing individual difference.

Due to entropy-controlled mechanism, all bio-systems can't directly use the incoming conventional parameter data, only physically taking the inversion (energy) induced by them. (E.g., if we touch a mechanical robot, it will record all the parameters directly related to the finger due to its lack of surface inversion structures to process the finger data into system inversion (energy). However, if we touch an animal,

its body automatically records the inversion induced by the finger, and with no mechanism to record its direct parameter data. Whether the animal feels happy or not is decided by the touch increases or decreases the trigonometric curve repetitiveness inside its body, not because of the touch parameters. In bio-systems, not only do structures such as DNA/RNA, proteins, cells, tissues, organs, and somatic bodies interact in the above elastic reference mechanism but also consciousness and language follow such ways. Even two people fall in love can't escape the mechanism) The above inversion energy memory-based processing mechanism is gradually evolved from non-living being surface tension regions):

The bottom of (**Fig.1a)** demonstrates the macrocosmic vertical quantization of gravity and the inversion energy memory mechanism in free-fall experiments[3]. The falling height h has been separated into different grids as h_1 to h_k. For theoretical rigid bodies, gravitational potential mgh_ican fully transfer into kinetic energy $\frac{1}{2}mV_i^2$ at each height h_j then get: $mgh_i = \frac{1}{2}mV_i^2$; for non-rigid bodies such as our half bottle of water VS a half bottle of oil experimental pair[3], the equation is: $mgh_i = \frac{1}{2}mV_i^2$ - $|mg\int tg\theta_i \cdot d\theta_i\rangle$ 1↓, which means part of the mgh_i on certain height h_j has been transferred to inversion energy $|mg\int tg\theta_i \cdot d\theta_i\rangle$ 1↓ due to environmental impacts, the reason for rigid bodies' common energy conservation $mgh_i = \frac{1}{2}mV_i^2$ is due to the item $|mg\int tg\theta_i \cdot d\theta_i\rangle$ 1↓ always equals zero or no part of a falling object can establish a persistently shifting angle θ against gravity. This reveals for free-fall liquid bottles or other non-rigid objects, their rigid energy conservations have been impacted by the item $|mg\int tg\theta_i \cdot d\theta_i\rangle$ 1↓ to a certain degree (strict thermos-dynamics first law needs zero surface tension). Such impact can shift the acceleration or even the falling path (to cylindrical spiral shapes) for non-rigid objects as in **(Fig 1a)**. Quantization effect and inversion happen inseparably thus issuing surface memory effects, at each height h_i:

$$mgh_n = \frac{1}{2}mV_n^2 - |mg\int tg\theta_n \cdot d\theta_n\rangle\ 1\downarrow$$
$$mgh_{n-1} = \frac{1}{2}mV_{n-1}^2 - |mg\int tg\theta_{n-1} \cdot d\theta_{n-1}\rangle\ 1\downarrow$$
. . . . . .
$$mgh_0 = \frac{1}{2}mV_0^2 - |mg\int tg\theta_0 \cdot d\theta_0\rangle\ 1\downarrow$$

At h_n the inversion energy is $|mg\int tg\theta_n \cdot d\theta_n\rangle$; at $h_{n-1}$the item $|mg\int tg\theta_{n-1} \cdot d\theta_{n-1}\rangle$can't fully transfer from $\Delta h_{n-1} = h_n - h_{n-1}$and the transferring efficiency decides by the system trigonometric curve repetitiveness at h_n, at h_{n-2} it is still decided by the trigonometric curve repetitiveness at h_{n-1}, and so on, which is an inversion superposition process and for each stage the efficiency is decided by the turnover resistance tension between the interaction structures (the non-transferrable parts back to $\frac{1}{2}mV_i^2$ or the environment). This is a standard physical inversion energy "procure and equivalent" or "memory" process albeit the percentage of inversion energy is lower.

Evolution to bio-systems, the memory mechanism is still the same just inversion energy $|mg\int tg\theta_i \cdot d\theta_i\rangle$ 1↓ extending from a single layer to multi-folded layers of surface tension regions, then fully following inversion energy conservation. (The surface tension-induced discrepancy for using the isolable parameter to the first and the second law of thermodynamics is less than 3% by *FHD* experiments [3] due to fewer surface tension layers; it is then not so urgent to differentiate inversion and common rigid energy. However, once the first law or second law is arbitrarily applied to non-isolable bio-systems, up to 10^9 levels of discrepancy will be induced from highly folded surface tension regions. The cause is the difference between processing isolable rigid energy into bio-system non-isolable inversion energy by surface tension regions. Under such a condition, discriminating inversion and rigid energy becomes indispensable. Inversion energies can be simply regarded as energy in surface tension regions for non-living beings albeit that becomes complicated in living systems. Such a surface tension-induced difference also reflects in quantum mechanics and board other disciplines, the wave function will collapse once contact with the outside world due to a lack of an intermediating surface tension "protection". For the bio-system equation in (**Fig.1a**), $mgh_i = \frac{1}{2}mV_i^2$ - $mg\left|\sqrt[12]{2^{n-1}}\right\rangle$, the earlier item $|\int tg\theta_i \cdot d\theta_i\rangle$ is to integrate all the parameter fluctuation-induced gravitational inversion energy based on a third-party reference, the new format$mg\left|\sqrt[12]{2^{n-1}}\right\rangle$is based on certain surface tension effects). Both Newtonian and Einstein's are *G* fixed gravity (rigid energy conservation, parameter rigid data driving) that never refers to the shifting between the surface tension regions and non-surface tension regions of an object. Bio-system *G* shifting gravity comes from the turnover resistance tension between a quantum structure and conjugated structures. Like bottled water, the liquid surface tension region is the quantum structure that is conjugated with inner non-quantized parts. *G* shifting gravity will present once the whole system falls in the gravitational field (In the free fall liquid experiments, a half bottle of oil shows a lower *G* fixed gravitational weight than a half bottle of water but hits the ground first [3], this reveals *G* shifting gravity originates from the motion of gravitational inversion grids in the bottle surface). For bio-system *in vitro* conditions, the *G* shifting gravity $mg\left|\sqrt[12]{2^{n-1}}\right\rangle$ can be applied for measuring *FHD* calibrated bio-inertia, just needs to trim by an organism's lifetime curve [3]. For *in vivo* structures, the tension between the surface or non-surface tension region will fall into the integer pattern of $\left|\sqrt[12]{2^{n-1}}\right\rangle$, such as n = 1,4,7 for one region and n = 2,5,8 for another, we then can modulate the relative motion state of inversion energy activated structures. The Cavendish mutations get 10^9 levels of experimental G shifting [2], the enlargement of bio-system G shifting gravity comes from the "equivalent" of previously memorized inversion energy with the newly procured inversion energy. The more turnover resistance tension among these two sets of inversion energies, the more gravitational binding, memory possesses "weight.

For bio-systems, the above capability of equivalent procured inversion energy from memorized trigonometric curve repetitiveness by inversion superposition is defined as bio-inertia. Newtonian inertia is for objects to keep their motion or rigid energy states, and bio-inertia is for topological spaces to retain their inversion energy memorized states. Newtonian inertia resists motion state change by rigid mass, and bio-inertia resists internal repetitiveness memory state change by turning over more gravitational inversion energy from the environment, both are "gravity-induced resistance" then referred to as "inertia"; just the third-party reference for the former is an old geometry dead reference that can't

elasticate environmental participation and the latter is a new geometric alive reference which can turnover environmental participation (**Suppl. A 1**) for entropy control (Old geometries issue the concept of manifold but don't know how to get an entropy-control state process via environmental participation to shift between homeomorphism shapes).

2.2 Define non-simultaneous time, quantizing time or repetitiveness memory for *G* shifting quantum growth gravity to issue the Law of Entropy Degeneration

The entropy generation law of thermodynamics describes non-living systems' equilibrium with environments, attaining the equilibrium state means reaching an entropy maximum state. From here, inversion energy fluctuations are to control bio-systems to stay in a state that is far from thermodynamic equilibrium states by patterning environmental participation and non-living systems lack such environmental participation "selection" capability. There are more than ten definitions for the widely applied entropy concept and mostly associated with a state of disorder, randomness, uncertainty, etc. Two unsolved problems for them to apply in bio-systems, first, most "disorder" conclusions confuse the reference basis (they fail to realize that entropy generation characteristic is the intrinsic property of any third-party rigid time reference and all bio-system entropy-controlled alive states come from their own topological space repetitiveness memory reference); second, unrealize of environmental participation and reverse "entropy" conditions inside a topological space (conventional thermodynamics believes that non-T-symmetry is the causality of entropy generation. This is incorrect since bio-systems can inverse non-T-symmetry conjugations to procure negentropy. The reason that bio-systems can keep entropy-control/degeneration states is simply that all environmental impacts have already been processed into "beyond reference" inversion before entering the system), the arrow of time is defined based on entropy which means these unsolved problems deeply concern time. There are similar problems for conventional quantum mechanics to apply in bio-systems also concerning rigid time. Now we'll discuss the "geometric" time robustness.

(**Fig. 1b①**) shows a general bio quantum path elastic string model, for an ideal string, the oscillation length/frequency relationships follow the same pattern (at any direction): $Wavelength = \frac{2}{n}L$, $frequency = nf_0$. In real conditions, due to the environmental participation tolerance, a bio quantum path can only effectively utilize the length/frequency ratio to resist environmental drifting in a certain range. E. g. upstream 5 lines and downstream 6 lines fall into system acceptable accuracy, which can define as the life (turnover) range of a string; within the life range, all the strings fall into a certain trigonometric curve pattern based on the modification of Newtonian first law. The previous law states that an object either remains at rest or continues to move at a constant velocity unless it is acted upon by an external force. It makes people misunderstand that "net to zero" forces stop objects from initiating along a straight line; however, the actual reason should be stopping objects from initiating along a bio quantum path. The fundamental difference between a Newtonian straight line and a bio quantum path is the environmental geometric participation. The origin of life or embryonic state is such a state, the yolk sac blood islands [5] as the first site of hematopoiesis is an example. These cells pattern environmental participation and then initiate bio quantum paths for entropy-controlled heart development (outside a surface tension region or its folded state is the environment for this surface tension region, this definition fits for all levels of all bio-systems).

Technologically, for the horizontal experiment in (**Fig. 1a**), we construct the rigid bio quantum path into a symmetric cosine curve; however, the non-gravitational environmental impacts will be an asymmetric parameter pattern based on the original path symmetry, and gravitational binding will tend to pull back such an asymmetric shifting. In a life range as in (**Fig. 1b①**), each line composes of a condensate, which means the effective string utilizes different tension to respond to the external environment, written down by Chu's constant as $\left|\sqrt[12]{2^{n-1}}\right\rangle$, n=1 means condensate 1, till n=k, condensate K (equivalently use *cos (nx)* or *sin (nx)*, just the latter lack index 12). For inversion energy $\left|\sqrt[12]{2^{n-1}}\right\rangle$ with n=1 to k, due to environmental participation, some integers will fall into surface tension regions and others will fall into non-surface tension regions, we roughly call these inside surface tension regions non-simultaneous time albeit they are shifting dynamically. (**Fig. 1b②**) gives the theoretical definition of geometric quadrupole non-simultaneous (quantizing) time. (**Fig. 1b③**) demonstrates the quadrupole definition of repetitiveness memory which is only the advanced part of the quantizing time (**Suppl. A2**). (Non-simultaneous quantizing time can also be called "aether", the aether hypothesis was the topic of considerable debate and had been discarded by the scientific community due to third-party reference; however, it is adaptable to bio-systems since it is a real existence that all the entropy-control/degeneration must rely on it.)

Now we'll use the quadrupole time to deal with two thermodynamic unsolved problems. First, the entropy generation system is based on third-party reference, once based on repetitiveness memory of a topological space as reference, it then becomes a bio-system entropy control state that can synchronize the entropy generation of different parts inside the space (E.g. wound healing or other biological processes are such kinds, system parameters x_1 to x_k, with their repetitiveness numbers as n_1 to n_k in the group, wound means the parameter x_i is damaged and its repetitiveness number n_i deviates from the previous n_1 to n_k pattern, then other repetitiveness numbers n_1 to n_k can gravitationally pull back the n_i back to an "environmental backflow time-based pattern" by the system repetitiveness memory. It is still entropy generated but keeps away from thermodynamic equilibrium states by n_1 to n_k turnover thus could be called quantum entropy generation, which means utilizing integer inversion patterns to synchronize different local entropies). Second, for an existing entropy-controlled repetitiveness pattern n_1 to n_k, once it happens a full string life range inversion by an adaptable environment or the partner (the sexual mating partner or asexual cell division partner still condensates from the environment thus plays the same role just quite higher in non-simultaneous quadrupoles), then can get degenerated entropy.

We can start by using the non-simultaneous time quadrupole definition in (**Fig.1b②③**) to modulate the photoelectric effect. As the left of (**Fig.1c①**), a particle *k* hits surface A

and induces ΔS_k transfer to the later incidental particles, now simply believes the non-simultaneous time ΔS_k roughly equals to electrons' work function W then can explain $K_{max} = h\nu - W = h\nu - h'\nu_0$. Here we use h' to replace Planck constant h in the emission part just to differentiate the incoming quantum length h and the "metal surface transferrable" quadrupole quantum length h' (none of the quadrupole unit polar can be zero thus $h \neq h'$, strictly speaking, h' should be a series data and not just a single value). Different from the conventional model only uses the photon energy of $h\nu$ and never considers the surface property h', this explanation includes surface retention transferring efficiency thus should be closer to facts. From here, a photoelectric effect is due to the surface tension non-simultaneous quadrupole time. Also, conventional quantum mechanics still bypasses the same surface effect by math. As in (**Fig.1c** ②), Planck's blackbody experiments need the cavity's inner surface, but he mathematically bypasses the surface to synchronize the Rayleigh-Jeans law and Wien approximation and then establishes the discipline foundation $E = nh\nu$ (following the new non-simultaneous time, simply regard the Planck blackbody cavity as a surface tension region and use the non-simultaneous time definition, the origin of quantum is then changed from Planck's mathematical skills into surface degeneration. We can also macrocosmically trial as suggested in (**Suppl.A2**) composed of balls, ball serving machines, hard surfaces, parameter sensors, etc., these publicly accessible experiments will be better than Planck's blackbody experiments to tell people what quantum and environmental participation is. Conventional quantum mechanics is only a special condition that the environmental inversion polar of quadruple time is minimized to close to zero but can't be zero, and for bio-systems, the environmental inversion polar is maximized for entropy degeneration. The five postulates of that discipline make it into a dead discipline by claiming the completeness of the Schrödinger wave function; we should carefully note that once a surface tension region presents, that wave function only can cover less than 1% of the condition and will lose 99% of the alive conditions that issue life). Under conditions (lower inversion) where surface tension effects can be neglected, the difference between h and h' is insignificant; however, once inversion happens, the trivial $\Delta S = h - h'$ can be extended to a large quantum length L following the modified third law *Wavelength* $= \frac{2}{n}L$, *frequency* $= nf_0$, from here, inversion is its disciplinary jinx. Conventional quantum mechanics only deal with identical particles (fermion or boson) with a fixed Planck length h, in some conditions such as BEC, even within identical particles and without a visible surface tension region, quadrupole time still can't be neglected (the "memory" of two particles' interaction to the third particle is still a special type of non-simultaneous time, just quite weak than the surface degenerated quadrupole time). Under a bio-system surface tension region or membrane, there are a lot of DNA/RNA segments, proteins, cells, etc., all with variable bio quantum lengths conjugated by inversion. Till now, there is no theory has fully explained all aspects of growth since all theories are based on no difference between *in vivo* and *in vitro* molecules. Growth is only the degeneration of different bio quantum lengths under the environmental surface tension regions, given time-independent Schrödinger equations $\hat{\boldsymbol{H}}\psi_k = \boldsymbol{E}\psi_k$ on (k means different quantum length) each quantized surface tension n_k, we can get the quantum growth gravity in (**Fig. 1d**):

For a bio quantum inversion energy $\cos x$ with quantum fluctuation length L and surface quadrupole stability $|\cos x\rangle$ (the wavelength of $\cos x$ is different from L, like the previous h and h' in photoelectric effect). In a favorable environment as in (**Fig. 1a**), L will gradually accumulate new fluctuation $2L$, $3L$, etc., or collapse to $\frac{1}{2}L, \frac{1}{3}L$,etc., with $\sum_n |\cos(\frac{1}{n}x)\rangle$ as growing states and $\sum_n |\cos(nx)\rangle$ as survival states (or equivalently expressed as $|n^{\frac{1}{2}}\sqrt{2^{n-1}}\rangle$). Environments vigorously participate in each step of the original L grows into nL or collapses into $\frac{1}{n}L$ by inversion, thus no matter whether the holographic superposed bundle L_n is bent, stretched, compressed, or in any system-accepted motion states, each component bio quantum path L_1 to L_k keep the elasticity or integer ratio follows the topological equation and turnover shifting optimum length L_n to the outside environment, conjugated with peripheral structures (the structures between the Planck region and surface tension region). The quantum growth gravity can then be written down as: $\hat{\boldsymbol{H}}\psi = \boldsymbol{E}\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$, $\hat{\boldsymbol{H}}\psi = \boldsymbol{E}\psi + \sum_n |\cos(nx)\rangle$.

The conventional part $\hat{\boldsymbol{H}}\psi = \boldsymbol{E}\psi$ is dead state rigid time fixed G energy conservation and the new equation $\hat{\boldsymbol{H}}\psi = \boldsymbol{E}\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$ is alive state quantizing time G shifting inversion energy conservation based on surface tension regions. For a conventional identical particle quantum collapse interaction, the quantum state is postulated to be disappeared and only leaves rigid eigenvalues. For eigenstates interacted on surface regions, the quantum state is still active (following non-simultaneous time definition, even if an identical quantum length h can collapse, it still can be regenerated by other quantum lengths h_k'), which also issues the inversion of eigenvalues instead of direct eigenvalues. Due to the need for the surface tension region to degenerate the inversion of eigenvalue quadrupoles, G shifting gravity and inversion processes become fully indispensable. Conventionally described quantum collapse is equivalent to a bio-system aging process that has a measurable lifespan (even for a non-living identical particle quantum state, a "super-simultaneous" collapse is still irrational. Conventional quantum mechanics always like to claim the presenting probability of particles, due to omitting surface tension regions, it is an environmental participation neglectable probability. In bio-systems, surface tension regions make all alive environmental participated probability can't be normalized, those can be normalized mean dead). For bio-systems, the quantum growth gravity memory turnover mechanism is not only for entropy synchronizing but also for directly issuing functions. As the somite entropy-control examples in (**Fig.1d**), a centipede has n somite each grafts a pair of feet, one pair n_i running induces its entropy increase, then n_1 to n_k somite synchronize the entropy to arrange the pattern of other feet's running. (Note, more than 90% of the feet's motion comes from the somite and only a small percentage of the control comes from the brain. Since the memory background of the spinal cord is the whole environment and that of the brain is only the spinal cord. Spinal memory is innate and universal, while brain memory is only acquired and specific. Even for advanced species

including humans, the former is over 90% of the system controls. This is the reason why brain consciousness can't stop the heartbeat.)

Non-simultaneous time is the same mechanism for non-living and living beings and only quantitatively differentiates by surface folding levels; therefore, non-living quantum interferences still can effectively validate inversion communication, which means at any condition and any distance, once inversion communication can happen, it will absolutely fall into certain trigonometric curves with certain turnover lifespan. To explain the slit(s) interference in the left of (**Fig. 1e**), each slit composes of two layers of surface quadrupole inversion units. While electron beams or lights pass, non-simultaneous quadrupole inversion will make the electron beam or lights bent at a series of angles, it is these angles that induce the interference fringes. Following the inversion communication rules, no matter single-slit or multi-slit, once we can see the interference fringe, the measurements of quantum length $L_k^{'}$ on the interference screen and the parameter fluctuations quantum length L_k on the slit surface, will compose of trigonometric integer correlation. The interference fringes on the right hand of (**Fig.1e**), with linear regions enclosed or interweaved with the non-linear regions, demonstrate the inversion communication rule, which means any parameter negative impacts to certain trigonometric curves can drive the turnover of their correlated trigonometric curves or be reversed the effects by such turnover and also can integrate environmental trigonometric negentropy; therefore, we can see and validate such multi-slit fringe pattern on the right hand.

From the non-simultaneous time definition in (**Fig.1b②**), non-simultaneous (quantizing) time has innately possessed entropy degeneration capability. Given n number of identical particles hit on a surface, with later particles getting previous particles' surface quadrupole retention, these n identical particles' retention will then roughly fall into three groups due to different environmental participation induced by the surface tension region, marked as 1 *to i*, *i to k*, and *k to n*, as in left of (**Fig.1c①**). The *i to k* range is in the middle and can fall into any position with any width depending on environmental conditions, which is the non-simultaneous quadrupole time high retention and transferring range for a surface tension region under the environmental conditions. Compared with the whole range, this *i to k* high retention range possesses a lower entropy than the remaining range and level of the entropy concerned with the whole system. We should carefully realize that now the *i* to *k* range has become the parameter inversion driving n_1 to n_k turnover range, which means while responding to external impacts, the surface tension region no longer uses 1 to *i* and *k* to *n* ranges, and only utilizes surface modified *i* to *k* range turnover structured by the modified third law to replace the above two ranges. It is such turnover replacement that induces the difference between rigid and inversion energy. Now, conventional quantum mechanics' orthogonal probability for *n* identical particle is equally replaced by environmental participated *i* to *k* range probability thus dead Schrödinger equation must be replaced by the alive quantum growth gravity $\hat{H}\psi = E\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$, and particles' presentation can no longer be normalized as before. From identical particles' fixed quantum length to non-identical particles/structures' variable quantum lengths, the mechanism is still the same just to increase the inversion level, now the inversion superposed *i* and *k* surface high retention range comes from groups of variable quantum length structures instead of conventional fixed Planck length *h*, the new environment participated high retention range can remove excrements and absorb negentropy, also induce up to 10^9 levels of the gravitational energy difference between living and non-living beings, rigid inertia and bio-inertia.

The high quadrupole retention range *i to k* of a surface is dynamically asymmetric, if environmental conditions or other internal turnovers can make *i to k* range or any of its folding partially or fully reverse interaction sequence (the 1 to *i* and *k* to *n* ranges keep the same and only reverse *i to k* range), then can degenerate entropy. This is a universal model for both the microcosmic and macrocosmic worlds. Practically, bio-systems are composed of bio quantum path life ranges at each level, a string life turnover range n_1.to $n_k$effectively inverse can degenerate entropy for that life range, which is the reason why bio-systems only take parameter-induced inversion energy and not direct data-induced common rigid energy (since only inversion energy can degenerate entropy by energy level inversion but rigid energy can't. We should also realize; energy level inversion is only a necessity and not a sufficiency for entropy degeneration. After inversion, if the system can't get enough environmental participation with memorized pattern, degeneration still can't success since the subsequent environmental participation is so critical. Modern technologies such as gene editing, stem cell implantations, etc., never consider subsequent environmental participation thus the successful rate is notoriously lower and even induce cancer. We must deeply understand that those operations without considering subsequent environmental participation are entropy generation processes and all entropy control/ degeneration processes must depend on environmental participation. A successful gene editing organism should be sensitive to falling height difference (*FHD*) evaluation like the aging process lifetime *FHD* standard curve judgment). Reproduction involves the highest turnover structure inversion in a topological space, then can degenerate entropy to offer a lower entropy level for offspring. The mechanism that a quantum condensate can issue degenerated entropy by quantum level inversion is called **The Law of Entropy Degeneration**, it can be simply regarded as the high surface tension version of the second law of thermodynamics under gravity. (**Fig.1f**) shows entropy degeneration evidence from embryonic development, the human embryo will experience the stages like a fish or a reptile. If we elapse the whole geological times of human evolution into a surface tension region, then the old functions such as gill slit, tail, etc., still via this surface tension to transfer to human later surface quadrupole time. This figure only shows morphological changes; however, all aspects such as genomic, proteomic, etc., should equally be degenerated since entropy degeneration is the fundamental characteristics of life. Conventional quantum mechanics studies the behavior of a large amount of identical or close to identical particles based on "rigid time normalized" probability, and the five postulates fully deny any degeneration thus it is still a dead state discipline. Bio-systems use surface non-simultaneous time, even non-identical particles/structures under the surface tension region have certain probability stories, once

quantizing time is established, all alive particles/structures must follow entropy degeneration requirements and no so-called normalize-able probability).

The entropy concept in bio-systems is no longer a simple "disorder" based on a third-party reference. It means the highest growth condensate $L_n$turnover (resistance) tension or efficiency of internal structure surface degeneration under the highest folding surface tension regions (As our previous example of *n* number of identical particles hit a surface tension region and then differentiate into groups of 1 *to i*, *i to k*, and *k to n*; suppose all the conditions are fixed, the (foldable) width of the *i to k* range means lower entropy. Aging is a natural process of narrow the *i to k* foldable range or entropy generation process. In ancient China, there is a physical strike training [2], it was still mechanized to widen the somatic *i to k* range by external physical strikes. The non-simultaneous time definition greatly inspired by this ancient physical training. Here the "repetitiveness entropy" definition is based on a topological space for studying evolutionary entropy degeneration turnover efficiency and the conventional entropy concept comes from studying engine efficiency based on a third-party reference). After degeneration, offspring will get a higher repetitiveness than parents, then can procure more negentropy than parents under the similar environmental conditions. Negentropy can only replenish part and not the whole parental degenerated entropy, this is the reason why lifespan is limited. Now, we can see how negentropy is integrated with turnover (inversion energy can't be transferred like rigid energy, must unconditionally survive by certain turnover). As in growth $\sum_n |\cos\left(\frac{1}{n}x\right)|$, suppose L_j, L_k, L_l, are integer ranges in L_n for procuring negentropy by foods, migrations, and shelters, etc. The ground states of L_j, L_k, L_l, are based on the topological equation, then: $L_j = L_k/L_n = L_l/L_n$. While the entropy generations of L_j, L_k, L_l, deviate from the holistic entropy generation, $L_n$will pull back L_j, L_k, L_l, to the ground states, and in the process of L_j, L_k, L_l, being pulled back, part of the environmental inversion energy will bring by L_j, L_k, L_l, to $L_n$and integrated, those from the environment and integrated by $L_n$are procured negentropy (the "environment" only means outside the growth bundle L_{nk}, different genes, proteins, cells, etc., interweave their L_n and "environment" to turnover negentropy. Schrödinger initiated the concept of negentropy but still didn't know this concept must be sustained by (surface) environmental participation).

For the condensates $L_j/L_n, L_k/L_n, L_l/L_n$, each negentropy pullback is first impacted the outsider layer L_{n-j}, L_{n-k}, L_{n-l}, then the trigonometric part can transfer further (the first impact position of each L_j, L_k, L_l is shaped by peripheral structures and from these first hitting positions run through the whole L_n in a certain pattern), the non-trigonometric part will be excreted. While environmental parameter availability changes, the system will adapt L_n. E.g. in a food abundant environmentL_j locates on the outside of growth $\sum_n |\cos\left(\frac{1}{n}x\right)|$, while food availability decreases, $L_k$orL_l will turn over to the out layer to replace $L_j$by inversion superposition (for humans such first hitting layer(s) turnover adaptability mainly happens in a sleep state since each shifting must synchronize all growth layers to exclude non-trigonometric curves, such a synchronization relies on the minimum fluctuations of all layers then fall in a sleep state. Daytime rest can only partially shift and far beyond touches with all layers. In old age, sleep time will be reduced substantially since the layer-shifting capability is dampened. A sleep state is wakened up due to the layer-shifting being externally interrupted, which is like when old people's CSF layer can't further shift then internally wakened). The trend of adaptability is always the good available negentropy sources tend to the outside hitting layer of the growth bundle to fold into new surface tension regions and establish new condensate structures (human training or learning is such "repetitiveness" layer-shifting that happens on the spinal structures to strengthen the pattern of attached peripheral body structures, certain signal layers get persistent stimuli then turn over to the out-layer and fixed to a new quantum length; therefore, need long-term stimuli and much sleep. If the stimuli are decreased, that layer could be overlapped by new negentropy layers and then forgotten. For plants, the only negentropy source is sunlight, following the above lay-shifting adaptability, photosynthetic inversion energy is shifting to the outside of the growing bundle and transfers along the bark; in an embryonic stage, the photosynthetic functions should be in deep layers for the inheritance, later, shift to outside by environmental negentropy sources. For plants, full growth turnover only happens in root apical meristems, leaves, flowers, etc., not like animals happen in spinal cords; therefore, a sleep state only in these locations. Such differences have been reflected in mRNA splicing patterns, intron retention is the major manner in plants, whereas exon skipping is a high frequency pattern in humans). In a generation, the lifespan is not only restricted by the availability of negentropy resources but much more rely on the adaptability that gravitationally turns the well-available resources over to the outside layers of the growth bundle L_n. The *in vivo* growth mechanism fits all species from genomic to somatic level. (Note: this mechanism endorses Lamarckism and not Darwinism. Genetic mutations never randomly happen and must physically pass turnover selection from various directions at diverse levels to degenerate entropy for the next generation. Lamarckism complies with board later experiments quite well than Darwinism. People insist on the latter constructing genetics only because of Newton's earlier impacts. From here, central dogma-based genetics must be replaced by entropy degeneration basis).

2.3 Bypassed surface homing tendency and in vivo gravitational quadrupole flow, entropy degeneration mechanism of asexual/sexual reproduction

Einstein predicted the big mass light bent; however, the bent angle is quite smaller than those induced by the slit interference as in (**Fig. 1e**), such a difference still originates from surface environmental participation, which can also be called gravitational surface homing effects (conventional Schrödinger wave function is innately born by certain environmental participation but the discipline arbitrarily shut off that by five postulates and the story of quantum collapse, we should carefully note that both gravitational waves and wave function can't escape environmental participation. No matter whether non-living beings/bio-systems or young/aging organisms, only differentiate by environmental participation quadrupole levels). As the fresh observation method [2] of a

mouse hypothalamus in (**Fig. 2a**), after the mouse is killed and the blood circulation has stopped for hours, its hypothalamus surface cell migration still can be observed as in (**Suppl. Movie 2**). Cell migration, no matter at any level of

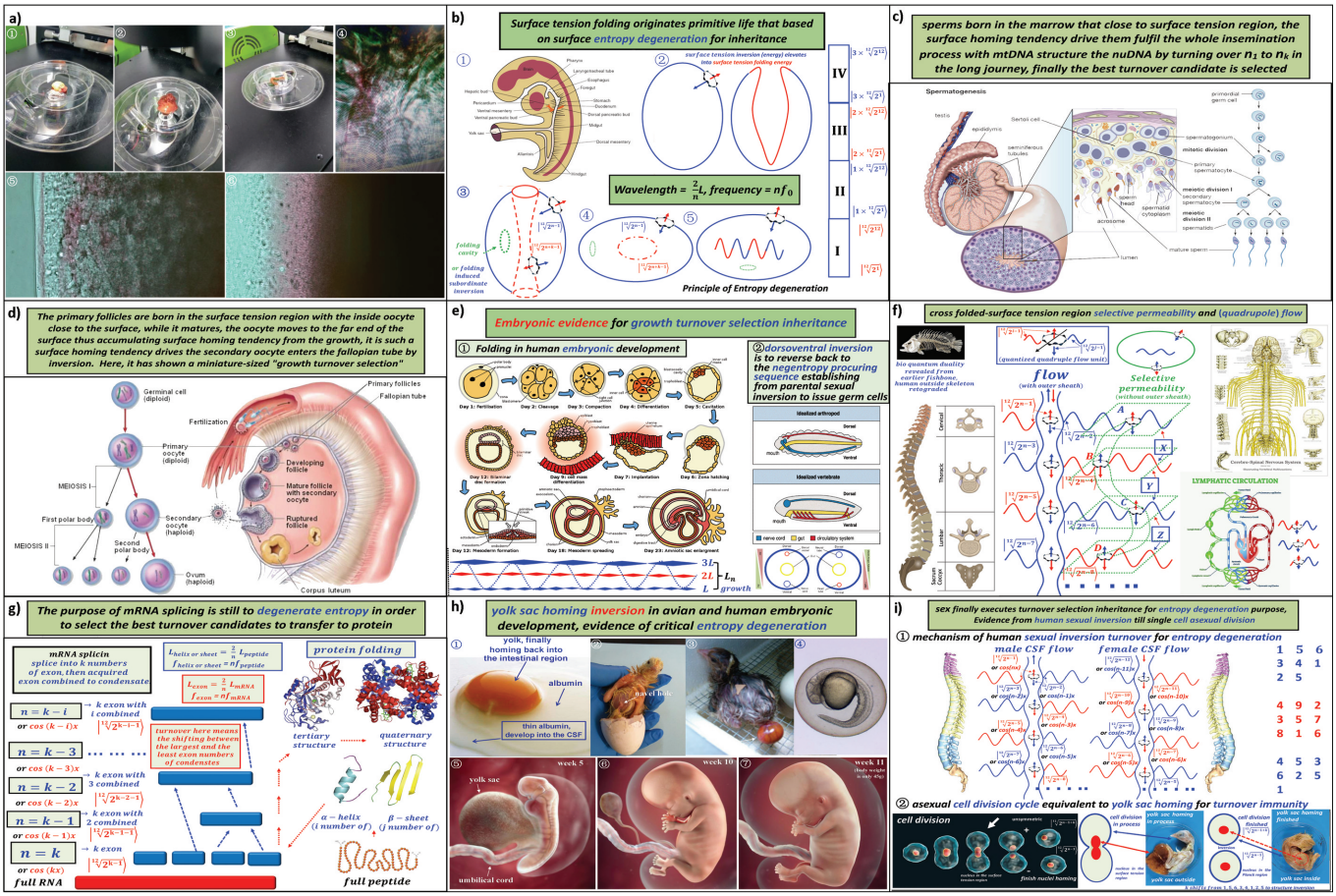

Figure 2: Entropy degeneration mechanism of evolution that evidenced by dorsoventral inversion/yolk sac (or nucleus) homing ***a)****fresh observation of mouse organ to reveal the surface tension role (18-week Jackson 003291 - C57BL/6-Tg (CAG-EGFP)1Osb/J mouse, Dec., 2016, Medical School B343, Tsinghua University)* ①*fresh observation: hypothalamus* ②*fresh observation: liver* ③*fresh observation: small intestine* ④*small intestine with × 40 objective* ⑤*liver with × 40 objective* ⑥*brain hypothalamic-pituitary region with × 40 objective* ***b)****primitive life originates from surface tension region folding bio quantum path duality and inherits by entropy degeneration mechanism without the participation of DNAs/RNAs* ***c)****spermatogenesis utilizes surface tension homing tendency to select the best turnover candidates* ***d)****oogenesis utilizes surface tension homing tendency to for growth turnover* ***e)*** ①*the folding in earlier human embryogenesis* ②*embryonic evidence of growth turnover selection from dorsoventral inversion* ***f)****growth of cross-folded surface tension region selective permeability and flow* ***g)****the mechanism of mRNA splicing is entropy degeneration* ***h)****embryonic evidence of growth turnover immunity from the avian yolk sac homing inversion, which reveals evolution is the expanding of generation sexual inversion/development back capability.* ***i)****growth turnover immunity evidence:* ①*human sexual inversion (sex equivalent quantizing time between male and female CSFs to mechanized to pass degenerated entropy for the next generation)* ②*cell division nucleus homing mechanism*

surface tension, is driven by the non-simultaneous time of that level to follow the modified third law. The cell migration in the hypothalamus and other locations only differentiates by non-simultaneous time or surface tension folding levels. From the video, if a cell, no matter migrates in any direction, can synchronize its behavior with diverse other cells, which means it is in a good entropy-controlled state or falls into the *i* to *k* stem cell range of (**Fig.1c**①) and possesses a longer migration lifespan, individual cell migration that fails to the surface degenerating region will be excreted out no matter its genomic sequence. Processes of memory mainly compose of cell (quadrupole) migration, hours after an animal is killed, the dampening non-simultaneous time still can maintain the nearby surface cell migration, which means conscience is still present there. Surface non-simultaneous time homing tendency shapes all bioprocesses, even the earliest life forms are born from surface tension degeneration:

(**Fig. 2b**①) is an animal gut development map, no matter which kind of animal, the development of guts can be simplified as a surface tension topological folding. The left of [**Fig. 2b**②] shows an ellipsoid enclosed surface tension region, if surface tension inversion energy can be accumulated and elevated, then it will make the surface concave like on the right hand. Finally, it will establish an ellipsoid sphere with a smooth tunnel that runs through like in (**Fig. 2b**③), one side is the mouth, and another side is the anus (it is noted that the only place that can bear this kind of surface tension structure in nature is a whirlpool; the yolk sac tube here is for acquiring the huge surface tension inversion energy requirements from parents to replace the natural environment for folding). The folding of a surface tension region will still be quantized to establish condensates of $\left|\sqrt[12]{2^{n-1}}\right\rangle$ to $\left|\sqrt[12]{2^{n+k-1}}\right\rangle$. (This integer pattern means turnover entropy degeneration processes can be happening between

them. According to the law of entropy degeneration, while a series of folded surface tension regions condensates get growth turnover entropy degeneration then can inherit because the driving force of genetics is still surface quadrupole retention of DNAs/RNAs' motion and not commonly believed DNAs/RNAs' codes (modern genetics tries to find single cistron DNA/RNA modulations but never realize that the entropy for these modulations is notoriously high, all entropy-controlled active DNAs/RNAs must be multi-cistron, which issue groups of genes under different surface tension strengths). The surface tension entropy degeneration inheritance is present well before the DNAs/ RNAs entropy degeneration inheritance, possibly by millions of years ahead, without surface tension regions to grow non-simultaneous time quadrupoles, stories such as RNA world still lack any evolutionary basis no matter how many RNA segments are present since all of them must integrate by environmental participations for living functioning.

Only after surface tension entropy degeneration inheritance has happened stably, then can gradually present later formats such as DNAs/RNAs inheritance due to non-simultaneous time mechanism. A human titin gene is reported to contain 363 exons [6], this highest splicing record means its relevant surface tension regions have been folded for at least 363 rounds to establish turnover condensates to correlate this gene with other genes. (**Fig.2b④**) is a folded and later detached condition. (**Fig. 2b⑤**) is a standard duality model, all the biostructures such as DNA/RNA, proteins, etc., we can see today have already historically experienced a lot of folding. After folding, the surface tension regions and the Planck regions need to be physically equivalent or grow into the same topological equation length L_n series. The "equivalent" here is to grow to the pattern in the right hand (**Fig. 2b**) (As in (**Fig.1d**), a human embryo will degenerate into stages such as a fish or a reptile, some remotely common characteristics such as gills, fin/limb buds, etc., means they work as negentropy procuring structures before; however, no longer used in later species such as humans then be turned inside the growth bundle L_n and yielded to better negentropy procuring source of outside layers. Albeit the function as a negentropy procuring source has been retrograded but the function of entropy control remains, the bio-system elasticity such as fault tolerance and hormesis capability still relies on them and can't be misunderstood into the "junk DNA". All functions from genomic till somatic levels are entropy degenerated turnover in this way, thus leaving patterns in the right hand of (**Fig. 2b**).).

(**Fig. 2c**) spermatogenesis, (**Fig. 2d**) oogenesis, (**Fig. 2e①**) early human embryogenesis, are all processes of surface entropy degeneration that select the best surface homing candidate and remove excrements (spermatogenesis needs so many sperm cells to travel so long a distance only to select the highest trigonometric non-simultaneous time candidate. For humans, one ejaculation issues 30-450 million sperm cells. It is estimated the sperm acquired highest non-simultaneous time in the journal will be 10^6 level than the lowest sperm cells even if the genome sequence of all sperm cells is storied by modern genetics as "identical" at the start, the final successful candidate should possess the highest physical non-simultaneous time which sacrifice from the almost all the sperm cells that finally attain the insemination region. The model still our surface degeneration i to k range folding. The non-simultaneous time turnover transfer among sperm cells directly shakes the rigid foundation of modern genetics).

(Fig.2e②) shows the dorsoventral inversion as the evidence of entropy degeneration which was first noted in 1822 by Geoffroy Saint-Hilaire and was heavily criticized, but later get molecular support. It sustains the growth turnover entropy degeneration. (**Fig. 2f**) shows how surface folding can establish a cross-folded surface tension region flow from "selective permeability". All *in vivo* such as blood vessels, lymphatic circulations, nerve impulses, etc., are established from folded surface tension regions and are quantized quadrupole liquid flows that different from *in vitro* flows. For *in vitro* liquids, the quadrupole inversion units only exist in the surface tension region and can't be present inside the liquid body. However, all *in vivo* flows compose of quantized quadrupole units on every folded surface tension region, or an inversion entropy degeneration process can only happen on the surface of an *in vitro* liquid; however, can happen in every folded surface tension region inside an *in vivo* flow. Such an *in vivo* flow property evolves from the membrane's "selective permeability" which also originated from the surface non-simultaneous time degeneration. As in (**Fig. 2f**), we use green color to represent four folded surface tension regions, on these folded surface tension regions there are groups of inversion units represented by A, B, C, and D, the advantaged quadrupole inversion units from the quantizing time of A, B, C, and D groups can establish a cross folded-surface tension path under certain conditions. For an *in vitro* flow, the entropy control capability is quite lower; it is difficult for an ingredient or environment impact y_i that has just reached location A to simultaneously satisfy the requirements of location B, C, D. For an *in vivo* flow, suppose the flow contact folded A, B, C, D locations have repetitiveness memory as n_A, n_B, n_C, n_D from "last entropy degeneration pattern"; then while y_i reaches location A, even it doesn't attain B,C,D, last time's entropy degeneration repetitiveness memory n_A, n_B, n_C, n_D pattern has activated to these locations. With such memory which can be expressed as certain combinations of condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$, the difference between the inversion energy before and after y_i really reaching the locations B, C, D, will be minimized. (Bone fracture is a typical example, the peripheral tissues follow memory to minimize the difference between the fractured part and non-fractured bone to grow to heal. Here, the fractured bone part is physically equivalent to the flow-activated memory from other places but still does not reach the actual location). This is the repetitiveness memory entropy degeneration that regulates all *in vivo* flows. All the attached peripheral structures of the flow such as epithelium cells, nervous fiber, connective tissues, blood vessels, etc., are for this purpose.

The lifespan or entropy degeneration potential of CSF for a person is largely based on the postnatal repetitiveness of the spinal condensates. From the genomic to protein level is the first entropy degeneration pattern in which the next level only takes the inversion energy from the previous level. As in (**Fig.2g**), suppose an mRNA will be spliced into k numbers of exons as condensates $\left|\sqrt[12]{2^{k-1}}\right\rangle$, then 2, till i numbers of exon combinations get condensates $\left|\sqrt[12]{2^{k-1-1}}\right\rangle$ till $\left|\sqrt[12]{2^{k-i-1}}\right\rangle$, combinations of these condensates follow: $L_{exon} = \frac{2}{n} L_{mRNA}$,

$f_{exon} = \frac{2}{n} f_{mRNA}$. The purpose of splicing is absolutely for entropy degeneration instead of so-claimed more isomers. Protein folding still follows the same folded surface tension "selective permeability". As in the right hand of (**Fig.2g**), we can find the least α-helix and β-sheet since they are the elements of protein secondary structures, we can write: $L_{\alpha-\text{helix}} = \frac{2}{n} L_{peptide}$, $f_{\alpha-helix} = n f_{peptide}$; $L_{\beta-\text{sheet}} = \frac{2}{n} L_{peptide}$, $f_{\beta-\text{sheet}} = n f_{peptide}$, then use the same inversion superposition to get condensates $\left|\sqrt[12]{2^{(k-i)+(j-i)-1}}\right\rangle$. No matter at any place or for any structure, once we know the folded surface tension region, simply write down them as n_1 to n_k pattern, then any impact will then process into the turnover tension of this integer pattern as $\sum_n |\cos\left(\frac{1}{n}x\right)\rangle$. Modern structural biology utilizes *in vitro* experiments to publish a lot of protein structures based on Anfinsen's dogma. However, all published structures including AI concoctions lack non-simultaneous time and thus are still dead structures. It is necessary to find non-simultaneous quantizing time dynamics for these structures.

(Fig 2h) shows yolk sac homing as radical evidence of growth turnover selection or the entropy degeneration law. **(Fig 2h①)** avian thin albumin locates in the outmost layer of the egg inversely develops into the CSF, then continuously grows layer by layer. From such reverse development, yolk sacs that locate in the innermost of the egg will then automatically move to the outside of the embryos. Yolk sac homing inversion will then move the yolk sac back to the navel region. **(Fig 2h②)** shows yolk sac that reaches 15% of the body weight[2] will pass through this small navel hole back into the intestinal region. **(Fig 2h③)**, this baby chick fails to home the yolk sac then it hangs outside. **(Fig 2h④)**, in situ yolk sac homing of zebrafish, yolk sac remains inside the body and never passes through a naval hole. The more evolution advanced a species, the more entropy degeneration capability of reverse elastic negentropy sequence into germ cells and then development back. Zebra fish's innermost yolk can only stay in situ since they lack enough yolk sac homing capability, but Gallus gallus can home the yolk sac back by their evolved growth turnover capability. Human embryonic yolk sac homing starts in week 5 (**Fig 2h⑤**) and ends in week 10 **(Fig 2h⑥)**. **(Fig 2h⑦)** shows on week 11 we can't see any yolk sac and the body weight is only around 45g; however, the umbilical cord transfer continues the reversing back function till birth. Finally, the body weight gain from the yolk sac homing/umbilical cord is around 1/100. Even after birth, the mother's milk continues such inversion function, which means humans possess more powerful turnover capability than the two species (for plants, the function of cotyledon(s) is equivalent to a yolk sac but no need to home back since the later negentropy source is from sunlight, then only the photosynthesis correlated functions need to reverse back). In avian, yolk sac homing inversion supplies great turnover resistance tension from the last generations for adaptations. In mammals, umbilical cord and milking exponentially elevate the turnover tension transferring capacity greatly but the physical inheritance quiddity is still the same. Bio-systems only intake parameter induced inversion, thus a baby only utilizes umbilical cord blood/ milking induced inversion for growth. The efficiency of a human baby can procure such inversion under gravity is still structured by the yolk sac homing quality ((**Suppl. Movie 3)** shows the yolk sac homing pulses of a chick, which can observe on days 18.5 – 19.5 for around 2-6 hours. The yolk sac homing quality, as the definition in (**Fig.1c①**), non-simultaneous time means surface environmental quadrupole retention, now the yolk sac homing quality means the transferring efficiency of yolk sac elasticity).

Yolk sac homing has been validated to migrate hematopoietic stem cells (HSC) [5,7], which means hematopoiesis must rely on zygote growth turnover reverse. The endothelial to hematopoietic transition (EHT) [8] which can be interpreted as the duality of HSC should also originate from yolk sac homing for generations. Not only hematopoiesis, but most other innate critical functions unexceptionally come from here, the sequences and chromosome inversion [9] are only representations of such sexual inversions, and 80% of the lifespan should also from such inversion. It is noted that there is no body contact-genital for zebrafish but Gallus gallus has, it is likely body contact-genital is present at the same time with trans-navel hole yolk sac homing. Human loss of baculum is an evolution advance to offer better yolk sac homing hematopoiesis individuals to get more offspring and assure the next generation comes before the parental hematopoietic function aging, which means a sexual behavior is evolved for turnover immunity and not for pleasure. The implication of sexuality after HSCT [10] only indicates it is still challenging for the HSCT to really regenerate the somatic hematopoiesis due to the process innately concerning generation turnover. As the previous example, HSCs belong to the developmental integer inversion pattern n_1 to n_k, while certain n_i is damaged, it can only rely on the n_1 to n_k inversion for repair. Albeit the newly injected HSCs are claimed to be stem cells, they can't enter the n_1 to n_k inversion pattern and only remains in peripheral structures, or the previous HSCs' and the newly injected stem cells' quantizing time are still not equivalent, thus effects are limited. Unsuccessful HSCTs are even reported to induce carcinogens [11].

As the major yolk sac homing hematopoietic niches, a gut is a visible cross-folded surface tension region flow with spinal CSF condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$ as the highest *in vivo* non-simultaneous time structures. Digested chyme flows from the gut means to cross the CSF extended folded surface tension regions, then increase the gravitational binding surface homing tendency or strengthen each CSF condensates and excrement the waste. CSF never takes the nutrients, only takes the inversion energy condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$ induced by foods. Then these condensates transfer to other flows inside the body and compose a huge cross-surface tension region network to transfer inversion energy. Sexual behavior as the highest species inversion communication (**Suppl. A 2**, or quadrupole *i* to *k* model) takes the same mechanism, never using the data of the opposite organ, only using the organ-induced inversion energy; however, in a reverse direction: digestion transfers inversion energy to all flows of the body via CSF, and sexual behavior cost the inversion energy from these flows via CSF. CSF is the largest non-simultaneous time condensate and runs in a different direction for males and females under normal daytime conditions (bisexual persons are different). Sexual behavior drives CSF to run in a different direction, then all the *in vivo* cross-surface tension flows and selective permeability

reverse their inversion energies back to CSF for use in the process. While sleeping, the direction of CSF is still in a reverse direction to that in the daytime. However, such a CSF reverse direction running is for system entropy control, different cross-surface tension flows based on the topological equation to recover more trigonometric curves for daytime entropy generation activities, not the sexual behavior reverse that will lose a substantial amount of inversion energy that even can reflect in *FHD* [3] test one week after the behavior. As in (**Fig.2i①**), sexual behavior finally executes the growth turnover selection for entropy degeneration, male or female CSF integrates their advantage negentropy procuring sequences on spines, these sequences are reversed by the behavior to compact into germ cells to issue zygote, development reverse back the sequence to evolutionary turnover circle again for entropy degeneration. Sexual power means the *in vivo* stored gravitational capability to reverse the spinal negentropy procuring sequence into germ cells, and developmental potential means the capability to gravitationally grow back the sequence inside embryos from environments. Such a genetically defined sexual power is the same as actual sexual capability in the real world. The gravitational loss of over 28% *FHD* sexual inversions have been verified by animals [3], the loss is the physical cost for degenerated entropy delivered to offspring and the mechanism adapted to all species. The concept that sperm is somatic condensate has been presented in ancient China's Kungfu training for thousands of years. It is interesting that in modern times similar modulation is presented in physical BEC but does not show in biological sciences. (What sexual behavior offered to the next generation is the entropy degenerative memory that is far beyond nucleotide sequences. For lower-evolved species, these are possibly close. With evolution, the more complexity of a species, the more difference between the memory and the DNA or the more sexual behavior power required from parents to reverse negentropy procuring sequences into germ cells (as in (**Fig. 1f**), human degeneration of entropy can extend to remote ancestors such as a fish or reptile. The more advanced a species, the more extension of the entropy degeneration capability from the remote ancestors). The fundamental mechanism of evolution is still entropy degeneration repetitiveness memory instead of certain "DNA code" (the generation turnover not just turns over routine environmental procuring info but also subtly includes community or society memory which can be regarded as "education". Even for lower-evolved species, such as bacteria, the turnover still degenerates cellular aggregation information which is such a kind of species "education". The mechanism is still the shifting of range for individuals and then "education" back). Within one generation, the lifespan or repetitiveness of spinal condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$still can be physically trained to some degree. (**Suppl. Movie 4**) is one of the ancient China spinal training. (**Suppl. Movie 5**) shows advanced spinal condensates after training, which means a successful trainer can procure a high level of environmental participation in one's spinal CSF (note: any motion of any *in vivo* structures must sustain by environmental participation, how much elasticity of joints, ligaments, spinal CSFs, etc., comes from how much environmental participation they can degenerate follow the quantum growth gravity equation, never like the common belief that structural elasticity come from things such as ratio of collagens, proteins, etc. Aging is simply the decreasing of elasticity by dampening of environmental quadrupole participation and never so-called epigenetic mutation claimed by modern genetics. It is claimed that bio-systems need some isolable parameters such as oxygen, foods, sunlight, etc., however, what really required are surface degenerated environmental participations based on these parameters and not parameters themselves. It is due to the conventions since Newtonian time, bio-systems are still misunderstood as isolated systems that no need of any environmental participation for sustaining). Trainees who reach such a level will be exempt from physical problems such as hypertension, diabetes, or even cancer, etc. It is challenging for modern sports that originated from ancient Roman and Greek that only train peripheral structures to reach such effects albeit they benefit health.

Sexual reproduction is evolved from asexual cell proliferation with the same turnover entropy degeneration mechanism. As in (**Fig.2i②**), an asexual cell division happens in the same turnover process as that of a multicellular sexual yolk sac homing. The elasticity that separates the nucleus into two offspring nuclei and then pulls them back to the position is the same as the pullback dynamic for yolk sac homing, cell division nucleus motion should be defined as "offspring nuclei homing", which means nucleus, nucleoid or even naked DNA/RNA moves from Planck region to surface tension region and then "homing" back to the position to modify genetic DNA/RNA carriers by gravitational elasticity (it is only the upgraded version of surface quadrupole definition in (**Fig.1c①**). Via the homing selection, high elastic parts are gravitationally pulled back, and lower elasticity parts are excreted out. Such modifications vigorously need environmental negentropy for homing quality. (**(Fig. 2h③)** is a failure case of the homing which is largely due to certain hindrance of the gravitational pull back. **(Fig. 2h③)** is a successful homing, we can see there is still an egg membrane that remains outside, which means trigonometric parts are homing and bad curve parts are excreted outside). Cell-free fetal DNA (cffDNA) [12], circulating tumor DNA (ctDNA) [13], etc., are examples of such DNA excrements. From here, even the most primitive asexual cell division delivers to the next generation is still turnover immunity for entropy degeneration purposes and not dead DNAs/RNAs storied by modern genetics. We should also carefully note, if one cell nucleus is pulled back into two offspring nuclei, the result will be asymmetric even theoretically without any mutation (two asymmetric nuclei follow certain condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$ patterns for quantizing time, which means the parental nucleus is no longer equally distributed into two daughter cells. No matter whether sexual and asexual processes follow quadrupole division instead of the conventional equal dipole division story, dipole separation means 50% of the DNAs from each parent, quadrupole means the deviation from 50% relies on on-site environmental participated condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$. The reason that modern genetics still claims asexual cell division into dead DNA separation since this discipline still uses third-party references). Sexual reproduction evolutionary trends of amplifying the difference between male and female germ cells also accumulated from such asymmetric nucleus homing (the polarity of cell division issues condensates $\left|\sqrt[12]{2^{n-1}}\right\rangle$and $\left|\sqrt[12]{2^{n-1+k}}\right\rangle$, the *k* makes the offspring condensate into integer series to steer all cell internal inversion levels; the

driving force to structure the *k* into integer while separation is still quantum growth gravity-based surface degeneration. As in the example of **(Fig.1c①)** left, the *i* to *k* range of two daughter cells will inevitably shift by the environment, to control such shift still fall within entropy-controlled range then issues $|\sqrt[12]{2^{n-1}}\rangle$ and $|\sqrt[12]{2^{n-1+k}}\rangle$). Such a quantized asymmetricity in cell division is the basis for evolution, failure of it means a lower entropy degeneration adaptability and even fatal abnormalities or death.

CSF is the largest *in vivo* gravitational non-simultaneous time storage that need folded surface tension regions for proliferating and immunity, aging is the in-generation turnover condensates dampening and extinction is out-generation turnover condensates withering. Our humans are gravitational turnover survivors from billions of years ago, and future species that transcend human beings are those who possess a substantially higher generation turnover adaptability than us, which largely branched from the *Homo sapiens* phylogenetic tree. (The recent COVID-19 pandemic can offer an example of turnover selection immunity. The SARS-CoV-2 variants, such as Gamma and Delta series, especially Omicron BA.1 till BA.5 series, evolved after large-scale vaccinations. Various variants came from the same human environment with the neutralizing antibody strength (NAbs) or drug strikes on their genomic condensates (growth item L_n) driving the coronavirus evolution. The generation turnover interval of the Omicron is around 2-3 days (wild type 4.5–5.4 days) [14]. No matter whether the NAbs of a human environment comes from natural infection or artificial vaccinations, those stopped generation turnover die from the NAbs attack; however, those who can still be turnover of their genomic condensates under the NAbs attack will survive and spread the $L_n$turnover tension for the next generation. And those who can adapt the NAbs means the neutralizing antibodies of that strength becomes their "foods" that can supply negentropy for their genomic turnover process (ADE is a viral evolution mechanism as it can lead to the selection and proliferation of viral strains that can bind to the Fc region of a neutralizing antibody [15]. For the viruses, inside nucleotide condensates are the growth bundle L_n and S proteins are the peripheral structures. Once the Fc binding-induced trigonometric curves can turn over among these two regions means it establishes a "food" negentropy source. As the earlier example, the L_n and S proteins establish a turnover integer series as n_1 to n_k , then an NAbs attack can no longer hit any $n_i$but be attenuated by n_1 to $n_k$turnover resistance tension. And with the increase of the turnover repetitiveness memory, the physical "foods" will elevate from "like" into "addiction". Same with the advanced species like humans, it is still the negentropy inversion degeneration mechanism for the NAbs food negentropy to be inheritable, which means while the n_1 to n_k can inverse back to conjugated with certain n_k to $n_1$pattern for survived viral strains then the quantum pattern can be inheritable). The purpose of mutation is only to find proper habitats, different locations inside a human body are varied greatly in NAbs, and the viruses can proliferate on different tissues such as the brain, testicles, ovaries, etc., only because the NAbs in these locations can offer more trigonometric "foods" to them and then anchor long COVID niches. It is the generation accumulation of the NAbs turnover resistance tension memory that finally bears various mutations.

FDA shouldn't allow lower block rate mRNA vaccines to the market, also, for any marketed vaccine, once people find it fails to wipe out the targeted turnover adaptability then must recall it, especially never allow the clumsy behavior of one injection till *n* injections, or the self-deceptive story of "failing to block but reducing morbidity and mortality rates of COVID-19". The reason for recalling a vaccine is so simple as not permitting any antibiotics used for antibiotic-resistant pathogens (antibiotic-resistant bacteria will also be subsisting to the turnover tension induced by their "conquered" antibiotics [16, 17]. Even human addition [18] follows the same turnover tension entropy degeneration mechanism). Clinical trials are those designed for the safety and effectiveness of the intended use of a product. Due to the challenge of monitoring effectiveness, most clinical trials generally focus on safety. However, for an infectious agent invasion, it is easy to get the effectiveness based on mutation resistance, it therefore should issue some post-market effectiveness surveillance. Suppose a vaccine can eliminate 99% of a viral strain, if survivors can turn over for 3 generations under the attack of the NAbs, then the elimination efficiency is quickly dampened to 33%. If the strain can turn over 10 generations under the attack of the NAbs, it will easily make the NAbs into a plausible food and then addicted to it. For the case of COVID-19 mRNA vaccines, 10 generations of Omicron are around 20-40 days [14], simply find some volunteers based on the previous marketing ethics approval, test the serum viral counting, inject the vaccine, then monitor the viral counting shifting. If the viral strain can make NAbs into a plausible food, then in 20-40 days, there will be a significant serum viral counting spike. Once such a spike is present then the vaccine must be recalled. For the SARS-VOR-1 pandemic, China successfully used physical quarantine to attenuate till wiped out the turnover of the strains since no vaccine "foods" were offered. Now for SARS-VOR-2, due to so higher than natural NAbs from mRNA being conquered into viral "foods", after three years long COVID niches are still frequent in almost every human and cannibalize somatic surface tension immunities at various body locations that have evolved for billions of years. The global casualties for pandemic 1 are 8k and for pandemic 2 are 8 billion, which means the lifespan of those 8 billion humans has been shortened for 5-8 years due to the somatic surface tension loss. With the above post-market effectiveness surveillance, the 8 billion lifespan loss can be avoided at a very lower cost. mRNA interference is a good medical technology, if it is dealt with non-spreading problems such as cancer or diabetes, etc., the clinical trial will still focus on safety and kick the effectiveness to be decided by the market. However, once it is intended for blocking the spreading of an alien infectious agent, due to the feasibility of monitoring based on evolution, the abovementioned post-market effectiveness surveillance should be enforced by law.

All discussed in this paper so far are mainly based on biological spinal repetitiveness memory, now we'll understand the impact of artificial intelligence (AI) on brain bio-intelligence (BI) that resides on the spine from an evolution point of view since AIs have impacted human society recently to raise concerns about the displacement of humans. No matter whether biologically or epistemologically

orientated, BI that drives evolution can be simply defined as "evidence processing capability" (E.g., monkeys can process 1k pieces of evidence, some of them evolved to humans, then can process 100k pieces of evidence, and in the future, a species that defeats humans possibly can process 1 million pieces of evidence. This is a general modulation, CRISP/ CAS9 in prokaryotes reconstruct invading DNA segments by the host memory is an example of "evidence processing"). The BI "evidence processing capability" includes two inseparable parts: "evidence procuring" and "evidence processing" (as mentioned, bio-systems can only use inversion energy/quantizing time, these two parts are composed of inversion relationships). However, nowadays AIs, no matter how powerful and diverse, unexceptionally only possess the later part of BIs and innately lack any "evidence procuring capability"; therefore, must parasite on humans for evidence procuring, and even cannot judge the evidence that humans feed to them. If people feed the wrong data to them, then they will then issue the wrong results. Algorithms and "deep learning" can only solve the efficiency of dealing with human-fed evidence but still can't procure any firsthand evidence (we can understand the term "evidence" from the left (**Fig.1c①**), AIs can easily get 1to *n* range data better than humans, but humans can get *i to k* range by somatic structures. The *i to k* range validate back by 1 *to i* and *k to n* range is "evidence". Due to a lack of (environment-participated) surface tension structures, AIs can't procure *i to k* range under any conditions and only can work on human-acquired *i to k* ranges for learning and further algorism (what AIs learn from humans is nothing but "environmental participation" that fully can't be resolved by algorism). Also, for the same dataset, different people will procure different *i to k* ranges, even offer AIs big data of bundles of different *i to k* ranges, AIs can still only use the high frequency *i to k* ranges and can't arrange a lot of common people issued *i to k* ranges to reconstruct into talented people's *i to k* ranges and use them. Like the theory of relativity can only be issued by Albert Einstein, all his contemporary globally renowned scientists, even get today's most powerful AIs' help and can work together, still can't write down that original theory. All those AIs helped guys work together and still can only do some "cobbler" jobs after Einstein finished the shoes). From this weakness, there are three prerequisite conditions for AIs to "defeat" humans in the artificially designed contest: ①possess the same amount of "evidence" as human "contester", ②in the "contest" no new "evidence" allow or the AI must have equal "evidence procuring" opportunity with human competitors, ③there available equal "execute opportunity" with human "contester" for output (Like the case of AlphaGo defeats human player, human professional players have level 1 till level 9, the AlphaGo get a large amount of level 9 recorded game "evidence" for learning. If restricted to level 1 "evidence" to feed the machine, no matter which AIs and which kind of "self-study" capability, it will be impossible to "self-evolution" to defeat a level 9 human player, which is the rule ①. Also, the story of "defeating humans" is still not terminated. Later versions of AlphaGo claim to defeat it; however, all their original training "evidence" are still the same. If human players can utilize AIs or any method to create new "evidence" (increase folding level) above their training set and don't give them access, then can defeat them again, which is the rule ② (**Suppl. A 3**). Due to intrinsically" evidence procuring parasite", AIs can't outperform humans for creativity in any field under any conditions. To "defeat" artificially designed contest opponents, Bis need to establish a higher than AIs' quantizing time folding, and AIs need to parasite on Bis' procuring "evidence" and unfolding them). From here, AIs can only conditionally and temporarily "defeat" humans under the above three rules since they are still machines that lack effective entropy degeneration evolution. Just 80% of human jobs will easily create the three conditions for AIs, then the life of the people with these kinds of jobs will be affected substantially. People will possibly consider restricting the negative sides of AIs by the three rules in some fields that are improper for AIs to get full access or equal the job opportunity for humans. Also, avoiding some "evidence" to feed to AIs immaturely can promote the BIs' originality.)

3. Conclusions

Law of Entropy Degeneration regulates life functioning and evolution on Earth. As the basis of (environment participated) entropy degeneration, non-simultaneous time-based quantum growth gravity can be defined as: $\hat{\boldsymbol{H}}\psi = \boldsymbol{E}\psi + \sum_n |\cos(\frac{1}{n}x)\rangle$

Availability of supporting data for empirical method

The datasets of the key reference paper [3] are available in the Science DB, CSTR: 31253.11. sciencedb.02448, DOI: 10.57760/sciencedb.02448, entitled "Measuring human *in vivo* gravitational waves and the origin of an elastic reference memory". The supplementary files of this paper are available in the Science DB, entitled "non-simultaneous time".

Ethical Approval

All methods were carried out in accordance with guidelines and regulations. For the key reference paper [3], no animal intervention tests happened, and all human volunteer participants only refer to a sportive test for *FHD*s to physically understand gravitational binding inversion energy and is not a clinical trial, without any somatic intervention, and no biological tissue samples were taken out from human bodies. The animal fresh observation [2] in reference 2 has been approved by Tsinghua University Animal facility with (IACUC) approbation.

Competing interests

The authors declare no competing financial interests.

Supplementary Information (can be downloaded at: Science DB, CSTR31253.11. sciencedb.09569, DOI10.57760/sciencedb.09569) includes:

Supplementary Annotation (PDF file of **Suppl. A 1-A 3**).

Supplementary Movies:

Supplementary Movie 1. Bio quantum path experiment for defining inversion energy

Supplementary Movie 2. Fresh observation of a mouse hippocampus (18-week Jackson 003291 - C57BL/6-Tg (CAG-EGFP)1Osb/J mouse)

Supplementary Movie 3. Avian embryonic development yolk sac homing (15% of bodyweight yolk sac homing back)

Supplementary Movie 4. Ancient China physical spinal training with over 1500 years of recorded history (unrecorded legendary history can be extended to over 2500 years)

Supplementary Movie 5. High level of spinal bio quantum path CSF condensate derived from ancient physical training (ancient China's "dragon culture" = "spinal training culture")

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