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Role of Evolutionary Urge in Epigenetics and Gene Culture Co-evolution: A Meta-evolution Perspective

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Abstract

Objectives: We wish to provide a meta-evolutionary basis for epigenetics and gene-culture co-evolution which lie beyond current evolutionary paradigms. We wish to give detailed mechanisms of action of the evolutionary urge that is responsible for all adaptations and hence of all evolution.**Methods:** We review recent developments in epigenetics and gene-culture co-evolution to explain in detail how exactly the evolutionary urge operates at all levels from a meta-evolution perspective. **Findings:** Adaptive urge leads to epigenetic marks which accumulate on the epigenome resulting ultimately in mutations in DNA, thereby causing morphological modifications. The epigenetic marks are the key intermediaries between the adaptive urges and the mutations. New adaptive urges get encoded into the epigenome and facilitate gene-culture co-evolution and speciation. The fundamental core of all evolution is the urge for survival, freedom and joy. **Applications/Improvements:** The fundamental proposal of meta-evolution theory is that the reason behind adaptive evolution is the evolutionary urge, which is lodged in the psyche of the individual. Intensity of urge determines the success or failure in adaptation.Fine structure of definite urges like cognitive urge, respiratory urge, locomotive urge, reproductive urge and urge for food etc. help explain the development of complexity ofcorresponding organs in the species.

Keywords: Epigenetics, Gene-Culture co-evolution, Species, Survival, Urge, Adaptation

1. Introduction

Darwinian evolution proposes that environment induced random mutations undergo the process of natural selection for the retainment of those genes which would help survival in the prevailing environment, thereby leading to evolution of newer species[1]. The enormous time scales required for such speciation should lead us to rethink on the exact mechanism behind natural selection. Darwin considered whether the intellectual and moral characters of man have emerged as results of biological selection in manners similar to anatomical and physiological characters. Darwinian ideas have important implications for social scientists concerning development of rationality and psyche of human agents[2–4]. Darwinian evolution involves development, retention and selection of information concerning adaptive solutions to survival problems faced by organisms in their environment.

It is suggested that biological evolution of species as well as development of individuals occur as a result of a complicated interaction of genes, individuals and environment[5]. Activities of the individual due to such interactions play definite roles in the development of the phenotype. Individual activities include cognition, processing of information, memory, applying knowledge, changing preferences, emotions, thinking and learning etc[6]. Learning and environmental enrichment alter gene transcription in the brains of young animals. Pathways of gene functions influenced by these experiences include genes associated with cell-survival and those involved in synaptic plasticity[6–8].

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The Darwinian principle of selection states that those individuals best adapted to the environmental conditions produce more fertile offspring than other individuals[9]. If the adaptation is at least partly hereditary, it follows that the overall adaptation of the population increases as long as there is variation in it. However, the most important observations that are not incorporated in the theory of evolution (synthetic theory of evolution) is trans-generational epigenetic inheritance, or the inheritance of acquired states of the function of genes from one generation of individuals to the next, though the same has now been suggested in the new synthesis of evolutionary theory, i.e.Extended Evolutionary Synthesis[6,10].

In this work we advance further a seminal argument put forward by us regarding the role of urge in evolution of life and of species[11]. We consider in particular gene culture coevolution and the role of epigenetics to establish and substantiate the continuous action of an evolutionary urge in and through all organisms.

2. Epigenetics

Epigenetics is a mechanism of gene control that can promote or repress the expression of genes without altering the genetic coding of an organism[12].The preliminary epigenetic processes that control and regulate gene expression are referred to as epigenetic marks. For example, methylation of DNA, alteration of histone molecules that fold together DNA structures via methylation or acetylation and various RNA and Dicer protein dependent processes that inhibit gene expression. The sum total of these epigenetic marks is known as epigenome[13].

Epigenetic influence over gene expression possibly originated as a defense against transposons, parasitic DNA that jumps around in the genome and can disrupt the genes by inserting into them[14]. It is an advantageous process which evolved into a method of promoting and repressing host genes and that is not only acquired throughout the lifetime of the Meta-evolution Perspective also passed on to its offspring[12]. Thus the epigenetic marks are inheritable from generation to generation. In some cases, it is also observed that epigenetic marks favor immunological variation within the newly arrived population[15].

An individual's adaptation to the environment is the strong influence that its epigenome exerts by the inheritance of epigenetic marks[16]. Such adaptation is strongly influenced by the acquired traits of the parents through generations. Thus, each generation will accumulate more and more epigenetic marks that influence future generations. The resulting population may be of a different genetic constitution or a modified one that will be naturally more adapted to the environment. When the areas of gene methylation are compared, the methylation occurring in the regions of DNA involved with Transcription Factors (TFs) have wide reaching influence on the expressed phenotype of an individual[17].

Thus, even small differences in the epigenome surrounding TFs can result in widely varying phenotypes among individuals of the same species[18]. So it is plausible that these changes (methylation in TFs of DNA) gradually may accentuate to bring about phenotypic changes in the gene down the generations. In fact, it has been suggested along these lines that the epigenetic marks actually promote the occurrence of mutation in the genes that are responsible for survival of species[13]. Thus epigenetics plays a pivotal role in the development of the capacity to adapt in an organism[13].The unique ability to adapt is due to the "urgent force" in the individual to continue its existence, which manifests as the struggle for survival. Therefore, epigenetics is the sole mechanism of action of the urge of the organism to survive. Badyaev proposes that the epigenetic mechanism may also have led to the development of multicellular organisms by tailoring the expressed genes in the single genome[19].

Moreover, epigenetics can not only silence older genes that are no longer required, under the influence of selective pressure, it can also introduce more plasticity into the expression of genes by allowing individuals that carry the same, or incredibly similar genome, to have altered gene expression[20]. Thus, mechanism of epigenetics allows the variability of phenotypes that are required for adaptation and selection[21]. As with any process of adaptation, there does exist a negative side and like genetic mutations, epigenetic marks are often damaging to an individual's health. For example, there is a known link between hyper-demethylation and oncogenesis, but nevertheless it affects evolution all the same[22].

However, the regions of the epigenetic changes of DNA of different species may be different e.g. HARs (Human Accelerated Regions) are regions of DNA that have undergone rapid changes since the emergence of human species far and above the normal rate of mutation[23]. Gene-culture co-evolution is a relatively recently investigated phenomenon that can be explained only by taking recourse to epigenetics.

3. Gene Culture Co-evolution

Evolution, whether biological or cultural, requires transfer of information, the principle of inheritance is a necessary condition for evolution. In cultural evolution, the inheritance is a sequence of events in which information is transferred from one individual to another with the aid of social learning mechanisms[24]. The evolutionary history of the individual is written in its DNA sequence. It is very likely that modification of its own ecological niche by means of culture has strongly influenced, and continues to influence, genetic evolution of mankind[25].

Cultural transmission can be roughly defined as the transfer of information between individuals by social learning, and genes used to be, and for most species still are, the only means available for the accurate transfer of information across generations[26]. The human interactions can occur between both, genetic as well as cultural inheritance systems. Gene-culture co-evolution refers to the evolutionary phenomena that arise from all those mutual interactions.

Humans have successfully survived and thrived in a huge variety of environmental conditions for millions of years. The reason for such success is the ability to adapt quickly and efficiently and definitely epigenetics has played a great role in this. Cultural adaptations to environments such as changes in clothing, rituals and customs are adaptive behaviors which are tackled by epigenetic changes in a population living in that particular area for some generations.

We propose that the reason behind the emergence of such mechanisms is the urge to adapt to its ecological niche by means of culture. The adaption may occur by helping to mitigate the negative effects of genetic relics acquired by ancestor populations under different evolutionary pressures or by silencing older genes that once served a vital purpose using epigenetics to prevent build-up of complexity in an organism, silencing older, less frequently transcribed genes in the same way that DNA methylation combats the damage caused by transposons [19,14].

A population living in a colder area compared to another in a tropical area will surely carry many genetic mutations which are suitable to their respective climatic conditions. Cultural adaptation is a mechanism which encompasses all adaptations an individual can make to become more comfortable in the environment. Whether it is clothing, food or development of new customs, they are useful only in terms of environmental changes that they faced, but they being short-term adaptations don't affect the phenotypic expressions of the species.

In case of long-term adaptations, visible genetic changes occur *e. g.* evidence of prevalence of sickle cell anemia in malaria-prone regions. In case of sickle cell anemia, the condition confers a resistance to malaria. Such long-term genetic changes occurred via epigenetic mechanisms. But now that malaria eradication programs have to a large extent successfully eliminated the malaria-generated selective pressure on such population, the epigenetic changes have now started to manifest in the direction of resisting sickle cell anemia itself by silencing the genes responsible for changeover to adult hemoglobin by maintaining production of fetal hemoglobin. There is evidence that Diabetes Mellitus Type 1 developed in early Europeans as an adaptation to the colder climate[27].The epigenetic changes therefore are proposed to be medium-term adaptations interpolating between short-term cultural adaptations and long-term genetic evolutions[20]. Such epigenetic changes also serve to silence completely the less-frequently transcribed genes down the generations, which had once upon a time a vital role in older generations, but later on became relics[19]. These epigenetic changes can be presumed to have occurred due to an inherent urge in such populations to adapt to their respective changed environmental conditions.

Cultural transmission can modify the selection process and exert selective pressure, thus affecting the course of population evolution.For example, the cultural tradition of dairy farming may have created the selective pressure in which genes for lactose absorption have been favored[28]. Digestive complications arising out of lactose mal-absorption through the generations spanning over thousands of years resulted in an intense urge for increased absorption through higher levels of enzyme (lactase) activity since milk and milk products were absolutely necessary ingredients of their diet in their ecological niche consisting of agriculture and dairy farming.

Similarly, low female birth rate in third world countries suffering from parental gender bias favoring birth of male child over a cultural regime of thousands of years has resulted in suppression of such genes as would favor female births[29]. This can be seen to have occurred due to the urge for getting male child ingrained in the parental psyche which acts through epigenetic mechanisms.

Thus the fundamental urges for survival, freedom, joy etc. can be seen to have led to evolution of culture which exerts a corresponding selective pressure resulting in short term adaptations. These short term adaptations gain entry into the genome as marks in the epigenome leading to certain epigenetic changes which are medium term modifications. Finally, such epigenetic changes become established due to continuation of cultural selective pressures over thousands of years and become long-term adaptations resulting in definite genetic mutations. Thus the underlying mechanism of evolution of species is given a novel explanation which has been lacking since long.

3.1 Urge and Adaptation

We have proposed that the urge to adapt to the environment is the original causative factor for evolution in the organism from the very beginning of its existence and thus leads to speciation and divergence[11]. In Darwin's theory, these are ascribed to random mutation under selective or adaptive pressure which results in speciation and population evolution. This implies that the urge to adapt gets encoded in the individual's DNA as epigenetic marks and gets accumulated through the generations in the DNA with time to bring about mutations in the genes and thus different morphological modifications occur in the organism leading to speciation.

For fulfilment of a definite predominant urge many subsidiary characteristics need to evolve in order to assist in the process and hence that single predominant urge is actually surrounded by many peripheral urges which have already been fulfilled in previous evolutionary stages and have now become accessory urges to help development of such characters as would fulfill the predominant urge. The fundamental cause of adaptive evolution is the "urge", which is lodged in the psyche of the individual[11].

In prey predator relationships there is evolution of both species towards gaining more fitness to capture or escape as a means of ensuring survival. The urge to survive is so strong that it even leads to role reversal in certain situations where the prey becomes the predator. This could have happened only through definite mechanisms of mutation over successive generations having faced serious threat to their survival from the predator species leading sometimes to extremely specialized preying techniques as in the case of *Epomis larva*-frog and praying mantis-snake.

Development of higher intelligence as in humans has many previous supportive levels of psychological development through instincts and emotions which no longer remain predominant in such highly evolved individuals/species and become recessive. Urges thus are responsible for the development/appearance of dominant and recessive traits in organisms and also governing agencies of all mutational changes in the genes.

The number of genes identified in the human genome project is around 21000 only which is not at all sufficient to represent all infinitude of characters that we see manifest even in a single individual[31]. Taking one eye of one individual for example, the size, shape, texture etc. of a single component like the cornea or fovea requires specification of thousands of characteristics. This means that the characteristics are too enormous to be encompassed by a mere few thousands of genes. If at all it is true that characters are encoded in the genes, then all these infinitude of characters must have been encoded in the genes. Thus, it turns out that enormously huge, if not innumerable, must be the genes, and certainly not a mere few thousands, as currently supposed. From this analysis of urge-based evolutionary adaptation we are led to the reality of the fine structure of urges and of genes.

3.2 Fine Structure of Genes andUrges

Gross features like a particular organ or limb are the result of gross urges for the fulfillment of the corresponding desires through them. But each such organ has many finer features which require correspondingly finer structure of the genes that execute the formation of that organ during the physiological development. Such finer structure of the genes must have their corresponding counter parts in the finer structure of the urges which are imperceptible at the gross level of sensory activity with which an organism is associated. Such finer structures may be continued right up to the molecular levels ending in the molecular structure not only of the genome but also of the continuously evolving epigenome. Through such fine structure of the urges the biochemical interactions at the sub-cellular level with the surrounding can be explained, though they are ordinarily construed as being purely chemical in nature.

Epigenetic mechanisms occur at the molecular level and as such they clearly establish the fact of influence of definite urges on the DNA of an organism. Perceived qualia differ qualitatively from individual to individual in particular specie. When we move from one species to the

other can we say that the qualia (colour, sound, odour etc) perceived are of the same nature? For example, in animals having no colour perception, the eyes are used only to sense the relative intensity of different shades of darkness. And what is colorless to humans may be attractively colorful to bees. Thus we find differences in the structure and function of organs in different species urge-based. Just as it is impossible to figure out the form of an organism merely by observing its seed or zygote, exactly similarly, it is even more impossible to visualize the emergence of genes from the initial seed form of imperceptible subjective urges.

We explain below the existence of fine structures with the help of several illustrative examples:

3.2.1 Development of Neural Networks

Development of progressively more complex neural systems from bottom up among the animal fila was necessitated by increasingly more sophisticated cognitive requirements for survival, corresponding to development of diversified sense organs. The urge for survival requires such cognitive abilities as for food, mate, habitat, risks like existence of predators and so on. Cognitive urge leads to development of sense organs to different levels of complexity in different species. Therefore, corresponding to each such definite cognitive requirement, there was the development of corresponding nervous systems which attains its maximum capacity in the highly complex neural networks in *homo sapiens*.

3.2.2 Development of Lung and Alveoli

This follows from the dominant urge for respiration but finer structures in the respiratory apparatus are helping factors and urges corresponding to their development have become less prominent or recessive but they were once prominent in a particular species at a stage of earlier evolution of respiratory apparatus. Primordial animal respiration in amoeba was cellular in nature which is the fundamental mechanism of respiration in all higher animals as well, though the respiratory apparata have evolved in complexity of structure and function. In porifera, the entire organism functions as a respiratory apparatus, respiration being the most dominant urge in them.

3.2.3 Urge for Food

The single predominant urge for food (carnivory) in the *Panthera tigris* species leads to the development of a carnivorous digestive apparatus, appropriate predatory organs like sharp claws, teeth, strong muscles, difference between front and hind legs, olfactory ability, night vision etc. Similarly, the corresponding developments occurred for other species like herbivores and omnivores etc.

3.2.4 Locomotive Urge

Locomotive urges lead to development of motor organs to different levels of complexity in different species right from cilia in paramecia to the fins in pisces, from organs of the amphibious jumping frogs to those of the mammalian primates, from centipeds to the legless reptiles (snakes), from the wings in birds to the highly specialized motor organs (hands and feet) in *homo sapiens* that finally led to the development of airplanes and spaceships! The urges to move towards food (prey) and to move away from fear (predators) are the twin wings of this locomotive urge.

Similarly, sensational urges lead to the development of peripheral nervous system; Emotional urges lead to the development of endocrine system; and finally the urge for greater power, comfort, joy and freedom leads to the development of intelligence to different levels of complexity in different species.

4. Intensity of Urge

Genetic composition is not the chief factor which is responsible for the positive or successful response of the species. Rather it is an external consciousness generated in the species by its depth of urge in the mind which physiologically changes the genetic composition in the species to determine its extent of positivity and success to the environmental challenges. Lack of this urge driven conscious ordering mechanism to survive leads to its eventual collapseto the thermodynamic equilibrium state of maximum disorder of its constituent atoms and can thus cause its extinction.

The adaptive changes in the species enable it to accept new opportunity for living or to resist the unfavorable environmental change. But the response may or may not always be successful. It is the intensity of the urge that determines the success or failure of the organism to adapt. The urgency for adaptation felt by an organism determines the intensity of its urge. Different organisms differ in their perception of the urgency for adaptation. The organisms that fail to adapt are thus eliminated because of their failure to properly assess and implement

the urgency. In some species, even if the urgency for adaptation is assessed properly but its implementation in the form of continuous focusing of attention on that particular adaptation may be lacking leading to their elimination.

For example, reduction of glucose levels in the cells when an organism is deprived of food for a longer time leads to the increase in the intensity of hunger and hence of the urge for food. Thus cellular glucose level can be taken as direct markers for the intensity of the urge for food. Similarly, for the quantification of other urges definite physiological markers can also be identified.

5. The Structure and Function of Urge

5.1 Molecular Modification and Urge

Molecular studies have made possible an approach to exact measurements of degrees of biochemical similarities and differences among organisms. Why at all there is a question of observing all these similarities? If there are similarities, does it mean that one has originated from the other? If the biochemical and biologic universals are the source of origin of life, why cannot the species originate by directly utilizing such ubiquitous universal biochemical and biologic sources instead of taking help of the process of evolution? Natural selection does not cause a living species to respond to the challenge by adaptive genetic changes. Rather, the living species interacts with nature consciously to be selected by it. Nature does not randomly change to select the species. Rather, the species consciously changes its life-force in its mind to be selected by nature. Thus the species makes itself enabled to occupy the once un-conducive ecological niche and creates a new opportunity for its survival which was earlier unfavorable to it. Not only was it unfavorable rather it remains the same at present also when the species accumulates physiological change through its urge that acts through its vital force to effect genetic change via epigenetic channels.

5.2 *Elan vital* and Urge

Bergsonwrote about the relationship between mind and body, and nature of consciousness[32]. He accepted that there was a close connection between states of consciousness and the brain. He has presented that memory is not material, is not stored physically and chemically in the brain and brain is not a reservoir of images. However, damage to certain regions of the brain prevents certain types of memory from acting, but this does not prove that the memories are physico-chemical structures localized within the nervous tissue.

Bergson further argued that purposeful structures such as the eye could not have evolved mechanistically simply through combination of random mutation and natural selection[33]. He rejected a Lamarckian explanation in terms of an inheritance of acquired characteristics, and also dismissed the idea that evolution proceeds towards a goal and is directed by some fixed transcendent plan or design. He thought that the current of life, flowing from generation to generation, was the result of an original 'vital impetus', the *elan vital*. According to him this impetus sustained right along the lines of evolution among which it gets divided, is the fundamental cause of variations[33]. Those that are regularly passed on, that accumulate and create new species. However, he could not explain what is the source of this *elan vital*? His *elan vital* seems to be blind and without intelligence having no self-sense of directed movement, and yet surprisingly enough, it moves along definite lines as 'the current of life'.

In our view, adaptation to changing environmental conditions is manifestation of the instinct/urge for survival. This urge only is the reason of *elan vital*. In fact, all processes in living organisms are but a manifestation of this primary urge for self-perpetuations. But the urge or instinct is metaphysical in nature which is most clearly realized in Homosapiens as being in the domain of psyche, the mind.

5.3 Collective Urge and Evolution of Species

The urge of the species is having its own field, which is the field of its mind and thought. Through its thought only the forms of the species with morphological, physiological and anatomical changes manifests through different genetic composition[11]. Thus the urge of the species itself is the reason of change in gene, which enables the organism to build the right chemical building blocks the properties which gets manifested as morphological, physiological and anatomical changes in the species. Beyond gene something primary is there in the forms of conscious field in the species which is the actual reason of the evolution of the species which gets inherited, which is the invisible

one really responsible for organization of the form and behavior of the species.

The urge to survive in the unsupportive environment in the one hand and the nature of the environment itself on the other are the two factors responsible for drawing from the morphic field that particular morphology, which is an attracter in the morphic field and would survive in those conditions. Corresponding mutations appropriate to the emergence of that particular morphology occur in the gene pool of the species. The process of evolution therefore occurs in a metaphysical plane where the urge to survive and the perception of the environmental challenges together lead to the change of form in the metaphysical domain and then through genetic mutations onto the physical domain. This metaphysical domain has to do with the perceptions of the individual or collectively of the species which are of electromagnetic in character. The current form as well as the future form, both are the definite modes of the morphic field which have existed all along, will also continue to exist as definite electromagnetic patterns in the universe[11].

The emergence of any species of a particular form is thus a gross physical manifestation of the metaphysical electromagnetic form suitable to a particular environment. However low the evolutionary status of the species may be, it can be claimed that its own form remains as a content of its own perception failing which it would fail to interact with the fellow members of the species and with rest of the world successfully. And the environmental challenges being faced by the organism are also very well present as contents of its perception in the forms of a discomfort, may it be from heat, cold, predators or any other supportive or unsupportive factor that has the potential to determine the future evolution of the species[11].

No species can get extinct in the real sense in the context of the existence of the morphic fields as electromagnetic patterns in a metaphysical domain. In the Jurassic period of the evolutionary history, if dinosaurs could evolve from the pre-existing species ranging right down to the amoeba, now also dinosaurs can again come up if the corresponding Jurassic environment is made manifest and available to the corresponding pre-jurassic species. This in a sense proves the permanence of existence of all evolutionary forms in the metaphysical domain though they may not be manifestly present in a particular era. Thus no extinction really happens in the metaphysical domain.

5.4 The Electromagnetic Nature of Urges

The urge to live in the individual leads to establishment of electrical action potentials in all the cells of the organism by which all essential biological processes for survival are kept functional. The urge itself has a neural correlate which links the physiological aspects with the psychological aspect[34].

It has been experimentally observed that application of magnetic fields can substantially affect the generation of action potentials in the brain through a process called transcranial magnetic stimulation. It is therefore appropriate to propose that the urge in the psyche is of magnetic character, which leads to an electrical effect in the form of action potentials corresponding to the neural correlate. Thus it is plausible that the whole process of evolution of species at the level of physically manifest forms has been achieved all along by the instrumentality of electromagnetic fields, which are metaphysical in nature[35–37].

Thus our hypothesis is that the all-pervadingElectro-Magnetic Fields (EMF) is the urge or instinct, which is responsible for the organization and form of material systems at all levels of complexity, not only in the living systems but also in crystals, molecules and atoms and nuclei. These EMFs are responsible for the form and organization of all material systems. They themselves have characteristic structures. And thus everything is derived from the electro-magnetic fields present. Therefore, in view of these EMF patterns nothing is past or present in a definite sense. The systems are organized in the same way as they were organized in the past. For example, an organism takes up the form of its species because past members also took up that form; and an animal acts instinctively in a particular manner because its predecessors behaved that way in the past. The question is how did it all arise in the first place? It is because the characteristic forms of infinite varieties of life that remain permanently stored in the form of electromagnetic field patterns in the metaphysical domain.

6. Holistic Nature of Organism and Mysterious Presence of Urges Inside

'Genetic drifts' are proposed by scientists as a convenient explanation of the origin of differences among organisms, of which no other explanation was found. If a trait does

not have visible adaptive significance, it does not mean that it has none. A trait is present in the organism because of a reason. Random genetic drift needs to be strengthened by explaining its root and core. Something which is mysterious does not mean that it must be rejected as non-existent. It definitely exists, and that is why it is endowed with the property of being mysterious. Developments of molecular biology were in general terms but still it rejects the mysteries by failing to address the real pioneer source of evolution in terms of urge, vital force and consciousness. The core of evolution is urge in the psyche of the being; but molecular biology could not shed any new light on these original speculations.

To appreciate how the whole is not merely a sum of the parts, we note that an atom of hydrogen is not just proton and electron, but has in addition the numerous quantum mechanical orbitals in the coulomb field that are generated by exactly solving the Schrödinger equation or even the fine structure and hyperfine structure of the orbitals obtained from Dirac equation. Similarly, a molecule of water is not just Hydrogen and Oxygen put together, since in addition, it has the numerous molecular orbitals. Now as far as liquid water itself is concerned, it is the presence of hydrogen bonds among the neighboring molecules that makes water what it is. This bond is electrical in character and if it is distorted we can get ice, if it is stretched beyond a certain limit, we get steam and so on. Thus, water is not just equal to a summation of individual H_2O molecules.

$$H \neq H^+ + e^-$$

$$H_2O \neq 2H + O$$

$$2H_2O \neq H_2O + H_2O$$

Just as an atom or a molecule cannot be fully explained by a study of its parts in isolation, so also the properties of a living cell cannot be fully explained in terms of its chemical constituents and also multi-cellular organism cannot be explained in terms of its cells, nor a species in terms of the individuals, nor the entire living kingdom in terms of the species and their interactions. Likewise, in addition to their constitutive structural units, the organelles in a cell, the cells themselves, the tissues in an organism, the organism itself, the society of organisms, the species itself and also the whole living world, all have a holistic aspect to them which includes but transcends them. This holistic aspect is consistently neglected in mechanistic approaches where in without much basis the structural units are themselves also labeled as functional units with the cause of their functioning aspect remaining unexplained.

All the functions are governed by the urge of the structural and functional units of the organism.As the cells build up, the whole system the urges build up the gross and thick urge which seems like one but into which many urges are converged to form one physical or morphological manifestation. The holistic urge that appears as 'an urge for survival' is the final organized form which is made up of many microscopic structural and functional units of urges in the form of innumerable adaptive behaviors.Thus everything that exists here is a whole entity of the whole moving,either from entropy to order or from order to entropy.

7. Conclusion

The universe is a whole. The manifested parts in the form of individual existences are also wholes themselves, being limited expressions of the original whole which includes them and transcends them in its unlimited wholeness. We ourselves being such limited expressions realize through our investigations of that unlimited wholeness that all our explorations and explanations are bound to be limited by inevitable limitations of the methods of investigation and analysis. Therefore, at any instant of time there lies an unknown unlimited expanse beyond the ken of human experience. Gravitation was in operation before Newton, electrons existed before Thomson, DNA existed before Watson and Crick, and the laws of quantum mechanics were in operation before their discovery and so on. Similarly, it has to be accepted that an all pervading ceaselessly operating holistic urge beyond our limited experience is in existence and is the ultimate determinant of all that exists, lives and moves.

In this work we have extended and expounded in more detail the idea of meta-evolution proposed earlier. We have mostly depended on the urge for survival though the other fundamental factors such as the urges such as the urge for freedom, joy etc. have their respective roles in all the stages of evolution till they become patently manifest in the human stage where intelligence has progressed to such an extent as to feel the unavoidable necessity for freedom from the thralldom of continuous struggles for survival.

We have shown that accepting the existence of various urges and their fine structures as the causative

factors behind all evolution we can explain the emergence of newer traits leading to morphological speciation. Epigenetic mechanisms prove to be the key intermediaries between the urges and the mutations. In higher evolved species such as human's cultural selective pressures are deriving from urge for survival, freedom and joy lead to established patterns of habits, customs and conduct resulting in new adaptive urges which get encoded into the epigenome and facilitate gene culture co-evolution.

It is not about a fight of views of vitalists, mechanists, biologists, molecular biologists, physicists and psychologist etc. rather it is a peak time to go into the core of the unanswered mysteries of evolution to address it amicably with a combined open effort cutting across the compartmentalized domains of various sciences. It may be noted that the question of genesis of urges themselves is sure to lead us from psychology to the domain of philosophy just as the why of evolution leads us from biology to psychology. The cosmic mind which is the repository of all urges, itself resides in pure absolute consciousness which is bereft of any urge what so ever.Any further analysis of such philosophical aspect is clearly beyond the scope of the present article.

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