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## Origin of Life: As Depicted in Upanishad and so Far Explained in Science

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### Abstract:

Scientists have generalized three features of life, i.e., able to reproduce, able to grow and able to respond stimuli. On this basis, there are number of experiments to prove that life has originated on Earth from chemical reactions. Scientific exercises resulted in the production of amino acids and components of nucleic acids (such as, some nitrogen bases, polysaccharides and phosphates). All these experiments were successful for spontaneous one step chemical reactions but for the next step. One important aspect that was missing in the research on origin of life is the way internal energy (the Prana as depicted in Upanishad) has evolved within a life form. As per scientific concept, a life form functions so long the membrane potential (energy) of cell exists. Upanishad tells us that existence of Prana in living bodies is in coarse form and could be understood through our five sense organs, while it is present in non-living object in extreme finer form and cannot be realized through senses. The philosophy depicted in Upanishad tells us that Prana (Atma) is present among all and an individual is not separated from others that are everything is one but expression differs. The Prana cannot be introduced within a life from outside rather it inherits from one to other form. Upanishad teaches us that there is dual existence of life (Prana/ Brahma/ Hirannyagarva) in both living and so called non-living world. The paper will analyze this aspect in detail to develop a clear understanding on origin of life.

**Keywords:** Energy, life, Upanishad, philosophy, living world, non-living bodies

### 1. Introduction

Science explains that the universe evolved by self-organization of matter towards more and more complex structures. Atoms, stars and galaxies self-assembled out of the fundamental particles produced by the Big Bang. Finally, in the process of biological evolution from bacteria-like tiny cells (the last universal common ancestor) to all life on earth, including humans, complex life forms arose from simpler ones. However, according to Upanishad, Prajapati created a duality which is also the source of maintenance of the continuity of created things. Prajapati, the cosmic mind, first created out of himself the Prana, the primal energy, and Rayi (matter), the giver of form. Existence of Prana in living object is in coarse form and could be understood through our five sense organs, while it is present in inanimate object in extreme finer form and cannot be realized through our senses. The role of Prajapati is creation, growth and protection to creation (Prashna 1-4, Sen 2005). Pippalada says that Prajapati created a duality of Matter and Life (Energy), of Rayi and Prana. The creation moves and maintains its continuity by an interaction of these dual principles.

In science, the fundamental forces of nature known to arise from laws of nature called symmetries, and are transmitted by particles known as gauge bosons. The weak force's symmetry should cause its gauge bosons to have zero mass. In physics, it is said that the Higgs boson particle (nickname is 'god particle'), an elementary particle in the Standard Model of Particle physics, is believed to be the particle which gives mass to matter. In the Standard Model, the Higgs particle is a boson with no spin, electric charge, or color charge and is very unstable, and immediately decays into other particles. Main relevance of Higgs boson is that it is the smallest possible excitation of the Higgs field— a field that unlike the more familiar electromagnetic field cannot be "turned off", but instead takes a non-zero constant value almost everywhere. The symmetries controlling interactions in the Higgs field should require them to be massless.

In Katha Upanishad, the cosmic mind, the creator, is explained as 'smaller than the smallest atom, and which is larger than the largest one' ... 'which is a stable thing residing in instable forms'. The ultimate supreme source of all existence is Brahman. The Self is subtler than the subtle, greater than the great; the Atma (soul/energy) resides in the hearts of all living beings. It is subtler than the subtle, because it is the invisible essence of everything; and it is greater than the great because it is the boundless, sustaining power of the whole universe; that upon which all existence rests (Katha 1-2-20; Manduka 3-1-7, Radhakrishnan 1953; Sree Aurobindo 1960; Sen 2005). Brahman (Hirannyagarva), the creator, is nirguna and nirakar, without qualities and without form. It has no mass, no shape and size (zero dimension), and is motionless. Science has now reached to a point and discovers a particle with minimum possible mass thus is called 'god particle'. If Higgs boson particle is conceived as closer to god or the source of creation then question arises where

from this nearly massless Higgs boson has originated? Thus the concept of creation in the philosophy of Veda is a step ahead of this so called 'god particle'.

## 2. Scientific Approach

Scientists have generalized three features of life, i.e., able to reproduce, able to grow and able to respond stimuli. On this basis, there are number of experiments to prove that various components of life have originated on Earth through chemical reactions. Charles Darwin contributed a very little to the concept of origin of life (he consciously avoided discussing the origin of life in his book), rather he proposed the probable homeland of first life. What he wrote in his book is that 'Probably all the organic beings which have ever lived on this earth have descended from some primordial form, into which life was first breathed'. However, Darwin personally wrote to his friend Joseph Hooker that 'But if (and oh what a big if) we could conceive in some warm little pond, with all sorts of ammonia and phosphoric salts, lights, heat, electricity etc., present that a protein compound was chemically formed ready to undergo still more complex changes, at the present such matter would be instantly devoured, or absorbed, which would not have been the case before living creatures were formed' (Follmann and Brownson 2009)

### 2.1. The Oparin-Haldane Hypothesis

In the early decades of the 20th century, A. I. Oparin (in 1924), and J. B. S. Haldane (in 1929, before Oparin's first book was translated into English), independently suggested that if the primitive atmosphere was reducing (as opposed to oxygen-rich), and if there was an appropriate supply of energy, such as lightning or ultraviolet light, then a wide range of organic compounds might be synthesised.

Oparin suggested that the organic compounds could have undergone a series of reactions leading to more and more complex molecules. He proposed that the molecules formed colloid aggregates, or 'coacervates', in an aqueous environment. The coacervates were able to absorb and assimilate organic compounds from the environment in a way reminiscent of metabolism. They would have taken part in evolutionary processes, eventually leading to the first life forms.

Haldane's ideas about the origin of life were very similar to Oparin's. Haldane proposed that the primordial sea served as a vast chemical laboratory powered by solar energy. The atmosphere was oxygen free, and the combination of carbon dioxide, ammonia and ultraviolet radiation gave rise to a host of organic compounds. The sea became a 'hot dilute soup' containing large populations of organic monomers and polymers. Haldane envisaged that groups of monomers and polymers acquired lipid membranes, and that further developments eventually led to the first living cells. Haldane coined the term 'prebiotic soup', and this became a powerful symbol of the Oparin-Haldane view of the origin of life.

It was proposed that the prebiotic atmosphere was "reducing" (called thus because of the chemical reactions) atmosphere which contains free hydrogen. Originally, it was postulated an atmosphere consisting of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), carbon monoxide (CO), ammonia (NH<sub>3</sub>), free hydrogen and water vapor. Newer schemes exclude ammonia and methane.

Proposition of the Oparin-Haldane hypothesis initiated many scientists to experiment in this interesting field. Based on the concept of prebiotic atmosphere, scientific exercises resulted in the production of amino acids (Miller and Urey 1959) and components of nucleic acids (Oró and Kimball, 1961) (such as, some nitrogen bases, polysaccharides and phosphates). Success in synthesis of amino acids in laboratory led to the next step of experimentations. All these experiments were successful for spontaneous one step chemical reactions but for the next step.

It is a long standing idea that every cellular function is catalyzed by protein while nucleic acid is the key molecule for informational replication system. This is a classic chicken (protein) and egg (RNA/DNA) paradox for the researchers that which came first, proteins or DNA? The discovery of RNA molecules with catalytic activity since early 80's, in addition to their properties as templates, led the scientists to presume that life began with the 'RNA world' (Gilbert, 1986). RNA World describes the hypothetical time of the earliest life forms when genes were simply strands of RNA. The idea that RNA might have formed spontaneously on early Earth has inspired a search for feasible prebiotic syntheses of ribonucleotides, the building blocks of RNA. But no plausible reactions have been found in which the two components could have joined together.

Orgel and Joyce (1999) assumed that "the de novo appearance of oligonucleotides on the primitive earth would have been a near miracle". After describing a chemically more plausible scenario, PNA (peptide nucleic acid) as a precursor to RNA, the authors point to the enormous difficulties of a transition from PNA to RNA, and to the fact that it yet has to be established that PNA could result in a replicating system. Later, a TNA (threose nucleic acid) system – being more promising, and simpler to synthesize than RNA and PAH World (PAH = polycyclic aromatic hydrocarbons) were proposed (Orgel, 2004). Ura et al. (2009) introduced an oligomer family that efficiently self-assembles by means of reversible covalent anchoring of nucleobases recognition units onto simple oligo-di-peptide backbones [thioester peptide nucleic acids (tPNAs)] and undergoes dynamic sequence modification in response to changing templates in solution.

### 2.2. Lacunae in Scientific Research

One important aspect that was missing in the scientific research on origin of life is the way internal energy (the Prana as depicted in Upanishad) has evolved within a life form. The life is neither the structure nor the reproduction, not even metabolism. These are the expressions or manifestations of life. There are potential difference present within the cell, i.e., some sort of electrical energy exists in a living cell without which a cell is dead. As per scientific concept, a life form functions so long the membrane potential (energy) of a cell exists. Scientists so far are engaged to solve the structural aspects of life forms rather probable mechanism of origin of energy

within the life form (Misra 1992). This question is intimately associated with the origin of energy, matter and ultimately Universe. The incidence of origin of life is a much later step in the context of the origin of matter and Universe.

### 3. Origin of Life as Depicted in Upanishad

Origin of life is dealt in Prasna Upanishad. In answering the question on origin of life, Rishi Pippalada starts with the origin of all existence in terms of matter and energy, and explained the answer step by step, till in the last one, he addressed the most direct and immediate aspect of origin of life.

First question of Kabandhi to Acharya: 'Where do all these beings come from?' (Prashna 1-4, Sen 2005). Acharya Pippalada told that Prajapati, the Creator, was desirous of progeny. He first expressed himself in dual form, i.e., the origin of dialectics. Prajapati, the cosmic mind, first created out of himself the Prana, the primal energy, and Rayi (matter), the giver of form. Existence of Prana in living object is in coarse form and could be understood through our five sense organs, while it is present in non-living object in extreme finer form and cannot be realized through our five senses. Prana and Rayi are the two poles of manifesting energy - positive and negative. This duality is at the heart of all that presently exists, and without it everything dissolves. Prajapati created a duality which is also the source of maintenance of the continuity of created things. It indicated the origin of time dimension. The creation moves and maintains its continuity by an interaction of these dual principles. Third question was "How Prana come into this body?" This prana is born of Atman. As a shadow is cast by a person, so this prana is, by Atman. Through the activity of the mind it comes into this body. This prana employs the other pranas, each in its separate place (Prashna 3-3, Sen 2005).

### 4. Scientific Basis of Upanishad

Scientists cannot believe the presence of life in non-living object (matter), because they cannot equate energy and life as depicted in Upanishad. However, if we look at the scientific approach on matter we find the truth of Upanishad. The elementary form of an element is atom where energy exists with positive and negative charges, but we cannot realize it with our five senses. This is the finest form of life (energy) exists in matter as mentioned in Upanishad. There exist many energy forms what we cannot realize with our five senses. The credit to scientific approach is that they made it understandable to us by using various tools which transduce those energy forms to our perceptible form.

A cell or an organism maintains their biological / physiological functions through electrical energy because these functions are dealt with membrane potential. All sorts of energy received by an organism are transduced to electrical energy by G protein (transducin). Sensory organs do these functions. Living body always responds to various stimuli (energy) i.e., universal transducing system exists without which organism is unable to perform their life functions. For each type of energy from the external world separate transducin are present in our sensory organs. Life and death boundary of living body is thus lies on the existence of internal energy, the Prana, as depicted in Upanishad.

Existence of Prana (life) in both living and non-living form can also be explained. All organisms (life forms) are composed of matter (element), i.e., our body is composed of finer form of energy. This finer form of energy is the medium / template of coarser life form. This explains that life exists in two forms and is not antagonistic to each other for which life forms thrive. This can be explained as duality interaction for the maintenance of biological life form. It is definite that all living bodies carry energy (Prana) (coarser form of life) within itself, and this energy is dissipated to the next generation along with the matter (finer form of energy). When such transfer fails, the progeny is called dead and in no circumstances life or energy (Prana) can be introduced within it.

Life has originated only once (Misra 1992). The logic behind this concept is the dichotomous nature of the biological World. Life must have originated in a single form at the beginning, and from the singular ancestor and subsequent progeny were resulted through reproduction. This has also been depicted in Upanishad as male / female creation for propagation of life. Concept of singular origin of life is also supported by the existence of uniform genetic code. If life could have originated at least twice then genetic code should not be universal, rather diverse. Thus, life originated only once as Upanishad explained us.

### 5. Origin of Life in the Context of Universe

Scientists now believe in singular origin of Universe. Concept of unified field theory (now called as Grand Unified Theory or GUT) is the basis of such concept. As per this theory the size of the Universe is – divide a proton by 1 million then divide one of these parts by 100 million. This is also now termed as 'Theory of Everything'. So far such concept is yet to be proved. Upanishad tells about the singular origin of Universe. Physicists think that that Plank dimension is the smallest dimension ever calculated. Upanishad depicts that Universe was created from a non-existent source which inflated very fast. Physics has developed inflation theory for the expansion of the Universe after birth and still inflation is going on in the Universe.

A common belief among scientists is that life has originated in the Earth from terrestrial source. Whereas Upanishad tells us that origin of everything is universal and singular in nature and occurred at one time. According to Srimad Bhagavad-Gita, Krishna displays His "universal form" (Viśvarūpa) which explains singular origin of life (both finer and coarser). However, there is evidence that components of life form exist in extraterrestrial space and also outside the Solar system. Polysaccharide (sugar), the building block of nucleic acid, is formed in interstellar space (even in galactic clouds) through polymerization of formaldehyde. Murchison meteorite (>100 kg) fell in Australia in 1969. Analysis of this well studied meteorite shows the presence of millions of distinct organic compounds including 17-60 amino acids and nucleobases, which are similar to our terrestrial forms. It shows that basic components of life are present in the Universe thereby proves Upanishad version that Prana is everywhere. As per Upanishad, "The thousand rayed sun exists in hundreds of forms as life of all living beings. It is resplendent, all-knowing, goal of all, sole light and giver of energy"

(Prashna 1-8). On 21 February 2014, NASA announced a greatly upgraded database for tracking polycyclic aromatic hydrocarbons (PAHs) in the universe. According to scientists, more than 20% of the carbon in the universe may be associated with PAHs, possible starting materials for the formation of life.

Science has shown that terrestrial life is dependent on Sun as the source of energy which flows through food chain. All these information attest the concept and philosophy of Upanishad (Vedanta) regarding universal origin of life.

## 6. Conclusion

The philosophy depicted in Upanishad tells us that Prana (Atma) is present among all and an individual is not separated from others that are everything is one but expression differs. The Prana cannot be introduced within a life from outside rather it inherits from one to other form. Upanishad teaches us that there is dual existence of life (Prana/ Brahman/ Hirannyagarva) in both living and so called non-living world. Life (Prana) has evolved from Prajapati (Paramatma), i.e., the ultimate supreme source of all existence is Brahman. (Prashna 3-12; Radhakrishnan 1953; Sen 2005).

It is thought that philosophy depicted in Veda (search of truth) could be understood only through meditation, and we have a primitive fixed idea about what meditation means. It can be said that meditation is a process to achieve truth. This process cannot be a singular one. It may be explained that modern scientific approach to Universe is also a process of meditation where human being uses tools for this purpose. Philosophical / spiritual meditation and scientific way of meditation differ in their approach, the former deals this to know only the truth of creation and the latter practice it to unravel and exploit the nature.

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