Life and Spiritual Evolution

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Abstract

The issues in Biology and Evolution can be discussed in regard to the very definition of 'life'. According to the popular scientific concept, life is defined as the product of systematic and complex molecular reactions. It should mean that all deeper and finer principles of life such as love, humility, forgiveness, truthfulness, respect, etc., could also be explained in terms of molecular reactions. But what will be the chemistry of truthfulness or humility? Is there any specific molecule responsible for truthfulness or humility? A similar reasoning we can also ask is whether there is any specific molecule responsible for life. Will DNA or RNA molecule possess all the properties of life? Modern biology does not have answers to these questions. Similarly, one can ask whether chemical evolution such as amino acids to protein molecules, nucleic acids to DNA, etc. lead to the production of living cell in the test tube. Why can't we create life in the laboratory although we have all the biomolecules? Something that animates the complex molecules is missing.

Similarly Darwinian evolution based on the fossil records cannot define 'life'. Natural selection, survival of the fittest, and chance mutation of genetic materials are not enough to explain the mysteries of life. In fact, Darwin was deeply troubled whenever he saw the eye of peacock's tail because he cannot explain how such an intricate pattern from his theory of evolution. It is quite clear that we need a new science in order to explain life, its meaning and purpose. Maybe the whole material paradigm or reductionistic paradigm of life is totally wrong. We may have to conceive a new science in which spirituality or spirit soul or life particle (spiriton) could be an important partner.

The incredible improbability of the evolution of a living cell from a cosmic molecular soup against many odds of known laboratory chemical reaction conditions (for example, maintaining an optimum pH, reaction time, proper concentration of reacting molecules, reaction medium (solid or liquid phase), overcoming the thermodynamic barrier, isolation of reaction products, and so on) forces us to consider with utmost seriousness about an alternative paradigm of life. Besides that, the insurmountable difficulty of even imagining how a living cell would be generated from a combination of readymade cellular chemicals, such as DNA, RNA, proteins, lipids, etc., compel thoughtful scientists to look for alternative paradigms beyond the existing molecular paradigms of life.

According to the spiritual tradition of Vedanta, Life is fundamentally a divine entity. In the Bhagavad-gita 7.5 Supreme Lord Sri Krishna explains that life is a superior divine energy of Him.

Similarly natural selection and survival of the fittest are some concepts of Darwinian evolution but, nature is working under the perfect direction of the Lord. If the survival of the fittest is true, we wouldn't have had unselfish love (which offers benefit to others even if that causes self destruction) in human beings who are supposed to be the most

advanced species in the evolutionary scale. According to Vedanta, it is the spirit soul (consciousness) which evolves through different bodies which

Biography

T. D. Singh (1937-): An extraordinary combination of a scientist, a spiritualist, an active promoter of world peace, an interfaith leader, an educationist, a poet, a singer, and a cultural ambassador. He is well known for his pioneering efforts for more than thirty years to interface between science and religion for a deeper understanding of life and the universe. He received his Ph.D. in Physical Organic Chemistry from the University of California, Irvine in 1974. He has contributed many papers in the Journal of American Chemical Society and the Journal of Organic Chemistry in the field of fast proton transfer kinetics in model biological systems using stopped-flow technique and NMR spectroscopy. He also worked on gas phase reaction mechanisms using Ion Cyclotron Resonance (ICR) spectroscopy. He underwent Vaishnava Vedanta Studies (1970-77) under His Divine Grace Srila Prabhupäda and was appointed as Director of the Bhaktivedanta Institute (1974-), which is a center to promote studies about the relationship between science and vedanta. He has organized three International conferences on science and religion - First and Second World Congress for the Synthesis of Science and Religion (1986 & 1997) and First International Conference on the Study of Consciousness within Science (1990) where a galaxy of prominent scientists and religious leaders including several Nobel Laureates participated. He is also organizing "Second International Congress on Life and its Origin: Exploration from Science and Various Spiritual and Religious Traditions" in Rome, Italy from November 12-15, 2004. He has authored and edited several books including "What is Matter and What is Life?" (1977), "Theobiology" (1979), (Ed.)" Synthesis of Science and Religion: Critical Essays and Dialogues" (1987), "Thoughts on Synthesis of Science and Religion" (2001), and "Seven Nobel Laureates on Science and Spirituality" (2004). He is the Editor-in-chief of the Journal of the Bhaktivedanta Institute entitled, Savijnanam: Scientific Exploration for a Spiritual Paradigm (www.savijnanam.org).

Dr. Singh is a founding member of the United Religions Initiative (URI). He is president of its Manipur (Northeastern India) Cooperation Circle and instrumental in starting its Kuala Lumpur Cooperation Circle. He started a network of schools in Northeastern India where about 4000 students receive education centered on spiritual values. He is the founder and Director of "Ranganiketan Manipuri Cultural Arts Troupe" which has approximately 600 performances at over 300 venues in over 15 countries. He guides over a thousand of his students around the world in the techniques of spiritual life. His poems inspire introspection and his beautiful singing of prayer at the opening of various global peace and interfaith meetings is a much-awaited sacred moment.

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1. Introduction

What is life? Everyone is curious about life – whether a scientist, a philosopher, a poet, an artist or a religious man or woman. We all want to know about the reality and purpose behind our existence – “Why are we born?”, “why do we die?”, “why do we suffer with diseases and old age?”, “what is our ultimate destination?” The Austrian physicist Erwin SchrÎdinger, although not a biologist, wrote a classic monograph -*What is life?* in 1944.

In the last few decades, there has been a rapid advancement in the study of genetics and molecular biology, which has provided us additional insights into the questions of life and evolution. Scientists have unraveled many mysteries behind various life processes, structures and functions of biomolecules. However, the answer to the question – ‘what is life?’ still seems far away. In this regard Karl Popper, one of the greatest philosophers of science of the 20th century, also remarked, “The undreamt-of breakthrough of molecular biology has made the problem of the origin of life a greater riddle than it was before: we have acquired new and deeper problems.”[1]

A sincere attempt to have a clear understanding of life either scientifically, philosophically and religiously is of foundational importance and it will have important impact on our life and our world-view. In this paper, the author first presents an overview of modern scientific theories of life and evolution and their incompleteness to explain life. Subsequently, he presents an alternative paradigm of life from the Vedantic perspective. He further explores the emerging field of consciousness and various other subjects pertaining to life from the Vedantic perspective.

2. Modern Scientific Theories of Life and its Origin: A Brief Overview

(a) Life and Chemical Evolution: When the bodies of living organisms are chemically analyzed, we find that they are primarily made up of four elements (H, O, N and C). Chemicals such as water, proteins, lipids, carbohydrates and nucleic

[1] Karl R. Popper, “Reduction and the Essential Incompleteness of All Science”, *Studies in the Philosophy of Biology* , eds., Francisco Jose Ayala and Theodosius Dobzhansky, 1974, p.271.

acids constitute 95% of all the molecules present in the body of a living organism. Thus it is tempting to conclude that life could be a product of complex chemical reactions. Based on this concept practically all research works about life’s origin are focused on the possible synthesis of small and large molecules that make up the bodies of living organisms. But is DNA or RNA molecule life? Will a combination of synthetic biomolecules lead to life? If life is made of chemicals, what will be the difference between life and death? Do the scientist really

study life?

According to modern biology, the smallest unit of life is called a cell. All living organisms have cells. Organisms such as bacteria and protozoa have single cells whereas higher living forms like human beings have billions of cells. Cells contain many simple, inorganic chemicals like water and inorganic ions. However, complex organic molecules such as proteins, RNA (Ribonucleic Acid), DNA (Deoxyribonucleic Acid), lipids, etc., provide for most of the essential biological
functions of the cell.

Scientists, in the field of biology, study life and its origin in terms of these biomolecules. They attempt to generate a living cell by combining these biomolecules. Many biologists and evolutionary chemists — such as Oparin, Fox, Miller, Orgel, Ponnamperuma and many others made extensive experimentation to generate life from molecules. Various models have been proposed for understanding how life may have generated from chemicals on earth such as Oparin's model of coacervates, Fox's model of protenoid microspheres, Cairns-Smith's model of clay as our grandfather, Christian de Duve's thioester model, Miller's electrical discharge reactions to simulate lightening in a so-called primordial gaseous mixture of H_2, H_2O, NH_3, CH_4, etc., of the presumed primordial or early earth. It is interesting that Miller himself, one of the main pioneers of prebiotic chemistry, has recently stated, "We really don't know what the Earth was like three or four billion years ago. So there are all sorts of theories and speculations. The major uncertainty concerns what the atmosphere was like. This is a major area of dispute."[2]

It is beyond the scope of this paper to describe all these models here. However the author would like to mention that all these models do not show any sign of generating a living cell till the present time.

(b) "Which came first — DNA or protein molecule?"

In 1953, Watson and Crick proposed the double helix model for the structure of DNA. Their discovery helped to explain how genetic material is copied inside the cell – genetic information flows from DNA, in the nucleus of each cell, to RNA, which carries the information out of the nucleus into the body of the cell and uses the instructions encoded in it to produce proteins (which acts as enzymes and also provide the structural framework of cells). However, the duplication of DNA requires numerous enzymes that catalyze those reactions. And enzymes are proteins themselves – the end product of the information coded in DNA. In other words, proteins are required for DNA synthesis and DNA is required for protein

[2] "From Primordial Soup to the Prebiotic Beach", Interview with Stanley Miller by Sean Henahan, October 1996, Access Excellence, National Health Museum; web: www.accessexcellence.org/WN/NM/miller.html

synthesis. How then could the first living cell with DNA-based molecular biology have

originated by spontaneous chemical processes on the prebiotic earth? This has been the chicken and egg problem of life's evolution from chemicals – "which came first — DNA or protein molecule?"

(c) The RNA World

In late 1960's several biologists including Crick, Carl Woese and Leslie Orgel[3] suggested that the ancestor molecule was neither DNA nor protein but RNA. RNA, they suggested, might have catalyzed reactions necessary for replication as well as providing the genetic information necessary to replicate itself. Self-replicating RNA based systems would have arisen first, and DNA and proteins would have been added later. DNA could evolve from RNA and then, being more stable, take over RNA's role as the guardian of heredity.

This idea further got support in early 1980's from the independent discoveries of Thomas Cech and Sidney Altman of a kind of RNA that catalyzes a reaction.[4] These catalytic RNA molecules have subsequently been termed as "ribozymes". In 1986, Walter Gilbert, in an article in *Nature* , portrayed the primordial world as 'RNA World' where RNA molecules catalyze their own synthesis.[5] Since then, the term 'RNA World' has stuck to the general hypothesis – RNA first, DNA and protein later and researchers continue to discover new functions for existing RNA, illustrating repeatedly how versatile these molecules can be.

However, there are many difficulties and problems in the RNA world.[6] Leslie Orgel, one of the scientists who first proposed it in the 1960s, himself concedes that researchers who have attempted to illustrate the possibility of spontaneous generation of the chemical elements of RNA itself have had only modest success. Ribose, the sugar that is part of the backbone of the RNA molecule, is difficult to create from hypothetical early earth conditions except in very small quantities.[7] Stanley Miller and his colleagues have also recently reported, "ribose and other

[3] Carl Woese, *The Genetic Code: The Molecular Basis for Genetic Expression*, New York, Harper and Row, 1967;
F.H.C. Crick, "The Origin of the Genetic Code", *J. Mol. Biol.*, 1968, 38:367-379; L.E. Orgel, "Evolution of the
Genetic Apparatus", *J. Mol. Biol.*, 1968, 38:381-393.

[4] K. Kruger, P.J. Grabowski, A.J. Zaug, J. Sands, D.E. Gottschling, and T.R. Cech, "Self-Splicing RNA: Autoexcision and Autocyclization of the Ribosomal RNA Intervening Sequence of Tetrahymena," *Cell*, 1982, 31:147-157; C. Guerrier-Takada & S. Altman, "Catalytic Activity of an RNA molecule prepared by
transcription in vitro", 1984, *Science*, 223:285-9.

[5] Walter Gilbert, "The RNA World," *Nature*, 1986, 319: 618.

[6] G. Joyce, "RNA evolution and the origins of life," *Nature* 338 (1989): 217-224; T.J. Gibson and A.I. Lamond,
"Metabolic complexity in the RNA World and implications for the origin of protein synthesis," *J. Mol. Evol.*
30 (1990): 7-15; G.F. Joyce and L.E. Orgel, "Prospects for understanding the origin of the RNA World,"

in
The RNA World, eds. R.F. Gesteland and J.F. Atkins, New York, Cold Spring Harbor Laboratory Press, 1993,
pp.1-25.

[7] Leslie E. Orgel, "The Origin of Life on the Earth", *Scientific American*, 1994, vol.271, No.4, pp.76-83. Also
refer R. Shapiro, "The improbability of prebiotic nucleic acid synthesis," *Origins of Life* 14 (1984): 565-570; R.
Shapiro, "Prebiotic ribose synthesis: a critical analysis," *Origins of Life* 18 (1988): 71-85; R. Shapiro, "The
prebiotic role of adenine: a critical analysis," *Origins of Life and the Evolution of the Biosphere* 25 (1995): 83-98.

sugars have surprisingly short half-lives for decomposition at neutral pH, making it very unlikely that sugars were available as prebiotic reagents."[8]

RNA world assumes that in the primordial world, ribonucleotides spontaneously condense into polymers to form RNA molecules and RNA molecules once formed would have the catalytic activity to replicate itself, and a population of such self-replicating molecules would arise. However, it is objected that even if RNA could have formed spontaneously, it would have been continuously degraded by spontaneous hydrolysis and other destructive processes operating on the primitive Earth.[9] Joyce and Orgel points out many detailed problems with these postulates of RNA world.[10] They finally suggest not to accept "the myth of a self-replicating RNA molecule that arose *de novo* from a soup of random polynucleotides. Not only is such a notion unrealistic in light of our current understanding of prebiotic chemistry, but it should strain the credulity of even an optimist's view of RNA's catalytic potential."[11] Similarly, Francis Crick has expressed great doubt about the RNA world. He says, "At present, the gap from the primal "soup" to the first RNA system capable of natural selection looks forbiddingly wide."[12] Thus the chemical concept of life does not seem to be very promising.

3. Search for an Alternative Paradigm of Life

Scientists do not actually study life. They only study how biomolecules such as RNA, DNA, Proteins, etc., might have formed early on earth. But their combinations do not seem to lead to life. Therefore we can say that life is beyond the interactions of molecules.

Leslie Orgel, in a 1998 review article entitled, "The Origin of Life – a review of facts and speculations" has summarized our current state of affairs in regard to life and its origin as – "There are several tenable theories about the origin of organic material on the primitive earth, but in no case is the supporting evidence compelling. Similarly, several alternative scenarios

might account for the self-organization of a self-replicating entity from pre-biotic organic material, but all of those that are well formulated are based on hypothetical chemical synthesis that are problematic."[13]

Thus it seems that the scientist are not able to generate life by a combination of biomolecules in the laboratory. It suggests that knowledge of DNA or any bio-molecule will not be able to explain what life is. Rather life could be beyond the

[8] Rosa Larralde, Michael P. Robertson, and Stanley L. Miller, "Rates of decomposition of ribose and other sugars: Implications for chemical evolution," *Proc. Natl. Acad. Sci. USA*, 1995, 92: 8158-8160. The ribose half-lives are very short, Larralde et al. report: 73 minutes at pH 7.0 and 100º C and 44 years at pH 7.0 and Oº
C.

[9] C. Thaxton, W. Bradley, and R. Olsen, *The Mystery of Life's Origin*, New York, Philosophical Library, 1984.

[10] G.F. Joyce and L.E. Orgel, "Prospects for understanding the origin of the RNA World", *The RNA World*,
eds. R.F. Gesteland and J.F. Atkins, New York, Cold Spring Harbor Laboratory Press, 1993, pp.1-25. Also
refer Gordon C. Mills & Dean Kenyon, "The RNA World: A Critique", *Origins & Design*, 17:1, 1996.

[11] *Ibid*.

[12] Francis Crick, "Foreword", *The RNA World*, eds., R.F. Gesteland & J.F. Atkins, 1993, p.xiii.

[13] Orgel, L. E., "The origin of life -a review of facts and speculations", *Trends in Biochemical Sciences*, 1998,
Volume 23, pp.491-495.

assembly of biomolecules. Werner Arber, a well-known microbiologist and Nobel Laureate in Medicine and Physiology from the University of Basel, Switzerland has commented as, "It is an important discovery of Thomas R. Cech and Sidney Altman. . . . that RNA could act as a catalyst. However, I am not sure about its significance with regard to the study of origin of life. RNA alone is not life. . . . for me it may always remain as a mystery that how many different molecules could come together to form a primordial cell. . . . I think that life could be beyond the assembly of biomolecules."[14]

It would be, therefore, worthwhile to examine alternative paradigms of life. SchrÎdinger, one of the founding fathers of quantum mechanics, also felt that life required some extraordinary laws to explain it. He said, "We must be prepared to find a new kind of physical law prevailing."[15] Michael Polanyi, a scientist and thinker of the twentieth century expressed more profoundly: "The recognition of certain basic impossibilities has laid the foundations of some major principles of physics and chemistry; similarly, recognition of the impossibility of understanding living things in terms of physics and chemistry, far from setting limits to our understanding of life, will guide it in the right direction. . . . such a demonstration would help to draw a truer image of life and man than that given us by the present concepts of biology."[16]

4. Life: Spiritual particle or Spiriton

According to Vedänta, the ancient spiritual science of India, all living beings are animated by the presence of a non-chemical or non-molecular fundamental spiritual particle – “spiriton” (called *ätman* in Vedantic terminology; the term ‘spiriton’ is coined by the author). Vedanta mentions that ‘spiriton’ or the spiritual particle has the following properties.[17]

a) It is the spiritual energy as opposed to the material energy of God.

b) It is a transcendental particle and is ontologically different from matter.[18]

c) It is only due to the interaction between the spiriton and material elements that the material body appears to be active and lively.

d) Its fundamental qualities are: (i) Consciousness (ii) Free will (iii) Intention and (iv) Purpose.

e) It is beyond ordinary sense perception but it can be inferred. Consciousness is the most visible symptom of life, spiriton. Matter, however complex it may be, can never be conscious.

[14] T. D. Singh & W. Arber, “Dialogue on Life and its Origin”, *Savijïänam – Scientific Exploration for a Spiritual Paradigm*, Kolkata, 2002, p.8 & p.16.

[15] E. Schrodinger, *What is Life?*, Cambridge University Press, Cambridge, 1944, p.81.

[16] M. Polanyi, “Life’s Irreducible Structure”, *Science*, 1968, 160:1308-1312.

[17] Refer A.C. Bhaktivedanta Swami Srila Prabhupada, *Bhagavad-Gétä As It Is*, Bhaktivedanta Book Trust, Bombay, 1997.

[18] *Ibid.*, verse 2.23 — *nainaà chindanti çasträëi nainaà dahati pävakaù na cainaà kledayantyäpo na çoñayati märutaù*, meaning, “the soul can never be cut to pieces by any weapon, nor burned by fire, nor moistened by water, nor withered by the wind.”

f) It is the source of all our knowledge.

g) It has a will to know about itself.

h) It has a will to have pleasure.

i) It has attractive powers not only with individual beings but also with matter. The attractive power or force between a mother and her baby is due to the interaction of spiritons. However, when the baby is dead, the attractive power will be lost because the spiriton is not there with the body of the child.

j) It exists eternally and it cannot be created or destroyed.

Further, when someone dies, one can experience the symptoms of the passing of the “spiriton” through the eyes, mouth, rectum, or through the skin holes of the head along with

life air.

In Vedanta there are two aspects of reality – the spiritual nature and the material nature. It should be noted that the activities of the living beings are not simply physical. Many scientists face great difficulty explaining human behavior only in mechanical or material terms and feel such limitations intuitively. James Watson, the co-discover of double helix model of DNA structure, says, “There are still very major problems to solve on how information is stored and retrieved and used in the brain. It’s a bigger problem than DNA, and more a difficult one. . . . You can find genes for behaviors, but that doesn’t tell you how brain works. . . . we still don’t know how the brain works. . . .”[19] Recently, Stephen Hawking also expressed in a lecture,[20] “As Dirac remarked, Maxwell’s equations of light, and the relativistic wave equation . . . govern most of physics, and all of chemistry and biology. So in principle, we ought to be able to predict human behavior, though I can’t say I have had much success myself. The trouble is that the human brain contains far too many particles, for us to be able to solve the equations.”

According to Vedanta, the brain in developed living beings is an important organ of the body machinery in which the symptom of consciousness is transmitted. The conscious energy is transmitted from the spiritual soul or ‘spiriton’.

In biology textbooks, life or living beings are generally defined as having potential to grow, reproduce, move, respond to such stimuli as light, heat and sound and are sustained by the processes of nutrition, respiration and excretion. But what makes these living systems grow? Biologically, we explain that growth is due to multiplication of cells through various types of divisions like mitosis or meiosis. But why any cell starts dividing at the first place? Why a fertilized egg (after the sperm cell unites with egg cell) undergoes divisions which results in the formation of the whole body? Vedanta describes that due to the presence of ‘spiriton’ the

[19] A Conversation with James Watson, *Scientific American*, 2003, 288(4):66-70. Also refer to the extended version of this conversation at Scientific American’s website www.sciam.com [20] Lecture by Stephen Hawking on “GÎdel and the End of Physics” at Texas A&M University in College Station, Texas, March 8, 2003; adapted from http://www.damtp.cam.ac.uk/strtst/dirac/hawking

body is animated and active and undergoes six types of transformations.[21] It takes birth, lives for some time, grows, produces some offspring, gradually dwindles, and at last vanishes into oblivion.[22]

It is just like the analogy of a car and the driver inside. When the driver goes away, the car cannot move. Similarly, when the spirit soul, spiriton goes away, or what we call death, the body can no longer be animated in spite of the fact that all the molecular machineries that make up the body are still intact.

Çrémad Bhagavadgétä mentions about ‘spiriton’ being different from matter as follows:

bhümir äpo 'nalo väyuù khaà mano buddhir eva ca ahaìkära itéyaà me bhinnä prakåtir añöadhä apareyam itas tv anyää prakåtià viddhi me paräm jéva-bhütää mahä-bäho yayedaà dhäryate jagat

Translation: "Earth, water, fire, air, ether, mind, intelligence and false ego – all together these eight constitute My (Lord Krishna's) separated material energies. Besides these, O mighty-armed Arjuna, there is another, superior energy of Mine, which comprises the living entities (spiritons) who are exploiting the resources of this material, inferior nature."[23]

According to Vedanta, the science of the soul or spiriton (*ätmän*) is the sublime essence of spirituality. The *Bhagavadgétä* refers to this science as – *räja-vidyä räjaguhyaà pavitram idam uttamam pratyakñävagamaà dharmyaà su-sukhaà kartum avyayam* , meaning, "This knowledge is the king of education, the most secret of all secrets. It is purest knowledge, and because it gives direct perception of the self by realization, it is the perfection of religion. It is everlasting, and it is joyfully performed."[24] According to Vedanta, the ultimate purpose of human life is to find our real spiritual identity and our relationship with the Supreme.

5. Life and Consciousness

We can all agree that consciousness is one of the most important characteristics of life. Nobody can deny its existence. It is the birthplace of noble human qualities such as forgiveness, humility, love, etc., and it is also the birthplace of sacrifice, tolerance and truthfulness. In fact, it is the birthplace of even the creative scientific theories being guided by the Supreme Spirit, God.

According to Vedanta, consciousness is a fundamental quality of the 'spiriton'. Thus it is purely spiritual and transcendental to matter. As explained earlier, matter is the inferior energy of the Supreme Lord. It is inferior because matter, however complex it may be, will never have conscious symptoms. On the other

[21] We should note that some religious traditions do not accept the existence of the soul and some others
proclaim that the soul is present in human beings only. However, ancient Vedic science of India does not
accept such statements and states very firmly that all living entities have spirit souls.
[22] *Bhagavad-Gétä As It Is*, verse 2.20 purport, *Ibid*.
[23] *Ibid.*, verses 7.4-5.
[24] *Ibid.*, verse 9.2.

hand, the living entities are the superior energy of the Supreme Being. They are superior because they have consciousness. The renowned physicist, Eugene Wigner also expressed, "There are two kinds of reality or existence; the existence of my consciousness and the

reality or existence of everything else."[25]

All living beings, microorganisms, birds, animals, etc., possess different degrees of consciousness. In other words, all these living beings are covered by different degrees of the three modes of material nature (see section 8). Microorganisms exhibit very little symptom of consciousness because of the very thick layers of covering of the material modes. However, they possess consciousness. The well-known biologist, George Wald and others such as, Lynn Marguilis indicated that Protozoa, single-celled animals and bacteria also possess consciousness.

Since the last few decades there is a growing interest to investigate consciousness among quantum physicists, neuro-physiologists, cognitive philosophers and spiritualists. William James, von Neumann, Eugene Wigner, Erwin SchrÎdinger, and David Bohm are some of the pioneers in the study of consciousness. One common feature among the leading quantum physicists is that they all try to explain the collapse of the wave function through some interaction of the mind or consciousness. However, there is very little evidence that such a collapse of the wave function really occurs. In the author's opinion, quantum mechanics, with its limitations in mathematical language, can, at best, indicate the presence of consciousness but can neither prove it nor describe it. Max Planck remarked, "It is a fact that there is a point, one single point in the immeasurable expanse of mind and matter, where science and therefore every causal method of research is inapplicable, not only on practical grounds, but also on logical grounds, and will always remain inapplicable. This is the point of [our] individual awareness." There are many different views among scholars regarding consciousness and a deeper study is necessary.

According to Vedanta, consciousness is not a function of the brain. As said earlier, the brain in developed living beings is an important organ of the body machinery in which the symptom of consciousness is transmitted. The conscious energy is transmitted from the spiritual soul, 'spiriton'. Thus consciousness is purely spiritual. It is the living energy and the fundamental quality of life particle, 'spiriton'. Just like a computer, however sophisticated it may be, will never be conscious. The program has to be supplied by an intelligent programmer. The computer is simply relaying the circumstantial choice fed into the program by the programmer, the human soul. It will be a good research field to study how the conscious energy is transmitted from the spiritual soul, 'spiriton' to the brain.

Niels Bohr, who made profound contributions to our understanding of atomic structure and quantum mechanics expressed, "We can admittedly find nothing in physics or chemistry that has even a remote bearing on consciousness. Yet all of us know that there is such a thing as consciousness, simply because we have it ourselves. Hence consciousness must be part of nature, or more generally, of reality, which means that, quite apart from the laws of physics and chemistry, as

[25] Eugene P. Wigner, "Two Kinds of Reality,"*The Monist*, Vol. 48, 1964, p.250.

laid down in quantum theory, we must also consider laws of quite a different nature.”[26]

Furthermore, Vedanta describes matter as the field of activity and by its nature, matter is inert and has no consciousness. But there is interaction between the individual particle of consciousness and matter through universal consciousness. Moreover, the natural events that are taking place in the material world are maps of the events occurring in the spiritual plane (consciousness).

About four centuries ago, the famous French philosopher Rene Descartes concluded that he knew one thing for certain: “I think, therefore I am.”[27] From the Vedantic point of view, the expression, ‘I am’ is the conscious experience and inherent transcendental property of the self. Thousands of years before Descartes, the sages of the Vedic tradition realized the principle even a step further, *aham brahmäsmi*, meaning, I am *Brahman,* I am spirit, conscious self. This is consciousness for which the Sanskrit word is *cetanä*. The act of thinking by a human being is the symptom of consciousness and it belongs to life. False consciousness is exhibited under the impression that ‘I am a product of material nature’.

Thus modern biologists and biochemists should include the study of consciousness in their research works. The field should not be left mainly to the neuroscientists, quantum physicists, psychologists and philosophers only.

6. Consciousness: Infinite and Infinitesimal

According to Vedanta there are two categories of consciousness, universal and individual. The Supreme Being, God is conscious of everything in the universe whereas the living entities are conscious of only themselves. The ontological nature of consciousness is non-physical. Säìkhya darçan of the *Çrémadbhägavatam* (Canto 3, Chapter 26) explains that life, ‘spiriton’, is characterized by the presence of a quantum of consciousness and it remains in a separate domain. It is the source of all our knowledge and experience.

In the *Bhagavadgétä* (15.7), we find: *mamaiväàço jévaloke jévabhütaù sanätanaù*, meaning, all living beings are eternal and conscious particles of the Supreme Lord. In the pure spiritual form, the living entities are also transcendental and their bodies are also made up of the three spiritual elements that make up the transcendental body of *Éçvara*, God. However, the difference between *Éçvara*, God and *jéva*,[28] the living entity is that the consciousness of the Supreme Being, God is universal (all pervasive) whereas the consciousness of the *jéva*, living being is localized. In the words of Çréla Bhaktisiddhänta Sarasvati Öhäküra, *Éçvara*, God is Absolute Infinity and *jéva*, the living entity is absolute infinitesimal. In other words, the living being has the same spiritual quality as that of the Supreme Lord. But, the capacity of the living being is limited whereas the capacity of the Supreme Being is unlimited. The human soul, however intelligent he/she may be, will always remain subordinate to the Consciousness of the Supreme Lord.

[26] T. D. Singh and R. L. Thompson, back cover, *Consciousness The Missing Link*.
[27] *Discours de la Méthode*, 1637.
[28] The individual living entity is called *jéva* in Sanskrit language.

7. Mind, Body and Spiritual Particle, “Spiriton”

According to Vedanta, every living being is a conscious life particle, spiriton or *ätman* and has mind and intelligence. Vedanta proclaims that all living beings including microorganisms possess mind and intelligence. George Wald, the Nobel Laureate in biology, was struck by the intelligence depicted in the behavior of a simple single cell entity. Seeing the intelligent behavior of a ciliate protozoon in its search for food he remarked, “That’s just what I would do!”

There are two types of activities in the behavior of a person – physical activity and mental or psychological activity. When we want to do a certain action, first our mind makes a plan. Then it is carried out physically. However, according to Vedanta, human activities are ultimately carried out by the will of the conscious
life particle, spiriton.

Vedanta gives the following hierarchy of brain, mind and consciousness (refer Figure 1):

indriyäëi paräëy ähur indriyebhyaù paraà manaù manasas tu parä buddhir yo buddheù paratas tu saù

Translation: “The working senses are superior to dull matter, mind is higher than the senses, intelligence is still higher than the mind, and he [the soul or ‘spiriton’] is even higher than the intelligence.”[29]

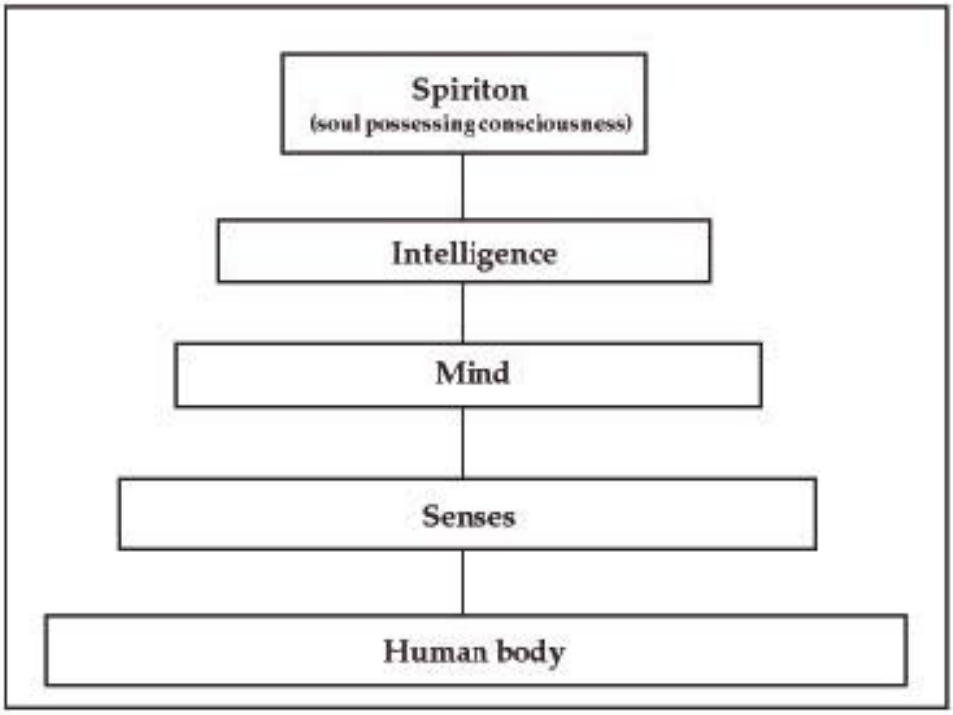

Figure 1: Vedantic Hierarchy of Human Body, Mind and Consciousness

[29] *Bhagavadgétä* verse 3.42, *Ibid*.

The interaction of consciousness with intelligence, mind, and senses is described in the *Kaöha Upaniñad* (1.3.3–4) as a chariot imagery (refer Figure 2) as follows:

ätmänaà rathinaà viddhi çaréraà ratham eva ca buddhià tu särathià viddhi manaù pragraham eva ca

indriyäëi hayän ähur viñayääs teñu gocarän ätmendriya-mano-yuktaà bhoktety ähur manéñiëaù

Translation: "The individual (the soul or 'spiriton') is the passenger in the chariot of the material body, and intelligence is the driver. Mind is the driving instrument, and the senses are the horses. The self (the soul or 'spiriton') is thus the enjoyer or sufferer in the association of the mind and senses. So, it is understood by great thinkers." The individual conscious life particle, spiriton is compared to the passenger because he is the chief occupant and thus enjoyer or sufferer of the journey. The horses indicate the senses that always drag the chariot of the human body to the objects of the senses. Intelligence is compared to the driver because the driver employs necessary discrimination for a successful and comfortable journey. Reins are compared to the mind because they are directly connected to the horses (senses) and are guided by the driver (intelligence). An able driver

(intelligence) takes control of the reins (mind) connected to the horses (senses) to properly guide the chariot towards its destination by discrimination. In this way the passenger or the soul can reach the desired destination by proper use of all the faculties. On the other hand, if any of the faculties are not controlled and coordinated properly in the hierarchy, sooner or later there may be an accident.

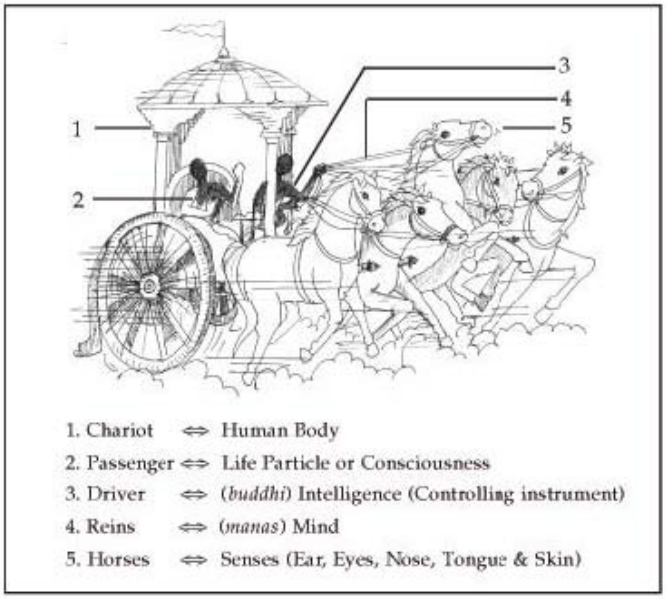

Figure 2: Chariot Model of the Interaction of Consciousness with the Body and its Components

Thus, according to Vedanta, the human activities are carried out by the will of the conscious life particle, which is then translated through the intelligence and mind to the human body. Mind interacts with body through the brain. The brain is like the central processing unit of a computer where all signals for activities come in and also go out, but it functions according to the will of the programmer. John Eccles suggested psychon as the fundamental unit of the mind and it interacts with the brain through dendrons.[30] Karl Pribram has suggested that psychon is

[30] J. C. Eccles, *Proc. Roy. Soc.*, B777, 1986, 411-28.

something like a Gabor function, a wave function.[31] However, Vedanta indicates that the life particle lies beyond material particle and wave nature. Hence the interaction of the life particle and intelligence is a highly complex interaction and may well lie beyond the scope of modern science.

In modern scientific research works, majority of the scientists are largely committed to reductionism and they do not think beyond material particles, forces, waves, etc., and their logico-mathematical relations in trying to explain the nature of reality. Vedanta proclaims that this one-sided approach will not do. In this connection, John Eccles, the Nobel Laureate in Medicine and Physiology says, “I maintain that the human mystery is incredibly demeaned by scientific reductionism, with its claim in promissory materialism to account eventually for all of the spiritual world in terms of patterns of neuronal activity. This belief must be classed as a superstition. . . . we have to recognize that we are spiritual beings with souls existing in a spiritual world as well as material beings with bodies and brains existing in a material world.”[32] He also said, “There is a fundamental mystery in my personal existence, transcending the biological account of the development of my body and my brain. That belief, of course, is in keeping with the religious concept of the soul and with its special creation by God.”[33]

8. Life, Free will and Three Modes of Material Nature

In order to accommodate the different desires of living entities, material nature, by the will of the Lord, manifests in variegated qualities. This material nature is broadly divided into three categories called the three modes of nature (*guëas*) – *sattvam* (goodness), *rajaù* (passion) and *tamaù* (ignorance). The living entities behave differently when they interact with these modes. The mode of goodness is purer than the other two modes and all living beings — human beings, animals, birds, plants, etc., are influenced to different degrees by the different modes of nature.[34]

Any activity that the living entity performs is called *Karma*. The word *karma* is a Sanskrit word and it means the action – both psychological and physical performed by the living entity under the influence of the three modes of material nature (*guëas*).

The cosmic manifestation is full of different activities. All living entities are engaged in different activities. These activities are being carried out from time immemorial and the living entities are enjoying or suffering the fruits of these activities. Based on these different activities of living beings, there is a natural law called the Law of *Karma* in Vedantic tradition. The law of *Karma* states that every

[31] T. D. Singh & Karl H. Pribram, “Science is Spiritual”, *Savijïänam – Scientific Exploration for a Spiritual Paradigm*, Kolkata, 2002, p.38. [32] John Eccles, *Evolution of the Brain: Creation of the Self*, New York, 1989, p.241. [33] *The Voice of Genius*, Ed. Denis Brian, Cambridge, Massachusetts, 1995, p.371. [34] *Bhagavadgétä As It Is*, Ch.14, *Ibid*.

living entity has a predestined happiness and distress in his/her present body according to the actions performed by the living entity in his/her previous and present life. The concept of *karma* is similar to that of action and reaction in Newton's Law. The wheels of *karma* are driven by the will and desire of the embodied being. The results of the law of *karma* are singular and pointed and there cannot be any error in them.

Karma has a close link with the free will of the individual. No one can deny that we all have free will although it cannot be detected in the laboratory. Professor Charles Townes, Nobel Laureate in Physics says, "Many scientists will say, 'I can't believe in religion. On the other hand, if you ask them, do you think you have some free will, almost every scientist instinctively thinks so. He has free will. He can choose some things. He can decide to go this way or that way. There is, in fact, no room for free will in present scientific laws and yet almost every scientist essentially assumes he has it."[35] Thus in science there is no room for free will and science,
therefore, has no capacity to explain life fully.

According to the Law of *karma*, free will is a property of life particle and by exercising free will a person performs various actions and is implicated in various reactions. The use of free will either rightly or wrongly will decide the course of life. When the living being reaches the human form of life, the free will is fully manifest and from human life the chain of *karma* can be cut off by choosing the right action, the spiritual action.

Thus *Karma* is not eternal. We can change the results of *karma* by using the free will rightly. This change depends on the perfection of our knowledge. Vedanta describes that all the other forms of life below the level of human consciousness cannot escape the chain of *karma* under normal circumstances. But, when it comes to the human form of life, the person can exercise his or her free will. This choice is available only in the human form of life. Hence, in Vedanta, the importance of the
human form of life is emphasized.

According to Vedanta, the answer to the question, 'why bad things happen to good people?' is *'Karma'.* A person will not remember what he or she has done before. However, the information of *Karma* remains stored in the book of *Karma* of the individual although he or she may not remember it.

We have the choice of acting rightly or wrongly, morally or immorally. The human race has an obligation to protect and guide not only mankind but also all lower forms of life. We can either destroy ourselves and other life forms or we can act in a way to uplift and benefit the world, thus making a meaningful use of our human form of life. If the human person uses his/her free will for destroying innocent lives, etc., he/she will be regarded as 'committing crime against creation.'

[35] *Thoughts on Synthesis of Science and Religion,* eds., T. D. Singh and Samaresh Bandyopadhyay, Kolkata, 2001, p.103.

9. Biodiversity

According to Vedic scientific views, there are 8.4 x 10^6 varieties of life (microorganisms, plants, aquatics, birds, reptiles, animals, humanoids and human beings) counted on the basis of different states or degrees of consciousness.[36] According to the conscious evolutionary cosmic time scale, one gets the human form of life after passing through millions of varieties of life.

According to modern biology, biodiversity is due to genetic variation caused by occasional process of chance mutation. However, according to Vedanta, biodiversity is a process to accommodate the conscious level of each individual and there is a gradual evolution of consciousness passing from a form of less conscious state to a form of a higher conscious state according to the subtle laws of *karma* (cause and effect). The law of *karma* and the material modes of nature – *sattva*, *rajas* and *tamas* – goodness, passion and ignorance -are responsible for biodiversity as well as for diversity in terms of levels of intelligence, degree of development of mind and consciousness of the embodied being within the same species.

Vedanta further explains that many life forms manifest simultaneously. In other words, genetic variation is already within a cosmic plan. Werner Arber's observation that genetic mutation is not due to error or mistake corroborates with the Vedantic conceptions. He says, "Evolution does not occur on the basis of errors, accidents or the action of selfish genetic elements. Rather, the evolution genes must have been fine-tuned for their functions to provide and to replenish a wide diversity of life forms. . . ."[37] Thus, according to Vedanta, biological forms are already within the cosmic plan and it is, therefore, just the opposite of Darwin's concept of biological evolution. In fact Darwin's theory of evolution has many loopholes. Stephen Jay Gould, a prominent evolutionist from Harvard University writes, "The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology (study of fossils). . . . In any local area, a species does not arise gradually by the steady transformation of its ancestors, it appears all at once and fully formed."[38] It is not that natural selection and random mutation will be the cause of biodiversity. The conscious self ('spiriton' or soul) will continue to transmigrate from one form to the next until the conscious self or the spiritual particle or 'spiriton' reaches the human form where consciousness is fully developed.

Thus, contrary to evolutionary theory, it is the consciousness that evolves, not the bodies, in the Vedantic tradition. The transfer of a conscious being from one form to another takes place according to its *karma*. It is called evolution of consciousness, and it will go on until the being reaches its pure divinity of existence (see section 10 on 'Spiritual Evolution'). There is good and bad *karma* according to the proper or improper use of one's free will. This conception is beyond the scope of modern biological sciences.

[36] Refered in *Brahma-vaivarta Puräëa* and *Padma Puräëa*.

[37] T. D. Singh & W. Arber, "Dialogue on Life and its Origin", *Savijïänam – Scientific Exploration for a*

Spiritual
Paradigm, Kolkata, 2002, p.12.
[38] Stephen Jay Gould, “Evolution's Erratic Pace”, *Natural History*, vol. 86, May 1977, p.14.

10. Spiritual Evolution – Evolution of Consciousness and Transmigration of the Soul (Vedantic Perspective)

Vedantic science describes evolution as the journey of the innumerable conscious particles of life (souls or spiritons) in time and space as they travel from one form of body to another under the laws of *karma* (cause and effect). Each living entity’s degree or level of consciousness, *guëa* (quality) and *karma* (activity) will determine the direction of his evolutionary path. Darwin’s mistake was that he could not conceive the existence of consciousness or a spiritual soul. Thus, Vedanta does not accept Darwin’s theory of evolution. Under normal circumstances, consciousness evolves linearly as well as step-wise. The different bodies or forms to accommodate a specific conscious being are already arranged by nature within a cosmic plan (*mayädhyakñeëa prakåtiù – Bhagavadgétä* 9.10). As stated before, *Brahmä Vaivarta Puräëa* describes as, *açétià caturaç caiva lakñääs täï jéva-jätiñu bhramadbhiù puruñaiù präpyaà mänuñyaà janma-paryayät* , meaning one gets the human form of life after

having changed 8.0×10^6 other forms of life.

Furthermore, *Padma Puräëa* gives a detailed statement regarding different forms of life as follows*:*

jalajä nava-lakñääi sthävarä lakña-viàçati kåmayo rudra-saìkhyakäù pakñiëää daça-lakñaëam triàçal -lakñääi paçavaù catur-lakñääi mänuñäù

Translation: There are 8,400,000 forms of life. There are 900,000 forms of life in the water, and 2,000,000 forms of trees and other plants. Then, there are 1,100,000 species of small living beings, insects and reptiles, and 1,000,000 species of birds. Finally, there are 3,000,000 varieties of beasts and 400,000 human species.

The biological forms impose a limitation in the development of consciousness. Therefore, different degrees of consciousness are expressed through these different bodies. Vedanta divides the degrees of consciousness into five broad categories: *äcchädita* (covered), *sankucita* (shrunken), *mukulita* (budding), *vikasita* (blooming) and *pürëavikasita* (fully bloomed).[39]

Trees and plants, for example, are almost inert. They fall into the category of ‘covered consciousness’. However, when we observe them carefully, we see that they have a limited consciousness. Jagadish Chandra Bose reported that plants have consciousness.[40] Other living entities, such as worms, insects, and other animals are in ‘shrunken consciousness’. They are not as covered as plants, but their consciousness is not fully developed either.

Human beings have ‘budding consciousness’. A bud appears shrunken, but it has the potential to bloom into a flower. Human consciousness has similar potential. So, human

beings have the innate ability to develop their consciousness to an

[39] Çréla Bhaktivinoda Öhäkura, *Jaiva-Dharma*.

[40] "... In many other ways we are able to find that the plant has a heart that beats continuously as long as
life remains." [Cf. Dibakarsen and Ajoy Kumar Chakraborty, *J. C. Bose Speaks*, Puthipatra, Calcutta, 2000,
pp.153, 195-200.]

almost unlimited extent, up to the point of knowing the Absolute Truth. Other species do not have this special ability. That is why Vedanta declares that the human form of life is the most elevated and inquiry into the *Brahman* , the Absolute Truth, God is especially meant for the human form of life.

Consciousness continues to evolve in this way because the goal of life is to attain the *saccidänanda* state of consciousness. Thus, in Vedanta, life is distinct from the material bodies it inhabits. In the human form of life, when one begins to sincerely inquire about *Brahman,* Absolute Truth, God one's bud-like spiritual consciousness begins to expand or evolve. That is the 'blooming' state of consciousness. When as a result of his inquiry, he practices regulated spiritual discipline, he evolves further and further. Finally, he attains complete transcendental realization, God consciousness, the 'fully bloomed' state of consciousness.

In Vedic cosmology, there are periodic cycles known as *yuga* cycles (ages) and creation and annihilation of the material world along with living beings take place continuously like changes of seasons. There are four *yugas* in each *yuga* cycle namely, *Satya*, *Tretä*, *Dväpara* and *Kali* and the seeds of life, spiritons are injected by the Supreme Lord into the womb of material nature. When the appropriate cosmic cycle appears, many different biological forms manifest in that particular *yuga* cycle. Also according to Vedanta, since all biological forms have already been existing in subtle states, either manifested or unmanifested, embodied life on earth would start, in principle, from any organism — bacteria, plants, birds, animals, human beings, etc., according to the subtle laws of *karma*. Thus, Vedantic cosmology supports the simultaneous manifestation of many organisms. This principle is in direct contradiction with the Darwinian paradigm.

If the existence of the soul or 'spiriton' is recognized in Darwinian paradigm then the spiritual paradigm of Vedanta could integrate the Darwinian paradigm. Thus the missing element in neo-Darwinian paradigm or molecular biology is the spiritual soul or 'spiriton'. However, in vedantic paradigm, consciousness evolves and the biological forms are designed in such a way that each form can accommodate the evolving conscious level of the living entity. This process is also known as the transmigration of the soul.

During the life of each universe, by the *karma* of the conscious living beings, some living forms manifest in certain periods of the different *kalpas* [41] and some may not. Also, there are partial and complete annihilations of the universe bringing catastrophes in which a whole

group of living forms can disappear. Thus, in the Vedantic account of cosmology, it is reasonable to assume that one will be unable to find a systematic account of universal or global history in fossil records. In the Vedantic model, the disappearance of the giant lizards, or dinosaurs, which is still a
mystery to Western science, is not unreasonable.

[41] 1000 cycles of four *yugas* (ages)

11. Spiritual Evolution, Inquiry and Uniqueness of Human Life

Inquiry, *jijïäsa,* is another fundamental quality of life. Everyone inquires about something or the other. In the course of life, a person experiences different phases like old age, disease and many kinds of sufferings. He then inquiries, “Why I am suffering?” Therefore, he wants to find out the solution to these problems. Every research work is a kind of inquiry. Humanity begins when this sort of inquiry is awakened in one’s mind. This quest for understanding the deeper meaning of life is
the turning point in the life of individuals.

Therefore, inquiry forms the most important process of acquiring knowledge. We want to know about things that are beyond what we can see conventionally. We invent electron microscope, telescope, etc., to satisfy our curiosity. But this is not enough. Our senses and extended senses are still very limited.

Can a bird inquire about the meaning of its existence? Innocent and ordinary living beings like birds and animals inquire only of bodily needs. They inquire, ‘where is water?, where is food?, where is shelter?’, and so on. However, they do not have the capacity to inquire about the deeper purpose and meaning of life. But in the human form of life, one is endowed with the unique ability to inquire beyond these bodily needs. This is the special and unique qualification of the human form of life.

When a child is growing up, he inquires from his parents about many things around him, such as ‘What is this?’, ‘what is that?’, etc. In this way, the child gathers knowledge from his parents. Since the conscious intelligence is fully developed, human beings can make different levels of inquiry including the deeper questions about life. The most important inquiry of human life should be to find out about the Absolute Truth, *jévasya tattvajijïäsä* (*Çrémadbhägavatam* 1.2.10).[42]

The ability to inquire about the ultimate truth of life makes the human being uniquely different

from all other forms of life. Newton asked why the apple did fall. As an answer to this question, he discovered the law of gravitation. Thus Vedanta emphasizes that the primary subject matter of the human form of life is to inquire about the science of Absolute Truth, God.

The *Kaöha Upaniñad* (1.3.14) in a very strongly and carefully worded tone makes a clarion call to all human beings in the following *çloka*:

uttiñöha jägratapräpya varän nibodhata kñurasya dhärä niçitä duratyayä durgaà pathas tat kavayo vadanti

Translation: Arise! Awake! Please try to understand the boon that you now have in this human form of life. The path of spiritual realization is very difficult; it is sharp like a razor's edge, difficult to tread and hard to cross, so say the learned sages.

[42] A.C. Bhaktivedanta Swami Çréla Prabhupäda, *Çrémadbhägavatam*, Canto 1, Ch. 2 Verse 10, Bhaktivedanta Book Trust, Bombay, 1987.

'Who am I?', 'what is the Supreme Absolute Truth?', 'what is the origin of life?', 'what is existence?', 'what will be the fate of the human soul when the body dies?' are some of the basic questions that a human being can inquire. Human life is the result of spiritual evolution.

Presently, scientific inquiry without spiritual knowledge is one-sided. All forms of human inquiry should be utilized in search for Absolute Truth, God. Hence, the purpose of all sciences should be to inquire about the nature of God. A physicist should inquire: what is the real source of the laws of nature? A chemist can inquire: who is the Supreme Chemist behind all the wonderful molecules, DNA, chlorophyll, proteins, etc.? Vedanta explains that if we do research far enough, we will find that the ultimate source is God. Thus, Vedanta cautions that intelligent people should not be mislead by the temporary and incomplete pronouncements of atheistic scientists who try to remove God from everything. This will be the proper use of the modern scientific knowledge. When one realizes the Absolute Truth through such an inquiry, he will understand the actual basis of reality. And then, his duty is to glorify the Supreme Lord through the scientific understanding. This is the secret and the real platform of happiness. This is what Närada Muni, the spiritual master of Vyäsadeva, instructed Vyäsadeva in the *Bhägavata,* the natural commentary on the *Vedäntasütra*.[43]

Albert Einstein once remarked, "The important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but in awe when he contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery everyday."[44]

In the human form of life, the consciousness *(cetanä)* , intelligence *(buddhi)*, mind *(manas)*, senses *(indriyas)* are fully developed. Thus, human being is totally equipped to make the deepest *jijïäsa* (inquiry), the spiritual inquiry. A similar message echoes in the statement of Albert Einstein who states that knowing the plan of God is most important and the rest are details.[45] By this inquiry, *sambandha,* the relationship between the self and God will be

established and the pure spiritual knowledge of the self will be understood. *Éça Upaniñad* further declares, *éçäväsyamidam sarvaà* , everything belongs to the Supreme Lord. Therefore, everything should be used, including the works of the scientists and all the leaders of the world in the service of the Supreme Lord. In a nutshell, this is the view of Vedanta regarding the prime duty of humanity.

12. Research Suggestions for Examining Life's Origin

A possible final test to see whether life is a product of chemical reactions or not is to design a super-catalyst that may have the property to accelerate the chemical reactions manifold. At this point of our advancement in biological sciences we can practically isolate all biochemicals such as, nucleic acids (DNA, RNA), enzymes

[43] *Çrimadbhägavatam*, Canto 1, Ch. 5, Verse 21, *Ibid*.
[44] In Donald O. Bolander, *Instant Quotation Dictionary*, 1979.
[45] R. Clarck, *The Life and Times of Einstein*, The World Publishing Co., New York, 1971, p.19.

(protein molecules), carbohydrates, lipids, etc., from organic bodies. What is the necessity of taking the trouble to synthesize even simple molecules like amino acids from the so-called primordial gaseous mixtures, spending millions of dollars in many evolutionary chemistry laboratories around the world and involving many research scholars in the hope of understanding the primordial chemical soup? Even given a cosmic time scale of billions of years, will that chemical soup ever give rise to a living cell?

Chemical evolutionists often claim that given a cosmic time scale or a long time span, life could generate spontaneously from the assembly of biomolecules. However, if we can synthesize a super-catalyst or a super-enzyme, then the problem of a long time span may be solved. That would be more reasonable than doing research on how small molecules would become big molecules, for example, from amino acids to protein molecules, which in turn might or might not lead to the first primordial living cell. Scientists in this field can design some research work on
how to find some special enzymes in order to accelerate these chemical reactions.

One advantage we have is that we are starting with all the readymade biomolecules and thus we are not worrying how these biomolecules evolved from chemical elements like carbon, hydrogen, nitrogen, oxygen, etc., in the cosmic time scale. One possible area is to investigate further about the RNA world. If RNA acts as a catalyst it may be possible that we can further undertake research work in this area by chemical modification of RNA, or a combination of RNA enzymes, protein enzymes and other catalytic agents, etc., to see whether a better catalysis is possible
or not.

If we can produce a super-enzyme that can act as a super-catalyst to accelerate the rate of these chemical reactions, we can conceive that in next few years from now, we will be in a

position to tell correctly whether life is a product of complex molecular reactions or not. Thus there is no need to wait millions or billions of years to see life's appearance on earth. Today, with the computer-aided synthesis of chemicals, it is conceivable that such a research project will be possible.

13.Conclusion

The study of life and its origin in terms of molecules has been the model of investigation of biologists and evolutionary chemists. However, the scientist so far are unable to generate life from biomolecules and cannot fully explain life and its origin. Further, this conception negates completely the inner and spiritual dimension of life, contrary to experience. How can we define life without taking into account of our feelings, which occupy most part of our life? We cannot neglect the whole world of aesthetics – beauty, music, sculpture, poetry, literature, theatre, dance, etc., which play a major role in our life. Thus it seems that in the study of life and its origin, a multi-disciplinary approach incorporating many fields such as, biology, physics, theology and others, is quite important and necessary. A scientific study of the spiritual concepts of life from all religious traditions of the world including the ancient Vedantic traditions will be extremely essential.

Bioengineering and biotechnology have also raised a lot of bioethical questions. We hope that during this 21st century we may see the development of many extraordinary aspects of life – including the spiritual aspect. We may have the opportunity to take a good look into theism and atheism through the study of life sciences in the 21st century. Thus in the search for a deeper understanding of life and the universe, inclusion of spirituality within scientific research works can become a significant factor. In other words, science and spirituality/religion should be important partners in this most profound area of human quest.