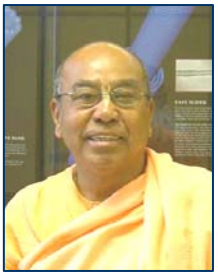

Paper Title: Vedantic Perspectives on Bioethical Questions
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Paper Abstract:
In this new millennium, rapid advancements of biotechnology and genetic engineering have raised some of the most profound bioethical questions that humanity has ever faced. In the name of scientific advancement these new technologies could be the causes of serious implications for our health, the environment, the future of agriculture, and the relationship between human societies and the rest of nature, especially if they are conducted without any reference to life's higher meaning and purpose. Fields such as stem cell research, cloning, euthanasia, abortion, gene therapy and so on have already become the subjects of heated public debate.

There are many important bioethical questions in biotechnology and bioengineering such as, does the embryo have the right to develop into a mature adult? Does embryonic stem cell research encourage the killing of the potential embryos? Will genetic modification or engineering of plants and animals be the cause of unknown dangers in the future? Should the right to die be allowed? There will be many more questions that will arise in the future as biotechnology advances. All of these bioethical implications cannot be ignored. To what extent should we be playing God?

All these debates have brought us back to the same age old fundamental question – What is life, its meaning and purpose? Over sixty years ago, the well-known quantum physicist, Erwin Schrödinger, although not a biologist wrote the classic book - *What is Life?* Today, many scientists (physicists, biologists, chemists, spiritualists and thoughtful people) are asking the same question. The magazine, *New Scientist*, has made a list of the top 10 contemporary questions of life and one of them is: 'What is life?' Undoubtedly, understanding 'what is life' holds the key to solve many of the bioethical questions facing us today.

Vedanta, the ancient Hindu theological and metaphysical treatise of human life, proclaims that life and matter are two distinct categories of reality. According to this treatise, the primeval being, God, is the origin of both. Matter is the insentient energy whereas life is the sentient or conscious energy of God. However, they can interact under the influence of time resulting in what we call embodied or biological life. Biological issues arise when this interaction begins, for human life at the time of conception. Vedanta strictly deals with life from a spiritual perspective and gives it preeminence over non-sentient matter. In this paper, the author will discuss various bioethical issues mentioned above and reflect on possible solutions in the light of the Vedantic wisdom.

The author is confident that the ongoing science and religion dialogue will certainly shed light on many of these complex scientific, theological and bioethical questions.

Author Biography:
T. D. Singh (1937-) is 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. He received his Ph.D. in Physical Organic Chemistry from the University of California, Irvine in 1974. He has organized three International conferences on science and religion (1986, 1990, and 1997) where a galaxy of prominent scientists and religious leaders including several Nobel Laureates participated. He also organized "Second International Congress on Life and its Origin: Exploration from Science and Various Spiritual and Religious Traditions" in Rome, Italy November 12-15, 2004. The conference was recognized by the President of Italy and the Mayor of Rome. He has authored and edited several books related to science and religion like *Seven Nobel Laureates on Science and Spirituality (2004)*. His most recent publication, *Towards a Culture of Harmony and Peace* (has a section dedicated to science and religion) has contributions from as many as nine Nobel Laureates in Peace and Science apart from that of the President, and the Prime Minister of India.
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Paper Text:

1. Introduction
2. A Brief Overview of Recent Biotechnological Advancements
3. Some Bioethical Questions Raised by Biotechnological Advancements
4. Vedantic Conception of Life, its Meaning and Purpose
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1. Introduction

In this new millennium, rapid advancements of biotechnology and genetic engineering have raised some of the most profound bioethical questions that humanity has ever faced. In the name of scientific advancement these new technologies could be the causes of serious implications for our health, the environment, the future of agriculture, and the relationship between human societies and the rest of nature. Fields such as stem cell research, cloning, euthanasia, abortion, gene therapy and so on have already become the subjects of heated public debate.

There are many important bioethical questions in biotechnology and bioengineering such as, does the embryo have the right to develop into a mature adult? Does embryonic stem

cell research encourage the killing of the potential embryos? Will genetic modification or engineering of plants and animals be the cause of some unknown and dangerous diseases? Should the right to die be allowed? There will be many more questions that will arise in the future as biotechnology advances. All of these bioethical implications cannot be ignored. To what extent should we be playing God?

All these debates have brought us back to the same age old fundamental question – What is life, its meaning and purpose? Over sixty years ago, the well-known quantum physicist, Erwin Schrödinger, although not a biologist, wrote the classic book - *What is Life?* Today, many scientists, spiritualists and thoughtful people are asking the same question. The magazine: *New Scientist*, has made a list of the top 10 contemporary questions of life and one of them is: 'What is life?'[1] Undoubtedly, understanding 'what is life' holds the key to solve many of the bioethical questions facing us today.

Vedanta, the ancient Hindu theological and metaphysical treatise of human life, proclaims that life and matter are two distinct categories of reality. According to this treatise, the primeval being, God, is the origin of both. Matter is the insentient energy whereas life is the sentient or conscious energy of God. However, they can interact under the influence of time resulting in what we call embodied or biological life. In developed living beings such as human life and others, this interaction starts from the very moment of conception and biological and ethical issues also begin from this point on. Vedanta strictly deals with life from a spiritual perspective and gives its preeminence to life over non-sentient matter.

In this paper, we will first briefly discuss some recent biotechnological advancement followed by various bioethical issues born from these advancements. We will then reflect on seeking possible guidance from the Vedantic wisdom to help resolve some of these issues.

2. A Brief Overview of Recent Biotechnological Advancements

From the second half of the 20th century, there have been astounding breakthroughs in the fields of genetics, genetic engineering and biotechnology. The discovery of DNA structure in 1953 by Watson and Crick has since led to significant advancement in these fields, namely, the synthesis of genes, discovery of restriction enzymes, cloning of animals, sequencing the genome of organisms and finally the human genome project which began in the year 1997 and concluded in 2003.

The history of modern genetics started from the garden of the Austrian monk, Gregor Mendel (1822-1884). Patiently experimenting in the breeding of diverse kinds of pea plants, he demonstrated how their visible characteristics could be foreseen according to simple mathematical probabilities as they were passed on from one generation to the next. He proposed that heredity information was passed from parent to offspring in discrete packets, which he called "factors." Different factors were responsible for distinct

[1] "The Mysteries of Life," *New Scientist*, London, Sept. 4-Sept. 10, 2004, Vol. 182, Iss. 2463, p. 24.

aspects of a pea plant's appearance, such as seed shape or flower color.[2] However, the secret of genetic inheritance was unlocked in April 1953 when Watson and Crick proposed a double-helical structure of DNA. The era of molecular genetics in the field of biochemistry was thus begun.

Scientists, now knowing the molecular structure of the genetic molecule, could begin both to elucidate and manipulate its function. These new studies were, however, dependent on the discovery and use of the many enzymes that are able to modify or join existing DNA molecules, or to aid in the synthesis of new DNA molecules.[3] As methods of visualizing DNA were being developed in the 1950s, a new tool was discovered: restriction enzymes. Werner Arber identified the first restriction enzyme in 1968. Restriction enzymes are protein molecules that cut deoxyribonucleic acid (DNA) chains into defined fragments.[4]

During an attack of an invading bacteriophage (virus that attacks/infects bacteria), the bacterium releases a so-called restriction enzyme that recognizes the DNA of the invading bacteriophage and cuts the DNA into pieces, thereby disabling it. Simultaneously, the bacterium releases another enzyme that defends and protects its own DNA from being cut by the restriction enzyme. It seems that even microorganisms have some sort of built-in intelligent system. The restriction enzyme of a bacterium cuts the viral DNA of foreign origin to safeguard and preserve its own identity. What a beautiful system nature has! Life displays such unique qualities even at the level of microorganisms.

Earlier, B. Weiss and C.C. Richardson had isolated DNA ligase (1966), an enzyme that could be used to 'ligate' or paste together two strands of DNA.[5] Thus researchers could now attach two or more DNA molecules or break it into fragments. In 1972, Paul Berg used restriction enzyme to cut DNA, and then a ligase to paste two DNA strands together to form hybrid circular molecule – this was the first 'recombinant' DNA.[6] This ushered in a new era of genetic manipulation – what has come to be known as the world of biotechnology – where profitable commercial uses of recombinant DNA became more and more feasible and it multiplied.[7]

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[2] *Science – Pathways of Discovery*, edited by Ivan Amato, New York, 2002, p. 60.

[3] Enzymes are a class of proteins serving as catalysts in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

[4] Restriction enzymes make cuts in foreign DNA molecules at specific sites. The site at which a given restriction enzyme cleaves double-stranded DNA consists of a segment usually four to six nucleotide pairs long, called the recognition sequence. The recognition sequence is a characteristic of the particular restriction enzyme and dictates where the enzyme will cleave the DNA molecule. Some enzymes, such as HaeIII, cut both strands of DNA at the same point, generating blunt-ended fragments whereas many other enzymes, such as EcoRI, make staggered cuts, leading to fragments with complementary cohesive ends (sticky ends). Also refer to "Dialogue on Life and Its Origin", T. D. Singh and Werner Arber, *Savijnanam – Scientific Exploration for a Spiritual Paradigm*, the Journal of the Bhaktivedanta Institute, Kolkata, 2002, vol. 1, pp. 9-15.

[5] Weiss, B. and Richardson, C.C. (1967) *Proc. Natl Acad. Sci. USA*, 57, 1021-1028.

[6] Paul Berg, along with Walter Gilbert and Frederick Sanger, received the 1980 Nobel Prize in chemistry. Paul Berg firstly constructed the recombinant-DNA molecule. Gilbert and Sanger independently developed separate methods for the determination of the exact sequence of the building blocks in DNA.

[7] Biotechnology means technology based on biology. The various techniques of biotechnology related to DNA are: (A) Restriction enzymes—enzymes from bacteria that act like "molecular scissors" to cut DNA

The advent of molecular techniques for manipulating and editing sequences of a DNA molecule necessitated a need for a way to determine the correct order of the As, Ts, Gs, and Cs that make up a unique sequence of DNA (This is called sequencing).[8]

In 1975, Frederick Sanger and Alan Coulson developed the first method for sequencing DNA.[9] Two years later, Walter Gilbert and Allan Maxam devised a method for sequencing DNA using chemicals rather than enzymes.[10] These two strategies made it possible to determine the sequences of DNA fragments a few hundred bases long. Thus, sequencing technology advanced rapidly.

In 1985, Kary Mullis discovered polymerase chain reaction (PCR) – an efficient method for generating a huge number of copies of any segment of DNA.[11] Like so many great

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at specific nucleotide sequences; (B) Gel electrophoresis—a technique of separating large molecules of proteins or nucleic acids through a jello-like sheet using electricity; molecules are separated by size, electric charge and other physical properties; (C) Electroporation—a pulse of electricity causes temporary holes in the plasma membrane of cells; DNA can enter the cells through these pores (D) Vectors—structures that can carry foreign DNA into a target organism - (i) plasmid—circle of DNA found in bacteria, separate from the main chromosome; (ii) bacteriophage—a virus that infects bacteria (iii) YAC (yeast artificial chromosome)—a linear piece of DNA that acts as an extra chromosome in yeast; can carry up to 1.5 million bases of foreign DNA; useful in the Human Genome Project; (E) DNA sequencing (by Sanger method)—synthesize a strand of DNA complimentary to that for which the order of the bases is to be determined using either radioactive or fluorescent labeled dideoxynucleotides (which cause chain termination) along with normal nucleotides and DNA polymerase; read sequence of synthesized DNA strand off gel and figure out original sequence based on nucleotide complimentarity; (F) PCR (polymerase chain reaction)—making many copies of a piece of DNA in a test tube using primers and DNA polymerase; (G) RFLP (restriction fragment length polymorphism)—restriction enzymes cut the DNA from different individuals into different lengths that can be separated by gel electrophoresis; different banding patterns indicate DNA variation among individuals; (H) Southern blotting—transferring DNA sequences to nitrocellulose or nylon paper from an electrophoresis gel; various DNA sequences are detected by using radioactive probes that bind to those DNA sequences; the detection is via film to which the gel containing the radioactive probes have been exposed; (I) Tissue culture—growing cells *in vitro* in the presence of essential nutrients and hormones; way of providing cells for genetic manipulations. See Alberts B, Bray D, Lewis J, Raff M, Roberts K, Watson JD (1994) *Molecular Biology of the Cell. Third Edition.* Garland Publishing, Inc., New York, pp. 162, 302, 315; Campbell NA (1993) *Biology. Third Edition*. The Benjamin/Cummings Publishing Company, Inc., New York, pp 390-404; and website http://www.cccu.org/resourcecenter/resID.850,parentCatID.246/rc_detail.asp

[8] Sequencing and Mapping: Sequencing is the process of determining the order of the nucleotides, or base pairs, in a DNA molecule. It is in the grouping and sequencing of the three million nucleotides that the coding for innumerable proteins occurs. Mapping is the process of determining the position and spacing of genes, or other genetic landmarks, on the chromosomes relative to one another. See J. Robert Nelson, *On the New Frontiers of Genetics and Religion*, 1994, Michigan, p. 10.

[9] Sanger, F. & Coulson, A.R., "A rapid method for determining sequences in DNA by primed synthesis with DNA polymerase," *J. Mol. Biol.*, **94**(3):441-448, May 1975.

[10] Maxam, A.M. & Gilbert, W., "A new method for sequencing DNA," *Proc. Natl. Acad. Sci. USA*, **74**(2):560-564, February 1977.

[11] PCR allows scientists to synthesize millions of copies of a DNA strand in a short time. This is much faster than cloning recombinant DNA, which can take days or weeks. PCR is a test-tube reaction that mimics the replication of DNA in cells that are undergoing division. To perform the reaction, all that is needed is a piece of DNA to be copied, spare nucleotides to build the copies, and the enzyme DNA polymerase, which reads one strand of DNA and builds a complementary strand using the spare nucleotides. PCR is now widely used in many fields. Molecular biologists rely on it to find the specific genes they are looking for in many different species and to make many copies of a piece of DNA they want to investigate. Forensic technicians use it to help identify suspects and victims based on the amplification patterns of their DNA. It is also used in disease diagnosis, evolutionary genetics, and genome sequencing.

scientific discoveries, the ideas for PCR came as a sudden inspiration. While driving from Berkeley to Mendocino one evening (1984), Mullis got the insight and inspiration to develop PCR.[12] Mullis received the Nobel Prize in 1993 for this discovery.

The discovery of PCR was a major step in the advancement of molecular biology. Another landmark in the development of molecular biology was cloning. In the newspapers we see a growing interest in the field even among the common people.

In 1997, cloning topped the charts of scientific and social discourse when Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland, cloned a sheep named Dolly. Dolly was the first cloned mammal.[13] Cloning is the process of making a genetically identical organism. It has been used for many years to produce plants (even growing a plant from a cutting is a type of cloning). Animal cloning has been the subject of scientific experiments for years, but garnered little attention until the birth of Dolly.

Nature has been cloning organisms for billions of years. For example, when a strawberry plant sends out a runner (a form of modified stem), a new plant grows where the runner takes root. That new plant is a clone. When we take a leaf cutting from a plant and grow it into a new plant (vegetative propagation), we are cloning the original plant because the new plant has the same genetic makeup as the donor plant.

Since Dolly, several university laboratories and companies have used various modifications of the nuclear transfer technique to produce cloned mammals, including cows, pigs, monkeys, mice and so on.

However, cloning has an inherent limitation as far as the understanding of life is concerned. Many people think that by cloning we can have a kind of biological Xeroxing. But we have all witnessed that identical twins, who possess almost identical physical forms (genetic makeup), are actually completely different persons in their talents, interests, levels of intelligence and performance. One could be a scientist and the other an artist.

Suppose today, if, by biotechnology, it were possible to produce a person of the same size and shape as Einstein, will such a person possess the same intelligence and personality of Einstein? The answer is no. Biotechnology cannot copy the spiritual nature of a person. The Vedantic texts confirm this statement. Further, Vedanta emphasizes that life is beyond DNA.

Cloning and genetic engineering have raised many serious ethical questions and fierce debates among scientists, politicians and the general public which we will briefly touch upon in the next section. With profound implications for our health, the environment, the

[12] Interview with Dr. Kary Mullis by Celia Farber, *Spin Magazine*, July 1994. Refer website http://www.posh-uk.org.uk/gmh/kmullis_article2.html

[13] Ian Wilmut and his colleagues transplanted a nucleus from a mammary gland cell of a Finn Dorsett sheep into the enucleated egg of a Scottish blackface ewe. The nucleus-egg combination was stimulated with electricity to fuse the two and to stimulate cell division. The new cell divided and was placed in the uterus of a blackface ewe to develop. After few months Dolly was born. Refer Wilmut I., Schnieke A. E., McWhir J., Kind A. J., Campbell K. H., "Viable offspring derived from fetal and adult mammalian cells," Nature 385:810 (1997). For general details about cloning refer *Science – Pathways of Discovery*, edited by Ivan Amato, New York, 2002, pp. 109-125. Also refer http://science.howstuffworks.com/cloning.htm

future of agriculture, and the relationship between human societies and the rest of nature, today's genetic technologies have aroused worldwide attention.

A group of European scientists have even speculated that the rapid spread of genetically engineered organisms in the environment may be one of the factors in the emergence of so many new, highly virulent disease pathogens in recent years, many of which are simultaneously resistant to several different antibiotics.[14] Indeed, we have seen that genetically engineered crops harm beneficial insects such as ladybugs, lacewings and monarch butterflies, and they cross-pollinate at higher rates than their non-engineered counterparts, and are more susceptible to the effects of environmental stresses. The consumption of these foods has been associated with unusual allergies, irritations of the digestive tract, the uncontrolled spread of antibiotic resistance, and possible distortions in the growth and development of vital organs. The profound ethical implications of genetic engineering and other new biotechnologies have proved impossible to ignore.

Nobel Laureate biologist Marshall Nirenberg, who made a significant contribution in describing the genetic code, cautioned us well in advance: "Man may be able to program his own cells with synthetic information long before he'll be able to access adequately the long-term consequences of such alterations, long before he'll be able to formulate goals and long before he can resolve the ethical and moral problems which will be raised. When man becomes capable of instructing his own cells, he must refrain from doing so until he has sufficient wisdom to use this knowledge for the benefit of mankind. I state this problem well in advance of the need to resolve it because decisions concerning the application of this knowledge must ultimately be made by society and only an informed society can make such decisions wisely."[15]

Nevertheless, research has continued. After the study of individual genes, researchers proceeded to the next step: the study of complete genomes, soon referred to as genomics. Their aim was to determine the complete sequence of base pairs in all the DNA molecules of a particular organism. This sequence is the organism's genome ('ome' in Greek means 'all', 'every' or 'complete', thus genome means 'all genes' or *complete* genetic makeup of an organism).[16] The smallest known genome for a free-living organism (a bacterium) contains about 600,000 DNA base pairs, while the human and mouse genomes have about 3 billion DNA base pairs.

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[14] Mae-Wan Ho, et. al., "Gene Technology and Gene Ecology of Infectious Diseases," *Microbial Ecology in Health and Disease*," Vol. 10, 1998, pp. 33-59.

[15] Marshall Nirenberg, "Will Society be Prepared?" (editorial), *Science* 157 (1967): 633.

[16] Human genome is contained in 23 pairs of chromosomes, which lie in the nucleus of every cell in the body. Each chromosome consists of a DNA double helix that is wrapped around spool-like proteins called histones. The DNA-histone complexes are then coiled and double-coiled to yield chromosomes.
The ultimate aim of the Human Genome Project is to understand the proteins that are encoded by the DNA. When a gene is 'on,' the cell uses a process called transcription to copy the gene's DNA into a single-stranded molecule called messenger RNA (mRNA), which leaves the nucleus to associate with a series of large protein structures called ribosomes. The ribosomes then translate the mRNA into the chain of amino acids that make up the encoded protein. The new protein – here a receptor destined for the cell membrane – goes through several folding steps in a sequence that researchers are trying to understand.
Also note that the study of the global properties of genomes of related organisms is usually referred to as genomics, which distinguishes it from genetics which generally studies the properties of single genes or groups of genes.

In 1990, the Human Genome Project formally began as an international effort to sequence the entire genome of humans.[17] In 1995, the genome of bacterium *Haemophilus influenzae* was produced and in 1998, the genome sequence of first multicellular organism – 97 million DNA base pairs of the roundworm *Caenorhabditis elegans* – was published.[18] In Feb 2001, Celera Genomics, the commercial sequencer led by J. Craig Ventor, and the Human Genome Project consortium, the publicly funded group led by Francis S. Collins, announced their 'first drafts' of the human genome. The human genome project was completed in 2003.[19]

With human genome at our hand, the bioethical issues have become much more deepened. The most serious impact of genomics may well be on how we view ourselves and each other. It requires our constant vigilance, lest we may lose sight of who we are, why we are here, what we wish to become and what the purpose of our life is.

Determining the structures of all of the genes in a cell doesn't explain the lively workings of the cell. In the last 50 years, we have discovered many details about living systems and can even manipulate their bodily structures in many astonishing ways. But we still do not know what life is. Even with the human genome in hand, the understanding of life still remains as a mystery.

Human Genome Project, though extremely useful, is related to only the physical aspect of a human person. It is inadequate to describe the complete human person since a person is far more than a mere collection of molecules or genes, however sophistically organized. A person is much more than his genome.

Genes are the coded instructions to make organisms' bodily structures, and the genome is the library of these instructions. But even an entire genome by itself is not alive. Life is much more than the genome. Werner Arber, the Nobel Laureate microbiologist from the University of Basel, Switzerland remarked, "I think that life could be beyond the assembly of biomolecules."[20] Dr. W. French Anderson,[21] one of the leading geneticists in the world and the father of Gene Therapy, also expressed, "Can we alter our humanness by this kind of manipulation? Can we alter what is uniquely important to us as a human race by engineering our genetic machinery?" He felt that it is not possible to change one's humanness by genetic engineering because of the presence of "that non-qualifiable,

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[17] Refer *Understanding the Genome*, compiled by George Olshevsky, New York, 2002; "The Human Genome", *Science*, 291:5507, Feb 16, 2001; *Science – Pathways of Discovery*, edited by Ivan Amato, New York, 2002, pp. 57-72; and http://www.ornl.gov/sci/techresources/Human_Genome/home.shtml

[18] R. D. Fleischmann et al., "Whole-Genome Random Sequencing and Assembly of *Haemophilus influenzae* Rd," *Science* 1995, 269, 496–512; and "Genome Sequence of the Nematode *C. elegans*: A Platform for Investigating Biology," The *C. elegans* Sequencing Consortium, *Science* 282: 2012-2018 (1998).

[19] Genomes data are publicly available and can be viewed at http://www.ncbi.nlm.nih.gov

[20] "Dialogue on Life and Its Origin", T. D. Singh and Werner Arber, *Savijnanam – Scientific Exploration for a Spiritual Paradigm*, the Journal of the Bhaktivedanta Institute, Kolkata, 2002, vol. 1, p. 8.

[21] Dr. W. French Anderson is the Director of Gene Therapy at the University of Southern California's medical school where he also serves as Professor of Biochemistry and Pediatrics. A preeminent researcher in the field for more than two decades, he presided over the first experimental treatment of a human in 1990.

spiritual part of us that makes us uniquely human." "We do have a religious, a spiritual aspect to our being. This would be difficult to quantitate, but it exists."[22]

According to Vedanta,

$$\text{Human Person} \neq \text{Human Body or Human Genome}$$

but,

$$\text{Human Person} = \underbrace{\text{Human Body}}_{\text{(Gross Body)}} + \underbrace{\text{Mind, Intelligence \& False Ego}}_{\text{(Subtle Body)}} + \text{Spiriton (life particle)}$$

Let us briefly outline some of the bioethical issues confronting us:

3. Some Bioethical Questions Raised by Biotechnological Advancements

3.1 Test Tube Baby and Embryo Transplants

When a woman's ovum (egg) is fertilized in a test tube by a male sperm and the resulting embryo is implanted in the womb of a mother, a baby born out of this process is called a test tube baby. The first 'test-tube baby,' Louise Brown, was born on July 25, 1978 in Oldham, a town in Northwestern England, amid intense controversy over the safety and morality of the procedure.[23] The doctors in charge of this project were Dr. Patrick Steptoe, a gynecologist at Oldham General Hospital, and Dr. Robert Edwards, a physiologist at Cambridge University. Lesley Brown's pregnancy gave hope to hundreds of thousands of couples who were not able to conceive. Yet, even as many cheered this new medical breakthrough, others were worried about future implications, for it raised many ethical problems.

Some people object to the very principle of external fertilization on social and traditional grounds. There are doubts about the origin and procurement of sperm both in relation to the methods used as well as the concomitant risks. Some raise doubts about the eventual risks for the further development of the embryo. When does life begin? If human life begins at conception, are doctors killing potential humans when they discard fertilized eggs? (Doctors may remove several eggs from the woman and may discard some that have been fertilized.) Is this process a foreshadowing of what is to come? Will there be surrogate mothers? Was Aldous Huxley predicting the future accurately when he described breeding farms in his book, *Brave New World*?

This process will create ethical and legal concerns. Marriages will not be necessary for creating progeny. This can lead to a breakdown of society and family. Who is the

[22] Anderson, W. French, "Genetic engineering and our humanness," *Human Gene Therapy*, 5: 755-759, 1994.
[23] Steptoe PC, Edwards RG (1978). "Birth after the reimplantation of a human embryo". *Lancet* **2** (8085): 366.

mother? Of what nature will that baby be? What would be its feelings and affiliation towards woman who collects it? What kind of bondage will be there between the baby and the parents? A number of controversial cases have been reported. For example, in 2001, a French woman received worldwide publicity when she posed as the wife of her brother in order to give birth to a donor egg fertilised by his sperm.[24] Such actions cause great moral and ethical problems in the human society.

Vedanta recommends that human society should be trained in spirituality from childhood itself, and when persons grow up with spiritual conscience, many moral problems that face society today could be solved.

3.2 Freezing Human Embryos

Since the introduction of modern techniques of artificial fertilization, many difficult moral and spiritual questions regarding life have emerged. One of the most important questions in this regard is in connection with the preservation of human embryos.

When women opt for in vitro fertilization a number of eggs are collected from them although only one may be needed for producing a child; the unused eggs can be stored. This means that the surplus germ cells and embryos may be thrown away or preserved in a deep freeze for future use or used for research purposes. The freezing and storage of embryos entails a serious question about life and leads to many problems such as denying the human rights to the tiny child, or belittling respect due to a human being. It is deeply questionable whether the embryos should deliberately be placed in a situation where their natural development is suspended, and their lives and future development endangered. Many embryos do not survive the processes of freezing and thawing. Embryo freezing has also led to the problem of what is to be done with embryos whose parents cannot be traced.

3.3 Surrogate Motherhood and its Implications

Surrogate motherhood refers to the practice in which a woman (the surrogate mother) bears a child for a couple who are themselves unable to produce children, usually because the wife is infertile or unable to carry a pregnancy to full term. The surrogate is impregnated either through artificial insemination or through the implantation of an embryo produced by in vitro fertilization.

Surrogate motherhood is a service done for a fee. Wealthy childless couples are willing to pay large sums to a surrogate mother who relieves them of the ordeals of child bearing. Instances have occurred in recent years where surrogate mothers have refused to part with the child, after getting deeply attached to it having borne it within he womb for nine months. As a consequence, the natural parents institute legal proceedings for the recovery of the child. The most famous case of surrogacy was the Baby M case, in which the

[24] http://en.wikipedia.org/wiki/In_vitro_fertilization

surrogate mother refused to surrender the child she had born in 1986 to the child's biological father. In 1988, a family court in New Jersey awarded custody to the biological father and visitation rights to the surrogate mother.[25]

Children born out of surrogate motherhood can pose difficult legal problems cutting across laws of inheritance, adoption, vestings, rights, etc. The sanctity of marriage and its vows, the integrity of the family and the identity of the child are all affected. Above all these, the psychological and emotional difficulties encountered by various parties concerned are far too complex to fully record. Substitute motherhood reduces pregnancy to a mere mechanical function of production or fabrication and make it lose any symbolic value. Some other problems like the refusal to give up the child by the woman who bore it or refusal to accept the child by the parents who demanded this service, death of the parents, etc., are likely to arise.

3.4 Stem Cell Research

Stem cell research is a hot topic now. It is being discussed in magazines, newspapers, scientific conferences, books, television, top government offices and, of course, in research laboratories around the globe.

Stem cells are found in all major organ systems and allow the body to regenerate damaged tissue. These kinds of stem cells are known as adult stem cells. There are also the embryonic stem cells, which are cells of the newly fertilized embryo.

Embryonic stem cells have amazing potential because they can develop into any cell type. There are five potential sources of stem cells: (i) spare embryos left over from in-vitro fertilization procedures (ii) new embryos created in order to extract stem cells (iii) cloned embryos (iv) fetuses, and (v) adults. If embryos are to be used, then inner cell mass of an embryo is extracted. Stem cells are all that remain. The embryo is killed in the process. This raises many ethical questions including the right of the embryo to develop into mature adult, and belittling of human dignity.[26]

People differ on when exactly life begins. As mentioned before, according to Vedanta, life begins from the moment of conception. Thus, even zygote, though it has not developed into bone, skin, heart, liver and any of the other 216 cell types in the human body, is life and cannot be killed.

3.5 Cloning

Cloning, as discussed earlier, is another biotechnological tool which has raised serious concerns. The recent ban by the United Nations on all human cloning – therapeutic and

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[25] Steinbock, Bonnie. "Surrogate Motherhood as Prenatal Adoption." *Law, Medicine, and Health Care.* v. 16, no. 1 (1988). pp. 44-50.

[26] Holland, S., 2003, Stem Cell Therapy, **in** *Bioethics: a Philosophical Introduction*, Polity Press, Cambridge, U.K., pp 11-28.

reproductive – is demonstrative of this fact (reproductive – the cloning of a whole organism; therapeutic – the cloning of cells and even organs for transplant).

There are many potential uses of cloning, such as replacing organs or tissues such as new skin for burn victims, brain cells for those with brain damage, spinal cord cells for the paralysed and complete new organs (heart, liver, kidney and lungs) and so on.

However, there are various problems associated with cloning, such as (a) low success rate (b) may cause genetic defects (c) premature ageing (d) could be used to produce a class of dispensable soldiers or workers. For many, it has affected their conceptions of personal identity and individuality. But, as discussed in the second section, cloning has inherent limitations. It cannot alter a person's spiritual identity. The identical twins, though possess almost identical physical forms (genetic makeup), are actually completely different persons in their talents, interests, levels of intelligence and performance. Cloning cannot copy the spiritual nature of a person. A person is much more than his genetic makeup.

3.6 Hospital Ethics & Comatose Patients under Life Supporting Systems

Sometimes a patient in comma may be admitted to a hospital. In an attempt to help the patient, doctors may use life supporting equipments and they will administer medicines, etc., hoping that the patient may recover. Sometimes this involves to simply extend the lifespan of the comatose patient. This may lead to painful and expensive process to the relatives of the patient. Seeing that there is no hope of recovery, the patient's relatives may request the concerned doctor to remove all the equipments used for prolonging life of the patients who has no chance of recovery. However, the doctor and the hospital management may not agree fearing legal implications. Vedanta recommends that the relatives' of the patient should be permitted to make the decision in such a situation.

3.7 Euthanasia

The word euthanasia is derived from two Greek words – 'eu' (good) and 'thanatos' (death). So euthanasia means good or painless death. Euthanasia – intentionally terminating the life of a patient by a doctor – is subject to intense debate in many countries and communities all over the world. Sometimes called "mercy killing," it has raised many serious questions. Should doctors have the right to terminate the life of their patients? Is the right to 'choose' more important than the inalienable right to life? What does "death with dignity" really mean? What is the purpose of life? Is euthanasia a compassionate response to suffering?

Human life is not merely a physical and biological system. It has higher meaning and purpose. According to Vedanta, human life is the most important platform where one can inquire life's deepest questions – '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?' These are some of the basic questions that a human being can inquire. Thus killing oneself or another innocent person implies a violation of divine law, an offence against the dignity of human persons, a crime against life. The prohibition of euthanasia is based on an instinctive appreciation and profound reverence for unique human life. We will discuss more about it in the next section.

Most of the bioethical issues mentioned above arise because we do not have any spiritual dimension of life in our modern scientific framework. If life is merely a bunch of molecules, as chemical evolutionists claim, why do we need to bother at all about ethical issues? The very fact that humanity has such a serious concern for ethical issues points out that we are more than a mere physico-chemical combination. What are we then? What is a human being, or more fundamentally, what is life? What is life's meaning and purpose? Answers to these questions will be the key to resolve many of the bioethical issues raised above. The vast and rich wealth of profound insights contained in Vedanta can shed immense light on this in the dark and pivotal time that we are facing today.

4. Vedantic Conception of Life, its Meaning and Purpose

Life is a mystery. The best minds in the fields of natural sciences and philosophy have been trying to understand life from the dawn of civilization. However, they have been unable to come up with any clear definition and understanding of life. Even after three centuries of tremendous success which scientists have experienced in their scientific investigation, they still can't identify on *exactly* what it is that which separates a living organism from other types of physical objects.

The *Vedanta* speaks of fivefold *tattvas*, truths or realities. These are, (1) *Isvara* or God; (2) Life, *Jiva* or Soul; (3) *Prakrti* or Matter; (4) *Kala* or Time; and (5) *Karma* or Action. The author will try to briefly focus on the difference between life and matter. Vedantic thesis, in a nutshell, is as follows:

Life and Matter: Vedanta proclaims that life and matter are two distinct categories of reality. Besides the physical bodies shaped by genome, there is a spiritual particle of life or soul or spiriton in every living being. Our conscious experience or consciousness and free will are the properties of spiriton. Matter, however complex it maybe, can never be conscious. Life and matter can interact under the influence of time resulting in what we call embodied or biological life. God, is the origin of both. Matter is the insentient energy whereas life is the sentient or conscious energy of God. He is beyond the perception of the material senses.

Evolution of Consciousness: There are 8.4×10^6 varieties of life (microorganisms, plants, aquatics, birds, reptiles, animals, humanoids and human beings) and conscious self (or soul or spiriton) passes 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), until it reaches

the human form. In human form of life, consciousness is fully developed and one can inquire about the higher meaning and purpose of life.

4.1 What is life?

As indicated earlier, life according to Vedanta can be described in the following representation:

Living Being = *Genome* + *Mind, Intelligence & False Ego* + *Spiriton*

(Physical/ Material Body) (Subtle Matter) (Spiritual Life Particle)

According to Vedanta, the topmost scientific and philosophical treatise of Indian spiritual and cultural heritage, all living beings are animated by the presence of a non-chemical or non-molecular fundamental spiritual particle—"spiriton" (called *atman* in Vedantic terminology).

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. . . . we still don't know how the brain works. . . ."[27] Recently, Stephen Hawking also expressed in a lecture, "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."[28]

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 result in the formation of the whole body? Vedanta describes

[27] 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

[28] 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

that due to the presence of 'spiriton' the body is animated and active and undergoes six types of transformations.[29] It takes birth, lives for some time, grows, produces some offspring, gradually dwindles, and at last vanishes into oblivion.[30]

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.

Srimad Bhagavad-Gita mentions about 'spiriton' being different from matter as follows:

bhumir apo 'nalo vayuh kham mano buddhir eva ca
ahankara itiyam me bhinna prakrtir astadha
apareyam itas tv anyam prakrtim viddhi me param
jiva-bhutam maha-baho yayedam dharyate 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."[31]

According to Vedanta, the science of the soul or spiriton (*atman*) is the sublime essence of spirituality. The *Bhagavad-Gita* refers to this science as—*raja-vidya raja-guhyam pavitram idam uttamam pratyaksavagamam dharmyam su-sukham 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."[32] According to Vedanta, the ultimate purpose of human life is to find our real spiritual identity and our relationship with the Supreme. Thus, Vedanta strictly deals with life from a spiritual perspective and gives it preeminence over non-sentient matter.

4.2 Inquiry into the Prime Duty of the Human Soul

The first aphorism of Vedanta states: *athato brahma jijnasa*, meaning in the human form of life, one must inquire about the Ultimate Reality. In the human form of life, the consciousness *(cetana)*, intelligence *(buddhi)*, mind *(manas)*, senses *(indriyas)* are fully developed. Thus, human being is totally equipped to make the deepest *jijnasa* (inquiry), the spiritual inquiry. A similar message echoes in the statement of Albert Einstein who

[29] 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.
[30] A. C. Bhaktivedanta Swami Srila Prabhupada, *Bhagavad-Gita As It Is*, Bhaktivedanta Book Trust, Bombay, 1997, verse 2.20 purport.
[31] *Ibid*., verses 7.4-5.
[32] *Ibid*., verse 9.2.

states that knowing the plan of God is most important and the rest are details.[33] 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. *Isa Upanisad* further declares, *isavasyamidam sarvam,* 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.

Inquiry, *jijnasa,* is the fundamental quality of life. Everyone inquires about something or the other. In the course of life, one experiences different phases like old age, disease and many kinds of sufferings. Therefore, we want to find out the solution to these problems. Every research work is a kind of inquiry. Unless a person is awakened to the position of questioning his sufferings, he is not to be considered a perfect human being. Humanity begins when this sort of inquiry is awakened in one's mind. 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, *jivasya tattvajijnasa*. *Srimad Bhagavatam* (1.2.10) states:

kamasya nendriyapritirlabho jiveta yavata
jivasya tattvajijnasa nartho yasceha karmabhih

Translation: "Life's desires should never be directed toward sense gratification. One should desire only a healthy life, or self-preservation, since a human being is meant for inquiry about the Absolute Truth. Nothing else should be the goal for one's works."[34]

The ability to inquire about the ultimate truth of life makes the human being uniquely different from all other forms of life.

[33] R. Clarck, *The Life and Times of Einstein,* The World Publishing Co., New York, 1971, p.19.
[34] A. C. Bhaktivedanta Swami Srila Prabhupada, *Srimadbhagavatam,* Canto 1, Chapter 2, Text 10, Bhaktivedanta Book Trust, Bombay, 1992.

4.3 The Beginning of Life

Biological issues arise when interaction between life and matter begins. It is very interesting to note that there is a significant description about the science of embryology in Vedantic literatures. S*rimad Bhagavatam*, Third Canto mentions a brief description of human embryology. *Garbhopanishad,* one of the ancient Upanishads, also serves as a brief treatise on embryology. These are very relevant to modern science and technology.

According to Vedanta the manifestation of life begins from the moment of conception. Life first enters the semen of the male and is injected into the womb of a woman.[35] Dr. Jerome Lejeune,[36] known as "The Father of Modern Genetics," also echoed, “Life is present from the moment of conception” before the Louisiana Legislature's House Committee on the Administration of Criminal Justice on June 7, 1990. He explained that within three to seven days after fertilization we can determine if the new human being is a boy or a girl. "At no time," Dr. Lejeune said, "is the human being a blob of protoplasm. As far as your nature is concerned, I see no difference between the early person that you were at conception and the late person which you are now. You were, and are, a human being." He pointed out that each human being is unique – different from the mother – from the moment of conception.[37] A detailed description of the beginning of life and embryology is available in the ancient literature called *Srimad Bhagvatam*, the cream of Vedanta.[38]

Thus, since according to Vedanta, material life begins at the moment of conception, and life is sacred and human life is very rarely obtained, discarding the embryos at any stage after the moment of conception, in whatever form, is prohibited. The absence of bone, skin, heart, liver etc., in zygote does not imply that it is lifeless.

5. A Glimpse of Vedantic Spiritual Biotechnology

Besides embryonic details, the Vedantic literature also provides purificatory processes to obtain a good child and thus good population for peace and happiness of human race. We will briefly discuss this here. There is a purificatory process called *garbhadhana-samskara* for getting a good child. *Garbhadhana* Ceremony is a vedic ceremony of purification to be performed by parents before conceiving a child. It is said in *Caraka Samhita* that the mental condition of a child depends upon:[39]

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[35] *Aiteraya Upanisad* 2.1.1, *Aitareya Brahmana* 2.5.1 and *Srimad Bhagavatam* 3.31.1

[36] Dr. Lejeune of Paris, France discovered the genetic cause of Down Syndrome, receiving the Kennedy Prize for the discovery and, in addition, received the Memorial Allen Award Medal, the world's highest award for work in the field of Genetics. He died on April 3, 1994.

[37] http://www.prolife.com/FETALDEV.html

[38] A. C. Bhaktivedanta Swami Prabhupada, *Srimad Bhagavatam* (1987), Mumbai, Canto 3, pp.707-709, 712, 714, 733-734.

[39] R. K. Sharma and Bhagwan Dash, *Caraka Samhita*, Varanasi, 1992, Vol II, Verse 4.8.16, pp.470-471.

(a) the mental status of his parents at the time he is conceived
(b) the sounds heard repeatedly by pregnant woman (please note that many of the experiments by some of the leading scientists to study the hearing capabilities of fetuses confirmed that human babies have the ability to recognize voices and even poems that they first heard before they were born.) [40]
(c) the actions performed by the embryo in his previous life and
(d) the frequent desires for a particular type of mental faculty by the progeny in his previous life.

Therefore, before begetting a child, one has to sanctify his perplexed mind. If the mind of the father is not sober, the semen discharged will not be very good. By performing this Garbhadana ceremony, both the husband and wife become completely pure and sanctified and a good child will be produced. (For example, Rig veda X. 186 mentions two mantras to be repeated by bridegroom before conception). There are also the restrictions and precautions to be taken by the pregnant mother mentioned in the *smrti* scriptures of Vedic literature. In addition, there are various types of vows mentioned which one could observe before conception to acquire child of his desired special characteristics.

So in Vedanta, there are systems from the very beginning of the birth of human life for begetting good population. To take care of the child is the primary duty of the parents because if such care is taken, society will be filled with good population to maintain peace and prosperity of the human race. There are also various other types of purificatory ceremonies in Vedic literatures before and after birth but we will be not be able to go here in details.[41]

Vedanta proclaims that the problems of unrest, political, social, communal and even religious are all due to the lack of spiritual qualities among the people. It thus provides *varnasrama* system, the most scientific culture for attainment of spiritual life. This system consists of four divisions of occupation and four orders of human life for training and acquiring of spiritual qualities. The four orders of life as *brahmacari* (celibate student), *grhastha* (household life), *vanaprastha* (retired life) and *sannyasi* (renounced life) are to be followed by all, irrespective of the occupational division. Thus it will be very important to undertake scientific research how to have good children in the world.

Another beautiful practice in Vedantic tradition and culture is *dvija* – twice born. The mother and father give child only a physical birth, but the teacher or spiritual master gives him a real birth. That is why, every human child, according to Vedic culture, has a double birth, genetic and spiritual.

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[40] DeCasper, A. and Fifer, W., "Of human bonding: Newborns prefer their mother's voice", *Science* (1980), 208, 1174-1176; DeCasper, A., Lecanuet, J-P., Busnel, M-C., Granier-Deferre, C., and Mangeais, R., "Fetal reactions to recurrent maternal speech", *Infant Behavior and Development* (1994), 17(2), 159-164; Moon, C., Cooper, R. P. and Fifer, W. P., "Two-day-olds prefer their native language", *Infant Behavior and Development* (1993), 16(4), 495-500.

[41] For further reading, one can refer many texts published on this topic including, Rajbali Pandey, *Hindu Samskaras: Socio-Religious Study of the Hindu Sacraments*, Motilal Banarsidas, 1969 (reprinted 1998), Delhi.

Vedanta also mentions that everything belongs to God and one must not encroach upon another's share.[42] This understanding can guide one to not involve in unnecessary killing certain groups of trees, animals, birds, fish, and so on beyond the limits of his quota for food or self-defense. This will protect us from ecological disasters and various other problems.

6. Concluding Remark – The Role of Science and Religion Dialogue in Dealing with Bioethical Questions

Just like the use of nuclear technology, we are today at crossroads with biotechnology. If used without a careful thought, we may run the risk of damaging the most prized human life. Technical innovations and their possible repercussions, therefore, require deeper reflections on what it means to be human and what life is, its purpose and meaning.

It seems that biologists will have to change their views of life being comprised strictly of matter. Laplace also thought that the physical sciences of matter would be able to completely explain the Universe, but that view has changed. It seems that biological science is following the footsteps of physical science and will begin to see the need to include spiritual elements in the study of life sciences. As John Eccles, the Nobel Laureate in Medicine and Physiology remarked, "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."[43]

The treasure of wisdom hidden in the spiritual traditions of all humanity can provide significant help in this direction. According to all major religious traditions of the world, life is a divine gift and it should be protected and guarded under all circumstances. Hence, as never before, the increasing dialogue between science and religion has become much more important. It will certainly shed light to resolve many of the complex scientific, theological and bioethical questions.

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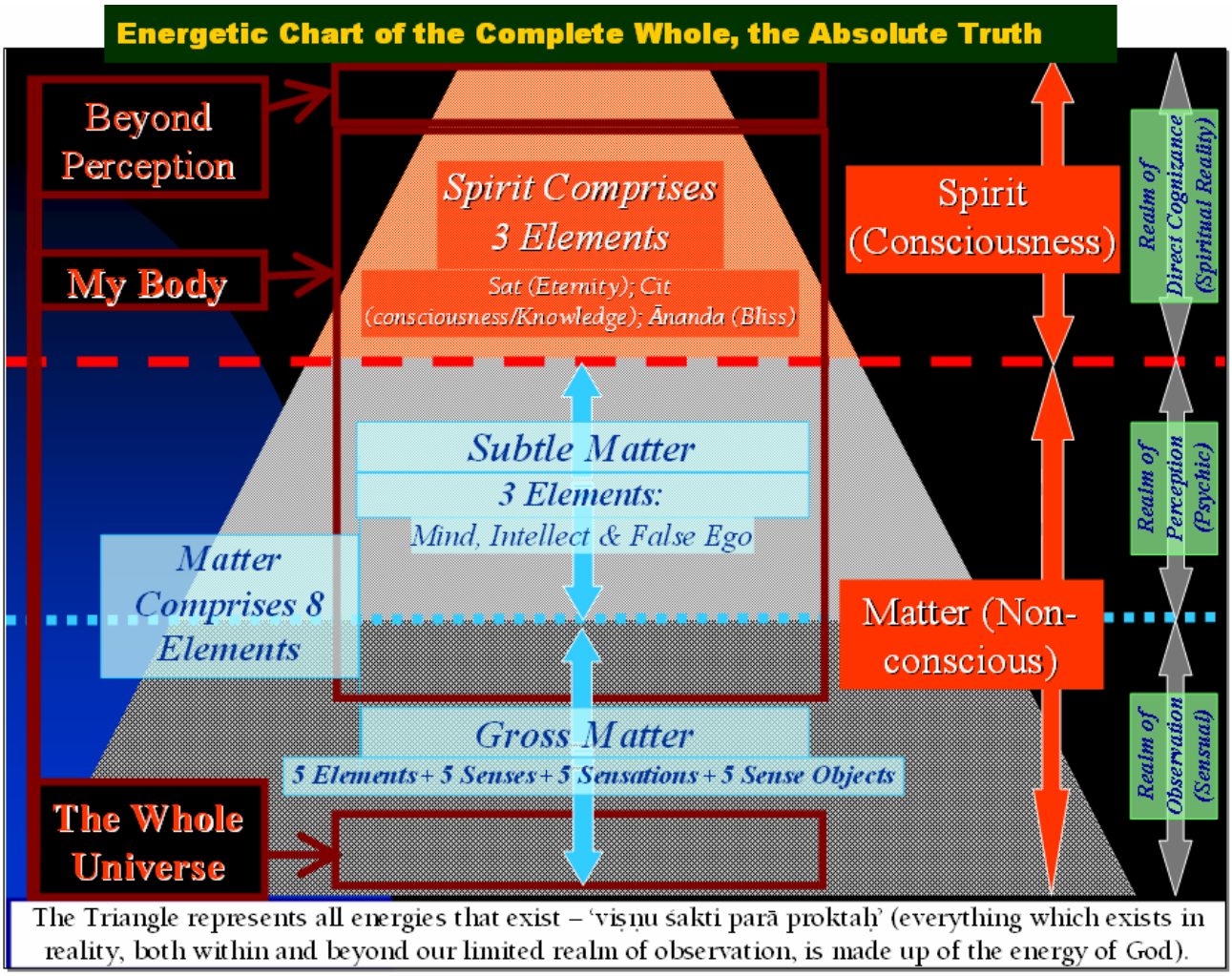
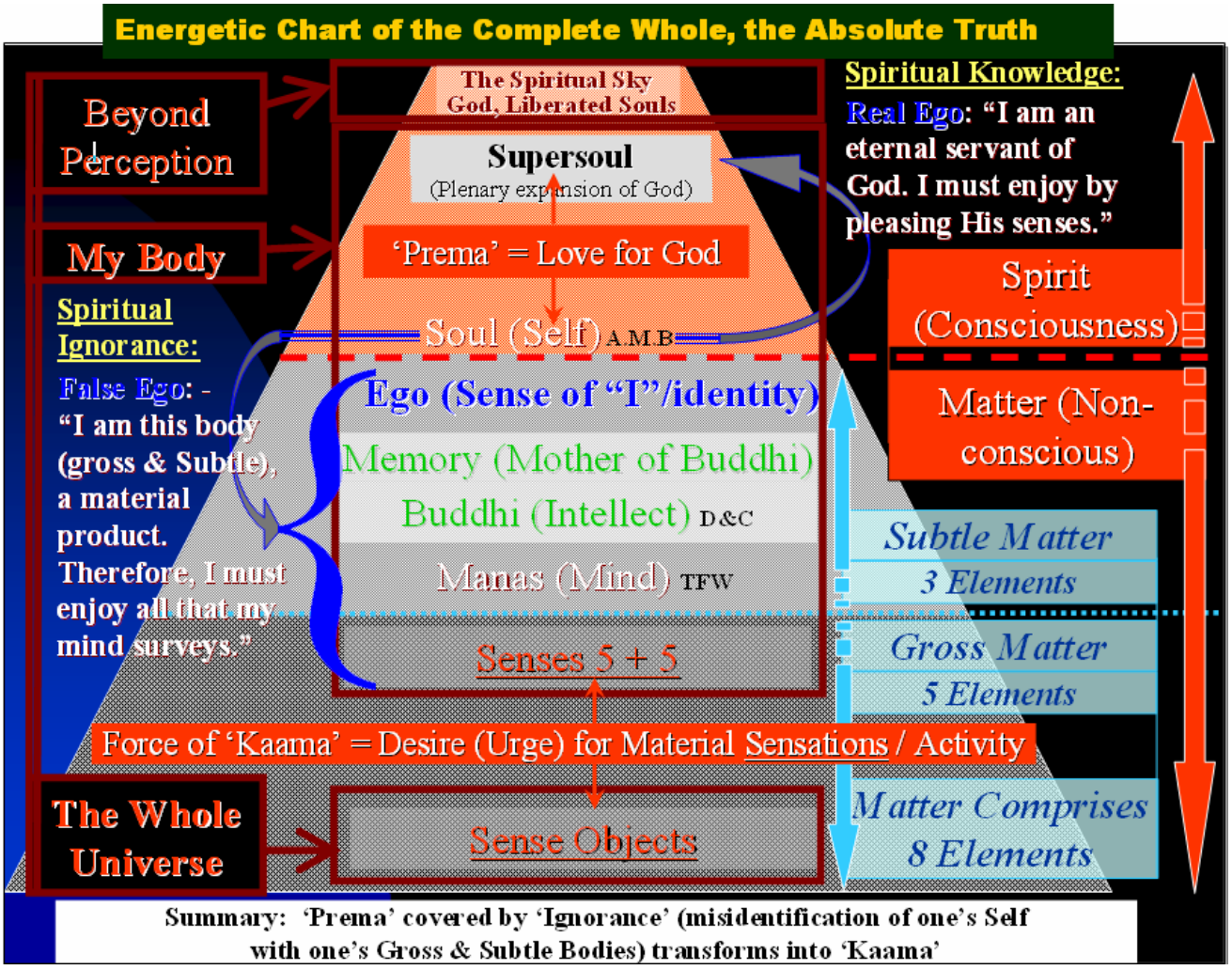
[42] *Isha Upanishad*, Text 1.
[43] John Eccles, *Evolution of the Brain: Creation of the Self*, New York, 1989, p.241.

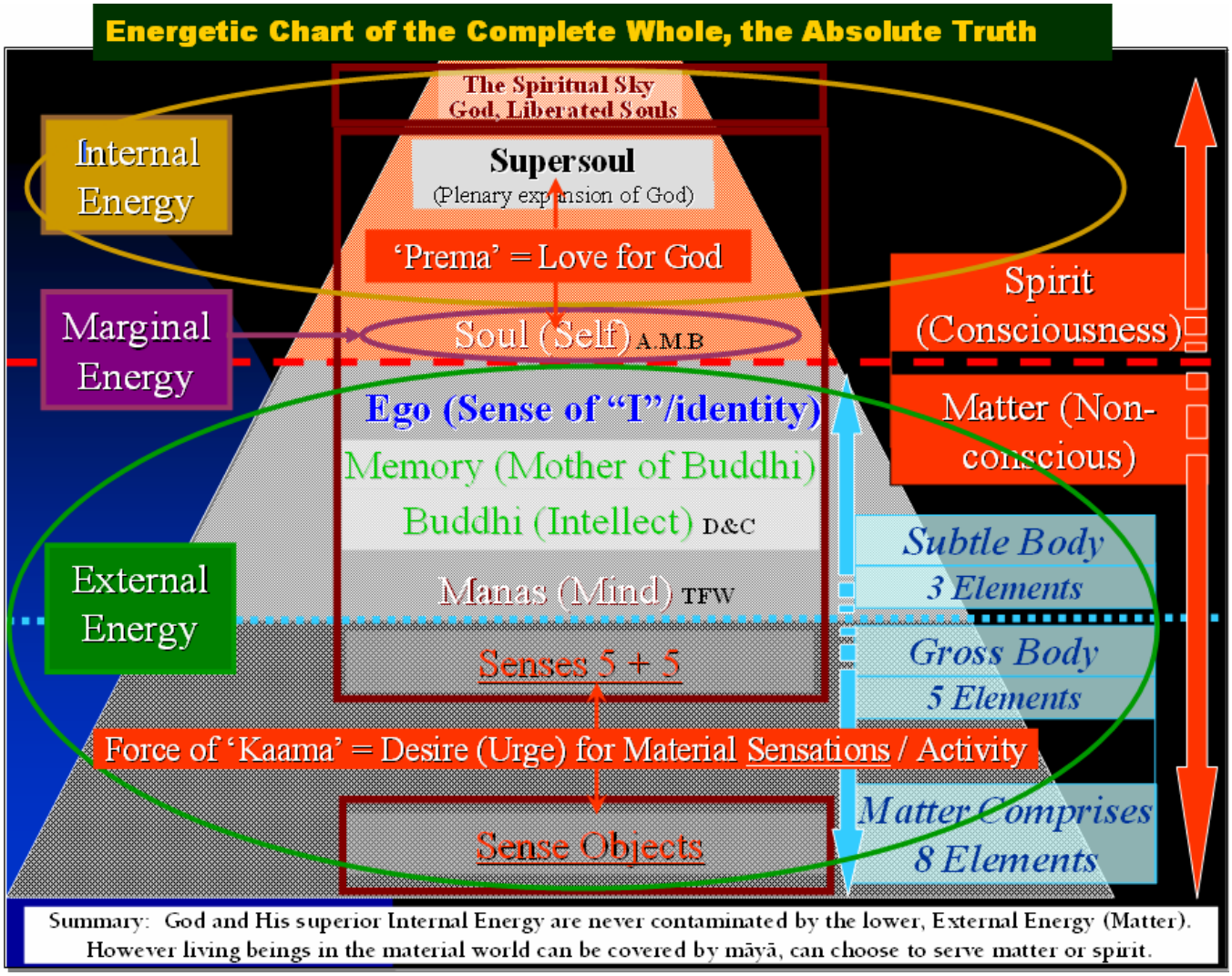
Annex 1


Energetic Chart of the Complete Whole, the Absolute Truth
Beyond Perception
My Body
The Whole Universe
Spirit Comprises 3 Elements
Sat (Eternity); Cit (consciousness/Knowledge); Ānanda (Bliss)
Subtle Matter
3 Elements:
Mind, Intellect & False Ego
Matter Comprises 8 Elements
Gross Matter
5 Elements + 5 Senses + 5 Sensations + 5 Sense Objects
Spirit (Consciousness)
Matter (Non-conscious)
Realm of Direct Cognizance (Spiritual Reality)
Realm of Perception (Psychic)
Realm of Observation (Sensual)
The Triangle represents all energies that exist – 'viṣṇu śakti parā proktaḥ' (everything which exists in reality, both within and beyond our limited realm of observation, is made up of the energy of God).

Annex 2


Energetic Chart of the Complete Whole, the Absolute Truth
Beyond Perception
My Body
Spiritual Ignorance:
False Ego: -
"I am this body (gross & Subtle), a material product. Therefore, I must enjoy all that my mind surveys."
The Spiritual Sky
God, Liberated Souls
Supersoul
(Plenary expansion of God)
'Prema' = Love for God
Soul (Self) A.M.B
Ego (Sense of "I"/identity)
Memory (Mother of Buddhi)
Buddhi (Intellect) D&C
Manas (Mind) TFW
Senses 5 + 5
Force of 'Kaama' = Desire (Urge) for Material Sensations / Activity
The Whole Universe
Sense Objects
Spiritual Knowledge:
Real Ego: "I am an eternal servant of God. I must enjoy by pleasing His senses."
Spirit (Consciousness)
Matter (Non-conscious)
Subtle Matter
3 Elements
Gross Matter
5 Elements
Matter Comprises 8 Elements
Summary: 'Prema' covered by 'Ignorance' (misidentification of one's Self with one's Gross & Subtle Bodies) transforms into 'Kaama'

Annex 3


Energetic Chart of the Complete Whole, the Absolute Truth
The Spiritual Sky
God, Liberated Souls
Supersoul
(Plenary expansion of God)
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Manas (Mind) TFW
Senses 5 + 5
Force of 'Kaama' = Desire (Urge) for Material Sensations / Activity
Sense Objects
Internal Energy
Marginal Energy
External Energy
Spirit (Consciousness)
Matter (Non-conscious)
Subtle Body
3 Elements
Gross Body
5 Elements
Matter Comprises
8 Elements
Summary: God and His superior Internal Energy are never contaminated by the lower, External Energy (Matter). However living beings in the material world can be covered by māyā, can choose to serve matter or spirit.