

# ***The Serpent and Its Tail: the Biological Basis of the Religious Impulse***

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## ABSTRACT

Throughout the ages, people of all creeds, backgrounds, and cultures have dedicated their lives to search for a higher reality where the visionary experience of Cosmic Consciousness brought about through mystical union, is part of an inner process which may lead to enlightenment. Traditions in India hold that this urge to find the truth involves awakening kundalini energy. In its dormant state, this serpent energy is said to lie coiled up at the base of the spine. In search of a biological basis of the religious impulse, we look at early embryonic human development, which is seen as being guided by higher cosmic forces. On approximately day 30-33, the human embryo begins to grow a tail, which then disappears. The corresponding development of the heart during this phase resembles that of reptiles. Linking the time lapse between the formation and absorption of the tail with an increase in voltage between the tail and the head suggests that on intake, the increase in charge could result in the potential at the base of the spine where it lies dormant until used either for procreation or reverse itself up to join the cosmic source from which it originated. To further our understanding of kundalini energy and its connection to light, we also consider these terms from various perspectives, including quantum physics.

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## I. INTRODUCTION

“If we want to solve a problem that we have never solved before, we must leave the door to the unknown ajar.” Richard P. Feynman

This paper is an attempt to show that there might be a new avenue from which we can begin to understand the origin

of the religious impulse. I take the view that information gained through studying the literature of spiritual traditions of different cultures is a consistent and epistemologically valid approach if we want to discover more about the spiritual dimension of human nature [1]. I also hold that the autobiographical data of people who have undergone the inner journey can help us understand not only the nature

of these expanded experiences but also our fundamental nature and the nature of Nature. In this article I look at certain concepts that appear in the literature of many spiritual traditions and to clarify them, I present information from different unrelated scientific disciplines to see if there might be some scientific evidence through which we can better understand the terms. I aim to throw more light on the biological basis of mystical experiences of saints and sages of all cultures throughout the ages both in the East and in the West. In doing this, I hope to reduce the conflict between different religious traditions and creeds as well as decrease the tremendous gulf that presently exists between science and religion.

Here I use the term 'religious impulse' to refer an impulse which impels people to actively begin to engage themselves in an inner search for a higher truth regardless of the faith they might or might not profess and also regardless of the methods they might use.

Nature is a grand mystery and how we approach it will determine what we see. There are two main ways of exploring the nature of reality and discovering its laws, the "outside in" perspective and the "inside out" perspective [2]. Science uses the first approach, which is based on our senses or extensions of them and then speculates about what they have found using inductive and deductive reasoning. These suggestions or hypotheses then undergo scientific testing using the scientific method.

People known in India as philosophers, yogis and seers, explored and still explore reality today from the "inside out position". They too want to know the nature of Nature, but not only know about it but experience it for themselves. They felt that if they knew their own nature, they would know the nature of the Universe [3], [4]. The theories based on these explorations are often

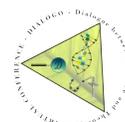
couched in mythical terms where certain names give us clues to the underlying reality that is being described.

One of these theories that have found its way into the scientific realm is the *kundalini*. It is associated with a serpent, and the word is derived from the Sanskrit *kund*, "to burn"; *kunda*, "to coil or to spiral". It is considered as the primordial energy, which in its dormant state, is coiled at the base of the spine in the area of the sacrum [5]. The meaning of this triangular shaped bone in Latin is holy or sacred. In Greek, it was called "Hieron Osteon", meaning "burning bone". The Egyptians also held this bone to be very valuable and considered it the seat of special power" [6].

The serpent power of the *kundalini* system is also recognized by other traditions such as that of the pre-Colombian Mayan cultures where the feathered visionary serpent was known as the deity Quetzalcoatl. The visionary serpent was seen as creating a "center axis", which permitted communication between the spiritual world and the earthly plane [7. p. 68]. An interesting analogy to this can be found in yogic science, they talk of three channels or *nadis*, the *ida*, the *pingala* and the central *Sushumna*. Although there are discrepancies in the literature regarding whether the *ida* and *pingala* are nerves or 'channels of energy' which represent dualistic qualities in nature, most schools agree that they need to be brought into balance for the energy to move up the central channel known as the *Sushumna*. The primary channel mentioned in Yogic science seems to coincide with the central axis mentioned in pre-Colombian Mayan cultures.

In the Greek tradition, we find a similar idea:

The caduceus, the wand of Hermes, with two intertwining serpents crossing each other to form three circles, symbolizes the dynamic circulation of fundamental male and



female energies and the three separations and unions that are part of the alchemical work in creating a sacred marriage. This healing and awakening rod has the power to reconcile conflicting elements and forces into a more inclusive harmonious state and support the transition of the soul into the domain of sacred wisdom. In physical terms...the shaft of this staff represents the spinal cord (the central axis of the nervous system and the path that generate sexual energy takes to the higher centers of the heart and the head. [8, p. 114].

Experiences that can be compared with the spiritual awakening are also “found in the liturgical descriptions of revered mystics of all three Abrahamic monotheistic traditions” [9, para. 3]. In the Gospel of John [10, 3:14–15]<sup>1</sup> there is an interesting comparison made by Jesus when he says “As Moses lifted up the serpent in the wilderness, even so, must the Son of Man be lifted up”, indicates that Jesus is talking about the *kundalini* system. In the mystical traditions of the Jewish, Christian and Islamic faiths we find respectively the Kabbalah, Christian Mysticism and Sufism, each of which has variations and adaptations that I shall not go into here. However, what distinguishes them is that they were secretive or esoteric traditions where God or the Absolute is revealed through undertaking certain spiritual practices.

To talk of mysticism in the Buddhist tradition is somewhat more complicated, and there are variations between the schools. The idea of union with a Higher Being or Absolute is absent in Theravada tradition, but they do talk of liberation or Nirvana as being the ultimate goal [11]. To get to the liberated state, they too undertake spiritual exercises but in this article, I shall not be looking at methods used by any

1. for varying translations of the original verse see <https://biblehub.com/john/3-14.htm>

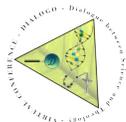
tradition, but paint our underlying biological nature using a very broad brushstroke in which I adopt a multidisciplinary approach.

Although Jung [12] gave a series of lectures on the *kundalini* in 1932, the term entered mainstream science mainly through the framework of the yogi and mystic Gopi Krishna [13] who popularized knowledge about it in the West. His claim that the energy behind the *kundalini* experience has a biological basis has opened an investigation into its nature from biological and psychological perspectives, and now there are numerous publications from a variety of viewpoints. This article is from yet another perspective where I suggest there is a physiological underpinning to this system, which is also energetic.

In spite of the fact that Dixon [5] feels that it is unfortunate that the *kundalini* has been associated with symbols such as the serpent as “non-awakeners might relegate it to the mere physical domain”, in this article I look for the physiological basis of the *kundalini* system and its association with the serpent precisely because a demonstrated physiological connection to this primordial energy would give support to the hypothesis that there is an underlying biological basis for the religious impulse.

For supporting evidence, in section A I look at our embryonic development and the different phases the embryo undergoes. In section B, I consider the terms light and *kundalini* energy from different spiritual and scientific disciplines, including quantum physics.

In this article, I am using the term *kundalini* to understand our underlying biological nature rather than drawing our attention to any specific method. I must also make it clear that there are methods for spiritual awakening that neither explicitly nor intentionally involve awakening the *kundalini* energy. Like a flower opening slowly, awakening can occur naturally



following certain practices, which do not bring any trauma to the person.

## II. BACKGROUND ASSUMPTIONS

This article rests on assumptions that are only slowly beginning to change in science today, the main one being that consciousness is primary and not just a product of the brain. This is consistent with classical Indian spiritual perspectives such as found in the Upanishads [Sen in 14]. I also follow Arka [3] when he adds “consciousness manifests itself through physical matter ...can take any form or shape and can emerge under challenging life conditions.... is mainly a non-physical yet powerful entity that is the pivotal point of all life and activates the senses in every living being. It is highly responsive and expressive and activates many levels, especially in humans” [3, p. 37].

In the life sciences, materialistic scientists consider living organisms to be the sum of their parts. However, the view taken here is that “it is the appearance which changes not the essence. . . . In the desert of modern day thought life, it is the embryo which cries out that wholeness comes first in living nature. . . . There is an endless series of differentiation, following one another over time, creating the organs and the different parts of the body, it never happens the other way around! [15, p. 37].

The assumption that consciousness is primary and is an inherent and ubiquitous property of living matter is now being supported by evolutionary biologists of the 21<sup>st</sup> Century such as Shapiro [16] who points out that “molecular biology has identified components of cell sensing, information transfer, and decision-making processes. In other words, we have numerous precise molecular descriptions of cell cognition” [16, p. 24]. According to Bhakti Niskama Shanta [17] “biology cannot avoid intelligence and

creative tags” [17, 2<sup>nd</sup> heading]. For Arka, awareness pervades itself “inside and outside of every cell, a mother like awareness of intelligence which prompts everything that happens biologically, psychologically, emotionally, or in any other way [S. Arka, personal communication in 4, p. 103].

## III. THE KUNDALINI SYSTEM: A MULTIDISCIPLINARY PERSPECTIVE

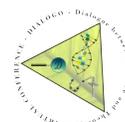
The intention of this article is to learn more about the *kundalini* system and its biological basis, which Gopi Khrisna [13] claims is underlying not only the ‘religious impulse’ but also the impulse that guides intellectual activity. It is also to discover more about the relationship between light, energy and the *kundalini* system. To aid in our understanding, I take a multidisciplinary perspective. Where appropriate, information from various spiritual traditions are interspersed with scientific insights within the narrative to highlight their view on the topic.

### A. Embryology

This section is divided into three sections. In the first, I consider what guides the structure of the human body, in the second, I consider the morphological ontology of the human embryo and in the third, I present the problem of the ‘serpent’s tail’ and a hypothesis regarding its solution.

#### 1) Structure of the human body:

Blechs Schmidt [17] questions the theory that the structure of the human body is based on information contained in the genes. “As each cell is equipped with identical genes, the genes themselves would have to know by themselves on the basis of information how, where and what differentiation should occur, in each split second, in every part of the organism,



during the whole of organism's life" [18, p. 16]. Based on this, he suggests the "form of the organism differentiates under biodynamic forces, not chemical-genetic information" [18, p. 18]. This does not mean that genes do not have a role in creating a form; it just means that they are not the only force at work. "The genetic substrate is itself a dynamic structure and functions as a co-participating member in an organic whole" [19, p. 7]. Environmental factors also have a role in molding forms both positively and negatively, as we know from congenital disabilities. Although it would be interesting to know how the biodynamic forces, genes, and environmental forces interact, what interests us here are the biodynamic forces mentioned by Blechschmidt [18].

a) *Biodynamic forces:*

In accordance with my assumptions, I suggest that these biodynamic forces can be considered an expression of one overriding Higher Intelligence. This Intelligent Awareness probably organizes itself into different forces to govern its creation. In Indian philosophy, this primary force or Intelligence is seen as dividing itself into three main forces: creation, maintenance and destruction; popularly known as Brahma, Vishnu, and Shiva. In Biology, we talk of anabolism, metabolism and catabolism. It is these forces that are behind the development, maintenance, and destruction of the material or physical body of living organisms, including cells; all of which are in a state of dynamic flux [19].

2) *Morphological ontology of the human embryo:*

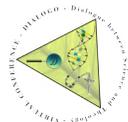
Van der Wal [14] is one of the few embryologists who see the morphological ontology of the human embryo as consisted of four distinct phases, the mineral, plant, animal and a fourth human phase. What concerns us here is on day 17, when the heart *primordium* starts pulsating, the

plant phase is over and one can behold how instead of growing upward, the heart tube doubles and moves toward the interior of the organism. At the beginning of this phase, intangible pulsation becomes tangible. Without pulsation, there would be neither a dynamic universe unfolding itself in time through 'matter', nor an individual being or soul unfolding itself in time through 'matter'.<sup>2</sup> Van der Wal [15] identifies this as the animal phase and during it the structural development of the organism as represented by cardio morphology and the formation of the vertebral column, recapitulates the evolutionary history from worms to fish to reptiles to mammals, and invertebrate to vertebrate forms; an evolution that occurred over millions of years [20], [4].

Curiously the human embryo at this stage first resembles that of a worm with its flexible notochord; then it grows pharyngeal arches, which later disappear. On approximately day 30-33, the human embryo begins to grow a tail which consists of five or six extra somite pairs. Between day 40 to 44, these somites then disappear. The corresponding development of the heart at the onset of this phase is said to resemble that of reptiles and amphibians [19].

At an estimated postfertilization age of approximately 49 days, the embryo now has a more human-like appearance where the anatomical-morphological development of the human embryo permits it to unfold. The ability to come upright permits the center of gravity in humans to be inside the body. In contrast to animals and primates, this allows humans to experience a center inside of themselves. This is also reflected in the concept of self [15].

<sup>2</sup> "Pulsation is the underlying core principle and property of universal existence, cosmic existence, and local existence [Arka in 3 pp. 87]. Regarding the relationship between the Self, soul and pulsation see [3].



a) *The Fourth Human Phase:*

Although humans and animals share some characteristics with animals such as 'innerness', ontologically van der Wal [15] identifies a fourth human phase. For him, it is the capacity to become upright or vertical that distinguishes humans from animals. In humans, at the end of the 4th week, a new impulse starts with the elongation of the brain, which is accompanied by certain characteristics including the appearance of the neck as the head grows cranially away from the trunk. The balance of the head on the trunk is "balanced in turn by the lower extremities" [15, p. 49] which shifts the center of gravity, which is on the outside in animals to the inside in humans. This allows the human to move in a unique way, which is not shared by other animals such as penguins and kangaroos. Even though the center of gravity in apes inclines slightly to the front and to the back in marsupials; essentially the center of gravity of animals is outside and draws the animal toward the environment and earth [15]. For van der Wal, one of the characteristics of the human being is that the anatomical-morphological formation is also reflected in the organization of our self-concept, 'I am.'

When we look at the center of gravity (COG) a little closer, we find it is a "hypothetical point at which all the mass appears to be concentrated (and from which) gravitational forces appear to act on the entire body from this specific point" [21, p. 152]. The anatomical center of gravity (COG) in a standing human being is located anterior to the second sacral vertebra on the midline [22] with slight variations between males and females. Although this author has not found reference to this by embryologists, the absorption of the extra somites on between day 40 and 44 which developed in the human embryo round about day 30-33 and formed a tail, would be one of the factors which helps

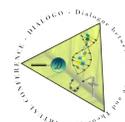
the human to adopt an upright position where the anatomical center of gravity is inside. However, it not the only condition for uprightness in humans to occur for other species like the great apes also do not have a tail.

b) *Primal streak and notochord:*

In reptilian avian and mammals, the primal streak is a structure that forms in the blastula stage and creates the left-right and future cranial-caudal body axis which is situated on the dorsal (back) face of the developing embryo [23]. The primal streak also has a relationship with the notochord [24] which starts to form on day 17, the same day as the heart primordium starts pulsating. The notochord is a rod-like structure and is the progenitor of the backbone or vertebral column, and like the heart, it is made of mesoderm or "inner" tissue. During a process known as neurulation, the notochord influences the ectoderm first to form the neural plate, which then folds in on itself to form the neural tube [24]. Closing of the neural tube proceeds in a zip-up action from day 20 to day 25 when the anterior neuropore closes" [25, p. 13]. The tail fold takes place later than the head fold and results from the dorsal and caudal growth of the neural tube [26, para. 2]. On day 26-28 the caudal neural tube now closes at the level of somite 31 or where the second sacral segment will differentiate [24, p. 13]. As pointed out earlier, in humans, 42-44 somite pairs are formed along the neural tube, ranging from the cranial region to the embryo's tail. These are described as mesoderm blocks or balls. Several caudal somites pairs are then reabsorbed which is why only 35-37 somite pairs can be counted in the end.

3) *The Problem of the Serpents tail:*

The connection between the reabsorption of the somites or 'tail', which initially grew when the heart morphology



in the human embryo resembled that of reptiles and amphibians and the *kundalini* system is a mystery that needs to be solved. The absorption of the somites suggests that there might be a physiological basis for the *kundalini* system, at least from the perspective of Einsteinian science where all matter is really energy. As energy cannot be destroyed, the disappearance of the tail does not mean a disappearance of the energy of which it was composed. However how the reabsorbed tail is associated with a primordial energy or power that is said to rise for enlightenment to occur needs an explanation

a) *The electrical basis of the body 'plan':*

Based on the work of Harold Saxon Burr in the early nineteen thirties in Yale University, it seems there is an electrical basis to the body plan in animals. Burr established that salamander eggs showed differing voltage around the "equator of the egg relative to the vegetal or south pole of the egg" [27, p. 58]. Using microsurgical instruments, Burr was also able to demonstrate that the point of maximum voltage in the unfertilized egg would, after fertilization, correspond with the salamander's head and the place of minimum voltage would develop into the salamander's tail. This voltage increases steadily after fertilization and throughout the development of the embryo. It seems that the "bioelectric field found in the unfertilized egg can be seen as a blueprint for a future location in the space of a polar relationship between the cranial and caudal end of the physical body of the future organism" [4, p. 70]. Working with Hovland, Burr [28] extended his investigations to frogs and chicks and came to the conclusion that electro-dynamic fields provide the missing irreducible relational factor required to account for the organization of the physical-chemical constituents of living organisms where the "potential gradients also are associated with the development and differentiation of the

nervous system" [28, p. 255].

b) *The Stored Potential or Power at the Base of the Spine:*

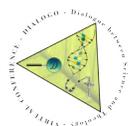
Although this author has not found references by embryologists, it seems there is a relationship between the primal streak and the later developments briefly described here and the metaphysical electrical force discovered by Burr [3].

As the voltage between the cranial and caudal extremities accompany and even precede the organism's biochemistry and patterns of organization, it appears we can talk of an *unseen, metaphysical or primal force* that guides the formation of the body plan. Holding that Burr's findings in other species apply to the human ovule, after fertilization the voltage between the cranial and caudal extremities would also increase in voltage as the embryo develops.

Now *the absorption of the tail takes on new relevance. We have a system that, according to Burr's findings is increasing in voltage as it matures. This voltage is linked to the head-tail relationship. Yet in the human embryo, the tail, which corresponds to an earlier developmental phase, disappears about ten days later. However, energetically this does not mean that the increased energy that occurred as the organism matures, disappears. This suggests that the energy corresponding to the increase in voltage that is now not accompanied by its physical manifestation, forms a stored potential or power at the base of the spine, just like that is described in the spiritual literature of India.*

c) *Membrane Potential:*

It is not only in the ovule that there is a difference in potential, but biological cells show a difference in potential between the interior and exterior of the cell, which is known as the membrane potential. This potential varies between cells but for resting cells is about -70mV. When an active stimulus is applied, if a certain threshold is



obtained, depolarization occurs where the membrane potential can rise to + 30 mV. This then drops again during the repolarization passing the resting membrane voltage phase resulting in hyperpolarization from which it returns to the resting stage [29].

As there is a difference in potential between the interiors and exteriors of every living cell, their summation would increase the overall voltage of the living being as it grows. This summation would be registered as a negative quantity in normal resting organisms. In the resting state, the negative pole of each cell would need to correspond to the direction of the negative pole found at the caudal or tail end of the organism otherwise charges between cells would cancel each other out.

d) *Batteries, potential and living organism:*

Burr's findings suggest an interesting analogy between the bodies of living organisms and a battery.

The term 'voltage' in a battery refers to the difference in electric potential between the positive and negative terminals of a battery (where) a greater difference in potential results in a greater voltage. Electric potential means the difference in charge between two points—in this case, the two terminals of a battery. One is positively charged, and the other is negatively charged. A negative charge simply means that there is an excess of negatively charged particles, or electrons, on the terminal, while a positively charged terminal has a lack of those electrons. Physical separation of the two terminals prevents the electrons from traveling from the negatively charged terminal to the positively charged one. Once the two terminals are connected, via a circuit, for example, the electrons are free to travel along the path of the circuit, moving from the negative electrode to the positive one. This motion of electrons is called electric current, which is measured in amperes, or amps" [30, para. Physics and Terminology].

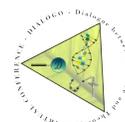
I shall come back to this analogy in our discussion, as it is relevant to what happens in spiritual awakening.

B. *Light, Kundalini, Cosmic Consciousness, Energy and Science*

To understand the connection between the *kundalini* system and light, I give a brief overview of how light is perceived in some spiritual traditions and how kundalini energy is described by some people. I also clarify who undertakes the spiritual journey, and I give an account of an experience of spiritual awakening and what distinguishes transient and lasting experiences of illumination based on a suggestion by Krishna [31]. I then turn to consider two components of Universal energy, where I bring in insights from Quantum Physics.

1) *Spiritual traditions and Light:*

The metaphor for Brahman/God/Divinity in many spiritual traditions is light. The process leading to cosmic union is also often referred to as 'enlightenment'. Light is used literally to refer to the perception of light as well as metaphorically when it refers to an increase in our understanding of consciousness. In the Bhagavad Gita of the Indian tradition it says "That ultimate truth is declared as the illuminator of all that illuminates, beyond the darkness of ignorance, residing within the heart of everyone, it is comprehensible by the wisdom gained from realization by the knowledge of direct experience" [32, chap 13, verse 18]. In the New Testament John [10, 1:5] says: "God is light." Goethe's insight that the physical eye had evolved "so light could see and not the reverse. Light is what gives us our sense of luminous reality, a cosmos whose divine purpose is made visible" [Goethe in 33, p.xix] seems to illustrate this last idea well. Sometimes the light is referred to in a more cryptic or esoteric fashion such as the "burning bush" in the Jewish tradition when Moses ascended Mount Sinai. Equally, the famous Sufi poet Rumi asks, "We live in the night's ocean, where are those lights?"



[33, p.xviii] The phrase of Jesus “if thine eye be single, thy whole body shall be filled with light” [34, 6:22] also seems to have an esoteric meaning, which points to the non-dual cosmic experience sometimes referred to as Christ Consciousness or Cosmic Consciousness although some traditions distinguish between the two terms [35].

a) *Kundalini and psycho-spiritual energy:*

Kundalini is conceived of as psycho-spiritual energy, which is said to rise from the base of the spine as a man or woman begins to evolve his or her consciousness. This invisible energy is vital and intrinsic to all life, and it can be used for procreation, or it can rise up the spine giving personal insights into his or her nature. “Kundalini is a microcosmic manifestation of the primordial Energy or Shakti. It is the Universal Power as it is connected with the body-mind” [36, p. 264].

According to Krishna [31] once awakened this process is continuous, although most people are probably not even aware of it. Different people describe the system differently as not all people start the journey with the same level of conscious understanding about their nature [31].

Some people connect the chakra system with the kundalini system. The idea of the chakra system entered India’s sacred texts between 1800 and 800 B.C” [37, p. 30]. However, not all saints, sages, yogis, and philosophers talk of the chakra system, but they do recognize an increase in their way of understanding as they progress on their inner journey. It appears that unless the person overcomes the limitations of his or her own consciousness, the energy does not continue up the spine. More information about the chakra system is not presented here, as it is marginal to the overall perspective adopted in this paper.

“Kundalini has been described as liquid fire and liquid light and is an aspect of Shakti,

the divine female energy and consort of Shiva. The ultimate outcome of kundalini is the union of Will (shakti-kundalini), Knowledge (prana-kundalini) and Action (para-kundalini). The inner fire is the most potent of all forces, for it knows no limits and penetrates the fabric of space, matter and time” [5, abstract].

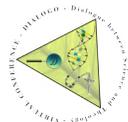
b) *Who undertakes the journey to Cosmic Consciousness?*

Before we can understand the full extent of expanded cosmic awareness, we also need to clarify who undertakes the journey. Arka [38; 2] identifies the part of the individual who undertakes the inner journey as the “I awareness,” “I ego conscious awareness,” or “I ego awareness” [38]. The “I awareness” is the pivot of the memories which form into a personality. We recognize this as a consistent personality from the day we become aware of our presence. “With the development of ‘I ego awareness’, a time arises when we want to touch the origin of consciousness expressing itself through the human body” [Arka personal communication in 4, p. 147]. In the journey to Self-realization, Arka [3] talks about the need of the person to reverse all that has happened to him or her.

c) *Cosmic Consciousness and the kundalini:*

The connection with the light and spiritual awakening is exemplified by Gopi Krishna’s introduction to the kundalini that he describes as a totally unexpected event where he nevertheless still managed to keep his mind on the point of concentration.

I felt the point of consciousness that was myself growing wider surrounded by waves of light. It grew wider and wider, spreading outward while the body, normally the immediate object of its perception, appeared to have receded into the distance until I became entirely unconscious of it. I was now all consciousness without any outline, without any idea of corporeal appendage, without any feeling or sensation coming from the senses, immersed in



a sea of light simultaneously conscious and aware at every point, spread out, as it were, in all directions without any barrier or material obstruction. I was no longer myself, or to be more accurate, no longer as I knew myself to be, a small point of awareness confined to a body, but instead was a vast circle of consciousness in which the body was but a point, bathed in light and in a state of exultation and happiness impossible to describe. [13, p. 4]

This experience of Krishna's was not the end of his journey but the start and he continued to undergo a process that enabled Spirit to take up residence in his body more fully. This can be highly traumatic for the person who is often not aware of what is happening although he or she is fully conscious. In Krishna's case, he conceived of this energy as an intelligent force over which he had little control and which was responsible for the evolution of the consciousness in humans. Based on his experiences, he felt that this force, once awakened, needed to reorganize and transform the nervous system, hence his emphasis on the brain and nervous system in his writings [13], [31], [39]. He believed that his experience began a process where his nervous system as a whole was slowly being reorganized and transformed by the *Kundalini* energy.

From reading other accounts, I feel this force will also reorganize and transform each person's body according to his or her past patterns. In Krishna's case, it was nerves that needed reorganizing, whereas, in Swami Muktananda [40], his spiritual experiences were initially related to changes in his physical body. Changes certainly take place, but I do not think the specific changes can be generalized from person to person. In general, it seems that changes take place not only in the consciousness of the person but in his or her physical body, including the brain. Many saints and sages also talk about the activation of the genitals during *kundalini* experiences.

Cosmic Consciousness is also known

as *Samadhi*, the breathless state, and it is during this state that the person is able to experience the all-knowing Cosmic Intelligence that is pervading and ruling every atom. The mystical experience or *Samadhi* denotes the entry to another dimension where the intellect is inoperative, and the object world dissolves into an ocean of being [39, p. 21]. The conscious experiences reported by people who have undergone a near-death experience share several characteristics with the *Samadhi* state [41].

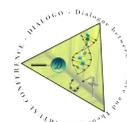
#### d) *Transient and Lasting Experiences:*

The experiences of lasting ecstasy accompanied by various clearly defined characteristics seem to be what distinguishes the transient experiences from the fully enlightened state. Indian authorities agree on the following list. However, it is in their interpretation that there are variations between traditions and philosophies.

- inner music and light,
- a feeling of expansion in which consciousness assumes a cosmic proportion,
- spontaneous happiness, welling up from within,
- a sense of kinship to or identity with an infinite sovereign entity, beyond comprehension,
- the mirage-like appearance of the objective world,
- conviction of immortality,
- a sense of highly extended knowledge,
- extrasensory experiences and the rest. [39, p. 71]

#### 2) *Universal Energy:*

In the ultimate, both (organic and inorganic) spring from and are two aspects of the unmanifested Creator. At the time of the manifestation, duality comes into being. Universal Consciousness and Universal Energy. Universal Energy is subdivided into two parts, the living *prana*, i.e., *Shakti* or life energy, and the mechanical matter. Universal Consciousness always remains unaffected and unchanged. The individual



soul is a tiny reflection of it, like the reflection of the sun in a dewdrop. By the power of higher *prana* sent up by *Kundalini*, this reflection becomes brighter, and then the man or woman is illuminated. [31, p. 30]

Some people from different philosophies and traditions might not agree on the terms used by Krishna in this account. It would also not be agreed on by biologists who have discarded the idea of life energy in their models. However, it provides us with a working hypothesis regarding the nature of reality. It also gives us a visible image of how Krishna views the relationship of the soul to the sun after the cosmic experience has been obtained. It is in this latter aspect where people of different philosophies might also differ in their interpretations, but that is beyond the scope of this discussion.

### 3) Universal, Cosmic and individual levels:

I propose we look more seriously into the suggestion of Krishna [30] about the nature of reality consisting of Universal Consciousness and Universal Energy where Universal Energy is “subdivided into two parts, the living *prana*, i.e., *Shakti* or life energy, and the mechanical matter [31, p. 30]. This division of Universal energy into two can also be seen as holding on the individual level. Normal healthy human beings are able to experience their individual consciousness, and they take their thinking mind conscious as being the only consciousness that exists, ignoring the fact that there might be other levels. Arka [3], in his theory of the Six Main Levels of Consciousness, identifies Pure Consciousness as corresponding with the sixth level. Many people also identify themselves with their material body. Some traditions consider we are really souls living in a body, but we are not the body. This suggests that we might really be cosmic beings and as such, our consciousness also corresponds to that realm. It is here that there are differences between traditions

that recognize the existence of a soul or self and those that do not. However true spiritual searchers want to go beyond what is believed and what others say so they can discover and experience their true nature for themselves.

#### a) Matter, vibrational energy and quantum physics:

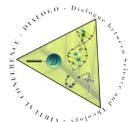
As we have seen Universal or Cosmic Energy can be divided into life or living energy and matter.

In the light of quantum physics, we do know something of the world of matter, at least at its microcosmic level. On this level, it seems that atoms, which make up “matter”, can be seen as consisting of largely empty space where the atom is comprised of smaller building blocks and more empty space permeated by fields. In this field of empty space, the atom continuously absorbs and emits the light or vibrational energy. According to Planck, this vibrational energy operates in a completely different way to the old mechanical view for in the microscopic world, changes are seen as being discrete, i.e., “quantized,” rather than continuous [42]. This was found to apply to electromagnetic energy, light, energy, and changes in orbits of electrons. So, from Krishna’s hypothesis, it does seem at least at its most basic microscopic level, the matter may be considered as a small part of Universal energy.

#### b) Life energy or living energy and spiritual awakening:

By dividing Universal Energy into two, Krishna [31] opens the possibility that life energy might operate in different ways to the vibrational energy associated with the microscopic world of matter. It is also possible that these two “energies” have different functions.

*Kundalini* energy falls under Krishna’s category of Life force or living energy and it seems it has various functions and



can operate differently under different circumstances.

c) *Functions of kundalini energy:*

The following points make up a tentative list of some of its possible functions:

- From spiritual literature, it appears that under normal circumstances, life energy is responsible for procreation.
- Life energy is considered to be associated with our psycho-spiritual development, and as such, it can be seen as being related to the evolution of our consciousness.
- When 'awakened,' this energy can be turned around and rise up the central channel. Under certain circumstances, this energy can ascend up one of the side channels, but that also is beyond the scope of this paper.
- As the spiritual path is said to reverse of all that has happened to the person, this energy may transform all in its wake until this spiritual cosmic energy is able to more fully express itself in the body
- It may transform the nervous system and brain and possibly other physiological aspects of the individual.
- In some people, spiritual awakening is accompanied by psychic abilities and other paranormal abilities.
- When awakened it may lead the practitioner to the experience of Cosmic Consciousness.
- Through the action of this energy, which can either be short or prolonged over the years, transient awakening experiences may be transformed into lasting ecstasy accompanied by various clearly defined characteristics of the fully enlightened state.

d) *Speculation on how kundalini energy operates:*

It is in considering how this energy might function the analogy of the body as a battery takes on a new meaning. In the human body (and other organisms as well) the caudal end of the body is negatively charged and the cranial end is positively charged. Like with a battery, a negative charge simply means

that there is an excess of negatively charged particles or electrons on the terminal, while a positively charged terminal has a lack of those electrons.

As pointed out, on activation by a stimulus scientists have found that cells within the body change from a negative to positive charge provided the stimulus is above a certain threshold. Activated cells then return to a negative resting state after going through a hyperpolarization phase. It seems possible that collectively the human body might act in a similar way to a stimulus as a single cell. In other words on stimulation, it might go from a resting state of negative potential to a positive depolarization phase and then back to the resting phase after going through hyperpolarization state. Provided of course the stimulus is high enough.

However, in the case of the human being the absorption of the tail adds a new dynamic to the picture, as we have energy that exists as a potential. It seems that under certain circumstances, this potential enables a connection between the negative and positive terminals of the battery, which then allows the energy to flow from the negative caudal pole to the positive cranial pole.

If the energy goes straight up, it gives the person a transient enlightening awakening experience like Krishna had. However, for more lasting experiences and full illumination, this energy needs to continue to operate over time and undertake some of the previously mentioned functions. Krishna states that once started, it does not stop, although it may bring the person "back to a normal state until the system is able to maintain the flow of prana to the brain continuously" [30, p. 48]. Based on his own experience and what he has read in books, Krishna maintains this energy also needs "feeding" - in the literature it says the person needs to eat a "light meal every

three hours” [12, p. 21] He also suggests that in men, the *kundalini* system uses the life energy found in the person’s semen to help in the transformation process [12, p. 36]. We can only presume women’s ovules play a similar role. Obviously, all these points need to be researched to fully understand the necessary conditions for the energy to keep flowing continuously.

Based on these insights, the following hypothesis seems to follow naturally:

*It is hypothesised that as in a battery, under certain circumstances the potential at the base of the spine can be activated which enable a current to run between the negative caudal pole to the positive pole in spite of the two poles being separated by a distance. Under certain circumstances, this current can operate in a permanent way.*

Fundamental to this analogy of a battery is that a battery needs a “source of energy” for it to function. Likewise, a body needs a “source of energy” for it to function. “Universal prana (living energy) is beyond the imagination of human beings. In its original state, it is a living substance of tremendous power. Humans live as it were, on the fringe of universal prana. That is, they are pervaded only by a slender beam of Universal prana. In the awakened man or woman, this beam becomes a little stronger. [30, p. 29].

e) *Other factors related to the kundalini system:*

According to van der Wal [14], the ability of humans to come upright is what distinguishes them from other animals. This ability is related to having the anatomical center of gravity inside which is anterior to the second sacral vertebra. The sacrum vertebrae fuse to form the sacrum when the person is about 18 years old. As pointed out earlier, the caudal neural tube closed at the level of somite 31 or where the second sacral segment will differentiate, and the sacrum

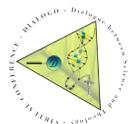
is referred to as the sacred or burning bone. The person experiences experiences of tremendous heat with an awakened *kundalini*, but how these factors fit together is another mystery that still needs to be explored. Suffice to say; this topic might touch on the interrelationship between energy mass and gravity. These terms and their interrelationship are also baffling to scientists in spite of them having equations which have been proven to work.

f) *Methods for spiritual awakening:*

I shall not say much about different methods here but just reiterate that there are many different spiritual methods to reach the enlightened state where no emphasis is placed on activating the kundalini system per se. It can be also active spontaneously, without the person using any method. Krishna [13] lists “concentration, breathing exercises, postures, prayers, fasting, asceticism and the like” as some of the methods used from “time immemorial for gaining visionary experience or super sensory perception” [13, p. 45]. To this, we can also add being enraptured with the object of one’s attention. The latter can either give rise to the saint or the man or woman of genius, as Krishna [13] suggests in his writings.

#### SUMMING UP

This exploration into the biological basis of the religious impulse has led us down different pathways where the disappearance of the serpent’s tail during our embryonic development plays a key role in helping us realize there is an energetic underpinning to matter. On absorption of the tail, it seems that some of this imminent energy converts into a potential, just like the ‘coiled by serpent’ described in the spiritual literature of India. It is this potential that seems to be behind the religious urge in people to find the truth about their existence.



This biological urge can also be seen as being present in scientists as they too actively engage themselves in a search for the truth regardless of the faith they might or might not profess. Whereas they rely on using their senses or extensions of them, they too have a method. However, their findings are limited to information obtained through their rational minds and there is no way they can irrevocably confirm their explorations. In spite of these limitations, quantum physicists have come to realize that at its most fundamental level, the object world of matter dissolves into an ocean of being – “where the field is the only reality” [Einstein in 43, p. 319].

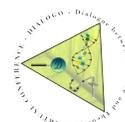
Mystics also have an urge to search for the truth, but instead of looking for it outside in matter, they search for it inside, using their own body as an instrument. From accounts of mystics, saints and sages throughout the ages both in the East and the West, it seems Nature has not only blessed humans with the capacity to know the truth, but experience it as well. The successful searcher is gifted with an experience known as Cosmic Consciousness whereby they able to experience an expanded state of awareness which allows the person “to gain access to both the trans-temporal and the trans-spatial plane, imperceptible to the normal mind [39, p. 25].

In this article, I have applied the analogy of a battery to the body, which requires that the negative and positive terminals need to connect for the current to run between the two poles. At the bodily level, this might be a good analogy for not only is the *kundalini* energy said to rise in the body, but also practitioners claim they are able to experience it ascending the spine. However, this analogy does not explain the conscious experiences of awakening. For this, we need to turn to levels of mind where the person undergoes an inner process, which includes ever-changing conscious experiences

involving new insights and understandings. In some, this search eventually leads to the experience of union with their Cosmic origin beyond the time-bound material world of matter. Without going into any detail here, in commentaries on the Vedas there are three different accepted philosophical understandings regarding this state: *Advaita*, *Dvaita* and *Visishadvaita*. However, in spite of these understandings being different, there is a great degree of tolerance and respect between people holding these varying positions [44].

Although we all have the potential to experience the higher states, we do not all have the same level of conscious awareness. The work of raising our conscious awareness is up to each and every one of us, depending on how we choose to live our lives. Selfishness, egoism, greed, vanity, pride, jealousy and anger constrict the heart and thus prevent the energy from rising higher in the body. The highest ethical standards also need to be maintained for success on this inner journey. In the end, we can only work at transforming ourselves instead of trying to transform others. Rather than arguing about which religion is the best or even which Saint or sage is more important, it is suggested here that each one of us unfold the potential we all have and work in raising our conscious awareness as much as we can while we are still alive. All true traditions lead to the same goal.

When scientists realize that the urge that impels them to look for the truth is the same as that which impels the mystic, they might also feel inspired to not only know the truth but also experience it for themselves. When this happens I, among others, am sure science will progress at a much greater rate than it has up to now. Hopefully, this will also have an impact on the followers of the different religions as once they realize there is an underlying potential in each of us to search for a higher truth regardless of



the faith one might or might not profess, each one can honor their own faith without trying to impose it on others. In this regard, we can learn from scientists where people of different faiths work hand in hand to discover the truth as they see it.

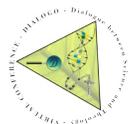
Although I have not talked about spiritual methods here, the easiest path is the path of *Bhakti* or love. The path to the mystical union is not a purely physical undertaking. It needs our full engagement and this is easier when our emotions are involved. Love is based on respect and without respect for oneself and for the self of others the spiritual path cannot unfold. Without love we cannot weave the world into a garland of oneness— a united field where each living being is fundamental to the whole; the cosmic vision made manifest on the earthly plane.

#### ACKNOWLEDGMENT

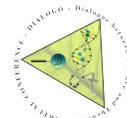
I am very grateful to the many people who have aided my understanding concerning this topic, especially to the philosopher and yogi Srinivas Arka who inspired and encouraged me to think, feel, and see things in their true perspective, through science, logic, and intuitive experience. This article builds on a section of my PhD. thesis in the field of Consciousness Studies at the University of Professional Studies, Hawaii.

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Peace Through Heart-Based Meditation on the Self”; “Emotions Including Anger, Bodily Sensations and the ‘Living Matrix’”. The name of her thesis is “Unlocking The Secrets of the Heart Through Meditating on the Self.” Her research interests involve finding out about the connection between the heart and different levels of Consciousness. Her research papers are available on Research Gate [https://www.researchgate.net/profile/Tina\\_Lindhard/research](https://www.researchgate.net/profile/Tina_Lindhard/research)

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