

# Live and die - develop a mind within, while living, using which one learns to create ideas, functional systems, and knowledge; and die later, when the mind ceases to be present

## Abstract

A few primary questions that are related to human life are about their purpose and significance, which differentiate it from other forms of life. An equally important question has always been about the nature of termination of life, which we call death. Most of the human beings used to believe that their life would continue even after death either in the heavens or a hell. Several of them still believe that this may happen, as life is a form of energy, which would continue its presence and capabilities with force forever, which cannot be dispensed or reduced to nothing. On the other hand, they do not entertain the same ideas about continuance of life in other biological or animal forms.

Electromagnetic and related energy forms may function as a physical force or drive, which may have a natural presence, and which man has learnt to produce through physical and functional arrangements. They have also learnt about the presence of such force in the nature-universe, as a natural physical force in the universe, despite the absence of any living force within the nature. The most adventurous states of life are achieved by dedicating immense love to the presence of a superior force, which one believes to be present. One may have learnt to believe in the force and consider it as the supreme force of the universe, and remain highly devoted to that energy form, when the mental processing in that direction could yield almost everything a human being cherished to have in the related domain. The high drive and intense devotional affection may invariably help one carry out almost any difficult task of life, for achieving immensely enriching results. The new strength and feelings are essentially within the body and using the brain capabilities, which we call mental creations, which may become an overwhelming force and entity, surpassing the roles of a physical reality one may create. However, we still have no certainty or even clue if the life force is a form of such spiritual force or if it is only a unique physical force. What is important to know is that the presence of the exceptionally special capability for movements and for causing physical and functional changes, are capabilities present in all animals, whereas human beings could apply much higher intellectual or rational capabilities in their applications. They all need the same drive or force from the body-mind fuel for utilizing it for making movements or actions. Drive has been already identified as psycho biological source of energy or force needed for all movements, responses, and actions.

**Keywords:** psycho biological source, energy, brain capabilities, entity, emotional state, human brain, spiritual effect, body-mind fuel, physical and functional changes

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## Introduction

The brain has been the most important seat of mental processes, though various body parts are utilized by mental controls. Orbito-frontal cortical areas, Anterior Cingulate Cortex, Ascending Reticular Action (ARA) systems and several subcortical areas interacting with Orbito-frontal Cortex and ARA are involved in the initiation and control of the drive or arousal in man, which has been contributed and supported by several neurobiological and neurocognitive studies.<sup>1-19</sup> The genesis of the drive is in the Anterior Cingulate Cortex (Brodmann's area 24) projecting into the Ventral Striatum by connecting the Nucleus Accumbens and the Ventromedial aspects of the Caudate and Putamen.<sup>20-26</sup> Either of two opposite responses i.e. flight or fight therefore, may occur automatically, even without any

sensory perception or the awareness of their source, as explained in preattentive emotional<sup>27</sup> responses.<sup>28-30</sup>

The drive initiated is molded, cognitively processed and labelled by the higher cortical areas and their neurocognitive capabilities, which gives the drive state an emotional quality and label drawn, from the cognitive processes employed by the individual.<sup>31-33</sup> Several decades of scientific enquiries have helped to understand the shaping of drive as emotional state, by using the cognitive processing employed by an individual at a given time. The highest cognitive status given to the drive is that of affection, which could make one make any personal sacrifices and loss of gains in own life, whereas anger, hurt, losses, sadness and pain in life, etc. made the drive take one with negative emotional state and corresponding behaviour.

Emotional arousal serves as a drive for the initiation and maintenance of various actions and responses, which may also be cognitively processed and controlled (control of sensory-motor contacts with physical realities). Drive initiates actions and responses through the frontal-limbic system, when it reaches a Critical Activation Potential (CAP) level,<sup>34-37</sup> it initiates the motor potentials required for the generation of actions and responses. The origin of the activity is in the Anterior Cingulate Cortex (Brodmann's area 24), which projects into the ventral striatum connecting the Nucleus Accumbens and the Ventromedial aspects of the Caudate and Putamen.<sup>20-26</sup> Responses of flight and fight therefore, may occur even automatically, without their sensory perception of the external sources, as explained in preattentive emotions by LeDoux.<sup>28-30</sup> The Anterior Cingulate Cortex and the Orbitofrontal Cortex are known to play central roles in addictive habits, including drug abuse.<sup>31-33</sup> The preattentive emotions, related responses and their neurogenesis have been well established and understood by all brain-mind scientists, over several years.

The difficult to account capability of the brain is the presence of self-consciousness, mainly verbal self-awareness that one may develop when endowed with such mental processing. For several thousands of years, we believed that self-awareness or consciousness is a unique human-brain capability. Consciousness was considered a spiritual endowment, which has had its own universal presence, above and beyond the material world. The miracle became an immense functional capability of the brain, when it was discovered that the human brain has two centers, one engaged in encoding and expressions using language (the talking brain), and the other which monitors the expressed speech from others and within the self (the listening brain).<sup>39,40</sup> Monitoring own self constructed speech help one to become aware of own speech and the ideas encoded or created, which has been identified as self-awareness. Such self-monitoring is a basic capability developed within the brain with regard to all sensory-motor processing, as one could verbally describe almost all changes that occur within, which induce self-monitoring capability and self-awareness. Such self-monitoring is an important functional capability and failure of the capability will remove the self-awareness, when the individual would believe that the sensory-motor functions are externally induced without the involvement of own processing systems, which came to be identified as hallucinations.

### Being active and alive

Each one of us come to life for the works of two other individuals, a male and a female, who help pass on the life they possess, into a new human body biologically created by them. The newly born needs careful and continuous care with regard to inputs from the parents and any outside sources. The early years of development of the body-mind systems created and transferred from parents, and those which the growing child may search and find for utilization, as well as engage in further self-creations, with ideas and experiences one learns or acquires while growing. The general thoughts, which most of the people subscribe to are based on the belief that life has been initiated by another higher force of power, which also controls all the material world and forms of life in the universe. Human beings use their brain capability to conceptualize of power in different forms and shapes, as there is no reality verification of such higher force, though they may believe in it. It is the human logic which made it necessary and possible to take such leads, and develop the related beliefs in and about such spiritual force. The associated believes and faith were essentially mental creations, and occasionally based

on huge sacrifices, which some made because of love and affection to others, who shared same life styles, as well as lived with them with sufferings and pain. There were creations of highly logically assembled ideas too, from which complex functional systems could be evolved or created. Highly suggestive states of mind could be induced in individuals by the consumption of drugs and intoxicating substances, as well as by listening to ideas which help induce states of mind suggesting complex ideas and states of mind. Self-labelling using religious and cast identities helped individuals and their groups to form specific identities, and life styles, by which they could differentiate themselves as superior or inferior human beings, as well as make choices for engaging in loving or terrorist activities.

Self-monitoring within own brain leads to the generation of self-awareness, which is the most practical method of making own self-judgments of intentions, response choices and action proposals, which one could think over and make judgments, so that one could make appropriate decisions and adjustments to such intentions and planned actions. The cognitive judgments may be encoded connecting multiples of planned issues, intentions, or wishes by each person, with a final selection of a most favorable choice. The relationships and the outcome effects may be as planned or wished by one, and the required effects may be built through the connection of input-output relationships, and instant and gradual outcome effects one may wish to have across events, rest of individuals and the objects of the material world. Belief that one is alive because of presence of a driving force within, which may normally be continuously present, or for short period with or without causing or sustaining damage to own system, which may cause termination of own bodily functions, and the survival of the body in total or parts.

### Mental strength as spiritual power

A fundamental belief with most human beings always has been that of immense physical and psychological capabilities are being created by a supreme spiritual force, which also controlled the presence of life within the body. For years after the birth, a new born may remain experiencing pain and pleasure of the body movements, which may gradually transcend to mental satisfaction and achievements, or destructive effects of diseases on the body in parts or full. The nature of energy transmission within the system is for putting forth controls in the different body parts for their normal or unusual movements. The functions of the body organs are controlled by blood flow, and the supportive effects of the presence of appropriate neurochemical substances. The transient and continuous transfer of energy from these sources induces functional changes and may even result in inducing structural effects in the system. The capability that develops for making sensory contacts and their equivalent verbal commands, which could be further reassembled for the creation of newer meaningful effects, become the foundation of human creativity, for the assembly of newer physical entities with new functional relationships, which hitherto never existed in the nature or the world. The physical sensory-motor contacts enabled in man-made systems could facilitate the creation new manmade systems with new relationships, along with already existing natural systems. The capability to discover and create new ideas and functional systems allowed them to change the world, where they live, move around and the facilities they created for working and utilization in their world.

Living could become inspiring and exciting when one could carry on different works for the creation of new functional systems and utilization of those systems as part of life. On the other hand,

living could become non-inspiring, boring, and lethargic, when one cannot carry on with any creative missions in the life. This may be a typical animal model, when they carry on with routine animal models of living and interacting with own and other animal folks and the changes in the material world. The creativity developed in various fields of human interactions and behaviour lays the foundation for immensely independent activities, which could shape own life styles, as well as recreate the world one living, with newly discovered and created facilities. The shocking aspect is the fact these creative changes, other than the natural changes that may occur because of changes in the natural environment, are made mainly by a human brain. That the human brain centers could be utilized for encoding and its continuous self-monitoring would provide self-awareness of the encoded relationships created within, allowing extraordinary development of the human capabilities, which is called the mental capabilities, and which is present only within the human brain. As individuals could not rationally think of the development of a mind within the brain in the early years, people in the ancient times could only believe that the human body has been specially endowed with the mind, and they considered that the mind is independently present in the universe, which had been also inculcated into the human body. The extraordinary achievements acquired in life by the presence of functional capabilities, came to be identified as by the efforts of own mind and body, and what one may have learnt from other talented persons (their minds), all of which came to be identified as that of a universal force. Ancient and earlier people considered mind as an independent universal force, which could be shared by each person. One could influence the body of another, its functioning, etc., through suggestions which may affect the other person's mind. Human mind has been generally believed by people as dwelling not only in the brain, but also in the heart of an individual. People believed in their ability to directly interact with the minds of others and also believed in the ability to mentally influence their thoughts and decisions. Mind has been considered attached to the soul, which was believed to be serving the driving force of the individual. It was believed that each individual believed that each of them shared the soul, which was considered a universal force. What has been shocking and immensely powerful has been the psychological ability to institute controls in the brain and the body, through the mind or the suggestive effects of words and actions. This capability still exists and is functional in many human beings. Words and their meanings could influence the bodily functions of the one who has been receiving the words and the meaningful suggestions from the hypnotic effects of words.<sup>19-38</sup>

The hypnotic suggestions in an individual may easily produce recognition of suggested inputs and subjective experiences. Thus, one is capable of recognizing and experiencing realities different from their physical qualities, and lives in that virtual world. Once a person is used to living in the virtual world, one looks out for it and that alone becomes reality for him. However, these effects could bring about changes in the body-mind functioning, though it could never restore any major injuries or life back to the individual. This was still identified as an immensely enriched and serious mental effect, which came to be identified in the early stages (?) of the world, considered by many as spiritual effect, until later and recent years, when we started considering it essentially as a body-mind phenomenon, which later came to be identified and called as hypnotic effect. The hypnotic effects on body functions are still strange, and though they have been well established in several scientific studies and utility attempts. As functional enrichment may take place without any scientific supports,

the effect is considered in lighter sense, as mentally induced change, often without scientific basis and seriousness. Despite these, hypnotic interventions are still supported to be used as pure psychological method of treatments or intervention programs for the control of experiences of individuals. Hypnotic effects are often executed in a lighter and no challenging manner on agreeable subjects, mainly for exhibition of a psychological effect, and hence they are often taken lightly. We are yet to understand the true scientific nature of the transmission effects of the meaning of words, especially their effects on the bodily functions. What is surprising is that these psychological effects could be seen mainly on the bodily functions of one, who has heard and understood the suggestions and has faith in their effects. When present, the positive effects of the suggestions and their influence in affecting the bodily functions are very apparent. The mental effects of bodily functions have been innumerable from the ancient times, though the people who indulged in in such causes and effects believed for ages that it was a spiritual effect, until the hypnotic explanations were developed and were used for explanations. The numbers of people who are mentally prepared to accept the suggestions in this manner have been reducing, as scientific thinking and rationalization has become more popular, acceptable and effective for people. However, earlier, hundreds of years back, man had conceptualized strong social systems for their life practice, which allowed man to believe in, as well as, accept supernatural life systems, which they believed had a genesis either in heaven or hell. These proposals forced each man to accept a system which allowed him or her to become attached to the heavenly or opposite life styles, in which they believed for the purpose of sharing peaceful and happy life styles with the rest of those sharing the life.

### The genesis of mental processes

Mind is recognized by many as the functional system engaged in dealing with signals of information received in the sensory systems, and also through the system processing information through encoding. The sensory systems and the motor coming in contact with signals generate specific meanings of the signals received. The next level of knowing is the understanding of monitoring the self-encoded information, which produces self-awareness of the multiple responses and feelings in the person. The two-fold knowledge belongs to knowing or becoming aware of the presence of physiological and psychological changes occurring within oneself, whereas another method is to derive or create relationships using language and symbolic techniques, with which one becomes aware of the information or knowledge of the relationships which one has scientifically created. Mind could initiate any response or actions only if it is endowed with drive, which serves as the propelling force for the system. The drive within a living being is the most important and marvelous function, without which the living being cannot carry out any movements, responses, or actions, even if the body organs may keep functioning. The drive could affect the whole body and all movements are controlled by the drive, because of which we consider the drive as a life force. Drive came to be identified as the original functional outcome of the ARAS, producing wakefulness and awareness in the brain. Under the direct influence of this arousal and drive, all other major biological functions including wakefulness work. The subcortical initiation of the drive is an important necessity for the initiation of any voluntary action or response in an individual or living system. Individuals receive social conditioning of the drive so that they learn to initiate and use the drive for carrying out various actions and responses, which occur under the cortical controls of the brain. Socially initiated conditioning

may be controlled by several human factors, which control important socially relevant behaviour. The drive which propels movements and responses by an individual, is generally experienced as a driving force, contributing to the life and the strength of the systems, whereas we may also consider it as an essential psychobiological force needed for the maintenance of life of the organs, other than providing the drive needed for leading adventurous and tough challenges in life.

### Drive needed for initiation of actions - responses

An important requirement for initiating and carrying out actions is to define a purpose for the action, which would justify the need to utilize the drive and carry out sequences of actions, which would take the individual to specific goals in life. Drive is always shaped by the accompanying cognitive processes in the person. Love and devotion are two positive and generous emotional states with specific cognitive processing, which could derive high levels of positive drive for initiating actions/responses in a person, whereas drive derived by negative cognitive processing and labeling would lead to negative emotional and aggressive states of experience, as well as expressions. They are indeed bound to result in painful or self-distressing, as well as destructive actions. Drive pouring and fueling strong emotional forces is always accepted and appreciated by individuals, as the same could induce immense positive or negative action/response power in the individual. This is all the more so when the emotional state is shaped into love and devotion, when the drive strengthens the motivation of the individual and may initiate strong actions for supporting a cause, which one may consider spiritually and emotionally important for the self and others, as it may help other individuals, even if it brings back pain and suffering to the self. Unfortunately the same drive works which help them to use their drive in indulging in terrorization and harming others. Actions and responses do not initiate if the drive is nil or weak. Responses could be severely opposite to those with whom one may not agree with, and aggressive when the drive is linked to personal disagreements leading to dislikes and disapproval of the outcome. The drive builds up internally from the subcortical areas and it initiates motor system and motor responses from the cortical area. The genesis of the drive is well established by the presence of the Bereitschaftspotential,<sup>35-64</sup> which is a negative potential occurring almost 2 – 3 seconds before the onset of the motor response. When this potential reaches maximum value, it initiates the motor potential response from the motor cortex for carrying out responses and actions. The drive disappears after the death of each individual or living creator. One may succeed in genetically and behaviorally passing on some of own bodily and mental characteristics to one's child, when one are engaged in setting up a family with children. Every life comes to end, though some genetic transmission of certain features may happen, if the individual has offspring, which may often be a normal phenomenon, associated with every new birth. Death is a normal phenomenon, and there is no scope for one to live longer, though one may succeed in genetically transferring one's own personal qualities and functional characteristics to one's offspring in a distant period. However, we learnt about the genetic transfer of qualities at the biological level, we interpreted the similar findings as spiritual showers of good and bad effects to each. Death is an essential happening to each life; millions and more have lived and died, and it will keep on happening. There is no evidence of any power within human mind or similar thinking systems being continuously present in the universe, even though the encoded relationships may explain the tempero-spatial changes in the systems and functional occurrences

in the universe. We have never had any living system being alive for extraordinary periods of time, compared to their established regular life periods. Even those human beings who have worshiped their spiritual masters for ages, have passed away and died like all other living beings. However, man could conceptualize a powerful spiritual force, and strengthen their own mind with encoded spiritual and devotional ideas, attached with immense emotional strength. Death is a natural turn of event for every living being, though all those living may utilize the existing social functional systems and rational ideas, as well as create new ones, and continue their applications in their lives. Their lifestyles and ideas become examples for others, who are alive, and yet to be born, as they all could follow similar value systems and functional methods in their own lives. The first need for a newborn human being is to acquire the basic responses needed for a living being, especially for each to develop all sensory-motor capabilities, develop drive and the maintenance of the body systems by intake of food, psychomotor regulation of movements, and learning communication abilities. These are followed by development of cognitive processing and emotional abilities in the growing child, until the child learns to make wishful thoughts and plan a strategy for a purposefully working on creative development of a system. Death occurs to all living beings, which is a natural end of life or an alive body. Even a dead man may influence the living beings by the actions that he or she made or the ideas created while being alive. However, the dead person cannot continue to be part of any of those events that may occur in the world. There is no rebirth of any type or at any other time, death is a final event of life, for all persons or living beings. It is indeed worthy and totally meaningful for each individual to consider living for achieving the best happiness and satisfaction during the short span of life, that one would be alive.

Mental activity contributes to extraordinary creation of new relationships and ideas, which facilitate creation of new functional systems in the world. This extraordinary capability as well as the creations is possible only when they are mentally worked out. The emotional gratifications one may achieve through such creations are indeed extraordinary, despite the fact that the new mental creations may not always be physical realities. Death of the body indicates the cessation of the mind within, provided its ceased functions are resurrected by another active mind.

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### Conflicts of interests

The authors have no conflicts of interest to declare.

### References

1. Hayden BY, Platt ML. Neurons in Anterior Cingulate Cortex Multiplex Information about Reward and Action. *J Neurosci.* 2010;30(9):3339–3346.
2. Hallanger AH, Levey AI, Lee HG, et al. The origins of cholinergic and other subcortical afferents to the thalamus in the rat. *J Comp Neurol.* 1987;262(1):104–124.
3. Steriade M, McCarley RW. Brainstem control of wakefulness and sleep. NY: Plenum Press; 1990.

4. Steriade M. Grouping of brain rhythms in corticothalamic systems. *Neuroscience*. 2006;137(4):1087–106.
5. Gallopin T, Fort P, Eggermann E, et al. Identification of sleep-promoting neurons *in vitro*. *Nature*. 2000;404(6781):992–995.
6. Lu J, Greco MA, Shiromani P, et al. Effect of lesions of the ventrolateral preoptic nucleus on NREM and REM sleep. *J Neurosci*. 2000;20(10):3830–3842.
7. Steriade M. Grouping of brain rhythms in corticothalamic systems. *Neuroscience*. 2006;137(4):1087–1106.
8. Parvizi J, Damasio A. Consciousness and the brainstem. *Cognition*. 2001;79(1-2):135–160.
9. Saper CB, Chou TC, Gooley J. The hypothalamic integrator for circadian rhythms. *Trends in Neuroscience*. 2005a;28(3):152–157.
10. Saper CB, Chou TC, Gooley J. The hypothalamic integrator for circadian rhythms. *Trends in Neuroscience*. 2005a;28(3):152–157.
11. Saper CB, Chou TC, Scammell TE. The sleep switch: hypothalamic control of sleep and wakefulness. *Trends in Neuroscience*. 2001;24(12):726–731.
12. Saper CB, Chou TC, Scammell TE. The sleep switch: hypothalamic control of sleep and wakefulness. *Trends in Neuroscience*. 2001;24(12):726–731.
13. Saper CB, Scammell TE, Lu J. Hypothalamic regulation of sleep and circadian rhythms. *Nature*. 2005b;437(7063):1257–1263.
14. Saper CB, Scammell TE, Lu J. Hypothalamic regulation of sleep and circadian rhythms. *Nature*. 2005b;437(7063):1257–1263.
15. Jonathan RL, Roth T. Neurophysiology of Sleep and Wakefulness: Basic Science and Clinical Implications. *Current Neuropharmacology*. 2008;6(4):367–378.
16. Jones BE. Arousal systems. *Frontiers in Bioscience*. 2003;8:438–451.
17. Mukundan CR, Kamarajan C, Ajayan P, et al. Frontal Cortex and Recognition: Neurocognitive Findings of Hypnosis. *Indian Journal of Health & Welfare*. 2013;4(4):703–710.
18. Cummings JL. Frontal-Subcortical circuits and human behavior. *Arch Neurol*. 1993;50(8):873–880.
19. Cummings JL. Anatomic and behavioral aspects of frontal-subcortical circuits. *Ann N Y Acad Sci*. 1995;769:1–13.
20. Morris JS, Ohman A, Dolan RJ. Conscious and unconscious emotional learning in the human amygdala. *Nature*. 1998;4;393(6684):467–470.
21. Whalen PJ, Rauch SL, Etcoff NL, et al. Masked presentations of emotional facial expressions modulate amygdala activity without explicit knowledge. *Journal of Neuroscience*. 1998;18(1):411–418.
22. Ohman A, Soares JJ. Emotional conditioning to masked stimuli: expectancies for aversive outcomes following nonrecognized fear-relevant stimuli. *J Exp Psychol Gen*. 1998;127(1):69–82.
23. Windmann S, Kruger T. Subconscious detection of threat as reflected by an enhanced response bias. *Conscious Cogn*. 1998;7(4):603–633.
24. Decety J, Jackson PL. The functional architecture of human empathy. *Behav Cogn Neurosci Rev*. 2004;3(2):71–100.
25. Luu P, Posner MI. Anterior cingulate cortex regulation of sympathetic activity. *Brain*. 2003;126(10):2119–2120.
26. LeDoux J. Emotional networks and motor control: A fearful view. *Progress in Brain Research*. 1996;107:437–446.
27. LeDoux J. Fear and the brain: Where have we been, and where are we going? *Biological Psychiatry*. 1998;44(12):1229–1238.
28. LeDoux J. The emotional brain, fear, and the amygdala. *Cellular and Molecular Neurobiology*. 2003;23(4/5):727–738.
29. Mukundan CR. Brain at Work: Neuroexperiential Perspectives, Atlantic Publishers, New Delhi; 2015.
30. Mukundan CR. Emotion – The Driving Force, Red Shine Publication, Ahmedabad; 2017.
31. Mukundan CR, Ajayan P, Kacker P, et al. Violent Behavior: Absence of Social Conditioning of Drives during Neurodevelopmental Stages. *International Journal of Indian Psychology*. 2016;2(1):1–33.
32. Mukundan CR. From perception to thinking – Verbal adaptation in human brain. In: Isaac JR, Purendu H, editors. Proceedings of International Conference on Cognitive Systems, New Delhi, Allied Publishers, XXXIX –XIII; 1998.
33. Mukundan CR. Computed EEG in Schizophrenics. *Biological Psychiatry*. 1986;21(12):1225–1228.
34. Mukundan CR, Singh J, Ray RR, et al. Bereitschaftspotential in Alcoholics. *Biological Psychiatry*. 1986;21(11):1090–1092.
35. Khanna S, Mukundan CR, Channabasavanna SM, et al. Bereitschaftspotential in melancholic depression. *Biological Psychiatry*. 1989;26(5):526–529.
36. Kitamura J, Shibasaki H, Takagi A, et al. Enhanced negative slope of cortical potentials before sequential as compared with simultaneous extensions of two fingers. *Electroencephalography Clinical Neurophysiology*. 1993;86(3):176–182.
37. Kalivas PW, Volkow ND. The Neural Basis of Addiction: A Pathology of Motivation and Choice. *The American Journal of Psychiatry*. 2005;162(8):1403–1413.
38. Goldstein RZ, Alia-Klein N, Tomasi D, et al. Anterior cingulate cortex hypoactivations to an emotionally salient task in cocaine addiction. *PNAS*. 2009;106(23):9453–9458.
39. Mukundan CR. From perception to thinking – Verbal adaptation in human brain. In: Isaac, J.R. and Purendu, H. (Eds) Proceedings of International Conference on Cognitive Systems, New Delhi, Allied Publishers, XXXIX –XIII; 1998.
40. Mukundan CR. Power of Words: Neuro-cognitive Approach for Understanding Brain Mechanisms of Awareness. In: Sangeetha Menon, MG. Narasimhan, A. Sinha, & B.V. Sreekantan (Eds.), Scientific and Philosophical Studies on Consciousness. National Institute of Advanced Studies, Bangalore, India; 1999;127–136.
41. Mukundan CR. Brain Experience: Neuroexperiential Perspectives of Brain-Mind. Atlantic Publishers, New Delhi; 2007.
42. Mukundan CR, Sumit S, Chetan SM. Brain Electrical Oscillations Signature Profiling (BEOS) for Measuring the Process of Remembrance. *EC Neurology*. 2017;8(6):217–230.
43. Gruzelier JH. Frontal functions, connectivity and Neural Efficiency Underpinning Hypnosis and Hypnotic Susceptibility. *Contemporary Hypnosis*. 2006;23(1):15–32.
44. Deecke L. Cerebral potentials related to voluntary actions: Parkinsonian and normal subjects. *Clinical Neurophysiology in Parkinsonism*. In: Delwaide PJ, Agnoli A, editors. Amsterdam and Oxford, Elsevier;1985:91–105.
45. Deecke L. Bereitschaftspotential as an indicator of movement preparation in supplementary motor area and motor cortex. *Ciba Foundation Symposium*. 1987;132:231–250.
46. Deecke L. Electrophysiological correlates of movement initiation. *Review of Neurology*. 1990;10:612–619.
47. Deecke L. The Bereitschaftspotential as an electrophysiological tool for studying the cortical organization of human voluntary action. *Supplements in Clinical Neurophysiology*. 2000;53:199–206.
48. Deecke L, Kornhuber HH. An electrical sign of participation of the mesial supplementary motor cortex in human voluntary finger movement. *Brain Research*. 1978;159(2):473–476.

49. Deecke L, Eisinger H, Kornhuber HH. Comparison of Bereitschaftspotential, premotion positivity and motor potential preceding voluntary flexion and extension movements in man. *Progress in Brain Research*. 1980;54:171–176.
50. Deecke L, Eisinger H, Kornhuber HH. Comparison of Bereitschaftspotential, premotion positivity and motor potential preceding voluntary flexion and extension movements in man. *Progress in Brain Research*. 1984;54:171–176.
51. Deecke L, Heise B, Kornhuber HH, et al. Brain potentials associated with voluntary manual tracking: Bereitschaftspotential, conditioned premotion positivity, directed attention potential, and relaxation potential. Anticipatory activity of the limbic and frontal cortex. *Annals of New York Academy of Sciences*. 1984;425:450–464.
52. Deecke L, Heise B, Kornhuber HH, et al. Brain potentials associated with voluntary manual tracking: Bereitschaftspotential, conditioned premotion positivity, directed attention potential, and relaxation potential. Anticipatory activity of the limbic and frontal cortex. *Ann NY Acad Sci*. 1984;425:450–464.
53. Deecke L, Lang W. Generation of movement-related potentials and fields in the supplementary sensorimotor area and the primary motor area. *Adv Neurol*. 1996;70:127–146.
54. Libet B. Neuronal vs. subjective timing, for a conscious sensory experience. In: P.A. Buser, A. Rougeul-Buser (Eds.), *Cerebral Correlates of Conscious Experience*, Amsterdam/New York: North Holland; 1978.
55. Libet B. Unconscious cerebral initiative and the role of conscious will in voluntary action. *The Behavioural and Brain Sciences*. 1985;8:558–5566.
56. Libet B. Do we have free will? *Journal of Consciousness Studies*. 1999;6(8-9):47–57.
57. Libet B. Consciousness, free action and the brain. *Journal of Consciousness Studies*. 2001;8:59–65.
58. Libet B, Gleason CA, Wright EW, et al. Time of conscious intention to act in relation to onset of cerebral activity (readiness potential). *Brain*. 1983;106(Pt 3):623–642.
59. Shibasaki H, Barrett G, Halliday E, et al. Components of the movement related cortical potentials and their scalp topography. *Electroencephalography & Clinical Neurophysiology*. 1980;49(3-4):213–226.
60. Shibasaki H, Barrett G, Halliday E, et al. Cortical potentials following voluntary and passive finger movements. *Electroencephalography & Clinical Neurophysiology*. 1980;50(3-4):201–213.
61. Shibasaki H, Sadato N, Lyshkow H, et al. Both primary motor cortex and supplementary motor area play an important role in complex finger movement. *Brain*. 1993;116 (Pt 6):1387–1398.
62. Soon CS, Brass M, Heinze HJ, et al. Unconscious determinants of free decisions in the human brain. *Nat Neurosci*. 2008;11(5):543–545.