

INTERVENTION OF AYURVEDA AS BIOENERGETIC MEDICINE IN HEALTHY AGING IN PURVIEW OF EPIGENETICS: A SYSTEMATIC REVIEW

Sabharwal Pooja^{1*}, Gujjarwar Vidula², Dada Rima³, Prakash Chetan⁴ and Sharma Akanksha⁵

¹Assistant Professor, PG Department of Rachana Sharir, CBPACS New Delhi.

²Principal & Head of Department, PG Department of Rog Nidan Evam Vikriti Vigyan, CBPACS, New Delhi.

³Professor & Incharge Lab for Molecular Reproduction and Genetics, Department of Anatomy, AIIMS, New Delhi.

^{4,5}PG Scholar, PG Department of Rachana Sharir, CBPACS, New Delhi.

***Corresponding Author: Dr. Sabharwal Pooja**

Assistant Professor, PG Department of Rachana Sharir, CBPACS New Delhi.

Article Received on 28/03/2019

Article Revised on 18/04/2019

Article Accepted on 08/05/2019

ABSTRACT

The science and traditional medicine that was previously same, and then parted away, are now approaching reunion. In Ayurvedic literature, living body is considered as amalgam of earth, water, fire, air and space and they make not just the physical composition but also the mind and the spirit. 5000 years ago, ancient spiritual tradition of India spoke of a universal energy called *Prana*. This universal energy is the source of all life. Scientific evidence provides tangible proof of the existence of body's energy and its relation to the health & well-being. Bio energetic medicine is the branch of medicine which deals with the treatment of subtle body and deals with healing through five senses, meridians and energy healing. Epigenetics is a new science that is exploring the effect of the environment on cellular behavior. The "environment" includes all aspects i.e physical, social, and electromagnetic environment as well as beliefs, perceptions, lifestyle, habits, behaviors, and mind-body practices such as *Pranic healing*. Despite improvements in public health and medical care, the leading causes of mortality for persons over age 65 are almost same in the past several decades. There is certainly impact of mind body practices in reversal of aging process, thus the present study focuses on the scientific studies related to intervention of *Ayurveda* as bioenergetic medicine in aging in purview of epigenetics.

KEYWORDS: Ayurveda, Bioenergetic medicine, Aging, Epigenetics etc.

INTRODUCTION

The leading cause of the mortality for persons over the age of 65 is almost same despite of improvements in public health and medical care.

The major diseases that causes severity with age include: coronary heart disease, stroke, cancer, dementia, osteoporosis and musculoskeletal disorders. The Institute of Medicine's National Research Agenda on Aging highlighted the importance to prevent the process of aging and enhance positive health in the elderly.^[1] In Ayurvedic literature, living body is considered as amalgam of earth, water, fire, air and space and they make not just the physical composition but also the mind and the spirit. That is, the body as a whole includes mind, soul, behavior and consciousness of an individual where the environment also plays a major contribution in making of a person. - Charaka Sharir 6/4 Where as in modern anatomy human body is made up of systems, tissues and cells from gross to subtle level. According to Charaka, the combination of Chetana (life element) and Panchmahabhutavikara is called Sharir and same is referred as Sthula Sharir. Sukshma Sharir is habitat of

Jeewatma and Jeewatma resides in it. Sukshma Sharir is a group of 18 elements. Pertinently Ahankaara, mana, ten Indriyas and Tanmatras are the most important. Conjugation of Aatma possessed within Sukshma Sharir is addressed as linga Sharir. Aatma with the Linga Sharir holds and supports the whole body. Aatma with the Sukshma Sharir provides Chetana (life element) to the Sthula sharir. The body is combination of Sharir, Indriya, Satva, Aatma. If one or more of these components are imbalanced or unconnected it can cause negative effect, such as disease. Charaka Samhita states that Satva or mind, Aatma or soul and Sharira or body are just like the legs of tripod, on which the world rests.^[2-6] Consciousness in living body is represented by—invisible energy field(chakras).^[7-9] In any diseases causing aging treatment at level of Pranamayakosha (subtle body, Chakra) is of the most importance. Human energy fielding (Aura, Chakra) is surrounded by each energy field which is again surrounded by universal energy field.^[10-12] A continuous exchange take place between the environment and the human body which is responsible for health and well being of human body. The methods and approaches to the phenomena studied

in bioenergetics. Clearing, balancing and energing the subtle body in all diseases is of equal importance as treatment at physical level. Energy (Chakra) healing is an important component of the treatment of any disease as bioenergetic medicine.^[13] Epigenetics is a recent branch of biology that is searching & exploring the effect of the environment & lifestyle on cellular behavior through changes in the genetic expression. The "environment" includes one's physical, social, and electromagnetic environment as well as beliefs, perceptions, lifestyle, habits, behaviors, and mind-body practices such as Pranic healing. Epigenetics science has revealed that we can map out genes that keep us in a healthy state and remove those bad genes that have been killing humans over the course of time.^[14-15]

Process of aging

Various cross-sectional & observational studies have been conducted on the physiological, psychological, and behavioral changes that causes the aging process. With advancing age decline in every system of the human body have been noted. These include factors like blood pressure, bone density, muscle mass, immune function, hearing, vision, renal function, glucose tolerance, pulmonary function, endocrine activity, and sympathetic nervous system activity.

Scientists McEwen, Seeman, Greenwald and colleagues developed and validated the concept of —allostatic load to describe and quantify the cumulative wear and tear on the body's major organ systems due to repeated adaptation to stressors.^[16-18] Prediction of decline in cognitive and physical functioning, the incidence of cardiovascular disease, and mortality in older adults has been found due to the allostatic stress.

The outcome of this has been explained to consist of two categories of biomarkers:

1) Primary mediators-substances the body releases in response to stress such as nor epinephrine, epinephrine, cortisol, and dehydroepiandrosterone sulfate (DHEA-S) and 2) secondary mediator's resulting from the actions of primary mediators. Elevated systolic and diastolic blood pressures, cholesterol levels, glycated hemoglobin levels, and waist-to-hip ratio are few conditions involved. The changes with age in these physiological systems generally predispose to risk for disease, disability and mortality.

Neuro endocrine and immune systems are two major systems where changes have been reported because of regular wear and tear over the years. Reductions in T cell number and function, activation and proliferation of B cells and lower production of specific antibody have been found in various studies related to aging.

The major neuroendocrine changes with aging include: a) declines in levels of the adrenal hormones-dehydroepiandrosterone and DHEA-sulfate (DHEAS), androstenedione, and progesterone, b) decreased gonadal

hormones, testosterone and estrogen, c) decreased growth function hormones, growth hormone (GH) and insulin-like growth factor-1 (IGF-1), d) changes in calcium metabolism hormones - decreased calcitonin and vitamin D and increased parathyroid hormone, e) higher basal levels of hypothalamic-pituitary –adrenal (HPA) axis hormones - notably ACTH and cortisol.

Because of reductions in immune structure and function, accumulating evidence demonstrates increases in pro inflammatory cytokines with aging. Ultimately these chemical mediators enhance inflammatory responses. It has been shown by substantial data that there is increase in the pro inflammatory cytokine & IL-6 level. This in turn induces products of the acute phase proteins, fibrinogen and C-reactive protein (CRP).^[19-20]

Health, Aging & Ayurveda

Ayurveda is the world's oldest and richest system of natural medicine, having its heritage in the ancient Vedic civilization of India. This science has been recognized by the World Health Organization as a best system of natural medicine with a detailed scientific literature consisting of classical medical texts, an oral tradition of knowledge, written texts, a comprehensive material medica, and a wide breadth of clinical procedures for prevention and treatment of acute and chronic diseases, as well as slowing the aging process.

"Ayus" in Sanskrit means life or lifespan. "Veda" means knowledge. The Ayurvedic tradition of knowledge and practice with its classical literature has been described as total knowledge of health and longevity.^[21]

In last many years, a systematic meta analysis of the classical texts and practical applications of Ayurveda in contemporary scientific principles has been done. Interestingly precise correlations between human neurophysiological structures and function and the aspects of the Ayurveda have been reported. The mind approach of Ayurveda include various meditation programs to reduce psychosocial stress and optimize neurophysiological effects on mental, physical and social health. The physiological approach of Ayurveda includes herbal preparations or supplements for dissolution of physiological imbalances associated with the declines of aging, acute and chronic disorders. Other strategies are physiological purification and behavioral recommendations. Some interventions are there for reducing socio-environmental stress and enhancing public health.

Non pharmacological interventions in aging

The non pharmacological intervention are the traditional practices that has their origin in the ancient vedic tradition of India. These techniques have been extensively studied for their effect on mental, physical and behavioral health. Several clinical conditions and diseases which commonly afflict the aged have been studied with this practice. 22 In one of the study, Orem-

Johnson investigated the health insurance records of more than 2000 people practicing these traditional non pharmacological interventions over five years. The results showed significantly less health care utilization by these practitioners for all 11 major disease categories including heart disease and cancer when compared to other groups of similar age, gender, profession, and insurance terms.

Wallace et al. employed a standardized test of biological aging showing that practice of the mind body practice program slows physiological declines associated with the aging process.

Epigenetic clock and aging

There is certainly impact of environmental changes in the process of aging. The scientific studies done in this area has gathered a good data which is revealing the impact of DNA methylation aspects of aging. Till date the most significant discovery is the specificity by which the methylation status of some cytosine-guanine dinucleotides changes with age. Most of the changes to DNA methylation state were known to occur with age, it is nevertheless a surprise to behold the remarkable precision of this change and that it can be used itself as a measuring stick of biological age.^[23-28]

Because of this, many surprises have been revealed, including the uniformity of age from diverse tissues of a body, influences of internal and external factors on aging, and the distinctiveness of epigenetic aging from current understanding of aging. Very rapidly, the epigenetic clock has uncovered many novel aspects of aging and most excitingly it is challenging concepts of aging that we have long held to be correct or complete.

Ayurveda as bioenergetic medicine in aging & epigenetics

Modern science, the science of bioenergetic medicine tells us that the human organism is not just a physical structure made of molecules; but like everything else, is composed of energy fields. We are constantly changing, ebbing, and flowing, just like the sea. Scientists are learning to measure these subtle changes. The human energy field is the frontier for modern research, and the development of new diagnostic and treatment systems. We are constantly swimming in a vast sea of life energy fields, thought fields, and bioplasmic forms, moving about and streaming off the body. We are vibrating; radiating bio plasma itself. People have recognized this phenomenon in the past. Now we are rediscovering it. This is thus not a new phenomenon; but rather, a new observation, a growing awareness, a new perspective, and a renewed interest in studying the intricacies of the unknown."A human being is a part of the whole, called by us the Universe, a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest- a kind of optical delusion of his consciousness.²⁹⁻³⁰ This delusion is a kind of prison for us, restricting us to our personal

desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circles of compassion to embrace all living creatures and the whole of nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is in itself a part of the liberation and of a foundation for inner security."According to Ayurvedic concepts each of us is born with a unique constitutional balance and the individual constitution or Prakriti, is based on physical and psychological characteristics (Vata, Pitta, Kapha, Sattva, Raja, Tama) and individual Prakriti roughly resembles our DNA, or our genes. Epigenetic changes can also introduce for genetic instability and have a major role in the development of human. There may be a link between the meridians and energy and information relayed by DNA.^[31-32]

Epigenetics is a new field of science that is exploring the effect of the environment on human body's cellular behavior. The "environment" consists of physical, social, and subtle environment and effect of mind-body practices such as Pranic healing. It is the study of the expression of genes without changing the sequence of the DNA or the genetic code.^[33-34]

Epigenetic mechanisms can influence the gene activity at the transcriptional and post-transcriptional levels and/or at the translation level and post-translational modifications. Such epigenetic mechanisms with a potentially vast spectrum of consequences could result in more varieties of cell differentiations, morphogenesis, variability, and adaptability of an organism, which can be affected by both genetic and environmental factors.^[35] Therefore, the field of epigenetics covers the modifications of DNA, DNA-binding proteins, and histones, which are important in making changes in chromatin structure without any change in the nucleotide sequence of a given DNA. Also, some of these alterations could be transferred between generations.^[36] Epigenetic modifications often happen during an organism's lifetime; however, these changes can be transferred to the next generation if they occur in germ cells.^[37] Three major epigenetic modification mechanisms are -DNA methylation and demethylation, Histone and non-histone modifications, Mitotic gene bookmarking.^[38] The Korean scientists studying oriental medicine with biophysical methods injected a special staining dye which coloured the meridians. By injecting the dye onto acupuncture points, they were able to see thin lines. These did not show up at non-acupuncture point sites where there are no meridians. The researchers discovered that the meridian lines are not confined to the skin, but are in fact a concrete duct system through which liquid flows, and that this liquid aggregates to form stem cells. In Korea, scientists believe that the primary vascular system is actually the physical component of the meridian system and they also suggest that this system is involved in the routing of energy flow and information, relayed by bio-photons (which are the electromagnetic waves of light) and by DNA.

In the age of genomics and on the cusp of regenerative medicine, healing therapy as complementary and alternative medicine (CAM) approaches represents a popular branch of health care. Healing therapy as integrative medicine not only considers the holistic perspective of the physiological components of the individual, but also includes psychological and mind-body aspects. Integrative medicine seeks to restore and maintain health by understanding the patient's unique set of circumstances and addressing their full range of physical, psychological, social, environmental, and spiritual influences. Most of the treatment modalities were derived from traditional approaches that viewed the body as a single unit.^[39-43] More recently, research indicates that thought and mental states are capable of affecting gene expression in various ways. Although the exact processes by which mind, thought, and consciousness arise within the brain have yet to be defined, a recent study demonstrated how a synthetic mind-controlled transgene expression device enabled human brain activities and mental states (captured by an EEG headset) to regulate wireless optogenetic implants that radiated infrared frequency and ultimately programmed transgene expression in human designer cells implanted both in mice and in a semipermeable cultivation chamber.^[44] In other studies, it has been shown that the autonomic nervous system (ANS), which is generally regarded as a system that cannot be voluntarily influenced, can in fact be brought under some conscious level of control. Results from a case study on a Dutch individual suggested that he could voluntarily activate his ANS through a self-developed method involving meditation, exposure to cold temperatures, and breathing techniques.^[45] "mind over gene" experiment revealed how mental exercise and meditation positively influence telomerase activity in subjects experiencing neuroticism, and these activities prevent the type of telomere degradation typically associated with poor prognosis in breast cancer.^[46] Taken together, these and other studies covered in this review suggest that IM methods such as meditation not only reprogram mental attitude and awareness, but do so through epigenetic reorganization and altered gene expression. Collectively, this paper postulates that mentally and materially oriented stimuli delivered through IM can switch genes on or off, presenting a new paradigm of how IM functions. It is effective not just in treating illness, but also in alleviating pain and stress.^[47] Epigenetic mechanisms include chromatin folding and attachment to the nuclear matrix, packaging of DNA, covalent modifications of histone tails (acetylation, methylation, and phosphorylation), and DNA methylation, which taken together provide a plausible explanation for nongenetic disease transmission.^[48-49] External parameters such as diet and exercise represent prominent elements in the induction of such epigenetic changes, resulting in health benefits through genomic regulation.^[50-51] Control is exerted through cellular signaling pathways that eventually affect physiological and developmental events. IM practices including

Ayurveda healing therapy may alter gene transcription and cause modifications at the level of DNA methylation and histone methylation and/or acetylation. Transcriptional analysis of depression-associated behaviour syndromes like postpartum depression that involve a differential immune activation and a decreased transcriptional engagement in cell proliferation, DNA replication, and repair processes might provide markers that can be targeted through the epigenetic mechanisms of healing therapies.

Epigenetic modifications such as DNA methylation and histone modification can be regulated by external environmental factors in addition to the inherited genetic profile of an individual. Such modifications are deterministic of disease onset from childhood through adulthood.^[50] The architecture of the epigenome (i.e., the specific pattern of epigenetic signatures including DNA methylation and histone modifications throughout the genome) is responsible for the physiological processes and psychological states inherent within everyone.

It is also important to understand that Integrative Medicine has the capacity to work at different levels, psychologically, physiologically, and/or directly at the level of the epigenome in the nucleus of a cell. Moreover, some IM approaches For example, meditation likely works primarily at the psychological level first, whereas yoga works at the psychological and physiological levels simultaneously, before altering the epigenome. Thus, the myriad effects of IM are visible from the level of gene expression to the overall physiology and psychology of the patient. Furthermore, the actual DNA sequence of an individual can modify the degree of response to an alternative medicine approach.

In the case of certain diseases or degenerative maladies, it may be mandatory for the IM approach to directly target the epigenome first. For example, in severe illnesses such as schizophrenia, a therapeutic strategy that targets psychological and physiological response prior to affecting the epigenome may prove ineffective in function or duration. For example, the chromatin may be locked (tightly wrapped) in such a manner that renders it difficult to alter through this cascade (i.e., psychological → physiological → epigenetic). Hence, for such diseases an IM approach capable of directly altering the epigenome first by initially circumventing/bypassing the psychological and physiological levels might be considered a more effective strategy.⁵¹⁻⁵² Auto immune disorder- The immune system and target organ are two main players in an autoimmune disease process and the epigenetic modifications of these players could have roles in disease development. Many functions of immune cells such as hematopoietic lineage, rearrangement of antigen-receptor, allelic exclusion, and inducible immune responses against pathogens are epigenetically controlled. The alterations of epigenetic mechanisms regulating immunological development could promote autoimmunity disease.^[53] Classically, allergens are

considered in relation to factors such as smoking behavior, and studies have confirmed that these agents can change epigenetic marks in asthma.^[54]

Poor life style, Mental stress, Oxidative stress cause disturbance the energy field (*Shadchakra*) and low immunity. These factor disturb the Prakriti (Genotype) due to disturbance of (Phenotype) Vata, Pitta, Kapha Satwa, Raja, Tama that is DNA mutation which ultimately cause disease. Epigenetic alterations induced by environmental stress associated with metabolic and neurodevelopmental disorders. However, the epigenome has a reversible property since it is based on removable residues on genomic DNA. Thus, environmentally induced epigenomic alteration can be potentially restored.

CONCLUSION

Interactions between human body and environment plays a crucial link between health & well being of the human body. The science of bioenergetics has proved the same. Regular practice of non pharmacological interventions is equally effective at physical & psychological level. The science of epigenetics has reveled the potential of mind body practices & achar rasayan (behavioral practices) at genetic level too. Practice of such interventions as bioenergetic medicine has impact on reversal of aging process in purview of contemporary understanding of epigenetics.

REFERENCES

- Masoro, E, Anstad, S and Rowe, J, *Handbook of the biology of aging*. 6th ed. 2006, New York: Academic Press.
- Susruta. Sharir Sthan, Chapter no.4, Shlok no.3. In: Susruta Samhita. Reprint-2014. New Delhi, Delhi: Chaukhamba Publication, 2014; 14. Hindi Commentary by Kaviraj Ambika Dutta Shastri.
- Charak. Chapter 6, Shlok No.4. In: Charaka Samhita. Reprint-2012. New Delhi, Delhi: Chaukhamba Sanskrit Sansthan, 2012; 787. Vidhyotini Hindi Commentary by Kashinath Shastri.
- Charaka. Sutra Sthan, Chapter no.1, Shlok no. 42. In: Charaka Samhita. Reprint-2012. New Delhi, Delhi: Chaukhamba Sanskrit Sansthan, 2012; 14. Vidhyotini Hindi Commentary by Kashinath Shastri.
- Charaka. Sutra Sthan, Chapter no.1, Shlok no. 46. In: Charaka Samhita. Reprint-2012. New Delhi, Delhi: Chaukhamba Sanskrit Sansthan, 2012.
- Susruta. sutra sthana chapter 15, shlok no. 48, page no. 84. reprint-2014. Vol. 1. new delhi, delhi: chaukhambha publication; 2014. Ayurveda tattva sandipikahindi commentary by kavirajambikadutta shastri.
- Dilip KV. Section-3. In: Clinical Yoga & Ayurveda. 2011th ed. Delhi, Delhi: Chaukhamba Sanskrit Sansthan, 2011; 107–8.
- Chandra RBS. Chapter no.5. In: Gheranda Samhita. 2011th ed. Varanasi, U.P.: Chaukhamba Vidhyabhawann, 2011; 80–7.
- Trivedi Kshemkaran Das. Kand-10, Shlok-31. In: Athervaveda. 2012th ed. Delhi, Delhi: Arya Prakaashan.
- Sabharwal Pooja. Discovery of the existence of human energy field (aura). Unique journal of ayurvedic and herbal medicine, 2015 Mar 2; 62–3.
- Kamath nagraj. kriyatmakaanvrshana of shad chakras. Unique journal of ayurvedic andherbal medicine, 2013 Mar 1; 34–6.
- Sabharwal pooja. Spiritual healing for cancer through chakras. In: Spiritual healing for cancer through chakras. 1st ed. Varanasi, U.P.: Chaukhambaorientalia, 2009; 1–14.
- Swerdlow RH. Bioenergetic medicine. British Journal of Pharmacology, 2014; 171(8): 1854–69.
- Epigenetics – What Ayurveda Already Knows By Gwen Diaz....www.ayurvedacollege.com
- Aguilera, O., Fernández, A. F., Muñoz, A., & Fraga, M. F. 2010. Epigenetics and environment: A complex relationship. Journal of Applied [Manoj Jagtap et al: Enlightening Epigenetics Through Ayurveda And its Role In Future] 294 www.ijaar.in VOL II ISSUE III SEP-OCT 2015 Physiology, 109, 243-251. Retrieved July 24, 2012, fromhttp://jap.physiology.org/content/109/1/243.full.pdf (PDF - 582 KB)
- McEwen, B and Seeman, T, Protective and damaging effects of mediators of stress; elaborating and testing the concepts of allostasis and allostatic load. *Ann NY Acad Sci*, 1999; (896): 30-47.
- Gruenewald, T and Kemeny, M, *Aging and Health: Psychoneuroimmunological processes*, in *The Handbook of Health Psychology and Aging*, C. Aldwin, C. Park, and A. Spiro, Editors. 2007, Guilford Press: New York, NY. p.97-118.
- Seeman, TE, McEwen, BS, Rowe, JW and Singer, BH, Allostatic load as a marker of cumulative biological risk: MacArthur studies of successful aging. *Proceedings of the National Academy of Sciences U S A*, 2001; 98(8):4770-5.
- Wan, H, Sengupta, M, Velkoff, V and DeBarros, K, 65+ in the United States: 2005, in *Current Population Reports*, U.C. Bureau, Editor. 2005, US Government Printing Office: Washington, DC.
- US Department of Health and Human Services. *Administration for Community Living*. 2014; Available from:https://aoa.acl.gov/Aging_Statistics/Index.aspx.
- Charak. Chapter 6, Shlok No.4. In: Charaka Samhita. Reprint-2012. New Delhi, Delhi: Chaukhamba Sanskrit Sansthan, 2012; 787. Vidhyotini Hindi Commentary by Kashinath Shastri
- Sabharwal pooja. Effect of intervntion of Ayurveda & practical implementation of shadchakras an indigenous approach as co- therpy with chemotherapy & radiotherapy for physical & mental well being of cancer patient. Journal of ayurved A., Oct-dec 2008; 2: 28–33.
- Beil, Laura (Winter 2008). "Medicine's New Epicenter? Epigenetics: New field of epigenetics

- may hold the secret to flipping cancer's "off" switch." CURE (Cancer Updates, Research and Education).
24. Bird, Adrian Perceptions of epigenetics Nature, 2007; 447(7143): 396-398.
 25. Gottlieb G "Epigenetic systems view of human development". Developmental Psychology, 27(1): 33-34.
 26. M. F. (2010). Epigenetics and environment: A complex relationship. Journal of Applied [Manoj Jagtap et al: Enlightening Epigenetics Through Ayurveda And it's Role In Future] 294 www.ijaar.in VOL II ISSUE III SEP-OCT 2015 Physiology, 109: 243-251. Retrieved July 24, 2012, from [http://jap.physiology.org/content/109/1/243.full.pdf\(PDF - 582 KB\)](http://jap.physiology.org/content/109/1/243.full.pdf(PDF - 582 KB)).
 27. D. S., Sebastian, S., Bispham, J., et al. (2007). DNA methylation, insulin resistance, and blood pressure in offspring determined by maternal periconceptional B vitamin and methionine status. Proceedings of the National Academy of Sciences, 104: 19351-19356.
 28. O'Connor, Anahad (11 March 2008). "The Claim: Identical Twins Have Identical DNA" New York Times. Retrieved 2 May 2010.
 29. Swerdlow RH. Bioenergetic medicine. British Journal of Pharmacology, 2014; 171(8):1854-69.
 30. Introduction to Bioenergetic Medicine [Internet]. Holistic Health Alternatives. [cited 2018 Apr 14]. Available from: <http://drdawn.net/learning-center/articles/introduction-to-bioenergetic-medicine/>.
 31. Egger G, Liang G, Aparicio A, Jones PA. Epigenetics in human disease and prospects for epigenetic therapy. Nature. 2004; 429(6990): 457-463. [PubMed] [Google Scholar]
 32. Epigenetic potential of nonpharmacological intervention in oncology – an integrated approach - Times of India [Internet]. The Times of India. The Times of India; 2019 [cited 2020Apr12]. Available from: <https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/epigenetic-potential-of-nonpharmacological-intervention-in-oncology-an-integrated-approach/articleshow/71184650.cms>.
 33. Epigenetics – What Ayurveda Already Knows By Gwen Diaz....www.ayurvedacollege.com.
 34. Aguilera, O., Fernández, A. F., Muñoz, A., & Fraga, M. F. 2010. Epigenetics and environment: A complex relationship. Journal of Applied [Manoj Jagtap et al: Enlightening Epigenetics Through Ayurveda And its Role In Future] 294 www.ijaar.in VOL II ISSUE III SEP-OCT 2015 Physiology, 109, 243-251. Retrieved July 24, 2012, from [http://jap.physiology.org/content/109/1/243.full.pdf\(PDF - 582 KB\)](http://jap.physiology.org/content/109/1/243.full.pdf(PDF - 582 KB)).
 35. Egger G, Liang G, Aparicio A, Jones PA. Epigenetics in human disease and prospects for epigenetic therapy. Nature, 2004; 429(6990): 457-463. [PubMed] [Google Scholar].
 36. Chandler VL. Paramutation: from maize to mice. Cell, 2007; 128(4): 641-645. [PubMed] [Google Scholar]
 37. Epigenetic potential of nonpharmacological intervention in oncology – an integrated approach - Times of India [Internet]. The Times of India. The Times of India; 2019 [cited 2020Apr12]. Available from: <https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/epigenetic-potential-of-nonpharmacological-intervention-in-oncology-an-integrated-approach/articleshow/71184650.cms>.
 38. The Chopra Center. Ayurveda—the science of life. 2016, <http://www.chopra.com/ayurvedic-spa>.
 39. Johns Hopkins Medicine. Types of complementary and alternative medicine. 2016, http://www.hopkinsmedicine.org/healthlibrary/conditions/complementary_and_alternative_medicine/types_of_complementary_and_alternative_medicine_85,P00189/.
 40. Witt C. M., Michalsen A., Roll S., et al. Comparative effectiveness of a complex Ayurvedic treatment and conventional standard care in osteoarthritis of the knee—study protocol for a randomized controlled trial. Trials, 2013; 14(1, article 149) doi: 10.1186/1745-6215-14-149. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
 41. Dobos G. J., Tan L., Cohen M. H., et al. Are national quality standards for traditional Chinese herbal medicine sufficient? current governmental regulations for traditional Chinese herbal medicine in certain Western countries and China as the Eastern origin country. Complementary Therapies in Medicine, 2005; 13(3): 183-190. doi: 10.1016/j.ctim.2005.06.004. [PubMed] [CrossRef] [Google Scholar].
 42. Tsang I. K. Y. Establishing the efficacy of traditional Chinese medicine. Nature Clinical Practice Rheumatology, 2007; 3(2): 60-61. doi: 10.1038/ncprheum0406. [PubMed] [CrossRef] [Google Scholar].
 43. Folcher M., Oesterle S., Zwicky K., et al. Mind-controlled transgene expression by a wireless-powered optogenetic designer cell implant. Nature Communications, 2014; 5, article 5392 doi: 10.1038/ncomms6392. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
 44. Kox M., Stoffels M., Smeekens S. P., et al. The influence of concentration/meditation on autonomic nervous system activity and the innate immune response: a case study. Psychosomatic Medicine. 2012; 74(5): 489-494. doi: 10.1097/psy.0b013e3182583c6d. [PubMed] [CrossRef] [Google Scholar].
 45. Carlson L. E., Beattie T. L., Giese-Davis J., et al. Mindfulness-based cancer recovery and supportive-expressive therapy maintain telomere length relative to controls in distressed breast cancer survivors. Cancer, 2015; 121(3): 476-484. doi: 10.1002/cncr.29063. [PubMed] [CrossRef] [Google Scholar]

46. Singer J., Adams J. Integrating complementary and alternative medicine into mainstream healthcare services: the perspectives of health service managers. *BMC Complementary and Alternative Medicine*, 2014; 14, article 167 doi: 10.1186/1472-6882-14-167. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
47. Jaenisch R., Bird A. Epigenetic regulation of gene expression: how the genome integrates intrinsic and environmental signals. *Nature Genetics*, 2003; 33(supplement): 245–254. doi: 10.1038/ng1089. [PubMed] [CrossRef] [Google Scholar].
48. Williams S. C. Epigenetics. *Proceedings of the National Academy of Sciences*, 2013; 110(9): 3209–3209. doi: 10.1073/pnas.1302488110. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
49. Kanherkar R. R., Bhatia-Dey N., Csoka A. B. Epigenetics across the human lifespan. *Frontiers in Cell and Developmental Biology*, 2014; 2 doi: 10.3389/fcell.2014.00049. [PMC free article] [PubMed] [CrossRef] [Google Scholar].
50. Bhasin M. K., Dusek J. A., Chang B.-H., et al. Relaxation response induces temporal transcriptome changes in energy metabolism, insulin secretion and inflammatory pathways. *PLOS ONE*, 2013; 8(5) doi: 10.1371/journal.pone.0062817.e62817 [PMC free article] [PubMed] [CrossRef] [Google Scholar].
51. Kanherkar RR, Stair SE, Bhatia-Dey N, Mills PJ, Chopra D, Csoka AB. Epigenetic Mechanisms of Integrative Medicine [Internet]. Evidence-based complementary and alternative medicine: eCAM. Hindawi Publishing Corporation; 2017 [cited 2020Apr12]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5339524/>.
52. Dolinoy D. C., Weidman J. R., Jirtle R. L. Epigenetic gene regulation: linking early developmental environment to adult disease. *Reproductive Toxicology*, 2007; 23(3): 297–307. doi: 10.1016/j.reprotox.2006.08.012. [PubMed] [CrossRef] [Google Scholar].
53. Greer JM, McCombe PA. The role of epigenetic mechanisms and processes in autoimmune disorders. *Biologics*, 2012; 6: 307. [PMC free article] [PubMed] [Google Scholar].
54. Yang IV. Epigenetics and prenatal influences on asthma and allergic airways disease. *Breathe*. 2014; 10(1): 24–31.[Google Scholar].