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Review Paper

Shiva Samhita and Modern Science: Ancient Yogic Wisdom Meets Contemporary Research

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Abstract

The Shiva Samhita is an important classical text of Hatha Yoga that integrates yogic practice with metaphysical, philosophical, and subtle-body concepts. Its descriptions of nadis, chakras, kundalini, pranayama, mudra, bandha, and meditative practice have sometimes been interpreted as early descriptions of modern anatomy and neuroscience. Such comparisons, however, require methodological caution because the traditional concepts of the subtle body do not correspond directly to anatomical structures recognized by contemporary biomedical science. This review examines selected concepts of the Shiva Samhita in relation to contemporary research on autonomic regulation, respiratory physiology, heart-rate variability, electroencephalography, and the nasal cycle. Particular attention is given to pranayama because slow voluntary breathing has been associated with measurable changes in heart-rate variability and cardiovascular autonomic regulation. Research on unilateral and alternate-nostril breathing also suggests that controlled nasal breathing can influence electroencephalographic activity, although the evidence does not establish a simple one-to-one correspondence between Ida and Pingala and the cerebral hemispheres. Proposed anatomical correlations between nadis, chakras, neural pathways, and endocrine structures remain hypotheses or interpretive models rather than established anatomical identities. Similarly, traditional claims concerning supernatural powers, including levitation, invisibility, prophecy, and physical immortality, are not supported by contemporary scientific evidence. The comparison between the Shiva Samhita and modern science is therefore most productive when traditional descriptions are treated within their historical and philosophical context while physiological claims are evaluated according to contemporary empirical standards. This approach permits meaningful investigation of potentially testable practices without reducing the traditional yogic system to modern anatomy or neuroscience.

Keywords: Shiva Samhita, Hatha Yoga, pranayama, nadis, chakras, kundalini, autonomic nervous system, neuroscience, nasal breathing, yoga research.

Introduction

The Shiva Samhita, traditionally presented as a dialogue between Shiva and Parvati, is one of the important classical sources associated with Hatha Yoga. The English translation by Rai Bahadur Srisa Chandra Vasu, published in 1914, presents a text combining yogic philosophy, subtle-body theory, pranayama, asana, mudra, bandha, meditation, and descriptions of extraordinary yogic attainments[1]. The text is therefore not simply a manual of physical exercise. Its practices are embedded within a broader philosophical framework concerned with knowledge, consciousness, liberation, and the transformation of the practitioner.

Modern interest in the Shiva Samhita has increased because several of its descriptions appear superficially comparable with concepts in anatomy, physiology, autonomic neuroscience, and psychology. Nadis have been compared with neural pathways, chakras with nerve plexuses or endocrine structures, and pranayama with mechanisms involving autonomic regulation. Contemporary authors have explicitly proposed such correlations, while also acknowledging that the structural relationship between the traditional nadi system and modern anatomy remains uncertain[2].

A scientifically responsible comparison must therefore distinguish between three different categories of statements: traditional descriptions made within the yogic worldview, modern physiological observations obtained through empirical research, and interpretations that attempt to relate the two. These categories should not be treated as equivalent. A traditional description may inspire a scientific hypothesis without constituting scientific evidence by itself.

The purpose of this review is therefore to examine selected concepts of the Shiva Samhita in relation to contemporary scientific research while maintaining a clear distinction between historical yogic theory, physiological evidence, and speculative correlation.

Philosophical and Conceptual Framework of the Shiva Samhita

The philosophical framework of the Shiva Samhita is important for understanding its descriptions of the body and mind. The opening chapter emphasizes knowledge and spiritual liberation and presents reality through a non-dual philosophical perspective[1]. Consequently, the subtle-body descriptions occurring in subsequent chapters should not automatically be interpreted as attempts to describe the human body in the anatomical sense used by contemporary medicine.

The text describes nadis as channels associated with the movement of prana and gives particular importance to Ida, Pingala, and Sushumna. It also describes chakras, kundalini, mudras, bandhas, pranayama, and meditative practices. These descriptions belong to a traditional conceptual system in which physiological, psychological, symbolic, and spiritual dimensions are interconnected.

This distinction is particularly important when considering the traditional number of nadis. The Vasu translation describes a system in which numerous secondary channels branch from the principal nadis, ultimately producing a traditional count of 350,000 nadis[1]. Modern anatomy, however, identifies nerves, blood vessels, lymphatic vessels, and other physical structures through dissection, imaging, histology, and physiological measurement. The traditional nadi system and the modern anatomical system therefore operate within different explanatory frameworks.

Contemporary attempts to correlate nadis with modern neuroanatomy can be useful as comparative hypotheses, but they should not be presented as proof that ancient yogic texts had already identified the spinal cord, sympathetic chains, or other modern anatomical structures. A recent narrative review proposed such correlations but explicitly acknowledged that structural correspondence remains insufficiently defined[2].

Nadis and the Modern Nervous System

The Shiva Samhita gives special importance to three principal nadis: Ida, Pingala, and Sushumna. Sushumna is described as the central channel associated with the vertebral axis, while Ida and Pingala are described in relation to the two sides of the subtle body and the nostrils[1].

These descriptions have led researchers to investigate whether the nadi system may have functional or symbolic parallels with the nervous system. A 2025 narrative review proposed that Sushumna may be compared with the spinal cord and that Ida and Pingala may be interpreted in relation to the sympathetic chains[2]. Such interpretations are interesting because the anatomical structures considered in these comparisons are distributed along the trunk and are involved in communication between the central nervous system and peripheral organs.

However, the similarity should not be interpreted as demonstrated anatomical identity. The spinal cord is a clearly defined physical structure consisting of nervous tissue, whereas nadis in classical yoga are part of a subtle-body model associated with prana. No anatomical study has demonstrated that Ida, Pingala, or Sushumna are physical structures corresponding directly to specific nerves or autonomic pathways.

The most scientifically testable aspect of the nadi concept is therefore not the physical existence of the channels themselves but the physiological effects associated with practices involving unilateral or alternate-nostril breathing. This distinction provides an appropriate transition from traditional description to experimental investigation.

Chakras, Kundalini and Proposed Neuroendocrine Correlations

The Shiva Samhita describes a system of chakras extending along the central axis of the body and associates them with particular symbols, sounds, deities, petals, meditative practices, and spiritual attainment[1]. Later interpretations have attempted to compare these locations with nerve plexuses, endocrine glands, and other anatomical structures.

One modern review examined proposed anatomical and physiological evidence concerning chakras and noted that relatively few scientific studies have investigated the subject. The review discussed proposed relationships between chakra locations and underlying nerve plexuses while emphasizing the limited nature of the scientific literature[3]. Such evidence does not establish chakras as anatomically identifiable organs or structures.

The same caution applies to attempts to associate particular chakras with endocrine glands. Positional proximity between a traditional chakra location and an anatomical structure does not demonstrate functional equivalence. For example, an anatomical structure located near the traditional position of a chakra does not establish that the chakra itself is that structure.

Kundalini presents an additional conceptual difficulty. In the Shiva Samhita, kundalini is represented through traditional imagery as a latent spiritual force associated with the base of the subtle body[1]. Modern neuroscience has not identified a physical substance or anatomical structure that can be demonstrated to be kundalini. Experiences interpreted traditionally as kundalini awakening may involve complex psychological, autonomic, perceptual, or contemplative phenomena, but the traditional metaphysical interpretation cannot be established solely through physiological measurements. Therefore, chakra and kundalini research should presently be regarded as an interdisciplinary field involving traditional studies, phenomenology, psychology, physiology, and neuroscience rather than as a settled anatomical science.

Pranayama and Autonomic Regulation

Among the practices described in the Shiva Samhita, pranayama provides one of the clearest opportunities for comparison with contemporary physiology. The text describes controlled inhalation, exhalation, nostril regulation, and breath retention within structured practice[1].

Modern research demonstrates that voluntary slow breathing can influence cardiovascular autonomic regulation. A systematic review and meta-analysis involving 223 eligible studies reported increases in vagally mediated heart-rate variability during slow voluntary breathing, immediately after a session, and following multi-session interventions[4]. These findings provide substantially stronger physiological evidence than attempts to establish anatomical identities for nadis or chakras.

A clinical study of slow-paced bhastrika pranayama investigated breathing at approximately six cycles per minute for five minutes. The researchers observed significant reductions in systolic and diastolic blood pressure together with a small reduction in heart rate. The study also investigated the response following administration of a parasympathetic blocker and proposed involvement of vagal and pulmonary mechanisms[5]. Because the experiment was short-term and involved a specific breathing protocol, its findings should not be generalized to all forms of pranayama.

A pilot study published in the Indian Journal of Medical Research investigated the short-term effects of slow breathing in 11 healthy volunteers, with six participants receiving pranayama training and five serving as controls. The investigators measured cardiovascular, pulmonary, and galvanic skin-resistance variables and reported physiological changes following the intervention[6]. The very small sample is an important limitation and demonstrates why individual pranayama studies should not be interpreted as definitive evidence of clinical efficacy.

A recent review published in the Asian Journal of Psychiatry in 2026 examined pranayama as a potential form of self-directed neuromodulation and discussed possible relationships involving autonomic pathways, respiratory–brain interactions, and neural regulation. The authors also identified the need for larger and better-designed studies[7].

Taken together, these studies support a cautious conclusion: controlled breathing can produce measurable physiological changes, particularly in cardiovascular and autonomic variables. They do not, however, demonstrate that all traditional claims concerning prana or pranayama have been scientifically validated.

Nostril Breathing and Cerebral Activity

The relationship between nostril dominance and brain activity represents another area where traditional yogic concepts can be examined experimentally. The Shiva Samhita associates Ida with the left nostril and Pingala with the right nostril[1]. Traditional interpretations often associate the two channels with different physiological or psychological states.

Modern physiology recognizes the nasal cycle, characterized by alternating changes in nasal airflow or nasal resistance. The phenomenon is influenced by autonomic regulation and can vary considerably between individuals[8]. The existence of a nasal cycle, however, does not by itself validate the complete Ida–Pingala model.

Experimental studies have investigated whether unilateral nostril breathing produces measurable changes in cerebral activity. Raghuraj and colleagues examined 130 right-hand-dominant schoolchildren and investigated whether breathing through a particular nostril produced a lateralized effect on hand-grip strength. The researchers reported an increase in grip strength without the expected simple lateralized effect[9]. This finding is relevant because it illustrates the difference between a traditional prediction and an experimentally observed outcome.

Telles and colleagues investigated alternate-nostril yoga breathing using electroencephalography in 13 healthy participants. The study examined cerebral hemisphere asymmetry and EEG activity and reported changes in EEG measures without demonstrating a simple change in hemispheric symmetry[10]. The small sample means that the findings should be interpreted cautiously.

A larger 2022 crossover study involving 30 participants examined unilateral yogic nasal breathing using 64-channel EEG. The researchers found changes in EEG spectral power across several frequency bands and reported different patterns associated with dominant and non-dominant nostril breathing[11]. These results indicate that unilateral nasal breathing can be associated with measurable changes in cortical electrical activity, but they do not establish the classical claim that left-nostril breathing simply activates one cerebral hemisphere while right-nostril breathing activates the other.

Thus, the evidence supports a narrower conclusion: controlled nasal breathing can influence measurable physiological and neural variables, while the traditional Ida–Pingala model should not be equated directly with modern cerebral lateralization.

Asana, Mudra, and Bandha: Traditional Practice and Physiological Interpretation

The Shiva Samhita describes several postures, mudras, and bandhas as components of advanced yogic practice[1]. Some of these practices have movements that can be described using contemporary anatomy and physiology, although such descriptions do not necessarily explain their traditional yogic significance.

Mula Bandha, for example, involves contraction of the pelvic-floor region. Pelvic-floor muscle contraction can be studied using established physiological and rehabilitation methods. The similarity between a particular yogic instruction and a modern therapeutic exercise, however, should not be interpreted as evidence that the traditional practice was historically developed from modern pelvic-floor physiology.

Uddiyana Bandha involves abdominal control following exhalation and can produce measurable changes in abdominal and respiratory mechanics. Similarly, Jalandhara Bandha involves positioning of the head and neck during breath-related practice. These effects can be investigated physiologically without requiring a metaphysical explanation.

Khechari Mudra represents a different category. Traditional descriptions associate the practice with the tongue, the palate, and the attainment of extraordinary effects[1]. Such traditional claims have not been established through modern clinical research. Consequently, the physiological components of a practice should be distinguished from the spiritual or extraordinary claims associated with it.

This distinction is consistent with modern safety literature. Systematic reviews have documented adverse events associated with some forms of yoga practice and have emphasized the importance of appropriate instruction and modification, particularly for individuals with pre-existing conditions[12,13]. A 2026 systematic review of published case reports and case series also identified neurological, cardiovascular, respiratory, psychiatric, ophthalmological, and musculoskeletal adverse events associated with yoga practices, although case-report evidence cannot establish incidence in the general population[14].

Traditional Claims Beyond Current Scientific Evidence

The Shiva Samhita contains descriptions of extraordinary accomplishments associated with advanced yogic practice. These include supernatural powers, unusual bodily abilities, extraordinary knowledge, and forms of liberation[1].
Such descriptions belong to the religious and philosophical context of the text. Contemporary physical and biological sciences have not established controlled evidence for claims such as physical levitation, invisibility, transmutation of metals through yogic means, entering another person's body, or physical immortality.

It is therefore inappropriate to present these claims as experimentally established physiological phenomena. At the same time, rejecting a supernatural claim does not require dismissing the historical or philosophical significance of the text. The claims can be studied as elements of the religious imagination, yogic soteriology, traditional symbolism, or descriptions of extraordinary subjective experience.

This distinction is especially important in an evidence-informed review. Demonstrated physiological effects of breathing should not be used as indirect evidence for unrelated supernatural claims. Conversely, the presence of supernatural claims in an ancient text does not mean that every physiological practice described in the same text lacks measurable effects.

Relationship Between Yogic Knowledge and Modern Scientific Knowledge

The comparison between the Shiva Samhita and modern science is most productive when neither tradition is forced into the conceptual framework of the other.

Classical yogic knowledge developed through philosophical reasoning, teacher–student transmission, disciplined practice, introspection, and long-term observation of subjective experience. Modern biomedical science uses controlled experimentation, measurement, statistical analysis, reproducibility, peer review, and defined physiological variables.

These approaches answer different types of questions. A yogic text may describe an experiential state or provide a framework for meditation, whereas a physiological experiment may measure blood pressure, heart-rate variability, EEG activity, respiratory rate, or other measurable outcomes.

Nevertheless, traditional practices can generate scientifically testable hypotheses. Pranayama provides a useful example. Modern studies have demonstrated measurable changes in autonomic and cardiovascular variables during slow breathing, while systematic reviews have reported effects on heart-rate variability[4-6]. These findings do not prove the metaphysical theory of prana, but they demonstrate that a traditional practice can produce measurable physiological effects.

Similarly, studies of unilateral nasal breathing demonstrate measurable changes in EEG activity, while not establishing the full traditional theory of Ida and Pingala[9-11].

The most scientifically defensible position is therefore neither that ancient yogic practitioners had already discovered modern neuroscience in complete form nor that traditional yogic descriptions have no relevance to modern science. Rather, traditional practices can provide hypotheses and experiential frameworks that can subsequently be investigated using contemporary scientific methods.

Practical Implications

The available evidence suggests that slow and controlled breathing is among the better-studied components of the practices discussed in this review. Systematic evidence indicates that voluntary slow breathing can influence vagally mediated heart-rate variability and cardiovascular autonomic regulation[4].

However, the presence of short-term physiological effects should not be interpreted as proof that every traditional therapeutic claim associated with pranayama is established.

Alternate-nostril and unilateral-nostril breathing also provide promising areas for research. Existing studies demonstrate measurable changes in EEG activity and other physiological variables, but the evidence does not justify reducing the practices to a simple left-brain/right-brain mechanism[9-11].

Breath retention requires additional caution because the physiological effects of prolonged respiratory manipulation differ from those of ordinary slow breathing. Individuals with cardiovascular, respiratory, neurological, or other relevant medical conditions should obtain appropriate medical advice before undertaking intensive breath-retention practices. Safety should also be considered when interpreting traditional mudras, bandhas, extreme postures, or intensive practices. Reviews of yoga-related adverse events emphasize that serious or vulnerable conditions may require professional assessment and appropriate modification[12-14].

Therefore, historical texts such as the Shiva Samhita should be approached as sources of traditional knowledge and practice rather than as substitutes for contemporary medical diagnosis or treatment.

Limitations: This article is a narrative review rather than a systematic review or meta-analysis. The scientific literature discussed includes studies with different designs, populations, sample sizes, interventions, and outcome measures. Several studies of pranayama and unilateral nostril breathing involve relatively small samples, limiting generalization.

In addition, correlations between traditional concepts and modern anatomical structures are largely interpretive. The presence of positional or functional similarity does not establish anatomical identity. The traditional concepts of nadis, chakras, and kundalini therefore require continued interdisciplinary investigation rather than definitive anatomical labeling.

Another limitation is the heterogeneity of pranayama techniques. Slow breathing, alternate-nostril breathing, rapid breathing, and breath retention can produce different physiological responses. Findings from one technique should not automatically be generalized to all pranayama practices.

Conclusion

The Shiva Samhita provides an important historical source for understanding classical Hatha Yoga, including its philosophical framework, subtle-body concepts, pranayama, mudra, bandha, and meditative practices[1]. Its descriptions should be interpreted within their original religious and philosophical context rather than treated automatically as anatomical or physiological statements.

Contemporary research provides meaningful evidence that some practices associated with the broader yogic tradition, particularly slow controlled breathing, can influence measurable cardiovascular, autonomic, and neural variables[4-7]. Studies of unilateral and alternate-nostril breathing also demonstrate measurable changes in EEG and other physiological measures, although these findings do not establish a direct anatomical equivalence between Ida, Pingala, and the cerebral hemispheres[9-11].

Similarly, proposed relationships between nadis, chakras, nerve plexuses, and endocrine structures remain hypotheses rather than established anatomical facts[2-3]. The supernatural accomplishments described in the Shiva Samhita remain unsupported by contemporary scientific evidence and should be understood within their traditional philosophical and religious context.

The most useful dialogue between the Shiva Samhita and modern science therefore lies not in attempting to prove that ancient yogic concepts are identical to modern anatomy, but in identifying practices and experiences that can be investigated objectively while respecting the conceptual integrity of the original tradition.

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