

Research Article

Philosophy of Innate Intelligence in Cellular Structure with Reference to Madhyastha Darshan

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A B S T R A C T

The cellular structure is the fundamental unit of life, which is of extraordinary complexity and coordination. It exemplifies an extraordinary degree of organisation, adaptability, and coherence. This paper explores the philosophy of innate intelligence within cellular systems, postulating that cells are guided by an inherent, self-organising principle that transcends mere biochemical interactions. Drawing insights from biological sciences, systems theory, and philosophical perspectives, the study examines how innate intelligence manifests in cellular processes such as replication, communication, and adaptability.

This innate intelligence is contextualised as an emergent property, balancing deterministic molecular mechanisms and holistic coordination that enables life to thrive amidst changing environments. The paper also investigates how this principle aligns with ancient philosophical ideas, such as Madhyastha Darshan and other frameworks that emphasise harmony, interconnectedness, purpose and inherent order in nature.

By integrating empirical evidence with philosophical inquiry, the study aims to deepen our understanding of the intrinsic organisational capabilities of cellular structures and their implications for broader biological and metaphysical discussions. The findings invite a re-evaluation of reductionist approaches, emphasising the need to consider cells not merely as mechanical units but as intelligent agents contributing to the larger organism and ecological networks.

Keywords: Innate Intelligence, Cellular Processes, Coordination, Interconnectedness, Harmony

Introduction

Biology, philosophy, and metaphysics are just a few of the fields that have been fascinated by the idea of innate intelligence in cellular structures. According to conventional scientific paradigms, genetic coding and metabolic processes are frequently responsible for cellular function-

ing. On the other hand, other philosophical systems offer a more comprehensive viewpoint, arguing that intellect and consciousness are fundamental characteristics of all things, including cells.

Even though contemporary science has made great progress in comprehending cellular processes, it frequently ignores

or rejects the idea that cells may be naturally intelligent. By investigating the idea of innate intelligence in cellular structures using Madhyastha Darshan's philosophical tenets, this study seeks to close this gap. By doing this, it aims to offer a more comprehensive explanation of cellular processes that takes into account both the material and the conscious.

Innate intelligence refers to the intrinsic, self-regulating, and self-organising principle within living systems that enables them to adapt, grow, and maintain balance in response to internal and external changes. This concept often transcends the purely mechanistic explanation of biological processes, suggesting that life is governed by an inherent wisdom or intelligence present at the cellular and systemic levels.¹

Scientific Views on the Cell

Science defines the constitution of cells as a complex system composed of various macromolecules and organelles, each with distinct functions essential for life. In biology, cells are regarded as the fundamental units of life, with their structure and function being essential for the processes of living organisms. The scientific understanding of cells is rooted in cell theory and supported by advancements in microscopy, molecular biology, and genetics.

Cell Theory (19th Century) - Cells are the basic structural and functional units of all living organisms, and all cells arise from pre-existing cells.²

The Modern Cell: Structural Components - The cell consists of several fundamental structures, each with specific functions. These include cell membrane, cytoplasm and organelles. Organelles are specialised structures like mitochondria for energy production, ribosomes for protein synthesis, endoplasmic reticulum for transport and modification of proteins, Golgi apparatus for processing and packaging of proteins, and lysosomes for waste breakdown.³

Biochemical Constitution of Cells - Cells are composed of four main classes of macromolecules—proteins, lipids, carbohydrates, and nucleic acids—that carry out all cellular functions.⁴

Genetic Material and the Central Dogma of Molecular Biology - Cells contain genetic material (DNA), which holds the instructions for all cellular functions. The central dogma of molecular biology explains the flow of genetic information:

DNA → RNA → Protein

DNA holds the instructions for protein synthesis. RNA transmits the instructions from DNA to the ribosome, and proteins carry out cellular functions based on these instructions.⁵

Cell Communication and Signal Transduction - Cells communicate with each other through chemical signals (hormones,

neurotransmitters, cytokines, etc.) that are recognised by receptors on the cell membrane, triggering signal transduction pathways that alter cellular activities. These signals are crucial for processes like growth, immune responses, and tissue repair.⁶

How Science Sees Innate Intelligence in A Living Cell

Science approaches the idea of innate intelligence in a living cell as self-regulating, information-rich, and adaptive behaviour encoded in molecular mechanisms. In cellular decision-making, cells sense their environment using receptors and respond through signal transduction pathways. For instance, a bacterium can move toward nutrients or away from toxins, called chemotaxis. It is the directed movement of a cell or organism in response to a chemical stimulus. This movement can be towards a higher concentration of the chemical (positive chemotaxis) or away from it (negative chemotaxis). It's a crucial process for bacteria to find food or avoid toxins. This behaviour seems purposeful and governed by feedback loops and chemical gradients.⁷

Science recognises the orderliness of a living cell as a manifestation of highly regulated, complex, and hierarchical systems of molecular interactions that collectively sustain life. This order is not random but emerges from deterministic biochemical processes governed by the principles of thermodynamics, molecular biology, and systems theory.

Molecular Architecture and Spatial Organisation

At the molecular level, the cell displays a meticulous arrangement of macromolecules—proteins, nucleic acids, lipids, and carbohydrates—each occupying specific locales to facilitate efficient biochemical functioning. For instance: The nucleus houses the genome in a topologically organised fashion, with euchromatin and heterochromatin regions segregated to optimise gene expression and silencing. Membrane-bound organelles, such as mitochondria and the endoplasmic reticulum, spatially compartmentalise cellular processes, preventing cross-interference and enhancing reaction specificity. This spatial precision is orchestrated by the cytoskeleton—a dynamic network of microtubules, actin filaments, and intermediate filaments that not only maintain cell shape but also facilitate intracellular transport and positioning.⁸

Biochemical Pathways and Regulatory Networks

Orderliness is also evident in the interconnected biochemical pathways that govern metabolism, signalling, and gene regulation. These pathways exhibit feedback control mechanisms, such as allosteric inhibition and genetic feedback loops, which maintain homeostasis. Robustness and adaptability, achieved through redundancy and modularity, allowing the cell to respond to environmental fluctuations while preserving internal stability. For example, the MAPK

signalling cascade demonstrates how signal fidelity and amplification are achieved through sequential phosphorylation events, ensuring a coordinated cellular response to external stimuli.⁹

Temporal Coordination

Temporal order is as critical as spatial organization. The cell cycle, circadian rhythms, and transcriptional bursts exemplify the temporal regulation of cellular events. These are governed by oscillatory networks (e.g., cyclin-CDK complexes) that ensure sequential progression through the phases of the cell cycle. Also by epigenetic timers, such as histone modifications and DNA methylation, which regulate gene expression over developmental timescales.¹⁰

Information Flow and the Central Dogma

Orderliness in the cell is underpinned by the central dogma of molecular biology, the directional flow of genetic information from DNA to RNA to protein. This unidirectional process ensures fidelity in information transfer through proofreading and error-correcting mechanisms (e.g., DNA polymerase and RNA surveillance). Functional precision, as each gene product assumes a defined role within the cellular milieu.¹¹

Entropy and Thermodynamic Considerations

From a thermodynamic standpoint, the cell maintains order by being an open system, exchanging energy and matter with its environment. Although local entropy decreases as the cell builds complex structures, this is compensated by an overall increase in the entropy of the universe, thereby aligning with the Second Law of Thermodynamics. Energy-dependent processes, such as ATP hydrolysis, drive reactions away from equilibrium, enabling the construction and maintenance of intricate cellular architecture and function.¹²

Emergence and Systems Biology

Modern science views the cell not merely as a collection of parts but as a complex adaptive system where emergent properties, such as self-replication, self-regulation, and adaptability, arise from nonlinear interactions among components. Systems biology employs mathematical modelling and network theory to understand how local interactions give rise to global behaviour, reinforcing the concept of inherent order within apparent complexity.

Science discerns the orderliness of a living cell through the lens of structural precision, dynamic regulation, and functional integration, all underpinned by physical laws and evolutionary optimisation. While our understanding is continually refined through advances in genomics, proteomics, and computational biology, the central theme remains: the cell exemplifies an extraordinary synthesis of complexity with coherence, stochasticity with control, and diversity with unity.¹³

Philosophical Views on Innate Intelligence in the Cell

The mechanistic philosophy views a cell as a complex machine composed of smaller parts (organelles), each of which performs a specific function. Cells are seen as mechanical entities whose behaviours and processes are entirely determined by their components and interactions.¹⁴

Descartes explores the human body as a complex machine, attributing its functions to mechanical processes governed by natural laws. He describes physiological activities such as digestion, heartbeat, respiration, sensory perception, and movement as resulting from the arrangement and motion of bodily organs and fluids, particularly the “animal spirits”. These processes, he argues, occur without the need for a vegetative or sensitive soul, likening them to the operations of an automaton. His mechanistic view implies a coordinated system where each part of the body operates in concert with others, akin to components of a well-designed machine. This perspective emphasises the interdependence and orderly function of bodily systems, which can be interpreted as a form of internal harmony. It presents a view of the body as a harmonious machine, with each part functioning in a coordinated manner according to mechanical principles.

Vitalists argue that life, including the activity of cells, cannot be fully explained by mechanical or chemical processes alone. Instead, a special “life force” is responsible for the organisation and functioning of living cells.¹⁵

Modern biology explains cellular functions through genetic information, molecular interactions, and evolutionary processes, without invoking non-material forces. Vitalism, including the idea of innate intelligence, is considered philosophical or metaphysical rather than scientific because it cannot be tested or measured directly. Vitalists, who refer to innate intelligence in cellular structures, believe that each living cell possesses an inherent, guiding intelligence that directs its growth, development, healing, and function. This innate intelligence is not a result of physical or chemical interactions alone, but rather a non-material, organising force that coordinates life processes. It ensures that cells “know what to do”—such as how to divide, repair themselves, or respond to their environment—without needing external instruction.

Organicism argues that living organisms, including cells, must be understood as wholes, not just as collections of parts. The cell is more than the sum of its organelles; its properties emerge from the dynamic interaction between parts.¹⁶

Organicism recognises that the intelligent-like behaviour of cells, their coordination, adaptability, and functionality is real and meaningful. It explains this not through su-

pernatural forces, but through the concept of emergent organisation. The idea is that complex, lifelike behaviour naturally arises from the dynamic interplay of biological systems.

Holism in biology contends that the cell's properties cannot be entirely explained by analysing its constituent parts in isolation. Instead, the whole cell and its relationships to its environment need to be considered.¹⁷

Holism holds that living organisms and their parts, like cells, cannot be fully understood in isolation. Every cell functions within the context of the whole organism. The "intelligence" of the cell is seen as part of the overall coordination and purpose of the organism. Holism sees "innate intelligence" as a metaphor for the deep organisation, coordination, and adaptability of living systems. The key idea is that cells are not isolated machines but active, interconnected participants in the complex, intelligent functioning of life.

In Dialectical Materialism, the Marxist philosophy suggests that living organisms, including cells, evolve through material conditions and contradictions inherent in nature. The development of a cell can be understood through the lens of historical and material forces. Dialectical materialism sees order in a living cell as a product of material interactions, not imposed by any external ideal (e.g., God or spirit). So, cellular order is not static or pre-designed—it is developed and maintained dynamically by material processes, such as metabolism, gene expression, and evolution.¹⁸

Systems theorists view cells as part of larger systems, both within themselves (subsystems like organelles) and as components of organisms or ecosystems. It views the orderliness in a cell not as a result of isolated components acting independently, but as the emergent behaviour of a highly integrated, dynamic system. It considers a cell as an open system that exchanges matter and energy with its environment (e.g., nutrients, waste, and energy). Order is maintained not by being closed, but by interacting continuously with the environment in regulated ways. These interdependent relationships give rise to emergent properties such as metabolism, reproduction, repair, and response. The cell's behaviour cannot be fully understood without reference to its place within these systems.¹⁹

Reductionism suggests that cells and their processes can be fully explained by analysing their individual parts, such as molecules, genes, and biochemical reactions. It treats the cell as a machine-like system whose behaviour and structure arise from the sum of its components. It gives explanations from the 'bottom up' and aims to explain higher-level phenomena (like metabolism, growth, or division) in terms of lower-level entities (like genes and enzymes). For example, gene expression is explained through the binding of transcription factors, RNA polymerase activity, etc.²⁰

Emergentism argues that a cell's complex properties emerge from simpler interactions among its parts, and these emergent properties cannot be predicted simply by analysing individual parts.²¹

Each of these philosophical approaches provides a different lens through which we might understand the constitution and functioning of cells, from mechanistic views to holistic or emergent properties.

These perspectives challenge purely mechanistic views by proposing that the cell's complex, coordinated behaviour may reflect an embedded intelligence in an orderly, purposeful, and self-regulated function. This opens a dialogue between biology and philosophy, raising questions about the origins, organisation, and meaning of life.

Madhyastha Darshan's Views on the Innate Intelligence in the Cell

In Madhyastha Darshan, the cell is not viewed as a random or purely mechanistic unit but as a self-organised, purpose-driven entity, regulated by an innate intelligence, the natural order (niyam) that governs all of nature. This intelligence is ensuring harmony within and among all biological processes. According to this view, each unit in existence, including the cell, possesses a specific constitution and intrinsic participation in the larger order. The cell is not seen merely as a biochemical machine but as a unit with inherent potential and definite conduct. In this philosophy, intelligence is not abstract or external but an inseparable attribute of each unit's identity. The cell, as part of a living body, operates in harmony with this universal intelligence through self-organisation, self-regulation, and purposeful participation in maintaining life processes. This innate intelligence is not learnt or acquired but is expressed as part of its existential nature. Madhyastha Darshan recognises innate intelligence in the cell as a natural expression of its participation in the universal order, where every living unit functions in alignment with its constitution, purpose, and coexistential role.

Madhyastha Darshan (the philosophy of coexistence) is a relatively modern Indian philosophical framework developed by Shri A. Nagraj, which focuses on the understanding of life, nature, and human existence through the lens of coexistence and harmony. Madhyastha Darshan is rooted in the idea that everything in the universe, including living beings, is interconnected and exists in harmony through a state of balance or equilibrium (madhyastha means "neutral" or "mediator"). Madhyastha Darshan (Sah-astitva-vad) "refers to the idea that every unit/entity/"ikai" in existence is submerged in (samprakt) with the all-encompassing whole (vyapak). "vyapak mein har ikai ki sampraktata" This concept emphasises the interconnectedness, orderliness and inherent relationship of every unit with the broader

universal existence. In this view, every entity in nature has a purpose and role in maintaining the overall balance and harmony of the universe.²²

In the context of cellular life and biological constitution, Madhyastha Darshan provides a unique interpretation of living entities like cells, focusing not only on their physical and functional aspects but also on their integral place in the larger system of nature.

Constitution of a cell - Cells, like all other natural entities, function within a self-regulated (swaniyantrit), interconnected system (avibhijyata). Every cell is seen as a part of a larger dynamic whole, working in harmony to maintain balance (harmony between the body and its environment).²³

Cells are not isolated units but operate within a holistic framework where their behaviour is synchronised with the larger body and environment. Each cell is seen as integrated into a broader system, and its purpose is aligned with the fulfilment of its role in maintaining the health and balance of that system. This view is in contrast with mechanistic reductionism, which breaks down cells into their components. Instead, Madhyastha Darshan focuses on synergistic relationships (saamrasyata) and natural order.²⁴

The cell as a holistic entity - Madhyastha Darshan sees each cell as a holistic and purposeful entity that contributes to the larger existence and functioning of the organism it is part of (swayam mein vyavastha avam samagra vyavastha mein bhagidaari). Cells are not just random collections of molecules but are endowed with a purpose to contribute to the growth, maintenance, and sustainability of life.²⁵

Purposefulness - In Madhyastha Darshan, cells are self-regulating and self-sustaining units and have a specific role in maintaining the natural balance by working in harmony with other cells and the environment. Cells function by following their innate purpose (swabhav-gati), which contributes to the universal balance or harmony.²⁵

Interconnectedness - The philosophy stresses that each living cell and its functioning is aligned with natural laws (niyam, niyantran santulan). Just as the universe operates on principles of balance and reciprocity, so too does every cell. The constitution of a cell, in this view, is not isolated but is interdependent with other entities in nature. Every living system, including cells, operates as part of a larger, harmonious whole, and any imbalance in this system leads to disease, dysfunction and disorderliness (awayawastha).²⁵

Balanced Existence in Four Orders - Harmony is understood in a holistic sense, where every entity—whether it's an atom, cell, plant, animal, or human—plays its role in maintaining a balanced, self-regulated system that supports the coexistence of all. Universal order (Saha-astitva) is about realising and maintaining the interdependence of all entities in the universe, and each plays a role in

maintaining a larger cosmic order. Every entity, whether conscious (humans, animals) or material (plants, minerals), has a place in this co-existence. The absence of conflict between these entities is a sign of harmony. In essence, harmony in Madhyastha Darshan is a state of balance and interdependence where every entity fulfils its role in a larger, interconnected system.²⁶

Madhyastha Darshan divides all of existence into four orders of nature:

1. **Material order (Padartha avastha):** Inanimate matter like rocks and soil.
2. **Bio-order (Pranic avastha):** Living matter, including plants and animals (which would include cells).
3. **Animal order (Jeev avastha):** Sentient beings that have a developed nervous system and consciousness.
4. **Human order (Gyaan avastha):** Beings with self-awareness and higher consciousness.

In this classification, the cell belongs to the bio-order (Pranic avastha), meaning it is part of the living aspect of nature. It is connected with both the material and conscious dimensions of existence. In this context, cells contribute to life processes and are understood as having coherence and purpose, playing a role in the progression and sustainability of life in the universe.

Collaboration to form Organs

- **Innate Harmony:** The cell does not function in isolation but exists in continuous communication and coexistence with other cells by maintaining a fixed distance (nischit doori). Cells work toward maintaining balance, growth, and repair according to their design. Their activities contribute to forming tissues and organs, which, in turn, maintain the functionality of the entire body.
- **Collective Harmony:** The collaboration of cells forms tissues, which then organise into organs. Each organ has a specific function, and this specialised function contributes to the overall harmony of the organism. This is seen as a reflection of collective harmony (smadhan sahit vyavastha).
- **Complementarity:** The organs, like the cells, do not operate in isolation but in complementarity. Each organ supports the functioning of others, and this interdependence ensures the sustained health and well-being of the organism.
- **Holistic View of Life:** Madhyastha Darshan views life as an integrated whole, where harmony at every level—cellular, organ, systemic, societal - stems from each unit understanding and performing its role. Just as the cells contribute to the organs, humans, too, are expected to contribute harmoniously to society.

In this way, Madhyastha Darshan proposes a model where innate order and coexistence are foundational principles

for maintaining harmony from the smallest unit (the cell) to larger systems (organs, individuals, society, and nature). Human beings have the potential to understand the holistic view of life.²⁷

Key Differences

Scientific and Madhyastha Darshan View's on Cellular Innateness

From a scientific standpoint, “innateness” refers to the cell's inherited capabilities, such as metabolism, replication, repair, and adaptation, all arising from molecular interactions and biochemical feedback loops. While science does not typically attribute “intelligence” or purpose to the cell, it acknowledges that cells exhibit complex, self-regulating, and seemingly intelligent behaviour, often modelled using systems biology, cybernetics, or information theory.

According to the Madhyastha Darshan view, the cell is not merely a physical structure, and its behaviour is not emergent from chance or complexity but is guided by intrinsic knowledge and purpose. The cell operates with certainty, continuity, and completeness, reflecting an inherent intelligence that allows it to fulfil its role in sustaining life in a coherent and orderly manner. This innate functioning is not probabilistic but assured.

- **Randomness vs. Pre-determined Order:** Science often attributes cellular order to evolutionary processes with random mutations, while Madhyastha Darshan views it as a reflection of an inherent, purposeful order.
- **Mechanistic vs. Holistic:** Science focuses on molecular and biochemical interactions to explain cellular behaviour, while Madhyastha Darshan emphasises that cells operate within a holistic, co-existential framework that goes beyond just the materialistic view.
- **External vs. Internal Drivers:** Science looks at external factors like environment and mutations as key drivers, while Madhyastha Darshan emphasises the cell's internal natural order and its role in maintaining harmony.

Philosophical and Madhyastha Darshan View's on Cellular Innateness

Across various philosophical traditions, the innateness of the cell is often interpreted as part of a broader inquiry into the nature of life, purpose, and order in the universe. Classical Western philosophy (e.g., Aristotle) speaks of a telos, an intrinsic purpose that drives all living beings, including cells, toward organised and goal-directed behaviour. In more contemporary thought, process philosophy and systems thinking view life as an emergent phenomenon, where cellular behaviour reflects patterned, self-organising processes rooted in the logic of the whole system. Eastern philosophies, like Vedanta or Taoism, see life as governed by cosmic intelligence or natural law, suggesting that even the smallest living unit reflects the larger harmony of existence.

In these traditions, innateness is not randomness but the expression of deeper order, essence, or consciousness.

Madhyastha Darshan grounds cellular innateness in the natural order (niyam), which is existence in harmony (sah-ashtiva). The cell is functioning with certainty, self-regulation, and purposeful participation in sustaining life. Its behaviour is not emergent from randomness.

- **Source of Orderliness:** Materialistic philosophies emphasise that cells' orderliness arises from physical and chemical processes, and metaphysical/vitalistic philosophies emphasise that order comes from a life force or divine principle. While Madhyastha Darshan sees orderliness as inherent in every unit/entity or “ikai” in existence due to submergence in (sampraktata) with the all-encompassing whole (vyapak) and part of the natural laws of co-existence (pahachanana nirvah karna), not imposed from outside or driven by an external force.
- **Randomness vs. Purpose:** Materialism sees no inherent purpose; processes are random and Teleology/vitalism sees the main cause of purpose as life force or being driven toward some end goal (e.g., growth, reproduction). Whereas, Madhyastha Darshan claims no randomness in existence; even cells naturally function with purpose and alignment to the larger system of nature, ensuring mutual fulfilment (upyogita purakta) and balance (niyam niyantran santulan).
- **Harmony in Cells:** Harmony may be a result of physical laws, divine will, or random processes, depending on the philosophical system. Whereas Madhyastha Darshan sees harmony as a reflection of the natural order and co-existence principles. Cells operate in alignment with the laws of nature, contributing to the well-being of the organism and ecosystem.

Orderliness as an Innate Intelligence in A Living Cell

The philosophy posits that everything in existence, including atoms, functions in harmony. An atom (Parmanu) is not seen as a random collection of particles but as an organised system where each component (parmanu ansh) has a defined role and behaves in a predictable, harmonious manner (nischit acharan). Each atom has its intrinsic properties that are a reflection of its specific nature (svabhav). The behaviour of the atom—its structure (madhyansh aur parivesh mein parmanu ansh ek vyavastha roop mein), energy, recognition and interactions (pahachanana nirvah karna)—demonstrates its inherent stability and order, which contribute to the stability and order of larger systems like molecules and matter.

The atomic structure based on energy by being submerged (samprakt) with the all-encompassing whole (vyapak vastu

urja) and forces such as electromagnetic (chumbakiyabal) interactions is seen as a balance. This balance is viewed not as chaos, but as a precise and meaningful arrangement that ensures stability. In Madhyastha Darshan, the concepts of harmony (samarasta) and orderliness (vyavastha) are central to its understanding of existence, extending from the atomic level all the way to the complexity of living cells. The philosophy suggests that all entities, from the smallest atom to the most complex living organisms, are governed by an intrinsic natural order that ensures harmony, balance, and purposeful interaction within the larger whole of existence.

From Atom to Molecule – Natural Progression

Molecular Structure: When atoms combine to form molecules, Madhyastha Darshan sees this as an expression of a higher level of harmony. This orderly way of atomic bonding demonstrates natural alignment to form more complex structures, contributing to larger systems in nature. This inherent orderliness of individual atoms allows them to co-exist and participate in the formation of compounds with the purpose of maintaining equilibrium in the material world.

Orderliness in cells

Cell Structure: In a living cell, atoms and molecules come together in even more complex structures, such as proteins, nucleic acids, lipids, and carbohydrates. These cellular components are organised in a way that reflects precise harmony and order. Every component in a cell has a defined role, contributing to the overall function of the cell, whether it's in energy production (mitochondria), genetic information storage (nucleus), or metabolic processes (cytoplasm). According to Madhyastha Darshan, a living cell represents a higher level of natural order, as it not only maintains its structure but also regulates and sustains itself autonomously.

Co-existence in a living system

In a living cell, each component does not function in isolation instead, there is a clear division of labour and integration of functions. For example, the DNA within a cell provides the blueprint for protein synthesis, and proteins in turn perform various essential tasks. This entire process happens with remarkable coordination, which Madhyastha Darshan sees as the cell's alignment with a universal order. This systemic order reflects the principle of sah-astitva (co-existence).

Santulan (Balancing) In a Living Cell

Homeostasis: The Principle of Equilibrium

It refers to the cell's ability to maintain internal balance, or homeostasis, despite changes in its environment. This includes regulating temperature, pH, and concentrations of

ions, nutrients, and waste products. Madhyastha Darshan sees this as the cell's natural ability to maintain harmony, a reflection of the universal order (sah-astitva).

Dynamic Balance of Functions

Cells maintain a dynamic balance between various functions such as metabolism, growth, and repair. For instance, the balance between anabolic (building up) and catabolic (breaking down) processes ensures that the cell can grow, divide, and maintain its structure. This balancing act is seen as part of the cell's natural design to sustain life.

Balancing of Internal and External Conditions

Through processes like osmoregulation (water balance), the cell adjusts to the changing external environment, reflecting a higher-order harmony that ensures its survival and continued function.

Energy Management

The cell balances the energy (ATP) it uses for various tasks with the energy it produces or stores. This energy equilibrium is essential for maintaining the overall stability and functioning of the cell.

Niyantran (Control) in a Living Cell

Genetic Control and Regulation

In a living cell, control is primarily exercised through genetic information stored in the DNA. The DNA controls the production of proteins, which regulate cellular functions, growth, and reproduction. This genetic control (niyantran) ensures that the cell's activities are well-regulated, following a natural order.

Cell Cycle Control

These regulatory mechanisms ensure that cells divide at the right time and in the right manner, which reflects niyantran at a cellular level. This controlled process ensures that the organism grows and repairs itself in an orderly way, without chaos or imbalance.

Signal Transduction – External and Internal Control

Cells receive signals from their environment (e.g., through hormones or other signalling molecules) and respond accordingly. This signalling mechanism controls how the cell reacts to external stimuli, such as nutrient availability, stress, or damage, to ensure it functions in harmony with its surroundings.

Enzyme Regulation

Enzymes within the cell regulate biochemical reactions, ensuring that metabolic processes happen in a controlled and efficient manner. These enzymes act as catalysts and also have feedback mechanisms that prevent overproduction or underproduction of certain products.

Membrane Regulation – Gatekeeping Function

It ensures that essential nutrients enter the cell while waste products are expelled, and harmful substances are kept out. This control mechanism maintains the integrity of the cell and allows it to function properly in its environment.

Definite Conduct in Organs (Nischit Acharan)

Organs are composed of different types of tissues that work together to perform a specific function, and each organ follows a definite conduct that aligns with its role in the body. According to Madhyastha Darshan, the principle of nischit acharan extends to how organs coordinate with one another to maintain the health and equilibrium of the body. This coordination happens in an orderly, predictable manner that ensures balance (santulan) within the organism.

Many organs, such as the heart, lungs, and digestive tract, are controlled by the autonomic nervous system, which regulates their function automatically and predictably. This regulation is an expression of nischit acharan, as the body maintains these vital processes without conscious effort, ensuring the organism's survival.²⁸

Definite Conduct in Larger Systems – Planets and Celestial Bodies

Celestial bodies like planets, stars, and moons exhibit definite conduct in their motion. For instance, the Earth revolves around the Sun in a stable, predictable orbit, while the Moon revolves around the Earth. This movement follows the laws of gravity and orbital mechanics, which are expressions of nischit acharan at the cosmic level. According to Madhyastha Darshan, such definite conduct reflects the inherent nature of celestial bodies to follow specific paths and behaviours, which are aligned with the universal harmony.

The regularity of celestial cycles, such as day and night, seasons, lunar phases, and eclipses, are not random; they occur with precision and predictability, ensuring that life on Earth follows a natural rhythm in harmony with the cosmos. Planets remain in their orbits and maintain their distance from the Sun due to the balance between gravitational forces and their own momentum. This balance is not arbitrary but governed by fixed laws that ensure stability and harmony across the cosmos.

Conclusion

Madhyastha Darshan affirms that the cell's innateness is real, knowable, and orderly, reflecting its participation in an inherently meaningful and harmonious universe. The cell is not viewed as a random or purely mechanistic unit. This is a clear departure from mainstream mechanistic biology, which often regards the cell as a chemical machine driven by physical and biochemical laws, governed by random mutations, natural selection, and external stimuli, developing

complex behaviour as an emergent property from simpler physical interactions. In contrast, Madhyastha Darshan rejects randomness or blind chance as the basis of natural systems. It holds that nature is not an accident. Every unit has a definite role, place, and behavioural programme.

The constitution of a cell is defined as both physical and purposeful, existing within the bio-order of nature and fulfilling a role in maintaining the overall balance of life. Each cell is understood to have a specific purpose (prayo-jan), contributing to the harmony of the organism and the broader system it belongs to. This view emphasises the interconnectedness of cells with the natural world and their purposeful existence, which goes beyond simple mechanistic or reductionist views of biology. This holistic understanding reflects the broader philosophical goals of Madhyastha Darshan, which seeks to explain life, nature, and a conflict-free system in terms of balance, coexistence, and interdependence.

In Madhyastha Darshan, the concept of behavioural orderliness, interconnectedness and harmony extends from the smallest atom to the largest celestial bodies like planets and stars. Atoms exhibit definite behaviour through their structure, bonding, and interactions, while celestial bodies follow predictable paths according to gravitational and orbital laws. Both levels of existence, despite their vast difference in scale, are seen as part of the same harmonious order of the universe, governed by intrinsic laws and consciousness. This definite conduct ensures that everything in existence coexists in a balanced, purposeful, and harmonious manner, reflecting the underlying unity of nature.

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