

Yoga- A Tree Without STEM in Present Times

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ABSTRACT

While the looming fear of political and climatic disruption in demographics floods the social media and the mind, longevity sciences are keeping microscopes busy. Artificially and manually, as the direct effect of the above two is on the human life span. The Indian Institute of Science (IISc), Bangalore is hosting a conference in the month of August for cutting-edge ageing technology and research discussion. India also themed this year's International Day of Yoga 2026 as 'Yoga for healthy ageing and a long life' and it draws attention to the fact that Yoga was, or is India's ancient longevity science that fostered healthy ageing and accessible old age. Support based enhancement of longevity (artificial proteins, drugs, diet and exercise), which forms the present-day ecosystem for delaying ageing is incomplete without understanding the fact that internal functioning of the body mirrors external habits and functioning of the body. i.e., the faster you work the body, the faster you age. A slow lifestyle is required to delay ageing, only night time rest will not be sufficient. Longevity in the present times does not need a support system, it needs the replacement of the system itself by fostering intelligent lifestyles as practiced in early India as Yoga. The present article draws attention to the scientific contribution of yoga to modern day longevity sciences and research and women's wellness and why it deserves a place in STEM.

Keywords: STEM, Yogic Sciences, Inclusion, Traditional Knowledge Systems, Indian Knowledge Systems.

Introduction

Background to Patanjali's Ashtanga Yoga- The pathway for promoting body and mind longevity

Patanjali identified cellular ageing first resulting in ageing of the brain. Constant decision making and thought processing under stressful conditions activates the sympathetic nervous system and runs all body processes without rest. This constant state leads to deterioration in the healthy gut bacteria and cellular degeneration. Yoga and ayurveda discuss pancha pranic imbalance and disturbances in the apana vayu or downward flowing wind in the body. As a result, overthinking, excessive dreaming and confusion increases and we experience brain fog and dementia in the final years of life.

He identified this as a concern for humanity and developed a comprehensive framework to eliminate social, functional, physiological and psychological stress. Hath Yoga Pradipika further identified cellular stress, and the oxidative stress on organs experienced by the body.

Know complete Yoga - Bhagwan Patanjali's Ashtanga Yoga

यम-नियमासन-प्राणायाम-प्रत्याहार-धारणा-ध्यान-समाधयोऽष्टावङ्गानि ॥ २.२९ ॥ (Yogasutra)

Yama (To reduce societal stress)

The first founding block Yama talks of Ahimsa (Thought, Speech, Action), Satya (Integrity and practice of truth), Asteya (wrongful procurement), Brahmacharya (Monogamy for Householders and

Celibacy for monks) Aparigraha (Objective Minimalism). The practice of Yamas ensures we reduce consumption at different levels and it also addresses the root cause of stress.

Niyama (To reduce functional stress)

Niyamas instill positive attitude building and self care. Shaucha (Physical hygiene), Santosha (Contentment), Swadhyaya (Self-Direction), Tapas (Increasing tolerance towards contradictions such as hot and cold, hunger and thirst and happiness and suffering and Ishwarapranidhana - (Surrendering the to the results of one's efforts). The practice of Niyama ensures a positive habit-forming flow state.

Asana (More popularly known)

Asanas refer to rhythmic physical postures that stimulate the organs and improve circulation and lymphatic drainage. They help the body shed off physiological stress.

Pranayama

Breathing practices that reduce oxidative stress and promote parasympathetic activation.

Pratyahara

Discipline of the senses and the practice of withdrawing the mind from the sense objects including fasting, this removes distractions and channelises thoughts. Fasting and moon-based diet bring nourishment to the body and balance the osmotic pressure at the cellular level.

Dharana

Patanjali advises the seeker of yoga to bring the mind from many thoughts (Heterogeneous) to one thought. Concentration improves and productivity boosts motivation.

Dhyana

The mind steadies in one thought and achieves a flow state. Cortisol is eliminated by the physiological systems through support of meditation.

Samadhi

The full awareness of the mind is instilled without dependence on the thought. The mind is steady and equanimous. Physical and mental stress is almost nullified.

Yogic postures as defence against Cellular -Ageing and benefits at cellular level

- **Baddha Konasana (Bound Angle Pose)**

Baddha Konasana facilitates enhanced circulation to the pelvic and abdominal regions, thereby improving tissue perfusion and nutrient delivery at the cellular level. The posture promotes parasympathetic dominance and stress reduction, which may attenuate the excessive production of reactive oxygen species (ROS). By reducing oxidative stress and supporting efficient cellular metabolism, Baddha Konasana may contribute to the preservation of cellular integrity and the maintenance of normal physiological functions associated with healthy ageing.

- **Ustrasana (Camel Pose)**

Ustrasana is characterized by a deep thoracic expansion that increases respiratory efficiency and oxygen uptake. Enhanced oxygen availability supports mitochondrial oxidative phosphorylation, thereby improving cellular energy production. Furthermore, the posture stimulates neuroendocrine activity and may help regulate hormonal homeostasis. Improved mitochondrial function and reduced oxidative burden are important factors in mitigating cellular senescence and age-related functional decline.

- **Matsyasana (Fish Pose)**

Matsyasana promotes chest expansion and cervical extension, facilitating improved respiratory function and circulation. Enhanced oxygenation supports ATP synthesis and cellular bioenergetics, which are critical for tissue maintenance and repair. The posture is traditionally associated with stimulation of the thyroid region, potentially influencing metabolic regulation. Improved metabolic efficiency may aid in reducing cellular dysfunction and maintaining homeostatic balance, thereby supporting longevity-related physiological processes.

- **Viparita Karani (Legs-Up-the-Wall Pose)**

Viparita Karani is a restorative inversion that promotes venous return, lymphatic drainage, and autonomic nervous system regulation. Improved circulation facilitates the efficient transport of nutrients,

oxygen, and immune mediators while enhancing the clearance of metabolic by-products. The posture has been associated with reduced sympathetic activity and lower stress-induced inflammatory responses. Through the modulation of inflammation and oxidative stress, Viparita Karani may create favorable conditions for cellular repair and regeneration.

- **Simhasana (Lion Pose)**

Simhasana incorporates controlled respiratory activation and neuromuscular engagement of the facial, pharyngeal, and respiratory structures. The practice may improve oxygen exchange and promote circulation within the head and neck region. By facilitating emotional release and reducing psychological stress, Simhasana may decrease the activation of stress-responsive pathways linked to oxidative cellular damage. Such effects may contribute to improved cellular resilience and maintenance of normal physiological function during ageing.

- **Parvatasana (Mountain Pose)**

Parvatasana encourages postural alignment, spinal elongation, and diaphragmatic breathing. These physiological effects enhance respiratory efficiency and tissue oxygenation, thereby supporting mitochondrial function and cellular energy metabolism. Improved oxygen delivery assists in maintaining cellular homeostasis and reducing metabolic stress. Regular practice may contribute to the preservation of cellular vitality by supporting efficient bioenergetic processes and reducing stress-related physiological burden.

- **Balasana (Child's Pose)**

Balasana is a restorative posture known for its calming influence on the nervous system. The posture facilitates parasympathetic activation and may reduce circulating cortisol levels, thereby lowering systemic stress responses. Chronic psychological stress is associated with increased oxidative damage, inflammation, and accelerated cellular ageing. By promoting relaxation and physiological recovery, Balasana supports cellular repair mechanisms and contributes to the maintenance of cellular homeostasis.

Implications for Cellular Ageing

The anti-ageing potential of these yogic postures may be attributed to their collective influence on key biological pathways implicated in cellular senescence. Regular practice has the potential to enhance mitochondrial efficiency, improve tissue oxygenation, reduce oxidative stress, modulate inflammatory processes, and support autonomic balance. These mechanisms are closely associated with the preservation of cellular function, maintenance of genomic stability, and promotion of healthy ageing. Consequently, the integration of such yogic postures into daily practice may serve as a non-pharmacological strategy for supporting cellular longevity and reducing the physiological impact of age-related decline.

Habits that Support Longevity and Prepare the Body for Yoga

Some habits have a positive impact on your body and mind. Aligning oneself with the circadian rhythms, developing a routine and forming a habit of moderation in eating, giving up intoxicants and prioritizing deep rest, all of these prepare the body and help one derive the energetic shift that yoga brings. Taking out time to soak in the sun at least twenty minutes a day, practice brisk walking, simple stretches, and light sports help condition the body. Adding a clean source of protein and vitamins will support physical health further. Some people also prefer going for an ayurveda detox retreat or panchakarma before they work through yoga. This enhances their cellular reception and removes sluggishness and laziness from the body. In case unprepared on the above aspects, one should add them to their health routine.

Way Forward

Why does YOGA need inclusion in STEM ?

STEM stands for Science, technology, Engineering and Mathematics.

Although a crucial factor in promoting longevity, yoga is not recognised as stem. It is either a part of Humanities or viewed as Alternative Therapy. If included under longevity sciences, Patanjali's Ashtanga Yoga will shine forth as longevity supported scientific disciplines and new doors of research and development will bring in scientific minds in yoga. Scholarships, fellowships in yoga based longevity

research will foster women's health and overall family wellbeing. This will change the way yoga is perceived and practised as holistic and integrated results will be visible.

The alarming rise in pre-mature ageing of the human body, degeneration of organs, due to stressful lifestyle and constant activation of the sympathetic nervous system, strongly point to the need to rethink work-life balance. The author of this article strongly asks for a place for yoga in STEM or STEM (India) and include her below recommendations in policymaking:

- Adopt Habit centric longevity approach vs support centric longevity approach
- Including yoga based lifestyle as primary demographic investment
- Further R&D in Patanjali's Ashtanga Yoga and clinical trials on practitioners
- STEM Yoga to include Integrated Medicine Sector
- Acknowledgment of lifestyle based human experiences, not solely object based
- Adopt Habit centric longevity approach vs support centric longevity approach
- Inclusion of natural living conditions for longevity
- Yoga induced Thermodynamics supporting longevity

'Time for living' - hours spent in practice of yogic practices

"योगः दीर्घजीवनस्य विज्ञानम्"

(Yoga is the science of Long- Life)

We are perhaps the most educated generation as compared with our ancestors, yet we fail to read the message of nature. The human body is nature, it cannot survive longer as a species if it is cut away from its source. We need to take inspiration from the movement of the earth, the stars and the planet and align our movement slowly and steadily accordingly. We need to observe the space birds and animals give each other to voice themselves. We must, too, reduce our noise of living and listen to the earth in meditation.

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