



Review Article

www.ijrap.net

(ISSN Online:2229-3566, ISSN Print:2277-4343)



A REVIEW ON ROLE OF YOGA IN ENHANCING IMMUNITY: AYURVEDIC AND MODERN INSIGHTS

Rakesh Shukla *

Lecturer, State Model Institute of Ayurveda Sciences, Gandhinagar, Gujarat, India

Received on: 08/1/26 Accepted on: 02/3/26

***Corresponding author**

E-mail: drakesh.ayur@gmail.com

DOI: 10.7897/2277-4343.17272

ABSTRACT

Yoga, a traditional practice rooted in Ayurvedic principles, is widely recognized for its beneficial impacts on physical, mental, and spiritual well-being. In Ayurveda, immunity is associated with the concept of "Ojas," which signifies energy and resilience. Various yogic techniques, including asanas (postures), Pranayama (breath control), and meditation, have historically been utilized to bolster Ojas and enhance overall health. Recent scientific research increasingly supports the idea that yoga positively influences immune function by reducing stress, modulating inflammation, and improving the autonomic nervous system's efficiency. Studies indicate that consistent yoga practice can lower cortisol levels, improve vagal nerve function, and optimize the performance of immune cells, thereby enhancing the body's defences against infections and chronic diseases. Moreover, Pranayama practices are shown to improve respiratory efficiency and oxygen delivery, benefiting immune health further. This review explores both Ayurvedic insights and contemporary scientific evidence regarding yoga's role in supporting immune function. It elaborates on the concept of Ojas, Ayurvedic approaches to immunity, and the physiological mechanisms through which yoga affects immune responses. Additionally, it examines research on the relationship between yoga and immunity, particularly the advantages of stress management, Pranayama, and dietary considerations. Although yoga offers a holistic approach to strengthening immunity, there are challenges in integrating Ayurvedic concepts with modern healthcare practices. Future research should focus on large-scale clinical trials and biomarker studies to establish standardized yoga protocols for immune enhancement. By incorporating yoga into daily life, individuals can improve their immune systems and facilitate long-term health.

Keywords: Yoga, Pranayama, Immunity, Ojas, Ayurvedic Practices for Immunity, Yoga for Immunity.

INTRODUCTION

The immune system is an intricate assembly of cells, tissues, and organs that collaborate to protect the body from harmful pathogens, such as bacteria, viruses, and various foreign entities. A properly functioning immune system is vital for overall health, as it not only combats infections but also contributes to wound healing, regulates inflammation, and helps prevent chronic diseases.¹ It is important to maintain a balanced immune response, as both excessive and insufficient immune activity can lead to health issues. For example, autoimmune disorders occur when the immune system becomes overactive and incorrectly targets the body's own cells, whereas a weakened immune system increases the risk of infections and other illnesses.²

Lifestyle choices play a crucial role in the functioning of the immune system. Increasing research indicates that factors such as stress, nutrition, sleep, and physical exercise all impact immune health. For instance, prolonged stress can weaken immune performance by raising cortisol levels, which hinders the body's capacity to combat infections.³ Consuming a well-balanced diet high in vitamins, minerals, and antioxidants is essential, as it supplies vital nutrients that bolster immune cell operations. Furthermore, engaging in regular exercise improves blood circulation, facilitating more effective movement of immune cells throughout the body. Lastly, sufficient sleep is important for immune system regulation, permitting the body to repair and regenerate its cells.⁴

Yoga has emerged as a significant lifestyle intervention for boosting immune health, recognized for its immune-modulatory benefits as a mind-body practice. Originating from ancient Ayurvedic traditions, yoga integrates physical postures (asanas),

breath regulation (Pranayama), and meditation (Dhyana) to foster holistic well-being. Traditionally, yoga has been employed to enhance both physical and mental health, increase flexibility, and alleviate stress.⁵

Recent scientific investigations have yielded substantial evidence highlighting the advantages of yoga in moderating immune function. Research findings suggest that yoga can decrease stress hormone levels, diminish inflammation, and boost immune cell performance. In particular, consistent practice of yoga has been linked to an increase in the production of advantageous cytokines, which are important signalling molecules that assist in orchestrating immune responses. Furthermore, studies have demonstrated that yoga can lower indicators of chronic inflammation, a significant contributor to various health issues, such as cardiovascular diseases, diabetes, and autoimmune disorders.⁶

Furthermore, yoga's emphasis on mindfulness and relaxation promotes parasympathetic nervous system activity, commonly known as the "rest and digest" response. This shift away from chronic stress allows the body to allocate resources toward healing, repair, and immune function. By incorporating yoga into daily routines, individuals can foster a holistic approach to health, supporting both mental and physical well-being while enhancing immune resilience.

As more research continues to explore the connection between yoga and immune function, it is becoming increasingly evident that this ancient practice offers significant health benefits. Whether practiced through gentle restorative yoga, dynamic Vinyasa flows, or deep meditative breathing exercises, yoga

serves as a valuable tool in promoting a balanced and robust immune system.⁷

Ayurvedic Perspectives on Immunity⁸

Ayurveda conceptualizes immunity as "Ojas," the essence of vitality and well-being. According to Ayurvedic principles, Ojas is nurtured through proper diet, lifestyle, and mental harmony. Yoga is a crucial component in maintaining and enhancing Ojas by:

- Reducing stress, which depletes Ojas
- Promoting proper digestion and detoxification
- Enhancing circulation and energy flow (Prana)
- Strengthening mental clarity and emotional balance

Concept of Ojas

Ojas is recognized as a crucial energy that influences immunity, strength, and resilience in the body. It represents the refined essence derived from bodily tissues, generated through effective digestion and metabolic processes. To promote Ojas, factors such as a Sattvic diet, sufficient rest, positive emotional states, and regular yogic practices are beneficial. Conversely, high stress levels, poor dietary choices, and insufficient physical activity can lead to a decrease in Ojas.⁹

Ayurvedic Practices for Immunity^{10,11}

Ayurveda emphasizes specific lifestyle and dietary interventions to enhance immunity, including:

- Herbal Remedies: Ashwagandha, Tulsi, and Amla to boost immune resilience.
- Daily Routines (Dinacharya): Oil pulling, tongue scraping, and Abhyanga (oil massage) for detoxification and immune support.
- Seasonal Regimens (Ritucharya): Adjusting lifestyle according to seasonal changes to maintain immune equilibrium.

Ayurvedic Perspective on Immunity and Yoga

Ayurveda, an ancient holistic healing practice, perceives immunity as a manifestation of Ojas, the vital essence that promotes health, resilience, and overall wellness. Ojas serves as the cornerstone of robust immunity, longevity, and both mental and physical strength. It is produced through the effective digestion and assimilation of food, complemented by a lifestyle that fosters balance among the body, mind, and spirit. When Ojas levels are high, individuals experience optimal health, increased energy, and greater resistance to disease. In contrast, a depletion of Ojas—often caused by inadequate nutrition, chronic stress, poor lifestyle choices, or significant emotional upheaval—can lead to a weakened immune system, resulting in greater vulnerability to illness and fatigue.¹²

NURTURING OJAS THROUGH YOGA

Yoga is intricately connected to Ayurveda as a therapeutic method that boosts Ojas and fortifies the body's defence systems. According to Ayurvedic literature, the integration of mindful movement, breath regulation, and meditation is essential for maintaining immunity by harmonizing the body's energies, known as Doshas, and fostering overall balance. Several processes through which Yoga enhances Ojas include:

1. Reducing Stress, Which Depletes Ojas

Chronic stress is a primary contributor to immune system decline, primarily due to elevated cortisol levels which trigger inflammation, oxidative stress, and reduced energy levels. In Ayurveda, high levels of stress and mental turmoil are recognized as major factors that negatively impact Ojas, the vital essence of

life. Practices such as Yoga, especially Pranayama (breathing exercises) and meditation, are effective in soothing the nervous system, stimulating the parasympathetic response, and lowering stress hormone levels. This, in turn, aids in safeguarding and revitalizing Ojas.¹³

2. Promoting Proper Digestion and Detoxification

Ayurveda identifies Agni, or digestive fire, as a crucial factor influencing immunity. A robust Agni facilitates the proper digestion of food, enhances nutrient absorption, and ensures the removal of toxins, known as Ama, from the body. Conversely, weak digestion can result in the build-up of undigested food, leading to toxin accumulation that hinders immune performance and diminishes Ojas. Engaging in yogic practices, including twisting postures, forward bends, and breathing exercises like Kapalabhati and Agnisar Kriya, can invigorate digestive fire, boost metabolism, and support detoxification processes.¹⁴

3. Enhancing Circulation and Energy Flow (Prana)

In Ayurveda, Prana, which is considered the life force energy, plays a crucial role in supporting all physiological activities. A free flow of Prana within the body nourishes cells, tissues, and organs, thereby boosting vitality and strengthening immune function. Specific yoga asanas, especially heart-opening poses like Ustrasana and Bhujangasana, inversions such as Sarvangasana, and dynamic sequences like Surya Namaskar, can enhance circulation, promote lymphatic drainage, and increase oxygen levels, all of which are vital for maintaining immune resilience.¹⁵

4. Strengthening Mental Clarity and Emotional Balance

In Ayurveda, mental well-being is closely linked to the immune system. Emotions that are negative, such as fear, anxiety, anger, and grief, can disrupt the balance between the mind and body, resulting in a decrease in Ojas, which is considered vital energy. Engaging in practices like yoga and meditation fosters inner tranquility, emotional stability, and mindfulness, enhancing the mind's capacity to handle stress and challenges from the outside world. Specific meditative techniques, including Trataka (gazing meditation), Japa (mantra repetition), and Yoga Nidra, are especially effective in promoting emotional health and improving mental clarity.¹⁰

Modern Scientific Insights into Yoga and Immunity^{6,16}

Scientific studies have increasingly validated the immunological benefits of yoga. The key mechanisms by which yoga enhances immune function include:

Reduction of Stress and Inflammation: Chronic stress suppresses immune function by increasing cortisol levels. Yoga has been shown to reduce cortisol and enhance parasympathetic activity, leading to lower inflammation and improved immune resilience.

Enhanced Circulatory and Lymphatic Function: Certain yoga poses stimulate the lymphatic system, which is essential for removing toxins and pathogens.

Boosting Respiratory Efficiency: Pranayama improves lung capacity and oxygenation, which enhances overall immune defense mechanisms.

Regulation of Cytokines and Immune Cells: Yoga modulates inflammatory cytokines and increases the activity of natural killer (NK) cells, which are crucial for immune surveillance.

Gut-Immune Axis Improvement: A healthy gut micro biome is fundamental to immune function. Yoga, through stress reduction and improved digestion, supports gut health and immune balance.

KEY YOGIC PRACTICES FOR IMMUNE ENHANCEMENT

Pranayama¹⁷

- Bhastrika (Bellows breath) – Enhances lung function and circulation.
- Anulom Vilom (Alternate nostril breathing) – Balances autonomic nervous system.
- Bhramari (Humming bee breath) – Reduces stress and anxiety.

Asanas¹⁸

- Bhujangasana (Cobra pose) – Stimulates the thymus gland.
- Matsyasana (Fish pose) – Enhances respiratory function.
- Viparita Karani (Legs-up-the-wall pose) – Supports lymphatic drainage.

Meditation and Mindfulness

- Mindfulness meditation lowers inflammatory markers.
- Yoga Nidra reduces sympathetic over activity and boosts relaxation.

SCIENTIFIC RESEARCH ON YOGA AND IMMUNITY

Recent scientific investigations have focused on the relationship between yoga and immune function. Research studies have shown significant evidence indicating that yoga can have a beneficial effect on multiple physiological and biochemical processes associated with immunity. Engaging in yoga, which encompasses asanas (postures), Pranayama (breath control), and meditation, has been found to modulate inflammatory responses, optimize autonomic nervous system activity, and boost both innate and adaptive immune responses.¹⁹

1. Reduction of Inflammatory Markers and Cytokines²⁰

Chronic inflammation is a key contributor to many diseases, including autoimmune disorders, cardiovascular diseases, diabetes, and even cancer. One of the most significant findings in yoga research is its ability to modulate inflammatory cytokines. Studies have shown that regular yoga practice reduces pro-inflammatory cytokines, such as interleukin-6 (IL-6) and tumour necrosis factor-alpha (TNF- α). These cytokines are associated with chronic inflammation and disease progression.

Yoga has also been found to increase levels of anti-inflammatory cytokines, such as interleukin-10 (IL-10), which help suppress excessive immune responses and prevent tissue damage.

A 2018 study published in *Psychoneuroendocrinology* found that individuals who practiced yoga and mindfulness meditation exhibited lower levels of inflammatory markers compared to non-practitioners.

Another study in *Frontiers in Human Neuroscience* indicated that yoga practitioners had reduced C-reactive protein (CRP) levels, an important marker of systemic inflammation.

2. Enhancement of Vagal Tone and Autonomic Nervous System Regulation^{21,22}

The vagus nerve plays a critical role in the regulation of the autonomic nervous system (ANS) and immune function. A well-functioning vagal tone (the activity of the vagus nerve) is associated with improved stress resilience, reduced inflammation, and enhanced immune response.

Research suggests that yoga enhances vagal tone, leading to better parasympathetic nervous system activation ("rest and

digest" response). This activation reduces excessive immune activation and promotes healing.

A study published in *Brain, Behaviour, and Immunity* found that yoga significantly increased heart rate variability (HRV), a key indicator of vagal tone and autonomic balance.

3. Reduction of Cortisol and Enhancement of Adaptive Immunity^{20,23}

Chronic stress weakens immunity by elevating cortisol levels, which suppresses immune function and increases susceptibility to infections and chronic diseases. Yoga, as a mind-body practice, has been scientifically proven to lower cortisol levels and enhance the body's adaptive immune response.

A study in *Journal of Behavioural Medicine* demonstrated that participants who engaged in yoga-based interventions exhibited significantly lower cortisol levels compared to those who did not practice yoga.

Lower cortisol levels correlate with enhanced T-cell function, particularly CD4+ T-helper cells, which are essential for coordinating immune responses.

Additionally, yoga has been found to increase natural killer (NK) cell activity, which is crucial for identifying and destroying virus-infected and cancerous cells.

Regular yoga practice has also been associated with improved immunoglobulin A (IgA) levels, an important antibody involved in mucosal immunity, which helps defend against respiratory and gastrointestinal infections.

Pranayama and Immunity²⁴

Breathing techniques in yoga, known as Pranayama, have profound effects on immunity by enhancing oxygenation, reducing oxidative stress, and improving lung function. Key practices include:

- Bhastrika (Bellows Breath): Increases lung capacity and oxygenation.
- Anulom Vilom (Alternate Nostril Breathing): Balances sympathetic and parasympathetic nervous systems.
- Bhramari (Humming Bee Breath): Lowers stress-induced inflammation and promotes relaxation

Impact on Stress and Immunity

Chronic stress negatively affects the immune system by raising levels of cortisol and inflammatory cytokines. Practicing yoga helps counteract these impacts by stimulating the parasympathetic nervous system, lowering anxiety, and improving resilience to stress. As a result, yoga indirectly aids in maintaining immune function.²⁵

Dietary Considerations in Yoga and Immunity

A balanced, sattvic diet plays a crucial role in immune support. Ayurveda recommends:

- Fresh, whole foods rich in antioxidants and micronutrients.
- Hydration and herbal teas to support detoxification.
- Avoiding processed foods and excess stimulants to prevent immune suppression.

DISCUSSION

The combination of Ayurvedic principles with contemporary scientific research underscores the multifaceted role of yoga in boosting immunity. In Ayurveda, the concept of Ojas is seen as the basis of immune strength. Meanwhile, modern immunology

associates yoga with decreased stress, hormonal regulation, and improved cellular immune responses. The relationship between these viewpoints indicates that yoga offers both preventive and therapeutic advantages. Recent research lends support to the idea that yoga can lower levels of pro-inflammatory cytokines, which are associated with several chronic illnesses, including cardiovascular diseases, diabetes, and autoimmune disorders. Furthermore, the balance achieved through yoga enhances vagal tone, which is essential for maintaining homeostasis and supporting immune function.²⁶

An important insight is the effect of yoga on mental health, which is directly related to immune system function. Factors such as stress, anxiety, and depression can adversely affect immunity by altering hormonal balances. Yoga employs mindfulness and deep-breathing exercises, which help reduce psychological stress and indirectly bolster immune resilience. Although considerable evidence backs the advantages of yoga, additional large-scale randomized controlled trials are required to develop standardized approaches for enhancing immunity through yoga. Differences in individual responses to practice, the time needed to see measurable benefits, and the long-term effects of yoga are subjects of ongoing investigation.²⁷

CONCLUSION

Yoga is a holistic mind–body practice that strengthens immune resilience by harmonizing physical, mental, and physiological processes. Rooted in Ayurvedic principles, it enhances Ojas, the vital essence responsible for immunity and vitality. Contemporary scientific evidence supports yoga’s immunomodulatory effects, including reduced inflammation, improved stress regulation, and strengthened immune responses. Through the integrated practice of asanas, pranayama, and meditation, yoga promotes a balanced nervous system and sustainable immune health. Thus, yoga emerges as both a traditional wellness approach and a scientifically validated strategy for naturally enhancing immunity and overall well-being.

REFERENCES

- Chlebowski DC. The Virus and the Host: Protect Yourself from Infectious Disease by Reducing Toxicity, Improving Immunity, and Minimizing Chronic Illness. 2022.
- Khadim RM, Al-Fartusie FS. Antioxidant vitamins and their effect on immune system. In *Journal of Physics: Conference Series* 2021 Mar 1 (Vol. 1853, No. 1, p. 012065).
- Shao T, Verma HK, Pande B, Costanzo V, Ye W, Cai Y, Bhaskar LV. Physical activity and nutritional influence on immune function: an important strategy to improve immunity and health status. *Front Physiol.* 2021;12:751374
- Suardi C, Cazzaniga E, Graci S, Dongo D, Palestini P. Link between viral infections, immune system, inflammation and diet. *International journal of environmental research and public health.* 2021 Mar 2;18(5):2455.
- Rathore M, Verma M, Abraham J, Dada R, Kumar M. Impact of “yoga based lifestyle interventions” and its implications on health and disease. *Int Res J Ayurveda Yoga.* 2023 Jan 31;6(1):64-73.
- Estevao C. The role of yoga in inflammatory markers. *Brain.* sciencedirect.com
- Giridharan S. Beyond the Mat: Exploring the Potential Clinical Benefits of Yoga on Epigenetics and Gene Expression: A Narrative Review of the Current Scientific Evidence. *Int J Yoga.* 2023;16(3):193–200.
- Roy D, Joshi S. Dhat Syndrome in Indian Traditional Medicine. In *Dhat Syndrome: Medical, Psychological and Sociocultural aspects* 2024 Mar 14 (pp. 37-48). Singapore: Springer Nature Singapore.
- Neelam K, Neelam Y. Ojas: A scientific review on the basis of ayurvedic and modern aspects. *J Ayurveda Integr Med.* 2023;14(2):100642.
- Thakur R, Naik R, Mythrey RC, Bhat S. Ayurveda perspectives and research updates on factors influencing the immunity: A review. *Journal of Indian System of Medicine.* 2021 Jan 1;9(1):21-7.
- Mishara RM, Koirala S. Evaluating the effects of Ayurvedic lifestyle interventions on naturopathic management of autoimmune disorders. *J Ayurveda Naturopathy.* 2024;8(1):45–52.
- Yadav P. An Analytical Study on the Methodical Scrutiny of Ayurveda's Trajectory Towards Longevity and Youthful Vitality Using Rasayana Therapy. *Journal of Internal Medicine and Pharmacology (JIMP).* 2025 Feb 25;2(01):48-61.
- Westfall S, Caracci F, Estill M, Frolinger T, Shen L, Pasinetti GM. Chronic stress-induced depression and anxiety priming modulated by gut-brain-axis immunity. *Frontiers in immunology.* 2021 Jun 24;12:670500.
- Dubey VK, Shukla VV. Bridging ancient wisdom and modern science: Exploring the symbiotic relationship between Agni and manas in Ayurveda and contemporary perspectives. *World Journal of Advanced Research and Reviews.* 2024;22(1):401-6.
- Munoz C. The Real Pranayama: Energy Vital-and Not Breath-Control Exercise. *Open Access Libr J.* 2024;11:e11045.
- Krishna A, Sharma KK. A comprehensive review of Yoga's impact on Immunomodulatory Functions and Microbiome in Obesity. *Journal of Ayurveda and Integrated Medical Sciences.* 2023 Dec 28;8(11):87-92.
- Thakare V. Pranayama for Enhancing Respiratory and Cardiovascular Function. *Int J Yoga Allied Sci.* 2021;10(2):120–125
- Singh BR, Singh MK. Yoga for Healthy Lungs. *J Anc Tradit Sci.* 2024;10(1):55–60.
- Yeun YR, Kim SD. Effects of yoga on immune function: systematic review. *Complement Ther Clin Pract.* 2021;42:101287
- Mishra B, Agarwal A, George JA, Upadhyay AD, Nilima N, Mishra R, Kuthiala N, Basheer A, Vishnu VY, Srivastava VP, George JA. Effectiveness of yoga in modulating markers of immunity and inflammation: a systematic review and meta-analysis. *Cureus.* 2024;16(4):e57521
- Pascoe MC, Thompson DR, Jenkins ZM, Ski CF. Mindfulness-based stress reduction and yoga on inflammatory markers. *Psychoneuroendocrinology.* 2018;88:172–181.
- Herbert C. Changes in heart rate variability after yoga. *Front Psychol.* 2021;12:699076.
- Shah K, Adhikari C, Saha S, Saxena D. Yoga, immunity and COVID-19: a scoping review. *Journal of family medicine and primary care.* 2022 May 1;11(5):1683-701.
- Gupta N, Kumar P, Mehta T. Physical Activity, Yoga and Meditation in Improving Immunity and Fighting Against Viral Respiratory Infections-A Systematic Review.(An Aid to COVID-19 and such Pandemics). *Indian Journal of Science and Technology.* 2022 Oct 14;15(38):1923-31.
- Erceg N, Micic M, Forouzan E, Knezevic NN. The Role of Cortisol and Dehydroepiandrosterone in Obesity, Pain, and Aging. *Diseases.* 2025. nih.gov
- Gautam S, Kumar U, Kumar M, Rana D *et al.* Yoga improves mitochondrial health in arthritis. *Mitochondrion.* 2021;58:200–208.

27. Pattyn N, Beech D, Wilhelmsson J, Kilding H, Mendrek A. Restorative techniques: Mindfulness, relaxation, breathing, and yoga. In Handbook of Mental Performance 2024 (pp. 86-118).

Cite this article as:

Rakesh Shukla. A Review on Role of yoga in enhancing immunity: Ayurvedic and modern insights. *Int. J. Res. Ayurveda Pharm.* 2026;17(2):170-174 DOI: <http://dx.doi.org/10.7897/2277-4343.17272>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IJRAP is solely owned by Moksha Publishing House, a non-profit publishing house dedicated to publishing quality research. Every effort has been made to verify the accuracy of the content published in our journal. IJRAP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of the IJRAP editor or editorial board members.