

Therapeutic Applications Of Colour And Light: Bridging Holistic Practices And Modern Healthcare

Wathsala Sripali Kumarasinghe¹ and Dr K. Jayanthi² and Dr Rajeshwari Ullagaddi^{1*}

¹ Department of Life Sciences, Sri Sathya Sai University for Human Excellence,
Kalaburagi, 585313, Karnataka, INDIA

² Department of Physical and Chemical Sciences, Sri Sathya Sai University for Human
Excellence, Kalaburagi, 585313, Karnataka, INDIA

*Corresponding author/email: Dr Rajeshwari Ullagaddi

Abstract

The growing incidence of stress-related disorders and emotional disturbances in modern society has intensified interest in alternative therapy and non-invasive therapeutic approaches that support holistic health. Colour therapy, or chromotherapy, is an integrative modality that applies the psychological and neuropsychological impact of various colours to manipulate emotions, mental states and even physical wellbeing. This integrative review examines the multifarious roles of light and colour therapy in areas of health and wellness ranging from historical background to scientific principles, mechanisms of psychological action, and traditional healing paradigms. The present paper explores the physical properties of light and colour perception, stressing neurobiological pathways involving limbic system activity, hypothalamic regulation, visual processing, and autonomic nervous system responses. Psychological evidence from light and colour perception studies is also discussed to expound upon how specific hues may impact mood, attention, emotions and stress responses. In traditional Indian healing systems, Ayurveda and the chakra framework are integrated to demonstrate symbolic and functional relations between light, colours, mental states, and energetic balance. Practical applications of colour therapy, including light exposure, visualization, environmental design, meditation, and expressive arts are studied within integrative health-care settings. Ethical considerations, safety implications and limitations inherent in these approaches are discussed critically so that their integration can take place responsibly in conjunction with conventional medical and psychological treatment. Overall, integrating light and colour therapy arises as a low-risk, accessible complementary method with potential benefits for emotional and mental well-being, demanding further rigorous interdisciplinary research to reinforce its scientific authentication and clinical significance.

Keywords: Holistic wellness, Light therapy, Chromotherapy, Integrative medicine, Colour psychology, Mental health.

1. Introduction

The challenges associated with health and wellness in stressful modern society have grown significantly in recent decades, due to rapid urbanization, digital overexposure, sedentary habits, and chronic psychosocial stress. These lifestyle-related stressors are further aggravated by disturbance of natural light-dark cycles, which play a perilous role in adapting circadian rhythms, emotional stability, and overall well-being [1,2]. Consequently, mental stress combined with emotional dysregulation, obstructive sleep cycles, and metabolic disorders due to an unbalanced lifestyle now affects populations across all age groups. While traditional pharmacological and psychotherapeutic therapies occupy a central position in medical practice, it must be acknowledged that their emphasis is often not on achieving effective cures, but rather on symptom management. In response to these pressing challenges, the use of complementary and integrated therapies with minimal or no side effects has been growing steadily (Fig. 1) [3,4].

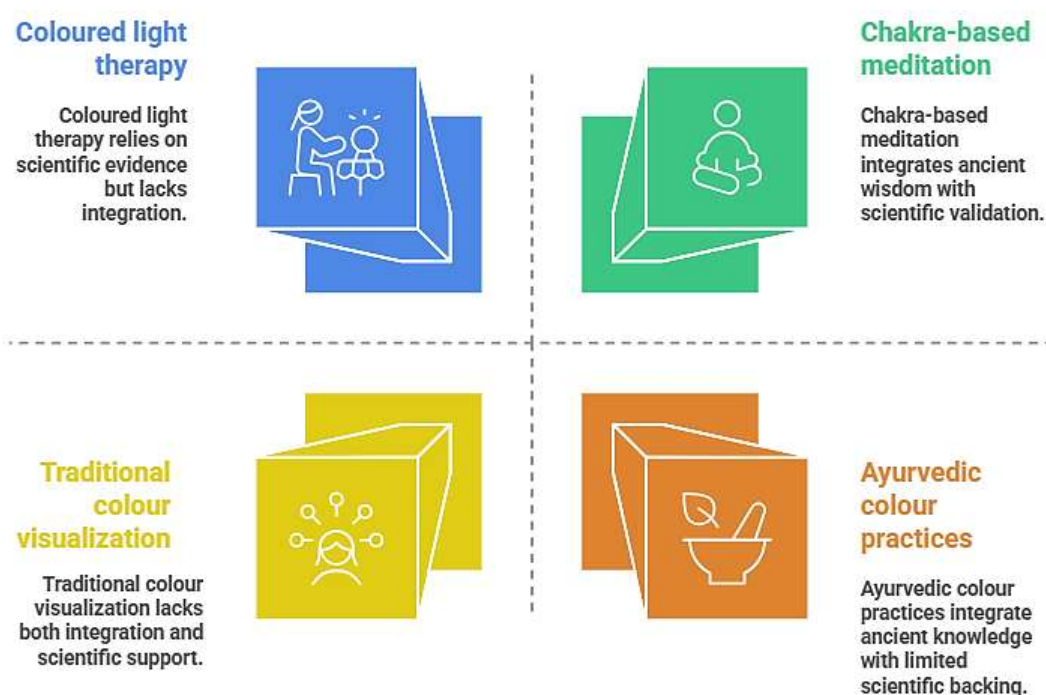


Figure 1. Light and colour-based therapeutic practices in integrative wellness [3]

Chromotherapy or colour therapy is a non-invasive and complementary healing modality that uses the various colours of the visible spectrum as an alternative to influence people's emotions, psychology and physiology. Colour itself is a form of electromagnetic radiation that takes form in the mind through a complex visual pathway and is processed by the brain, where it can greatly influence not only mood [5], but also cognitive functions, endocrine response, and autonomic nervous system reactivity. In contrast to the invasive tendencies of modern medicine, colour therapy is based on balance, harmony, and self-regulation, offering special advantages for prophylaxis and supportive treatment in the areas of mental health. This healing method uses both ancient knowledge and recent findings from science and psychology to aid recovery from environmental shocks through modulation of sensory inputs, rather than relying solely upon pharmacological intervention. Mental health disorders, stress, anxiety, mood disturbances (including depression and emotional instability) are increasing at an alarming rate on a global basis, mainly due to rapid urbanization, drastic lifestyle changes, enormous digital exposure and social isolation, coupled with burgeoning pressure to perform well in different facets of life. Pharmacological interventions and psychotherapy remain the main methods of treating these conditions, but, interestingly, both require a more symptom-based management scheme rather than an integrated approach to emotional health. In addition, limitations related to side effects, economic burden, accessibility, and adherence complexity have increased interest in complementary and integrative therapeutic techniques [4].

Ancient cultures and healing systems, including the traditions of Ayurveda, Yoga and Traditional Chinese Medicine, have acknowledged the subtle but powerful role that colour plays in human consciousness and in the complex energy fields of the body. Today, colour therapy is used in many ways, from the application of coloured light and visualization exercises in meditation to lifestyle modifications designed to improve one's general wellbeing. The growing area of study in colour psychology is also adding credibility to the idea that colours can evoke certain emotional and behavioural reactions,

impacting aspects such as stress responses, attention spans and the communication of emotions. This review intends to provide an extensive and critical overview of the subject, integrating historical backdrops, theoretical foundations, psychological mechanisms, and interpretations through the chakra system, along with its implications within various therapeutic contexts. Particular attention is given to its role in the maintenance of mental health, including the reduction of stress levels, anxiety relief, emotional balance and improvement in cognitive function. By integrating the knowledge from ancient modalities with evidence from current clinical research, this article attempts to shed light on both the therapeutic potential and practical barriers of colour therapy as an integrative healing system in mental health care [4].

This review provides a comprehensive overview of light and colour therapy in health and wellness, drawing on historical roots and scientific evidence regarding underlying mechanisms and psychological outcomes. Special emphasis is devoted to the role of colour therapy within integrated frameworks and models that enhance traditional practice, offering new possibilities for modern chromotherapy.

2. Historical and Philosophical Foundations of Colour Therapy

The therapeutic application of colour has been recorded across ancient civilizations, where colour was considered a vital life force rather than merely a visual experience. In ancient Egypt, colour played a central role in healing rituals and temple medicine. Healing chambers, known as solariums, were specially made with coloured glass panels that filtered sunlight into specific hues, directing them onto patients to heal physical and psychological disorders (Fig. 2) [4]. Each colour was believed to have unique vibrational properties capable of restoring balance within the body and mind.

In traditional Chinese medicine, colour is intimately linked to the ancient and complex five-element theory, which includes wood, fire, earth, metal and water. These elements are intricately connected to specific organs, emotions and seasonal cycles, and colour was used as a diagnostic and therapeutic tool for emotional and physiological imbalances. Emotional states, described as anger, fear, or even grief, were regarded as disruptive to the delicate interplay of organs, and exposure to colour was used to restore balance. One of the most thorough philosophical systems for colour therapy is found in the rich traditional Indian Ayurvedic and Yogic practices, as illustrated especially through their complex chakra system. The human body is perceived as an interconnected field of energies regulated meticulously by chakras, which vibrate to a specific colour and control psychological and physiological functions [6]. Diagnosis of mental illness was widely interpreted as an imbalance in these subtle energies, and colour was used to treat the whole person, including emotional and spiritual needs.

The medieval philosopher Avicenna described colour as an important diagnostic tool in his classic treatise, *The Canon of Medicine*. He cleverly attributed the colour red to circulation and life, and blue-and-white to cooling effects. In the late 19th and early 20th centuries, chromotherapists, such as Edwin Babbitt and Dinshah Ghadiali sought to codify the principles of colour therapy, contending that coloured light could be used to 'stimulate or sedate' specific parts of the body. These early concepts remain influential elements of modern chromotherapy, underpinning contemporary theories and applications of colour in therapeutic contexts and healing practices.

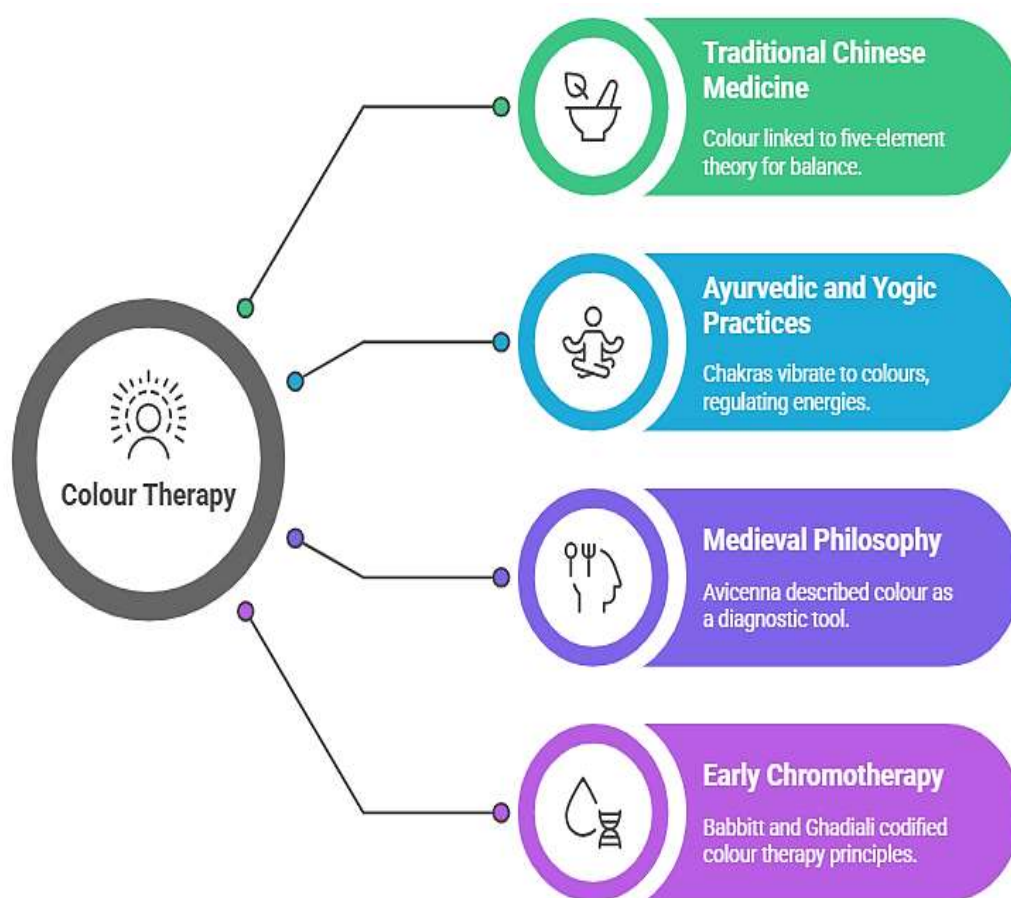


Figure 2. Historical roots of colour therapy [4]

3. Scientific and Theoretical Basis of Colour Therapy

The theoretical foundation of colour therapy is widely established at the intricate crossroads among physics, neurobiology and psychology. The colour that we know comes from light, and light is essentially a form of electromagnetic radiation - waves with different wavelengths and frequencies. The visible spectrum ranges from red (longer wavelengths and lower frequencies) through to violet (shorter, higher), along with ultraviolet light that is not visible to humans but is detected by several insect species. While the human eye cannot see ultraviolet (UV) radiation, it still has significant biological and therapeutic significance. Light enters the eye, where rods, cones, and specialised photoreceptors in the retina convert this colour stimulus into neural impulse sent to the brain [4]. UV-based phototherapy, largely UVB (310 nm - 320 nm), acts on cellular molecules to produce immunomodulatory, antimicrobial and skin related effects. In contrast, visible light acts primarily by influencing psychological perception and circadian rhythms [7-9]. These complex signals are processed not just in the visual cortex, but also within the limbic system and the hypothalamus, both critical for regulating emotions, forming memories and maintaining hormone balance. The hypothalamus, in particular, contributes significantly to regulating both the autonomic nervous system and endocrine reactions. This establishes a strong neurobiological foundation for why colour can have a notable influence over mood, arousal, and different emotional states.

Emergent evidence suggests that controlled UVB-based phototherapy may also indirectly affect neuroendocrine and immune pathways. This expands the scope of light-based interventions beyond perception-driven mechanisms to include physiologically

facilitated beneficial responses [10, 11]. Such complex interplay provides strong evidence that colour perception elicits measurable psychological and physiological adaptations (Fig. 3) [4]. Colour itself is defined by three fundamental properties: hue (the specific colour), value (lightness or darkness), and intensity (saturation or brightness). Changes in these attributes play a key role in emotional response and perception. Consequently, research in colour psychology often focuses on how these, in turn, affect attention span, cognitive and emotional associations and behavioural tendencies [3]. These effects are modulated by an intricate interaction between user specificity, cultural background and situational conditions. Ultimately, this theoretical framing of colour as a therapeutic mediator allows for integration of aforementioned scientific principles with holistic views of energy balance, creating a multidimensional understanding of colour's role in mental health.

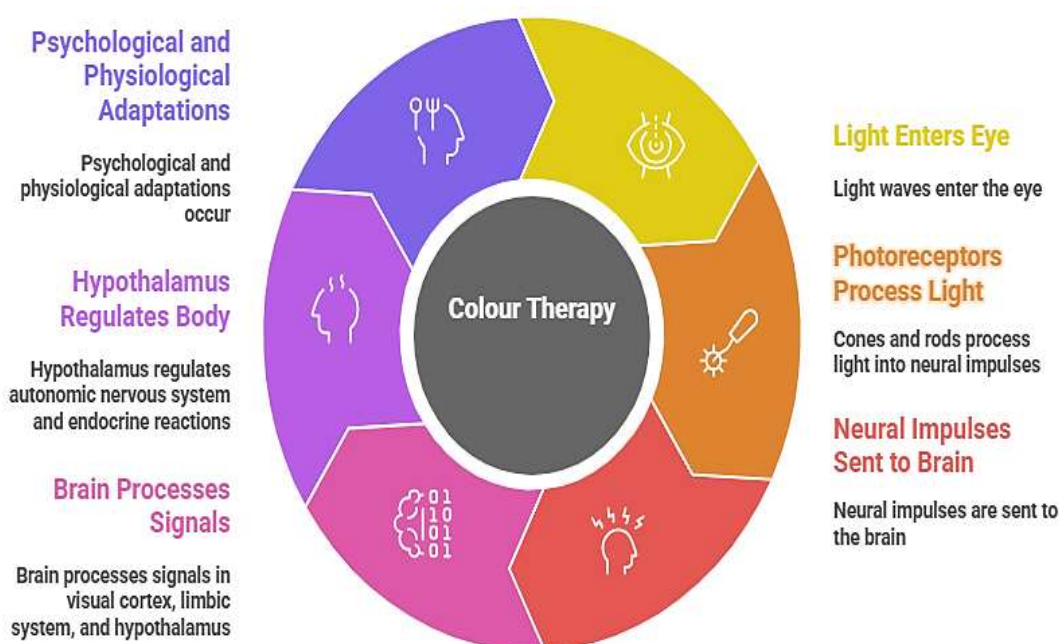


Figure 3. Neurophysiological pathway underlying colour therapy [4]

3.1 Physical Properties of Colour and Light

Colour represents a perceptual interplay of physical and physiological processes arising from electromagnetic radiation within the visible spectrum, extending from approximately 380 nm to 740 nm. Each wavelength within corresponds to a distinct hue, ranging from longer wavelengths (red) to shorter wavelengths (blue and violet). When light enters the eye, specialised photoreceptors in the retina, namely rods and cones, convert this energy into electrical signals which are transmitted via optic nerves for visual interpretation [3].

However, neural processing of light extends beyond vision. Extensive research has established that light exposure influences non-visual pathways, particularly through intrinsically photosensitive retinal ganglion cells (ipRGCs). These cells play a critical role in regulating circadian rhythms and modulating the release of key hormones such as melatonin and cortisol, which are essential for maintaining multiple physiological functions [12]. This broader biological responsiveness to light also forms the scientific basis for phototherapy, where controlled exposure to specific wavelengths elicits therapeutic effects beyond conscious visual perception [5].

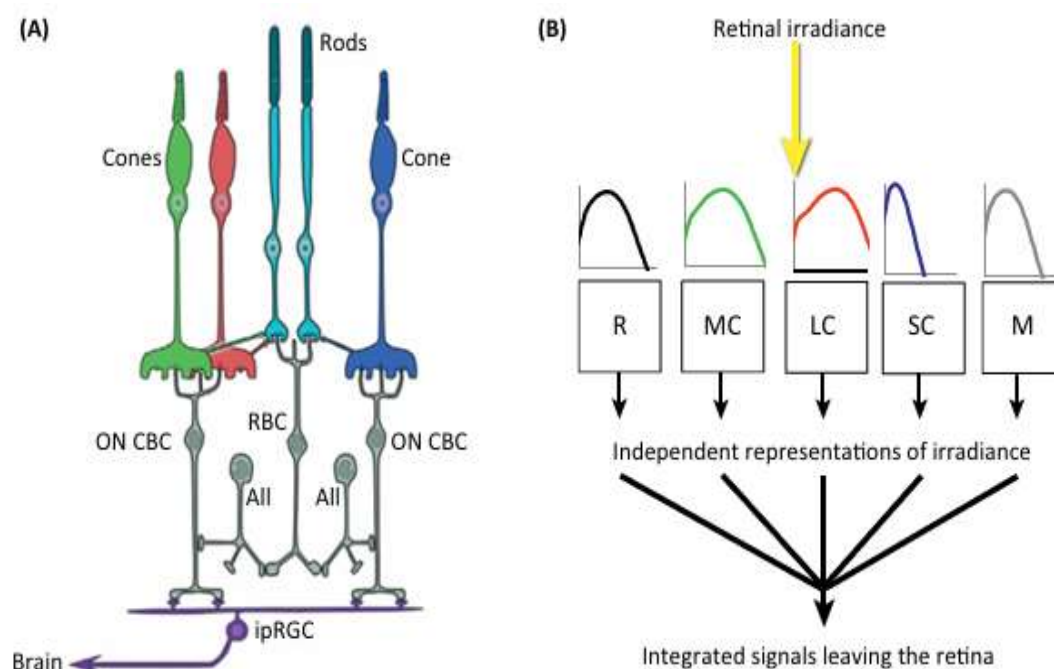


Figure 4. Retinal photoreceptor circuitry and irradiance processing. (A) Rod and cone pathways within the retina. (B) Integration of spectral irradiance signals transmitted from the retina to the brain [5].

The retinal pathways (Figure 4) produce different effects depending on the wavelength, with rods and cones, and melanopsin-expressing ipRGCs working together. While rods and cones primarily facilitate image formation, ipRGCs process both intrinsic and extrinsic (environmental) light signals to collectively report total retinal light irradiance. These signals are sent to brain areas for circadian regulation, neuroendocrine control, and neurobehavioral responses. This process explains how different light colours affect bodily states, including mood and hormone levels [5, 13, 14].

This mechanistic understanding explains why colour and light exposure can exert pronounced effects on sleep-wake cycles, alertness, and physiological arousal, often beyond conscious awareness. Chromotherapy is built on the premise that variations in hue, intensity, and duration of colour exposure can effectively influence both physiological and psychological states. Generally, longer wavelengths, such as the warm reds and oranges, are commonly associated with stimulation and heightened arousal, while shorter wavelengths, including calming blues and certain greens, are linked to soothing and cooling effects. For example, highly saturated colours may evoke strong, vivid emotional responses, whereas softer, pastel shades are often associated with emotional stability and a pleasant disposition (Fig. 5) [6]. Collectively, these inherent properties provide the rationale for employing colour as a regulatory stimulus in health and wellness interventions, offering a complement to conventional pharmaceutical treatments [3,15].

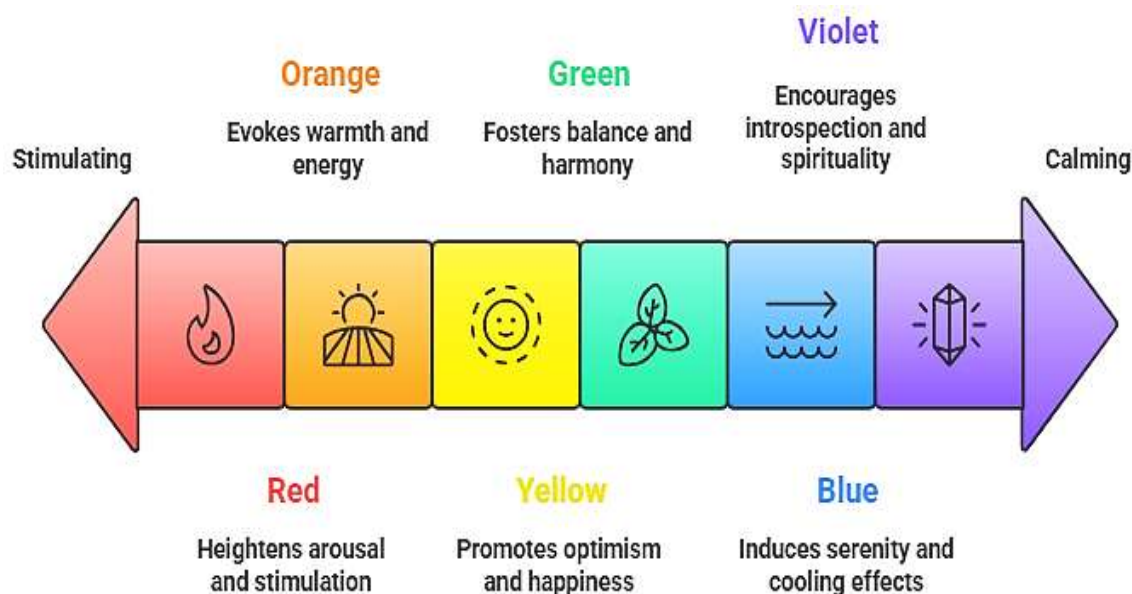


Figure 5. Colour spectrum and associated emotional responses [6]

3.2 Neurobiological Mechanisms

Behavioural and neuroimaging studies validate that light influences cognitive alertness, attention, and brain activation forms through non-visual pathways [16,17]. The neurobiological effects of colour extend beyond the primary visual cortex, impacting a wider system that encompasses the brain's intricate architecture. Following basic visual processing, colour perception quickly engages the limbic system, particularly structures like the amygdala and hippocampus, which are essential for emotional regulation and memory processing [12]. Furthermore, colour exposure profoundly influences hypothalamic activity, affecting the autonomic nervous system and various endocrine responses. Through these intricate pathways in the central nervous system, light and colours can modulate both sympathetic and parasympathetic activity, impacting physiological markers such as heart rate variability, stress hormone levels and general emotional states [18,19].

3.3 Colour Light Therapy: Translational and Therapeutic Implications

Colour therapy uses specific wavelengths of visible light to alter physiological, psychological, and neuroendocrine processes. Departing from static exposure techniques, this method involves controlled photonic energy directed into the retina to interact with retinal pathways. Light stimuli pass through rods, cones, and ipRGC (intrinsically photosensitive retinal ganglion cells), directly or indirectly regulating the circadian clock and hormonal secretion [12]. Research shows that blue-enriched light enhances alertness, while green and turquoise shades promote calmness, and longer wavelengths such as red and amber, aid in relaxation and cellular repair [3].

Clinical evidence highlights the therapeutic significance of structured light exposure, with studies suggesting that precise colour or bight light interventions can decrease anxiety and depressive symptoms [20,21]. Often used in integrative medicine to reduce stress. It can treat sleep disorders, mood disorders, and other psychosomatic issues through methods such as structured light exposure or visualization therapy. Studies have indicated that it can reduce stress and improve emotional stability, this non-invasive, sometimes mindfulness-based approach serves as an effective adjunct to mental health services [4,12]. Involvement with Ayurvedic and adrenopathic therapies has led, in

practice, to the belief that certain light frequencies can naturally regulate energy levels [22, 23]. Given the non-invasive nature of this therapy, it warrants further clinical tests and standardization [3,4].

Beyond conscious colour perception, light-based phototherapy also exploits neurobiological pathways by bringing controlled light stimuli at particular wavelengths and intensities to induce expected physiological responses. This innovative therapeutic breakthrough selectively delivers light stimuli under stringent experimental conditions at precisely determined wavelengths and varying intensities, which nonetheless produce predictable and measurable physical reactions in the skin.

By careful administration of therapeutic doses of light, especially at certain wavelengths, responsive hypothalamic and brainstem centres have been observed as a result. These centres are essential for the regulation of circadian cycles, controlling the secretion of neuroendocrine factors, and stabilizing emotional mood. Because of its ability to profoundly affect melatonin release, modulate cortisol rhythms, and maintain autonomic balance through non-photochemical pathways, phototherapy becomes an extremely powerful tool.

When merged with chromotherapy, which incorporates the principles of light stimulation, this offers an operational model for colour-driven interventions. When such strategies are elaborated systematically, they will target stress-induced illness, mood disturbances and sleep issues. This neurobiological framework enforces the understanding that light as well as colour are not merely passing sensations or sensory experiences, but grand administrators of homeostasis to our brain-body balance, which in turn may have a significant effect on overall health and well-being [24].

4. Psychological and Emotional Dimensions of Colour Therapy

4.1 Colour and Emotional Regulation

The colour psychology research demonstrates that various colours evoke a rich tapestry of emotional associations, significantly influencing individual emotions, cognition and behaviour. While these associations are also influenced by cultural elements and personal history, certain trends consistently emerge across distinct populations [3]. The psychophysiological response to colour is further fine-tuned by perceptual attributes such as saturation and brightness. Highly saturated, radiant colours often provoke stronger physiological or emotional reactions, sometimes leading to overstimulation and restlessness. On the other hand, pale, dull or pastel tones tend to induce calm, particularly in environments where they can be effectively employed. Such modulation in emotional responses underpins the creation of modern healing environments, which frequently favour soft shades over vivid intensities to maintain peace and tranquillity [3, 12]. For instance, serene blues and gentle greens are, consistently linked with a marked lowering of sympathetic arousal and, consequently, an enhancement of parasympathetic dominance, which is beneficial for relaxation. Conversely, the strategic use of hot colours like vibrant reds or warm yellows may trigger increased alertness and general physiological activation, including a sense of energy [14]. Experiential studies across various populations reliably report consistent correlations between specific colours and emotional responses, affirming the presence of largely shared psychophysiological forms in colour perception [25, 26].

Experimental research also shows that colour harmony and aesthetic combinations influence emotional comfort and visual preferences, thereby determining individual emotional responses [27]. UV exposure holds significant potential for altering patient moods. Comprehensive studies are necessary to further understand this intriguing relationship between human behaviour and psychopathology, which could lead to

effective therapeutic treatments and professional training programs, such as those focusing on practical applications. Given that UV exposure influences mood both directly and indirectly through mechanisms like β -endorphin production and perceived brightness, these factors can markedly impact emotional states. It is important to note the review's assertion that the mood-enhancing effects of UV light operate independently of visual states; this is crucial for understanding non-visual photoreceptive mechanism in delicate emotional regulation. In the broader field of colour and light-based therapy, these results show UV-based phototherapy to be an effective, controlled, and specialist-supervised adjunct for mood regulation. Furthermore, these findings emphasize that the mood-enhancing effects of light can occur without conscious awareness, reinforcing the importance of non-visual mechanisms in emotional regulation [28].

4.2 The Use of Colour in the Promotion of Mental Health and Well-Being

Experimental and environmental psychology studies provide strong evidence that exposure to calm colours can lower stress levels, improve emotional balance, and enhance attentional control. On the other hand, overstimulation from aggressive colours may lead to irritability or emotional exhaustion, especially if not balanced with calming tones [15]. Additionally, colour exposure has also been shown to impact cognitive performance, attention, and working memory, indicating its potential application in occupational and educational settings [28, 29]. These findings support the use of colour as a modifier of mood, particularly within stress management, health maintenance, and supportive mental health care.

Above all, colour therapy emphasizes the subjective experience of the individual. Emotional responses to colour are deeply influenced by personal memories, current psychological states, and various contextual factors. This built-in variability underscores the critical need for individually tailored colour applications, rather than the implementation of uniform, one-size-fits-all prescriptions [3, 4, 22].

4.3 Colour Associations in Chakra and Ayurvedic Frameworks

Traditional Indian health care systems conceptualise human well-being as a dynamic balance between subtle energy centres (chakras located along the spine) and the tridoshas: Vata (wind), Pitta (fire), and Kapha (phlegm). Within this framework, colour extends beyond a mere sensory stimulus to assume functional associations with physiological process, emotional traits and psychological states. Certain colours are traditionally linked to certain chakras, symbolising their regulatory role in various aspects of physical and emotional well-being. Concurrently, colours are supposed to modulate doshic balance by either increasing or pacifying Vata, Pitta, or Kapha, depending on their inherent energetic qualities. These ancient combinations serve to provide a strong theoretical basis for the use of colour within holistic and integrative health care systems. Ayurvedic literature further supports this perspective by describing colour-based doshic modulation, where different hues influence Vata, Pitta, or Kapha according to their energetic and elemental characteristics [30]. These principles form the basis for using colour in holistic health practices, as summarised in Tables 1 and 2 [23].

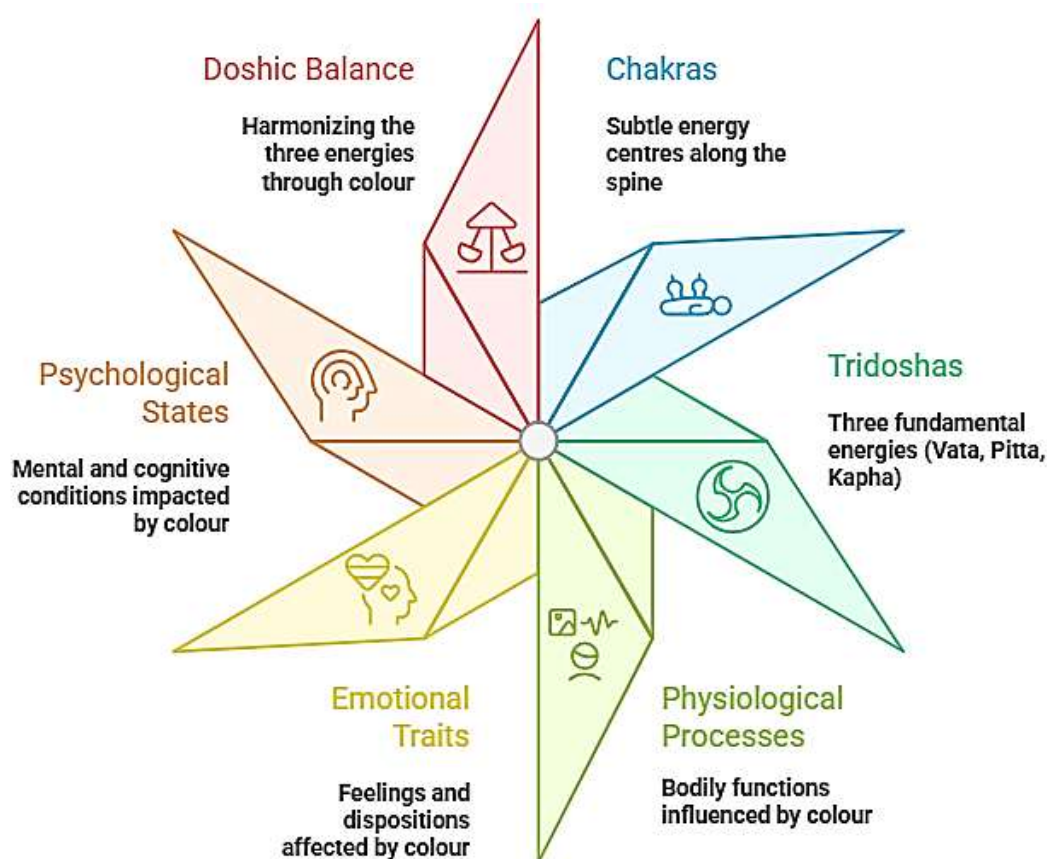
Table 1. Traditional Colour-Chakra Associations [23]

Colour	Chakra	Chakra Name
Red	1st Chakra	Muladhara (Root)
Orange	2nd Chakra	Svadhithana (Sacral)
Yellow	3rd Chakra	Manipura (Solar Plexus)
Green	4th Chakra	Anahata (Heart)
Blue	5th Chakra	Vishuddhi (Throat)

Indigo	6th Chakra	Ajna (Third Eye)
Violet	7th Chakra	Sahasrara (Crown)
White / Black	Not Assigned	Not Applicable

Table 2. Colour-Dosha Relationships in Ayurveda [23]

Colour	Increases	Decreases
Red	Pitta	Vata, Kapha
Orange	Pitta	Vata, Kapha
Yellow	Pitta	Vata, Kapha
Green	Kapha	Vata, Pitta
Blue	Vata, Kapha	Pitta
Indigo	Neutral effect on Vata	Pitta, Kapha
Violet	Vata	Pitta, Kapha
White	None	Pitta, Vata, Kapha
Black	Pitta, Vata, Kapha	None

**Figure 6. Multidimensional effects of colour in integrative healing system [23]**

In traditional Indian thought, the art of colour therapy is closely linked to the seven-step chakra system, which views the human body as a continuous conduit of energy controlled by seven main hubs along the spine. This practice aims to harmonise these chakras through focused colour exposure, guided visualisation, and meditation to support overall well-being. The broader model of Ayurvedic chromotherapy organizes complex relationships between ten distinct energies, such as Akash, Vayu, Agni, Jal and Prithvi, which are all correlated with body organs and represented by certain colours. Treatment ranges from tonifying weak energies to sedating strong ones using colours, alongside

body correspondences. While metaphysical, these systems provide a comprehensive framework that combines the emotional, psychological, and spiritual aspects of mental health. Practitioners often associate coloured light with these 'energy centres', suggesting that exposure impacts the bodies, as part of a holistic approach. Each chakra vibrates at a specific frequency, corresponding to a particular colour, psychological characteristic, and physical component, creating an interconnected pattern (Fig. 6) [23].

The root (base) chakra, associated with the colour red, governs basic survival instincts, a sense of security, and our connection to the earth. Blockages in this area may lead to deep-seated fear, insecurity, or chronic worry [4]. Further up the line, the sacral chakra, associated with warm orange, controls emotions, fosters creativity, and improves our ability to experience pleasure. Next is the solar plexus chakra, represented by bright yellow, which powers confidence, mental clarity, and self-worth. Imbalances in this area of personal power often manifest as emotional disturbances, such as depression, low self-esteem, or chronic indecision [23].

The heart chakra is symbolically depicted in a gentle and delicate shade of green and influences the more spiritual aspects of a person's nature, such as kindness and the capacity to love, especially their family. It also affects emotions in an analogous manner comparable to breathing. The throat chakra, related to calming blue, is responsible for basic communication and self-expression, helping you articulate your thoughts and feelings. Associated with the deep, reflective colour indigo, the third eye chakra is responsible for intuition and insight – essentially seeing reality with great clarity. Finally, the crown chakra, whose hue is purple (or violet), represents spiritual consciousness and the quest for altered states of higher awareness by linking us with the universe [4].

Recent studies suggest that colour therapy may be helpful for mental health and the treatment of psychological disorders, including stress, depression and anxiety [30]. Exposure to calming colours such as blue and green has been associated with reduced stress levels and enhanced emotional regulation, potentially through modulation of the autonomic nervous system by decreasing sympathetic arousal and increasing parasympathetic activity, thereby promoting a state of calm [4].

In the context of anxiety disorders, colour therapy is frequently used as an adjunctive approach to foster a sense of emotional security and to promote relaxation. Accordingly, counselling rooms and health facilities often utilize soft, earthy tones to evoke emotional security. Conversely, mood-lifting hues like yellow and orange can enhance vitality and engagement, though moderation is advised when addressing low spirits. Beyond environmental design, colour therapy is applied in art and expressive therapies; non-verbal emotional processing is achieved through mandala colouring, painting and guided visualisation, particularly for trauma victims and children.

Studies indicate that using colour to express feelings promotes emotional literacy, self-control and calmness [3]. Cognitive and behavioural research also suggests that colour influences cognitive functions such as attention, creativity, memory recall and productivity. For instance, blue spaces may encourage "outside the box" thinking, while yellow can promote mental activity. These findings support the application of colour therapy to enhance mental performance and education emotional well-being in educational and occupational settings [4, 22].

5. Therapeutic Applications of Colour Therapy

5.1 Modalities of Application

Different ways of practising colour therapy are employed, according to the specific needs of the person being treated, their personal temperament, and condition. The application is diverse and includes exposure to coloured light, development of visualisation skills,

meditation, the wearing/using of various coloured clothing or items, a diet that incorporates certain colours, and the use of colour in the environment. These methods are intended to modify mood, increase energy, and yet be balanced in a non-invasive way. In Ayurvedic chromotherapy, treatments are done in light of the observation of energy imbalance. Certain colours are used to tone down or sedate forceful energies, or boost deficient ones, based on their correspondences with the body: fingers, organs and chakras. For example, blue can reduce anxiety and hyperactivity, while yellow can foster confidence and cognitive clarity.

Beyond direct light application, techniques include colour visualisation, guided imagery, in which individuals imagine specific colours flowing through the body to promote relaxation and healing. Colour-focused meditation techniques are often used to increase mindfulness and promote emotional stability. Arts-based interventions such as mandala colouring, expressive painting, are widely used in counselling and therapeutic settings to promote emotional expression and stress reduction. Arts and movement-oriented colour therapy approaches have been associated with enhanced emotional expression, trauma processing, and stress reduction in therapeutic frameworks [32,33]. Another important application is environmental colour design, particularly in healthcare and educational settings, where colour choices can influence mood, support relaxation or concentration, and, in some cases induce anxiety. Although therapeutic models differ in format and empirical support, they represent accessible and culturally diverse tools for promoting mental wellness [3,4].

5.2 Colour Therapy in Health and Wellness

Colour therapy is increasingly recognised and incorporated into contemporary medicine as an important component of integrative healthcare. Alongside other holistic therapies such as counselling, yoga, meditation and naturopathy, it is applied across physical and occupational healthcare settings [4]. This innovative, inexpensive and non-invasive therapeutic approach is now found in a wide range of healthcare environments, including (but not limited to) hospitals, health centres, mental health facilities and infant education institutions. Moreover, environmental colour design exerts an important role in the architectural layout of modern healthcare buildings. Hospitals and medical clinics frequently use soft hues and calm colour schemes to reduce patient anxiety, creating a comfortable, healing environment. These applications aim to alleviate stress, improve emotional and cognitive wellbeing and contribute to therapeutic care in a broader sanatorium sense [4, 23].

Empirical research in healthcare environments shows that soft, harmonious colour schemes in clinical settings can significantly reduce patient anxiety, induce a profound sense of peace, and increase their satisfaction and comfort to a noticeable extent. Another low-cost application of colour theory in hospitals and rehabilitation institutions lies in researcher examining the psychological and social effects of light and colour on human rehabilitation. The deliberate use of colour within the healthcare environment may also indirectly help recovery by promoting supportive emotional states and to relax patients during critical stages of therapy or hospitalization [16].

5.2.2 Applied Colour - Number Frameworks in Integrative Practice

Innovative colour-number frameworks combine specific hues and digits to target distinct functional intensions, aligning with psychological conditions, physiological processes, and energetic balance. Reflex-based methods are considerably more effective than traditional colour applications combined with light therapy. Consequently, modern chromotherapy can not only optimize treatment experiences but has evolved into a multidisciplinary field in its own right. As a sophisticated system rooted in vibrational medicine and traditional energy concepts, it combines colour frequencies with numerical archetypes to activate the body and mind, facilitating intent-setting. Feng Shui

practitioners, for instance, utilize colour to achieve pressure-relief, viewing each number as a specific state of energy such as beginning, dynamic motion, or grounding. This conceptual integration echoes traditional Indian healing philosophies, ayurveda and yogic psychology, where numerical order, sensory perception, and elemental balance are viewed as interrelated components of health regulation. [23, 30].

Importantly, such applied approaches of colour-numbers draw on a deeply rooted experiential practice. Rather than standardized clinical therapies with rigid protocols that stifle the creative and individual aspects of healing, these interventions are short-term, non-invasive, and tailored to individual needs. By recognizing significant inter-individual variability in colour perception, psychosomatic experience, and sensory sensitivity, these methods can be used alongside conventional medical and psychological treatments [12, 34].

Functional Domains of Colour-Number Application

Embedded within intricate applied colour-number associations, these pairings function as both symbolic and functional cues that profoundly affect psychological states, physiological rhythms, and energetic balance. Black-zero often represents a “reset” or “neutral” state, used to facilitate mental clarity, support sleep, and recalibrate cognitive functions, reflecting black’s symbolic association with stillness and restoration. For instance, purple-one embodies nuances of initiation, receptivity, and the strength to express oneself. Meanwhile, blues and greens bring a sense of peace, offering cooling, calming effects that support circulation and metabolic balance. This correspondence mirrors findings from colour psychology and environmental health research, validating the calming and regulating effects of cooler tones, as noted by Kuller et al. [15] and Elliot and Maier [5].

Yellow-five plays an essential stabilizing role in this series of digits, representing vital traits such as support, nourishment, and solid foundations. Within broad Ayurvedic and yogic traditions, yellow is intimate connection with the solar plexus, relating to digestion, metabolic regulation, confidence, and emotional resilience. This traditional logic underscores how yellow can balance work and rest, as noted by Lad [30] and Gupta [4]. Higher numerical connections provide another application mode for the colour-number pairings. These pairings interact with many layers within such a system through the complexity of their functions: timing tools; directions or routes taken; intentional focus; internal management processes dependent on outside stimuli (vibrations emanating from nerves or perhaps long-term habits). At all these levels, colour-number interventions are implemented in an unobtrusive, time-limited and highly individual way. This approach emphasizes subtle adjustment, contrasting with the straightening recommended by most physical therapists at the Bihar School of Yoga and others trained in classical therapy [4].

6. Ethical Considerations and Safety Implications

While colour therapy is generally considered a non-invasive, low-risk intervention, its use within health and wellness contexts demands careful ethical considerations and attention to safety. Certain individuals possess unusual sensitivities to powerful colour stimuli, particularly those with sensory processing disorders, severe psychological conditions, or epilepsy, specifically photosensitive epilepsy, where specific light patterns can trigger seizures. Consequently, seeking professional guidance is essential. Furthermore, special caution is required when using high-intensity light sources, as improper exposure may disrupt circadian rhythms or provoke neurological responses in vulnerable individuals [25].

Closely connected to colour-based therapy, light therapy, which involves exposure to specific frequencies and intensities of light leads to a multitude of ethical and safety

issues. Unsupervised, excessive, or high-intensity exposure, particularly to UV light, can lead to ocular fatigue, visual disturbances, and disrupted circadian rhythms that affect sleep and overall health. It may also cause skin irritation, such as itchy, dry or scaly rashes on the arms or face, and overstimulate the nervous system, which is particularly harsh for sensitive individuals. As a result, standardized procedures, rigorous control of light wavelengths, and careful clinical supervision are essential for the safe and ethical administration of these therapies within the healthcare framework, protecting patients from potential harm [1].

In short, colour therapy must be approached cautiously to support, rather than supersede, evidence-based medical and psychological treatments. Guidelines for integrating colour therapy into care still need to be established by professionals, including psychotherapists, neuroscientists and expert colour advisors. When applied with ethical awareness, colour therapy can serve as a vital link in patient-centred care, producing significant, evidence-consistent improvements in overall treatment outcomes [12].

7. Future Directions and Research

An interdisciplinary approach drawing on neuroscience, psychology, environmental design, traditional medicine and light-based therapies may help bridge the divide between empirical science and holistic paradigms. Future studies on colour and light therapy need to focus on robust methodological designs, including randomized controlled trials, longitudinal studies, and cross-cultural inquiries. Advances in neuroimaging and psychophysiological analysis offer promising paths for discovering how colour exposure impacts brain activity, autonomic regulation, hormonal responses, and emotional state [3,4]. Furthermore, developments in digital technology may enable personalized colour therapy interventions through mobile apps, virtual reality, or biofeedback-based systems [35, 36]. Investigation into the role of colour therapy in preventative mental health, stress management, corporate wellness, and education could broaden its application. Supported by rigorous research and implemented ethically, colour therapy has the potential to develop into a scientifically based complementary, and adjuvant intervention in integrated mental healthcare.

8. Conclusion

Colour therapy has emerged as a holistic, aesthetic, and culturally rooted approach that offers a complex, in-depth look into emotional experiences. By mirroring mental states and moods, it acts as a curious counterpoint to the complexity of human emotions. Building upon a vast tapestry of ancient healing practices and body-mind techniques, this approach provides valuable insights for modern psychology. Alongside this, light therapy, utilizing controlled exposure to specific wavelengths and intensities extends these principles by directly influencing neurobiological process, such as circadian rhythm regulation, hormonal balance, and neural activity.

Together, colour and light interventions form a largely drug-free framework encompassing multiple techniques aimed at enhancing emotional stability, reducing stress, and fostering self-awareness. While not intended to replace established psychotherapeutic or psychiatric treatments, these approaches offer valuable complementary modalities within integrative care models. Their application can provide tangible benefits in clinical settings, contributing positively to overall emotional well-being.

As the perception of colour and light is inherently subjective, this therapy requires personalized, fine-tuned procedures, supported by strict ethical standards and professional counsel.

As interdisciplinary research progresses rapidly, light-based colour therapy is becoming integrated into evidence-based clinical practice. This approach holds promise within integrative mental health systems, bridging insights from psychology, neuroscience, cultural studies, and traditional healing frameworks. Offering a non-invasive avenue for supporting emotional regulation, its emphasis on harmony, balance, and well-being aligns with contemporary, patient-centred, holistic care. This convergence strengthens its clinical relevance, positioning it as a meaningful subject for further rigorous, interdisciplinary investigation.

References

- [1] R.G. Foster, T. Roenneberg, Human responses to the geophysical daily, annual and lunar cycles. *Curr. Biol.* 18(17) (2008) R784–R794.
<https://doi.org/10.1016/j.cub.2008.07.003>.
- [2] A. Landvreugd, M.G. Nivard, M. Bartels, The effects of light on wellbeing: A systematic review and meta-analysis. *J Happiness Stud.* 26(1) (2024) 1. <https://doi.org/10.1007/s10902-024-00838-4>.
- [3] F. Birren, *Color psychology and color therapy; a factual study of the influence of color on human life*. Chicago: Pickle Partners Publishing; 2016.
- [4] R. Gupta, Color therapy in mental health and well being. *IJARESM* 9(2) (2021) 1068–1076.
- [5] A.J. Elliot, M.A. Maier, Color psychology: Effects of perceiving color on psychological functioning in humans. *Annu. Rev. Psychol.* 65 (2014) 95–120,
<https://doi.org/10.1146/annurev-psych-010213-115035>.
- [6] R. Tyagi, S.P. Samal, Role of various color therapies on alleviating depression, anxiety, and stress. *IJISRT* 9(2) (2024) 149–152.
- [7] P.A. Vieyra-Garcia, P. Wolf, A deep dive into UV-based phototherapy: Mechanisms of action and emerging molecular targets in inflammation and cancer. *Pharmacol. Ther.* 222 (2021) 107784, <https://doi.org/10.1016/j.pharmthera.2020.107784>.
- [8] D.E. Bertani, A.M.P. De Novellis, R. Farina, E. Latella, M. Meloni, C. Scala, et al. “Shedding light on light”: A review on the effects on mental health of exposure to optical radiation. *Int. J. Environ. Res. Public Health* 18(4) (2021) 1670.
- [9] X. Huang, Q. Tao, C. Ren, A comprehensive overview of the neural mechanisms of light therapy. *Neurosci. Bull.* 40(3) (2023) 350–362.
- [10] C. Skobowiat, A.E. Postlethwaite, A.T. Slominski, Skin exposure to ultraviolet B rapidly activates systemic neuroendocrine and immunosuppressive responses. *Photochem. Photobiol.* 93(4) (2016) 1008–1015.
- [11] R.M. Slominski, J.Y. Chen, C. Raman, A.T. Slominski, Photo-neuro-immuno-endocrinology: How the ultraviolet radiation regulates the body, brain, and immune system. *Proc. Natl. Acad. Sci. U. S. A.* 121(14) (2024) e2308374121,
<https://doi.org/10.1073/pnas.2308374121>.
- [12] R.J. Lucas, S.N. Peirson, D.M. Berson, T.M. Brown, H.M. Cooper, C.A. Czeisler, et al. Measuring and using light in the melanopsin age. *Trends Neurosci.* 37(1) (2014) 1–9,
<https://doi.org/10.1016/j.tins.2013.10.004>.
- [13] D.M. Berson, Strange vision: ganglion cells as circadian photoreceptors. *Trends Neurosci.* 26(6) (2003) 314–320.
- [14] S. Hattar, M. Kumar, A. Park, P. Tong, J. Tung, K.W. Yau, et al. Central projections of melanopsin-expressing retinal ganglion cells in the mouse. *J. Comp. Neurol.* 497(3) (2006) 326–349, <https://doi.org/10.1002/cne.20970>.
- [15] R. Küller, S. Ballal, T. Laike, B. Mikellides, G. Tonello, The impact of light and colour on psychological mood: a cross-cultural study of indoor work environments. *Ergonomics* 49(14) (2006) 1496–1507, <https://doi.org/10.1080/00140130600858142>.

- [16] G. Vandewalle, P. Maquet, D.J. Dijk, Light as a modulator of cognitive brain function. *Trends Cogn. Sci.* 13(10) (2009) 429–438.
- [17] C. Cajochen, Alerting effects of light. *Sleep, Med. Rev.* 11(6) (2007) 453–464.
- [18] J.F. Thayer, R.D. Lane, Claude Bernard and the heart–brain connection. further elaboration of a model of neurovisceral integration. *Neurosci. Biobehav. Rev.* 33(2) (2009) 81–88.
- [19] S.W. Porges, *The polyvagal theory: neurophysiological foundations of emotions, attachment, communication, and self-regulation.* New York: W. W. Norton & Company; 2011.
- [20] R.W. Lam, A.J. Levitt, R.D. Levitan, M.W. Enns, R. Morehouse, E.E. Michalak, Efficacy of bright light treatment, fluoxetine, and the combination in patients with nonseasonal major depressive disorder. *J. Affect. Disord.* 90(1) (2006) 1–10.
- [21] G. Pail, W. Huf, E. Pjrek, D. Winkler, M. Willeit, N. Praschak-Rieder, Bright-light therapy in the treatment of mood disorders. *Neuropsychobiology.* 64(3) (2011) 152–162.
- [22] S.S. Saraswati, *The chakra book: energy and healing power of the subtle body.* Munger, India: Yoga Publications Trust; 2007.
- [23] N. Kamath, Y. Patel, S. Lal, Review on chromotherapy and its significance in Ayurveda. *EPRA Int. J. Multidiscip. Res.* 11(4) (2025) 955–958.
- [24] G.C. Brainard, J.P. Hanifin, Photons, clocks, and consciousness. *J. Biol. Rhythms.* 20 (4) (2005) 314–325.
- [25] L.C. Ou, M.R. Luo, A. Woodcock, A.B. Wright, A study of colour emotion and colour preference. Part I: Colour emotions for single colours. *Color Res. Appl.* 29(3) (2004) 232–240, <https://doi.org/10.1002/col.20010>.
- [26] N. Kaya, H.H. Epps, Relationship between color and emotion: A study of college students. *Coll. Stud. J.* 38(3) (2004) 396–405.
- [27] K.B. Schloss, S.E. Palmer, Aesthetic response to color combinations: preference, harmony, and similarity. *Atten. Percept. Psychophys.* 73(2) (2011) 551–571.
- [28] R. Mehta, R. Zhu, Blue or red? Exploring the effect of color on cognitive task performance. *Science*, 323(5918) (2009) 1226–1229.
- [29] V. Vani, P. Ojha, M. Arjundan Gadhvi, A. Dixit, Impact of artificial colored lights on performance in working memory task. *Acta Psychol.* 256 (2025) 105001.
- [30] V. Lad, *Textbook of Ayurveda: Fundamental principles.* Volume One. Albuquerque, NM: Ayurvedic Press; 2002.
- [31] X. Huang, Q. Tao, C. Ren, Neural mechanisms of light therapy: implications for mood and cognition. *Neurosci. Bull.* 40(3) (2023) 350–362.
- [32] A.J. Elliot, M.A. Maier, Color and psychological functioning: a review of theoretical and empirical work. *Front. Psychol.* 5 (2014) 78.
- [33] S. Koch, T. Kunz, S. Lykou, R. Cruz, Effects of dance and movement therapy and dance on health-related psychological outcomes: A meta-analysis. *Art Psychother.* 41(1) (2014) 46–64.
- [34] K. Beri, Understanding the concept of vibrational medicine and its potential role in regenerative medicine. *Future Sci. OA.* 4 (2018) FSO280.
- [35] S.Y. Lu, Q.Z. Li, The impact of virtual reality immersive light art on anxiety reduction: Exploring the role of color combinations and emotional perception. *Int. J. Hum. Comput. Interact.* 42(2) (2026) 1032–1042.
- [36] K.T. Stewart, U. Albrecht, Beyond vision: effects of light on the circadian clock and mood-related behaviours. *npj Biol. Timing Sleep* 2, (2025) 12.