

# SKM YOGA

## YOGA TEACHER TRAINING PROGRAMME

*Naturopathy Series — Ancient Healing Sciences*

# HELIOTHERAPY IN NATUROPATHY

**Surya Chikitsa — सूर्य चिकित्सा**

*The Science of Healing with Sunlight — A Complete Reference*

*Compiled & Authored by*

**Dr. Shivam Mishra**

*Founder, SKM Yoga Institute*

**[www.skmyoga.in](http://www.skmyoga.in) | WhatsApp: 8826476724**

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# FOREWORD

*Dr. Shivam Mishra | Founder, SKM Yoga Institute*

Dear Students of Yoga and Naturopathy,

The Sun is the source of all life on Earth. Every breath we draw, every morsel of food we eat, every photon of light that allows us to see — all of it is ultimately the gift of the Sun. The ancient seers who composed the Vedas understood this with a clarity that modern civilization is only now, with the tools of biochemistry and photobiology, beginning to quantify and appreciate. They called the Sun Surya — the supreme illuminator — and understood it not merely as a physical object in the sky but as the cosmic intelligence that sustains, purifies, and elevates all of life.

Heliotherapy — the science of healing with sunlight — is one of the oldest, most universal, and most profoundly effective modalities in the entire tradition of Naturopathy. From the sun-courts of ancient Greek healing temples to the Vedic practices of Surya Namaskar and Surya Chikitsa, from the solar sanatoriums of 19th-century Switzerland to the cutting-edge photobiology research laboratories of the 21st century, human beings have continuously recognized and refined their understanding of the extraordinary healing intelligence that the Sun freely and generously offers to all.

As a yoga teacher, your relationship with sunlight is already more intimate than that of most people — you begin your practice with Surya Namaskar, you guide your students through postures that open the body to the sky, and you cultivate an awareness of the natural rhythms of day and night that most urban dwellers have almost entirely lost. This manual invites you to deepen that relationship, to understand it scientifically and philosophically, and to bring this ancient healing wisdom into your teaching with authenticity, precision, and genuine therapeutic understanding.

This book covers the complete science and art of Heliotherapy: its historical roots across ancient civilizations, the remarkable biochemistry of light and the human body, the UV spectrum and its therapeutic applications, the therapeutic protocol of sunbathing, the clinical applications of heliotherapy for specific health conditions, its integration with other naturopathic treatments, the Vedic and yogic philosophy of Surya as a healing force, and the practical guidelines that every naturopathic practitioner must know for safe and effective sunlight therapy. We have also included the precautions, contraindications, and skin-type considerations that responsible heliotherapy practice demands.

Approach this study not only intellectually but experientially. Rise before sunrise. Practice your Surya Namaskar in the early morning light. Sit with the rising sun on your face and feel its

extraordinary intelligence entering your body, awakening your cells, elevating your consciousness. The Sun is not simply a therapeutic tool — it is a teacher, a healer, and in the deepest sense of the yogic tradition, a manifestation of the supreme consciousness that yoga calls Brahman. May your study of Heliotherapy bring you into a deeper, more conscious, and more healing relationship with this most generous of all teachers.

*Om Suryaya Namah*

**Dr. Shivam Mishra**

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# Chapter 1: Introduction to Heliotherapy

## 1.1 Definition and Meaning

Heliotherapy is the systematic, medically informed, and purposefully applied use of natural sunlight for the prevention, treatment, and management of human disease. The word derives from the Greek Helios (the Sun god) and therapeia (healing, service). In Indian naturopathic tradition, it is known as Surya Chikitsa — 'solar therapy' — and in its most spiritually integrated form as Aditya Upasana — worship and communion with the solar principle.

Heliotherapy is one of the oldest healing modalities known to humanity, practiced in every ancient civilization with a recognized medical tradition, and today validated by a robust and rapidly expanding body of photobiology research. It is classified as one of the five primary treatment modalities of classical Naturopathy — the others being hydrotherapy (water), mud therapy (earth), fasting (internal purification), and air therapy (wind and breathing) — corresponding to the Pancha Mahabhutas, the five great elements of Indian natural philosophy.

### **Core Definition — Heliotherapy**

Heliotherapy is the therapeutic, systematic, and scientifically guided application of natural solar radiation to the human body for the purpose of preventing and treating disease, optimizing physiological function, restoring homeostasis, supporting immune competence, regulating hormonal balance, and promoting complete physical, mental, and spiritual wellbeing. It works through the biochemical, neurological, endocrine, and bioenergetic effects of the full spectrum of solar radiation on human tissues, cells, and consciousness.

## 1.2 The Foundational Principle

Heliotherapy rests on the most fundamental principle of Naturopathy: *Vis Medicatrix Naturae* — the Healing Power of Nature. The Sun is the primary and most abundant source of natural healing energy available to all life on Earth. Every living organism on this planet has evolved in the presence of sunlight; every biochemical process in the human body has been shaped by millions of years of adaptation to the solar cycle. To use sunlight therapeutically is to align the healing process with the most fundamental organizing intelligence of all terrestrial biology.

Unlike pharmaceutical interventions — which introduce foreign molecules into the body's biochemistry — heliotherapy works by triggering the body's own innate, evolved, and precisely

calibrated photobiological responses. Sunlight does not heal the body from outside; it activates the body's own healing intelligence from within.

*“The physician who heals from the outside is the physician of the body. The Sun heals from within — it is the physician of the soul.”*

— **Dr. Auguste Rollier, Pioneer of Modern Heliotherapy**

### **1.3 Why Every Yoga Teacher Must Understand Heliotherapy**

The relationship between yoga and the Sun is not coincidental or decorative — it is foundational and philosophical. Surya Namaskar (the Sun Salutation) is the central physical practice of Hatha Yoga, performed at sunrise to receive the first pranic charge of the day. The first mantra of the Rigveda — the oldest Vedic hymn — is addressed to Agni (fire), and the second to Vayu (wind), but it is the Sun that the entire tradition ultimately circles around as the supreme manifest symbol of Brahman.

- ◆ Yoga teachers who understand heliotherapy can design daily schedules and retreats that harness the Sun's healing properties systematically and safely.
- ◆ Understanding photobiology enables teachers to explain the science behind Surya Namaskar's timing, direction, and its effects on the body's circadian rhythms and endocrine system.
- ◆ Heliotherapy knowledge allows yoga teachers to offer their students evidence-based guidance on sun exposure, Vitamin D, seasonal mood management, and lifestyle alignment with natural light cycles.
- ◆ The Vedic and Upanishadic philosophy of Surya enriches and deepens yoga teaching with a philosophical understanding of sunlight that transcends the purely physical.

# Chapter 2: History of Heliotherapy

## 2.1 Ancient Civilizations and Solar Healing

The therapeutic use of sunlight is as old as human civilization itself. Every major ancient culture that developed a systematic healing tradition also developed systematic practices of solar healing — not as mystical superstition but as the practical expression of careful observation of the natural world.

Civilization	Solar Healing Tradition
<b>Ancient Egypt (3000+ BCE)</b>	The Egyptians were among the most sophisticated heliotherapists of the ancient world. Their temples at Karnak and Luxor were designed as heliotherapy chambers — oriented to channel specific qualities of sunlight at different times of day into sacred healing spaces. Egyptian medical papyri describe sunbathing protocols for skin diseases, including a practice remarkably similar to modern photochemotherapy (combining plant preparations with sun exposure for treating vitiligo). The concept of Ra — the solar deity — was inseparable from their medical philosophy.
<b>Ancient India (Vedic Period)</b>	The Vedic civilization recognized Surya (the Sun) as both the supreme cosmic healing force and the source of all Prana (vital energy). The Rig Veda contains hymns to Surya as the physician of all (Surya vaidyo — the solar physician). The Atharva Veda includes specific sunbathing prescriptions for skin diseases, joint conditions, and jaundice. The Ashtanga Hridayam (Ayurvedic text) prescribes solar exposure (Atapa Sevana) as a primary treatment for skin diseases, respiratory conditions, oedema, and seasonal affective disorders.
<b>Ancient Greece (700-200 BCE)</b>	The Greeks called sunlight therapy Heliosis. Hippocrates (460-370 BCE) — the Father of Medicine — recommended systematic sunbathing for a wide range of conditions. Greek healing sanctuaries (Asclepieia) featured sun terraces (helioses) as a standard component of the therapeutic environment. Herodotus observed that the skulls of Persian soldiers killed in battle were much thinner and more fragile than those of Egyptian soldiers, attributing the difference to the Persians' habit of wearing headgear that excluded sunlight from their skulls.
<b>Ancient Rome (500 BCE-400 CE)</b>	Roman bathing culture incorporated solaria (sun terraces) into bath complexes as a standard facility. Roman physicians including Galen and Celsus documented the use of sunlight for treating skin conditions, joint diseases, and general debility. The gladiatorial training tradition included systematic sunbathing as a component of conditioning. Pliny the Elder described specific solar protocols for healing wounds and skin infections.
<b>Inca Civilization (1400-1533 CE)</b>	The Inca civilization of Peru built their capital Cusco — the 'Navel of the World' — as a city oriented around solar worship and solar healing. The great temple of Coricancha (House of the Sun) was not merely a place

	of worship but a centre of solar healing practice. Inca healers used gold mirrors and reflective surfaces to concentrate sunlight on specific areas of the body for therapeutic purposes — an early form of phototherapy.
<b>Ancient China (2000+ BCE)</b>	Traditional Chinese Medicine recognized Yang energy (associated with the Sun, warmth, and upward movement) as essential for health. Chinese classical texts prescribe specific sun exposure practices for deficiency of Yang Qi. The tradition of Qi Gong — practiced facing the rising sun to absorb solar Qi — is directly parallel to the Vedic practice of Surya Namaskar.

## 2.2 The Modern Heliotherapy Era — 19th and 20th Century

The formal scientific era of heliotherapy begins with Niels Ryberg Finsen (1860-1904), a Danish physician who scientifically demonstrated the bactericidal effects of ultraviolet light and developed the first clinically validated phototherapy system — using concentrated ultraviolet light to treat Lupus Vulgaris (cutaneous tuberculosis). His work earned him the Nobel Prize in Physiology or Medicine in 1903 — the first Nobel Prize ever awarded for a therapeutic modality that could be classified within the naturopathic tradition.

The Swiss physician Auguste Rollier (1874-1954) established the most famous heliotherapy sanatoriums in Leysin, Switzerland — high in the Alps where the combination of altitude, clean air, and intense solar radiation created optimal conditions for heliotherapy. Rollier treated thousands of patients with tuberculosis, bone and joint diseases, and skin conditions using systematic, graduated sun exposure protocols that he documented in extraordinary detail. His two-volume work 'Heliotherapy' (1923) remains a classic reference for naturopathic physicians worldwide.

In India, the 20th-century revival of Naturopathy brought heliotherapy back into formal therapeutic practice. Mahatma Gandhi was an enthusiastic advocate of sunbathing and wrote about its benefits in his health writings. The establishment of naturopathic hospitals and colleges across India codified heliotherapy protocols that remain the basis of current Indian naturopathic practice.

### **Pioneer — Niels Finsen (Nobel Prize 1903)**

Niels Finsen's landmark work established that specific wavelengths of ultraviolet light could destroy Mycobacterium tuberculosis in the skin — healing Lupus Vulgaris that had been considered untreatable. His work proved for the first time in modern scientific terms what ancient healing traditions had known empirically: that sunlight has a direct, specific, and powerful antimicrobial effect on living tissues. The Nobel Prize awarded to Finsen in 1903 was the first recognition by the international scientific community of a naturopathic treatment modality.

# Chapter 3: The Sun — Properties and Therapeutic Energy

## 3.1 Physical Properties of the Sun

Understanding the physical properties of the Sun is the foundation of understanding Heliotherapy. The Sun is a G-type main-sequence star located approximately 150 million kilometres from Earth — a distance called one Astronomical Unit (AU). Its surface temperature is approximately 5,778 Kelvin, which produces a characteristic radiation spectrum that spans from high-energy gamma rays to low-energy radio waves, with the peak of its emission in the visible light range.

Property	Value	Therapeutic Significance
<b>Surface Temperature</b>	5,778 K (Kelvin)	Produces the perfect spectrum of radiation optimally suited to biological life on Earth
<b>Distance from Earth</b>	149.6 million km (1 AU)	At this distance, solar radiation reaches Earth at approximately 1,361 W/m <sup>2</sup> (Solar Constant)
<b>Peak Emission</b>	~500 nanometres (green-yellow)	The human eye evolved to be maximally sensitive at exactly this peak wavelength
<b>Solar Constant</b>	1,361 W/m <sup>2</sup> (at top of atmosphere)	The amount of energy reaching Earth's surface varies with atmosphere, altitude, latitude, and season
<b>UV Percentage</b>	~8-9% of total solar radiation	This small fraction contains the most bioactive, therapeutically potent wavelengths
<b>Visible Light</b>	~43% of total radiation	Provides photoentrainment of circadian rhythms, chromotherapy effects, and direct neurological stimulation
<b>Infrared</b>	~49% of total radiation	The major thermal component — provides deep tissue warming, pain relief, and metabolic stimulation
<b>Solar Cycle</b>	11-year sunspot cycle	Affects intensity of solar radiation; influences Earth's climate and potentially biological processes

## 3.2 The Sun's Journey Across the Sky — Therapeutic Timing

The angle of the Sun in the sky determines both the intensity and the spectral composition of the sunlight that reaches the Earth's surface. As sunlight travels through more or less atmosphere depending on the Sun's angle, different wavelengths are filtered, scattered, and absorbed to different degrees. This means that the same sunlight at different times of day has profoundly different therapeutic properties — a fact that traditional solar healing cultures understood empirically and that modern photobiology has confirmed scientifically.

Time of Day	Therapeutic Properties and Recommendations
<b>Brahma Muhurta (4:30–6:00 AM)</b>	The traditional yogic auspicious time before sunrise. The atmosphere filters out the most intense UV radiation while allowing the beneficial infrared and longer-wavelength UV-A to pass. The prana of the pre-dawn atmosphere is traditionally considered at its highest quality — cool, clean, and maximally charged with negative ions. This is the ideal time for Surya Namaskar, pranayama, and meditative sun-gazing (Trataka on the rising sun). Safe for extended practice without sunburn risk.
<b>Sunrise (6:00–8:00 AM)</b>	The optimal therapeutic window for heliotherapy in most traditions. UV-B radiation begins to increase significantly. Ambient temperature is comfortable. The quality of light is warm, golden, and rich in visible spectrum wavelengths that stimulate serotonin production, reset circadian rhythms, and support melatonin regulation. Vitamin D synthesis begins. Ideal for full-body therapeutic sunbathing — the classic naturopathic 'morning sun cure.'
<b>Morning (8:00–10:00 AM)</b>	UV radiation is building but not yet at maximum intensity in most latitudes. This window is suitable for therapeutic sunbathing for most healthy individuals, with appropriate duration limits by skin type. The combination of UV-B for Vitamin D synthesis, infrared for deep tissue warming, and visible light for mood and immune stimulation makes this the most complete therapeutic window for most conditions.
<b>Midday (10:00 AM–2:00 PM)</b>	Peak UV intensity — UV index at maximum. Short periods of careful sun exposure during this window produce the most rapid Vitamin D synthesis. However, extended exposure carries significant burn risk. NOT recommended for general therapeutic sunbathing. Brief, carefully timed exposures (5-15 minutes) for specific UV-B-dependent therapeutic effects only, under professional guidance.
<b>Afternoon (2:00–4:00 PM)</b>	UV intensity declining but still significant. The infrared component remains high. This window is sometimes used therapeutically for specific conditions requiring deep tissue warming. Not ideal for Vitamin D synthesis (UV-B declining). Some traditions recommend brief afternoon sun exposure for arthritic conditions where the warming effect is primary.
<b>Sunset (5:00–7:00 PM)</b>	Similar to sunrise — a second golden therapeutic window. UV intensity low (minimal sunburn risk), infrared and visible spectrum predominant. Excellent for mental wellbeing, circadian rhythm regulation, and gentle relaxation-oriented heliotherapy. Watching the setting sun

(Sandhyavandana — twilight worship) is a traditional Vedic daily practice with clear photobiological benefits.

# Chapter 4: The Electromagnetic Spectrum and Therapeutic Light

## 4.1 Understanding the Electromagnetic Spectrum

Solar radiation spans the entire electromagnetic spectrum — from extremely high-frequency gamma radiation to extremely low-frequency radio waves. However, the Earth's atmosphere acts as a highly selective filter, blocking most of the high-energy ionizing radiation (gamma rays, X-rays) and much of the far-ultraviolet range, while allowing the therapeutically beneficial ranges to pass through. This atmospheric filtering is one of the most extraordinary aspects of Earth's biosphere — it is precisely calibrated to allow the wavelengths that support life while blocking those that would destroy it.

Radiation Type	Wavelength Range	Atmospheric Penetration	Primary Therapeutic Effects
<b>Gamma Rays</b>	< 0.01 nm	Completely blocked	Not applicable — would be lethal in therapeutic doses
<b>X-Rays</b>	0.01–10 nm	Completely blocked	Not applicable — blocked by atmosphere
<b>Far UV (UV-C)</b>	100–280 nm	Blocked by ozone layer	Germicidal (used artificially in UV-C therapy)
<b>UV-B</b>	280–315 nm	Partially filtered	Vitamin D synthesis, antimicrobial, psoriasis therapy, skin immune activation
<b>UV-A</b>	315–400 nm	Mostly penetrates	Pigmentation, PUVA therapy, mood, circadian rhythm
<b>Visible Light</b>	400–700 nm	Fully penetrates	Circadian rhythm, serotonin, mood, chromotherapy, eye health
<b>Infrared-A (Near IR)</b>	700–1400 nm	Fully penetrates	Deep tissue warming, wound healing, pain relief, circulation
<b>Infrared-B (Mid IR)</b>	1400–3000 nm	Partially penetrates	Surface tissue warming, skin hydration
<b>Infrared-C (Far IR)</b>	3000 nm–1 mm	Largely absorbed by water vapour	Surface warming, minor therapeutic

			significance outdoors
<b>Radio Waves</b>	> 1 mm	Fully penetrates	Not directly therapeutic in this context

## 4.2 The Therapeutic Windows of Solar Radiation

Within the full solar spectrum, photobiology research has identified several specific 'therapeutic windows' — wavelength ranges where solar radiation produces particularly significant and well-documented beneficial effects in human tissues. Understanding these windows is essential for the design of rational heliotherapy protocols.

- ◆ The UV-B Window (290-315 nm): The vitamin D synthesis window. Photons in this range trigger the conversion of 7-dehydrocholesterol in the skin to pre-vitamin D<sub>3</sub>, which then undergoes thermal isomerization to Vitamin D<sub>3</sub> and enters the circulation. UV-B is also the primary range responsible for the therapeutic effects of heliotherapy in psoriasis, vitiligo, and other phototherapy-responsive conditions.
- ◆ The UV-A Window (315-400 nm): The mood, pigmentation, and deeper UV window. UV-A penetrates more deeply into the skin than UV-B and is primarily responsible for stimulating the production of nitric oxide (NO) in the skin — a vasodilator that has significant cardiovascular benefits. UV-A also stimulates melanin production (tanning), provides PUVA therapy effects when combined with psoralens, and plays a role in immune modulation.
- ◆ The Blue Light Window (440-490 nm): The circadian and mood window. Blue wavelengths of visible light are the primary signal for the suprachiasmatic nucleus (SCN — the brain's master biological clock) to set the circadian rhythm. Morning blue light exposure suppresses melatonin, increases cortisol and serotonin, raises alertness and mood, and sets the body's entire 24-hour hormonal rhythm.
- ◆ The Near-Infrared Window (700-1100 nm): The tissue healing window. Near-infrared radiation penetrates deeply into the body — up to several centimetres into tissue — and directly stimulates cytochrome c oxidase, a key enzyme in the cellular energy production pathway (mitochondrial ATP synthesis). This is the primary mechanism of photobiomodulation (PBM), also known as low-level laser therapy (LLLT) when using artificial sources.

# Chapter 5: Photobiology — How Sunlight Interacts with the Human Body

## 5.1 The Skin as a Photobiological Organ

The skin is far more than a passive barrier or waterproof covering for the body. It is a sophisticated, active photobiological organ — a light-sensitive, biochemically responsive surface that translates solar radiation signals into a cascade of systemic physiological responses that affect every organ system in the body. The skin's photobiological functions evolved over millions of years precisely because consistent solar exposure was the central environmental given of life for terrestrial organisms.

The skin contains multiple photoreceptor chromophores — molecules that absorb specific wavelengths of light and respond with chemical changes. These include: 7-dehydrocholesterol (UV-B receptor for Vitamin D synthesis), trans-urocanic acid (UV-B receptor with immunomodulatory function), melanin (the primary UV-protective pigment), nitrosothiols and hemoglobin derivatives (UV-A receptors for nitric oxide release), and cytochrome c oxidase in keratinocytes (near-infrared receptor for ATP synthesis stimulation).

### Key Insight — The Skin as a Neuroendocrine Organ

Modern photobiology research has revealed that the skin functions as a complete neuroendocrine organ in its own right — not merely responding to sunlight but converting solar signals into systemic hormonal and neurological messages. Skin cells produce and respond to all the major hormones of the body, including cortisol, melatonin, serotonin, dopamine, endorphins, and corticotropin-releasing hormone. Sunlight activates and regulates all of these cutaneous neuroendocrine pathways simultaneously, making heliotherapy simultaneously a hormonal, neurological, metabolic, immune, and psychological treatment.

## 5.2 Systemic Effects of Sunlight on Major Body Systems

Body System	Photobiological Effects of Sunlight
<b>Immune System</b>	UV radiation in therapeutic doses suppresses excessive local immune responses (beneficial in autoimmune skin conditions like psoriasis) while simultaneously enhancing systemic immune competence through Vitamin D-mediated pathways. Vitamin D activates macrophages, enhances the production of antimicrobial peptides (defensins and cathelicidins), improves T-regulatory cell

	function, and reduces excessive inflammatory signalling that underlies chronic disease.
<b>Endocrine System</b>	Sunlight regulates the entire hormonal axis. Morning blue light exposure triggers cortisol production (healthy awakening response), suppresses melatonin, and primes serotonin synthesis. Evening light reduction triggers melatonin production (sleep induction). Vitamin D produced by UV-B exposure functions as a steroid hormone — regulating the transcription of over 1,000 genes involved in immune function, cell differentiation, calcium metabolism, and cardiovascular health.
<b>Cardiovascular System</b>	UV-A radiation triggers the release of nitric oxide (NO) from nitrosothiol stores in the skin. NO is a potent vasodilator — relaxing smooth muscle in blood vessel walls, reducing peripheral vascular resistance, lowering blood pressure, and improving endothelial function. Epidemiological research has confirmed that populations living at higher latitudes (less sunlight) have significantly higher rates of cardiovascular disease — partly but not entirely explained by Vitamin D deficiency.
<b>Nervous System and Mood</b>	Sunlight stimulates the retinal photoreceptors that signal the suprachiasmatic nucleus (the master biological clock), entraining the body's circadian rhythm. This circadian synchronization has profound effects on all neurological and psychological functions. Additionally, sunlight exposure directly increases serotonin production (the neurotransmitter of wellbeing, confidence, and social bonding) and regulates the dopaminergic system. Seasonal Affective Disorder (SAD) is the most dramatic clinical manifestation of sunlight deficiency on neurological function.
<b>Musculoskeletal System</b>	Vitamin D is essential for calcium absorption from the gut and calcium deposition into bone. Vitamin D deficiency causes rickets in children and osteomalacia in adults — conditions of bone softening and deformity caused by inadequate mineralization. Vitamin D also plays a direct role in muscle function — Vitamin D deficiency causes proximal muscle weakness and increases falls risk in the elderly. The infrared component of sunlight provides direct therapeutic warmth to muscles and joints, reducing stiffness and pain.
<b>Metabolic System</b>	Vitamin D improves insulin sensitivity and beta-cell function — Vitamin D deficiency is now recognized as a significant independent risk factor for Type 2 diabetes. Morning sunlight exposure improves mitochondrial function in peripheral tissues. Near-infrared exposure stimulates cytochrome c oxidase, directly enhancing cellular ATP production and improving the efficiency of energy metabolism. Regular sunlight exposure is consistently associated with lower rates of obesity and metabolic syndrome in epidemiological studies.

# Chapter 6: Vitamin D — The Sunshine Vitamin

## 6.1 What is Vitamin D?

Vitamin D is unique among vitamins in that it is not, in the strict sense, a vitamin at all — it is a steroid prohormone. A true vitamin is a compound that cannot be synthesized by the body and must be obtained through diet. Vitamin D, however, is synthesized by the human body in response to UV-B radiation from the Sun, and it is converted in the body into a fully functional steroid hormone (1,25-dihydroxyvitamin D<sub>3</sub>, or calcitriol) that regulates the transcription of over 1,000 human genes. Calling it a 'vitamin' significantly understates its biological importance and its dependence on sunlight.

The synthesis pathway: UV-B radiation (wavelength 290-315 nm) strikes 7-dehydrocholesterol in the skin's epidermis and converts it to previtamin D<sub>3</sub>. Body heat then converts previtamin D<sub>3</sub> to Vitamin D<sub>3</sub> (cholecalciferol). Vitamin D<sub>3</sub> is transported in the bloodstream to the liver, where it is converted to 25-hydroxyvitamin D<sub>3</sub> (calcidiol — the storage form measured in clinical blood tests). Calcidiol then travels to the kidneys, where it is activated to 1,25-dihydroxyvitamin D<sub>3</sub> (calcitriol — the fully active hormone form).

Stage	Location	Compound	Trigger
<b>1 — Photolysis</b>	Skin (epidermis)	7-dehydrocholesterol → Previtamin D <sub>3</sub>	UV-B radiation (290-315 nm)
<b>2 — Isomerization</b>	Skin (dermis)	Previtamin D <sub>3</sub> → Vitamin D <sub>3</sub> (Cholecalciferol)	Body heat (37°C)
<b>3 — Hydroxylation</b>	Liver	Vitamin D <sub>3</sub> → 25-OH-Vitamin D <sub>3</sub> (Calcidiol)	Enzyme CYP2R1
<b>4 — Activation</b>	Kidneys (and other tissues)	25-OH-D <sub>3</sub> → 1,25-OH <sub>2</sub> -D <sub>3</sub> (Calcitriol)	Enzyme CYP27B1, PTH, low Calcium
<b>5 — Gene Regulation</b>	All nucleated cells	Calcitriol binds Vitamin D Receptor (VDR)	VDR present in >200 tissue types

## 6.2 Functions of Vitamin D

- ◆ **Calcium and Phosphorus Metabolism:** Vitamin D increases intestinal absorption of calcium by 30-40 times and promotes renal reabsorption of calcium. Without adequate Vitamin D, even a calcium-rich diet cannot maintain bone density. This is the most classically

recognized function of Vitamin D — prevention of rickets (children) and osteomalacia and osteoporosis (adults).

- ◆ **Immune Regulation:** Vitamin D is a master regulator of the immune system. It activates macrophages, enhances production of antimicrobial peptides (cathelicidin and defensin-beta2), promotes T-regulatory cell development (reducing autoimmune overactivation), and modulates the inflammatory response. Vitamin D deficiency dramatically increases susceptibility to respiratory infections, including tuberculosis, influenza, and — as recent research has confirmed — COVID-19.
- ◆ **Cardiovascular Health:** Vitamin D receptors are present in cardiac muscle and vascular smooth muscle. Vitamin D regulates renin production (part of the blood pressure regulation system), reduces arterial inflammation, improves endothelial function, and reduces platelet aggregation. Meta-analyses confirm that Vitamin D deficiency is an independent risk factor for hypertension, heart failure, and stroke.
- ◆ **Metabolic and Anti-diabetic Effects:** Vitamin D improves insulin sensitivity in peripheral tissues and supports beta-cell function in the pancreas. Multiple large-scale studies have confirmed that Vitamin D deficiency significantly increases the risk of developing Type 2 diabetes, and that Vitamin D supplementation improves glycemic control in deficient individuals.
- ◆ **Neurological and Psychological Function:** Vitamin D receptors are abundant in the brain — particularly in the hippocampus, hypothalamus, and cortex. Vitamin D deficiency is associated with increased rates of depression, schizophrenia, autism spectrum disorder, and dementia. Vitamin D regulates the production of nerve growth factor (NGF) and the synthesis of neurotransmitters including serotonin and dopamine.
- ◆ **Anticancer Effects:** Vitamin D promotes cell differentiation (healthy maturation) and apoptosis (programmed death of abnormal cells) while inhibiting cell proliferation and angiogenesis (formation of blood vessels that tumours require to grow). Epidemiological studies consistently show that higher Vitamin D levels are associated with significantly reduced risk of several cancers, including colorectal, breast, prostate, ovarian, and lung cancers.

### 6.3 Factors Affecting Vitamin D Synthesis

Factor	Effect on Vitamin D Synthesis
<b>Skin Pigmentation</b>	Dark skin contains more melanin, which absorbs UV-B and reduces Vitamin D synthesis efficiency. A person with very dark skin requires approximately 5-10 times more UV-B exposure than a very fair-skinned person to produce equivalent amounts of Vitamin D. This is a physiological adaptation — dark-skinned peoples evolved in high-

	UV-B equatorial environments. Problems arise when dark-skinned individuals live at high latitudes with low UV-B availability.
<b>Latitude and Season</b>	UV-B radiation is only sufficient for Vitamin D synthesis when the Sun is at a sufficient angle in the sky (Solar Elevation Angle > 30-35 degrees). At latitudes above 35-37°N or below 35-37°S, there may be little or no Vitamin D synthesis for 4-6 months of the year (autumn through winter). This is why Vitamin D deficiency is epidemic at northern and southern latitudes.
<b>Time of Day</b>	UV-B for Vitamin D synthesis is only present when the Sun is above approximately 30 degrees on the horizon — typically from mid-morning to mid-afternoon. Early morning and late afternoon sunlight, while valuable for other photobiological reasons, does not trigger significant Vitamin D synthesis in most latitudes.
<b>Age</b>	Skin Vitamin D synthesis efficiency declines with age — a 70-year-old produces only about 25% of the Vitamin D that a young adult would produce from the same UV-B exposure. This dramatically increases the risk of Vitamin D deficiency in the elderly, compounding the osteoporosis risk that already increases with age.
<b>Sunscreen</b>	Sunscreen with SPF 15 blocks approximately 93% of UV-B, and SPF 30 blocks approximately 97%. While sunscreen is important for preventing sunburn and reducing skin cancer risk with prolonged exposure, it essentially eliminates Vitamin D synthesis when applied before sun exposure. The appropriate approach is brief unprotected sun exposure for Vitamin D, then sunscreen for extended time outdoors.
<b>Glass and Clothing</b>	Ordinary glass blocks UV-B entirely — sitting next to a sunny window produces no Vitamin D. Clothing blocks UV-B in proportion to its coverage area and weave density. Thin, loosely woven fabrics allow some UV-B through; thick, tightly woven fabrics block it entirely. Traditional practices of exposing the upper body during morning sun practices (as in Surya Namaskar) were not merely ritual — they were photobiologically rational.

# Chapter 7: Ultraviolet Radiation — UVA, UVB, UVC and Their Effects

## 7.1 The UV Spectrum in Detail

Ultraviolet radiation is the most therapeutically important and also the most potentially damaging component of solar radiation. Understanding the three UV sub-bands — UVC, UVB, and UVA — their distinct biological effects, and their different penetration depths in human tissue is essential for the rational design of safe and effective heliotherapy protocols.

UV Band	Wavelength	Penetration Depth	Key Biological Effects	Therapeutic Uses
<b>UVC (200-280 nm)</b>	Shortest UV	< 0.1 mm (epidermis surface only)	Most potent germicidal effect — destroys DNA of bacteria, viruses, fungi. Also most damaging to skin — causes direct DNA photoproduct formation. Blocked by ozone layer naturally.	Artificial UVC used for disinfection, wound sterilization, Lupus Vulgaris (historical). NOT used in outdoor heliotherapy — not present in natural sunlight reaching Earth's surface.
<b>UVB (280-315 nm)</b>	Short UV	0.1-0.5 mm (epidermis and upper dermis)	Vitamin D3 synthesis. Delayed pigmentation (tanning). Sunburn at excess doses. Immune modulation in skin. Antiproliferative effects. Antipsoriatic effects.	Vitamin D optimization, psoriasis, eczema, vitiligo, Seasonal Affective Disorder (via skin pathway), antibiotic-resistant wound infections. The most therapeutically potent UV band for most conditions.
<b>UVA-II (315-340 nm)</b>	Long UV (near B)	0.5-1.0 mm (full epidermis and superficial dermis)	Weak Vitamin D synthesis. Immune modulation. Melanin oxidation (immediate pigmentation).	PUVA therapy (psoriasis, vitiligo, mycosis fungoides), tanning beds (with care), SAD phototherapy.

			DNA damage at high doses via indirect oxidative pathways.	
<b>UVA-I (340-400 nm)</b>	Long UV (near visible)	1-2 mm (full dermis)	Nitric oxide release (vasodilation, cardiovascular effects). Collagen remodelling (both breakdown and stimulation). Immune modulation. Melanogenesis stimulation.	Cardiovascular support, scleroderma, urticaria pigmentosa, wound healing in specific contexts.

## 7.2 The Dose-Response Relationship in Heliotherapy

One of the most important principles in heliotherapy is the dose-response relationship of UV radiation — the fact that the therapeutic and harmful effects of UV depend critically on the dose received, and that there is an optimal therapeutic dose beyond which benefits cease and harm begins. This relationship was eloquently expressed by Paracelsus: 'The dose makes the poison.' In heliotherapy, the same radiation that at low doses prevents cancer can at high doses cause it.

### The Hormesis Principle

Hormesis is the biological phenomenon in which low doses of an agent that is harmful at high doses produce beneficial adaptive responses. UV radiation is a classic hormetic agent: low doses stimulate immune function, promote Vitamin D synthesis, activate DNA repair mechanisms, and reduce cancer risk; high doses cause sunburn, DNA damage, immunosuppression, photoaging, and increase skin cancer risk. The entire science of heliotherapy is essentially the science of optimizing UV hormesis — consistently achieving the benefits of low-dose exposure while avoiding the harms of high-dose exposure.

## 7.3 UVB and Psoriasis — A Model of Phototherapy

Psoriasis is the condition for which the phototherapy evidence base is most extensive and most convincing. UV-B radiation reduces the hyperproliferation of psoriatic keratinocytes (skin cells that multiply at 7-10 times the normal rate in psoriasis), induces apoptosis (programmed death) of activated T-lymphocytes in psoriatic plaques, reduces the production of pro-inflammatory cytokines (including IL-17, IL-23, and TNF-alpha) that drive psoriatic inflammation, and stimulates the production of anti-inflammatory Vitamin D3 in the skin.

Narrowband UV-B (NB-UVB), using artificial sources emitting primarily at 311-313 nm, has become one of the most effective and widely used phototherapy modalities in modern dermatology. For natural heliotherapy, the mid-morning sun (8:00-10:00 AM) provides a natural broadband UV-B source that produces equivalent therapeutic effects through graduated sunbathing protocols, as demonstrated by the clinical results of heliotherapy sanatoriums from Rollier's era to the present day.

# Chapter 8: Infrared Radiation and Its Healing Properties

## 8.1 Infrared Radiation — The Invisible Warmth

Infrared radiation (IR) constitutes approximately 49% of total solar radiation — the single largest component by energy. It is experienced as warmth when it strikes the skin. Unlike UV radiation, which is a two-edged sword requiring careful dose management, the IR component of sunlight is generally beneficial and well-tolerated, making it one of the most accessible and universally applicable aspects of solar healing.

Near-Infrared (NIR, 700-1400 nm) radiation penetrates deeply into biological tissue — up to 5-10 cm in some studies — reaching muscles, joints, bones, nerves, and even internal organs accessible near the body surface. It is absorbed by cytochrome c oxidase (Complex IV) in the mitochondrial respiratory chain, where it directly stimulates ATP (adenosine triphosphate) production — the fundamental energy currency of every cell in the body.

## 8.2 Photobiomodulation — NIR and Cellular Energy

The discovery that near-infrared light can directly stimulate mitochondrial ATP production has opened an entirely new field of medical research: photobiomodulation (PBM), previously known as low-level laser therapy (LLLT). Natural sunlight is the most abundant and accessible source of the near-infrared wavelengths that drive PBM.

Clinical Application	Mechanism and Therapeutic Effect
<b>Wound Healing</b>	NIR radiation stimulates fibroblast proliferation and collagen synthesis — accelerating wound closure, reducing scar formation, and improving the quality of healed tissue. Controlled trials have demonstrated 50-60% faster wound healing under NIR exposure. Traditional heliotherapy sanatoriums routinely achieved wound healing results that seemed miraculous to observers accustomed to slower healing in sunlight-deprived environments.
<b>Musculoskeletal Pain</b>	NIR penetrates to joint surfaces and muscle bellies — directly warming inflamed tissues, reducing muscle spasm, improving synovial fluid viscosity, and stimulating the production of nitric oxide in joint tissues. Regular morning sun exposure of affected joints produces consistent improvement in pain and mobility in conditions including arthritis, fibromyalgia, bursitis, and tendinopathy.

<b>Nerve Repair and Neuropathy</b>	NIR radiation at appropriate wavelengths stimulates nerve regeneration — accelerating the regrowth of damaged nerve fibres, improving nerve conduction velocity, and reducing the pain and dysaesthesiae of peripheral neuropathy. Clinical applications include diabetic peripheral neuropathy, post-herpetic neuralgia, carpal tunnel syndrome, and traumatic nerve injuries.
<b>Improved Circulation</b>	NIR induces the release of nitric oxide from endothelial cells and red blood cells, producing local and systemic vasodilation. This improves peripheral circulation, reduces blood pressure, enhances oxygen delivery to tissues, accelerates removal of inflammatory mediators from congested areas, and supports cardiovascular health through multiple parallel mechanisms.
<b>Skin Rejuvenation</b>	NIR stimulates fibroblasts to produce new collagen and elastin — the structural proteins that maintain skin firmness, elasticity, and youthful appearance. At therapeutic doses, NIR exposure counteracts the structural protein degradation that produces photoaging, wrinkles, and skin laxity. This explains the paradoxical observation that moderate, regular sun exposure produces healthier, more resilient skin than chronic sun avoidance.
<b>Anti-inflammatory Effects</b>	NIR reduces the production of pro-inflammatory cytokines (TNF-alpha, IL-1beta, IL-6) while increasing anti-inflammatory cytokines (IL-10). This anti-inflammatory effect, combined with the enhanced circulation and accelerated tissue repair that NIR promotes, creates the therapeutic conditions for resolution of chronic inflammation that responds poorly to pharmaceutical intervention alone.

# Chapter 9: Visible Light — Chromotherapy and Circadian Science

## 9.1 The Visible Spectrum and Biology

The visible spectrum — the narrow band of electromagnetic radiation between approximately 400 and 700 nanometres that human eyes can detect — is far more biologically active than its gentle, harmless appearance suggests. The human body has multiple photoreceptor systems that respond to different wavelengths of visible light, translating each colour into specific biochemical, hormonal, and neurological signals that profoundly affect health, mood, energy, sleep, metabolism, and immune function.

Colour / Wavelength	Primary Biological Effects	Therapeutic Applications	Traditional Indian Correspondence
<b>Violet (380-450 nm)</b>	Pineal stimulation, serotonin production, calming of nervous system, antiseptic at high intensities	Anxiety, insomnia, skin infections, nervous system disorders	Sahasrara Chakra — crown, transcendence
<b>Blue (450-490 nm)</b>	Melatonin suppression, cortisol release, serotonin increase, circadian resetting, alertness	Seasonal Affective Disorder, depression, circadian rhythm disorders, jaundice in newborns	Vishuddha Chakra — throat, clarity, communication
<b>Green (490-570 nm)</b>	Blood pressure reduction, muscle relaxation, anti-inflammatory, balancing	Hypertension, cardiac conditions, stress, fatigue	Anahata Chakra — heart, balance, healing
<b>Yellow (570-590 nm)</b>	Digestive stimulation, nerve tonic, liver activation, mental clarity, anti-depressant	Digestive disorders, diabetes, liver conditions, depression	Manipura Chakra — solar plexus, will, digestion
<b>Orange (590-620 nm)</b>	Thyroid stimulation, lung function, anti-spasmodic, immune stimulation, vitality	Respiratory conditions, hypothyroidism, muscle cramps, fatigue	Svadhithana Chakra — creativity, vitality
<b>Red (620-700 nm)</b>	Circulation enhancement, warmth, metabolic stimulation, wound healing, nerve stimulation	Anaemia, poor circulation, chronic fatigue, cold extremities, depression in winter	Mooladhara Chakra — root, survival, physical energy

## 9.2 Light and the Circadian Clock — The Master Rhythm

The human circadian clock — the biological timekeeper that regulates virtually every physiological process in the body across a 24-hour cycle — is set, maintained, and regulated primarily by light. Specifically, specialized photoreceptors in the retina called intrinsically photosensitive retinal ganglion cells (ipRGCs), containing the photopigment melanopsin, are maximally sensitive to blue light (approximately 480 nm) and send signals directly to the suprachiasmatic nucleus (SCN) — the master pacemaker of the entire circadian system.

The circadian clock regulates: cortisol secretion (peaks at 8 AM in natural light conditions — the 'awakening response'), melatonin secretion (rises after sunset, peaks at 2-3 AM), core body temperature (lowest at 4 AM, highest at 5 PM), immune function (different immune activities are optimized at different times of day), cellular repair and DNA correction (primarily occurs during sleep and the early morning hours), and hormonal rhythms of growth hormone, testosterone, estrogen, progesterone, insulin, leptin, and ghrelin.

### **Surya and the Circadian Teaching**

The ancient Vedic concept of Ritambhara (cosmic rhythm) — the understanding that all of life moves in sacred cycles of time — finds its most direct physiological expression in the circadian system. The Vedic instruction to perform Sandhyavandana (sunrise and sunset worship) was not merely religious ritual; it was a prescription for daily circadian synchronization — ensuring that the body's master clock was reset each morning by the first light of dawn and gradually prepared for sleep by the gradual dimming of the evening sky. The instruction to rise at Brahma Muhurta — the auspicious pre-dawn hour — and to practice Surya Namaskar as the sun rises is a complete circadian medicine protocol expressed in the language of spiritual practice.

# Chapter 10: Heliotherapy Protocol — Sunbathing Techniques

## 10.1 The Classical Sunbathing Protocol

The systematic sunbathing protocols developed by Auguste Rollier and refined by subsequent generations of naturopathic physicians represent the most scientifically grounded and clinically tested approach to therapeutic sun exposure. These protocols are based on the principle of graduated exposure — beginning with brief exposures to small body areas and progressively increasing both the duration and the body surface area exposed as the patient's tolerance and pigmentation develop.

Week / Stage	Duration	Body Areas Exposed	Time of Day	Notes
<b>Week 1 (Beginning)</b>	5-10 min total	Feet and lower legs only	8:00-10:00 AM	Absolute beginners. Fair skin types begin with 3-5 minutes. Monitor for any redness.
<b>Week 2</b>	10-20 min	Legs to knees	8:00-10:00 AM	Only advance if no adverse reaction from previous week. Increase gradually.
<b>Week 3</b>	20-30 min	Full legs and lower abdomen	8:00-10:00 AM	Mild tan developing — increased tolerance. Continue monitoring skin response.
<b>Week 4</b>	30-40 min	Torso (front and back alternately)	8:00-10:00 AM	Rotate body position every 10-15 minutes for even exposure.
<b>Week 5</b>	40-50 min	Full body except face	8:00-10:00 AM	Well-established tolerance. Continue graduated increase only.

<b>Maintenance</b>	30-60 min	Full body with face protected	8:00-10:00 AM	Sustainable ongoing protocol. Face protection with hat or sunscreen recommended.
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## 10.2 Essential Principles of Safe Sunbathing

1. Timing is primary: Always prefer the morning sun (8:00-10:00 AM) for therapeutic sunbathing. This window provides optimal UV-B for Vitamin D synthesis, beneficial infrared for warming, and natural blue light for circadian synchronization — without the excessive UV intensity of midday that significantly increases burn and skin damage risk.
2. Begin gradually — never sunburn: Sunburn is not a therapeutic event — it is a sign of tissue damage and represents a failed heliotherapy session. The golden rule of heliotherapy is that the skin should never be allowed to become red, tender, or blistered. Progress must always be slower than you think necessary, particularly in the early weeks.
3. Protect the head always: The head, face, and particularly the eyes should always be protected from direct sun during therapeutic sunbathing. A wide-brimmed hat, head covering, and quality UV-protective sunglasses are essential. The therapeutic body surface areas are the limbs and torso — not the head and face.
4. Hydration is essential: Sun exposure increases transepidermal water loss and promotes sweating. Drink 500-750 ml of clean water before a sunbathing session and ensure ongoing hydration during and after. Dehydration dramatically increases the risk of heat-related adverse effects.
5. Body position and rotation: Rotate body position every 10-15 minutes during sunbathing to ensure even exposure across all exposed surfaces and prevent localized overexposure. A comfortable reclining position with arms slightly away from the body ensures maximum skin surface exposure.
6. Pre-sun skin preparation: Do not apply moisturizers, oils (except for specific therapeutic purposes), or cosmetics before sunbathing — many contain photosensitizing compounds and can unpredictably alter the UV response of the skin. Skin should be clean and free of any topical applications.
7. Post-sun care: After sunbathing, move into shade or indoors. Apply clean water or aloe vera gel to the exposed skin for cooling and hydration. Allow the skin to settle for 30-60 minutes before showering — this allows Vitamin D synthesis to complete as the previtamin D3 isomerizes to Vitamin D3 under body heat.
8. Environmental factors: Monitor the UV index for your location (apps and weather services provide this). Adjust session duration according to UV index — shorter sessions on high

UV index days, longer on low UV index days. Altitude, reflective surfaces (water, sand, snow), and cloud cover all significantly affect actual UV exposure.

# Chapter 11: Surya Namaskar as Heliotherapy

## 11.1 The Science of the Sun Salutation

Surya Namaskar — the Sun Salutation — is simultaneously the most important physical practice of Hatha Yoga, the most complete heliotherapy protocol ever developed, and one of the most extraordinary integrations of photobiology, physiology, and spiritual practice in human history. When practiced in the traditional manner — facing the rising Sun, in the open air, in the early morning — Surya Namaskar is a complete therapeutic protocol that simultaneously provides graduated UV and infrared exposure, cardiovascular conditioning, musculoskeletal mobilization, respiratory training, nervous system regulation, circadian entrainment, and spiritual communion with the solar principle.

Modern fitness culture has largely stripped Surya Namaskar of its heliotherapeutic context, reducing it to an indoor warm-up sequence. This manual calls for the restoration of its original outdoor, solar-oriented practice — not as a rejection of indoor yoga but as a recognition that the morning outdoor practice carries a dimension of healing intelligence that the indoor version, however beautifully performed, cannot replicate.

Posture (Asana)	Sanskrit Name	Photobiological Effect	Physiological Benefit
<b>1. Prayer Pose</b>	Pranamasana	Face and upper chest face East (sunrise) — full retinal blue light reception	Circadian clock reset, cortisol activation, melatonin suppression — the biological alarm clock
<b>2. Raised Arms</b>	Hasta Uttanasana	Arms, chest, and entire front body exposed to morning sun	Maximum solar Prana absorption; deep lung expansion; spinal extension; Vitamin D surface area maximized
<b>3. Standing Forward Bend</b>	Uttanasana	Back and posterior legs exposed upward to morning sky	Hamstring lengthening; inversion improves cerebral circulation; calms nervous system
<b>4. Equestrian Pose</b>	Ashwa Sanchalanasana	Hip flexors and anterior thigh exposed to sun	Hip flexibility; prepares pelvic region for fuller Sun exposure; stimulates digestive organs

<b>5. Plank</b>	Kumbhakasana	Entire dorsal body surface faces the sky	Core strength; arm and shoulder conditioning; deep breath retention
<b>6. Eight-Limbed Pose</b>	Ashtanga Namaskara	Chest, knees, hands, feet contact the earth simultaneously	Prithvi-Surya connection — earth and sun simultaneously grounding and energizing the body
<b>7. Cobra Pose</b>	Bhujangasana	Full chest and abdomen exposed directly to morning sun	Opens heart and lungs to maximum sunlight; spinal extension; adrenal stimulation
<b>8. Downward Dog</b>	Adho Mukha Svanasana	Posterior body fully exposed; mild inversion	Full spinal decompression; hamstring opening; shoulder strengthening; improved circulation
<b>9. Equestrian Pose</b>	Ashwa Sanchalanasana	Return — anterior thigh and hip flexors sun-facing	Symmetrical hip preparation for standing postures
<b>10. Standing Forward Bend</b>	Uttanasana	Back body skyward — second exposure	Second hamstring stretch; nervous system calming
<b>11. Raised Arms</b>	Hasta Uttanasana	Full anterior body sun-facing once more	Final full-body solar charge; lung expansion; spinal extension
<b>12. Prayer Pose</b>	Pranamasana	Return to stillness, facing the Sun with gratitude	Integration of all heliotherapeutic and physiological effects; meditative closure

## 11.2 The Twelve Sun Salutation Mantras

Each of the twelve positions of Surya Namaskar is traditionally accompanied by a specific mantra that names and invokes a different aspect of the solar principle. These mantras are not merely decorative — each one addresses a specific quality of solar energy and, through the vibration of sound, amplifies the photobiological effect of each posture.

Mantra and Position	Meaning and Photobiological Significance
<b>Pranamasana — Om Mitraya Namah</b>	Salutation to the Friend of All — invoking the Sun's universally benevolent, life-giving aspect. Mitra is the Vedic deity of friendship, contract, and the bonds that sustain social harmony — qualities sustained by the warming, stabilizing energy of the morning sun.

<b>Hasta Uttanasana — Om Ravaye Namah</b>	Salutation to the Shining One — invoking the Sun's radiance and brilliance. Ravi is the glowing, luminous aspect of the Sun — the pure light that illuminates all things and makes seeing possible.
<b>Uttanasana — Om Suryaya Namah</b>	Salutation to the Inducer of Action — invoking the Sun as the power that activates, motivates, and propels all movement and activity. Surya is the active, energizing aspect of the solar principle.
<b>Ashwa Sanchalanasana — Om Bhanave Namah</b>	Salutation to the Illuminator — the Sun as the bestower of wisdom and clarity. Bhanu is the aspect of the Sun that dispels not only physical darkness but the inner darkness of ignorance and confusion.
<b>Kumbhakasana — Om Khagaya Namah</b>	Salutation to the Sky-Mover — invoking the Sun as it moves through the sky, the great sustainer of all celestial order. Khaga is the bird of the sky — the Sun as the supreme being that moves freely through space.
<b>Ashtanga Namaskara — Om Pushne Namah</b>	Salutation to the Nourisher — the Sun as the provider of all nourishment, physical and spiritual. Pushan is the pastoral aspect of the solar deity — the one who guides, feeds, and protects all living things.
<b>Bhujangasana — Om Hiranyagarbhaya Namah</b>	Salutation to the Golden Womb — the Sun as the cosmic source from which all creation emerges. Hiranyagarbha (the Golden Womb) is Brahman in its creative, generative aspect — the source of all existence.
<b>Adho Mukha Svanasana — Om Marichaye Namah</b>	Salutation to the Rays of Light — the Sun as manifested in its individual rays, each carrying the full healing power of the whole. Marichi is one of the primordial Rishis and the grandfather of the solar race.
<b>Ashwa Sanchalanasana — Om Adityaya Namah</b>	Salutation to the Son of Aditi — the Sun as born of Aditi, the infinite, boundless mother principle. Aditya is the Sun in its divine, celestial aspect as one of the twelve Adityas (solar deities of the months).
<b>Uttanasana — Om Savitre Namah</b>	Salutation to the Stimulator — the Sun as the cosmic activating force that stimulates all biological processes. Savitri is the generative, vitalizing aspect of the Sun — this is the solar deity invoked in the Gayatri Mantra.
<b>Hasta Uttanasana — Om Arkaya Namah</b>	Salutation to the Fit to be Praised — the Sun as worthy of all worship and devotion. Arka is the aspect of the Sun as a remedy — the great healer. Arka also means a medicinal plant used in Ayurveda for many healing purposes.
<b>Pranamasana — Om Bhaskaraya Namah</b>	Salutation to the Shining Light — the Sun as the bringer of illumination, wisdom, and liberation. Bhaskara means 'light-maker' — the Sun as the cosmic creator of all light, the ultimate source of all vision, knowledge, and consciousness.

# Chapter 12: Heliotherapy for Specific Health Conditions

## 12.1 Skin Conditions

Condition	Heliotherapy Approach	Key UV Band	Expected Outcome
<b>Psoriasis</b>	Graduated UV-B sunbathing, 20-40 min daily; Dead Sea protocol (sun + salt water)	UV-B primarily	Significant PASI score reduction; reduced plaque thickness, scaling, and inflammation; often complete remission with consistent treatment
<b>Vitiligo</b>	Gradual UV-A and UV-B exposure of depigmented areas; may combine with topical psoralen	UV-A and UV-B	Gradual repigmentation (follicular then diffuse); best results at edges of lesions; may take months of consistent treatment
<b>Eczema / Atopic Dermatitis</b>	Moderate UV-B exposure; salt water + sun (seawater heliotherapy)	UV-B	Reduced pruritus, inflammation, and skin barrier disruption; Vitamin D optimization reduces flare frequency
<b>Acne Vulgaris</b>	Brief early morning sun exposure (10-15 min); UV germicidal effect on P. acnes	UV-B, UV-A	Reduced bacterial load; improved skin microbiome; reduced inflammation; cosmetically significant improvement in 4-6 weeks
<b>Tinea (Fungal infections)</b>	Direct sun exposure to affected areas; UV fungicidal effect	UV-B, UV-C (near surface)	Fungal organisms destroyed by UV radiation; combined with systemic Vitamin D immune support
<b>Seborrhoeic Dermatitis</b>	Brief daily sun exposure; UV antimicrobial effect on Malassezia yeast	UV-B	Reduced yeast burden on skin; anti-inflammatory; significant symptom relief

## 12.2 Metabolic and Systemic Conditions

Condition	Heliotherapy Approach and Evidence
<b>Vitamin D Deficiency</b>	The primary and most direct indication for heliotherapy. Specific UV-B exposure protocols designed to optimize Vitamin D synthesis according to skin type, season, latitude, and individual requirements. A 20-30 minute midday exposure of arms and legs in a fair-skinned individual at tropical latitude can produce 10,000-20,000 IU of Vitamin D3 — dramatically more than any supplementation protocol. Regular monitored sunbathing is the most physiologically complete method of Vitamin D restoration.
<b>Type 2 Diabetes</b>	Regular morning heliotherapy improves insulin sensitivity through multiple mechanisms: Vitamin D improves beta-cell function and reduces insulin resistance; morning light exposure improves circadian rhythm regulation of cortisol and insulin; nitric oxide released by UV-A improves peripheral vascular function and glucose uptake in muscle; regular outdoor activity associated with heliotherapy reduces sedentary behaviour. Systematic morning sunbathing as part of a naturopathic diabetes management programme produces measurable improvements in HbA1c over 3-6 months.
<b>Hypertension</b>	UV-A radiation triggers the release of nitric oxide (NO) from skin stores — NO is a potent vasodilator that reduces peripheral vascular resistance and blood pressure. Studies at the University of Edinburgh confirmed that UV-A exposure produces a clinically significant reduction in systolic blood pressure in hypertensive subjects, independent of Vitamin D effects. Regular morning heliotherapy (with UV-A component) is a legitimate adjunct therapy for hypertension management in naturopathic practice.
<b>Depression and Seasonal Affective Disorder</b>	The most robustly evidenced psychological application of heliotherapy. Morning bright light exposure — ideally natural sunlight — is now the first-line recommended treatment for Seasonal Affective Disorder (SAD) in most evidence-based clinical guidelines. Mechanisms include: serotonin production stimulation by morning light, circadian clock resetting, melatonin normalization, Vitamin D (which regulates serotonin synthesis), and the psychological and social benefits of outdoor activity. Even in non-seasonal depression, morning sunlight exposure is a significant evidence-based adjunct to other treatments.
<b>Osteoporosis</b>	Vitamin D deficiency is one of the most significant modifiable risk factors for osteoporosis and fragility fracture. Regular heliotherapy that optimizes Vitamin D synthesis, combined with dietary calcium, weight-bearing exercise, and Vitamin K2 (which directs calcium into bone rather than arteries), constitutes the most comprehensive and physiologically complete approach to osteoporosis prevention and management available. Bone density measurements consistently improve with Vitamin D optimization through sunlight exposure in Vitamin D-deficient individuals.
<b>Autoimmune Conditions</b>	Multiple autoimmune conditions — including multiple sclerosis, rheumatoid arthritis, inflammatory bowel disease, systemic lupus erythematosus (interestingly, with specific precautions in this case),

and Type 1 diabetes — show strong geographical associations with sunlight deficiency. Vitamin D is now recognized as a master regulator of immune tolerance — deficiency allows excessive immune reactivity that underlies autoimmunity. Regular heliotherapy as part of an integrative naturopathic approach to autoimmune conditions improves immune regulation, reduces inflammatory markers, and supports overall disease management.

### **12.3 Tuberculosis — The Historical and Scientific Highlight**

Tuberculosis is historically the most important and most extensively documented indication for heliotherapy. The remarkable successes of Auguste Rollier and other heliotherapy sanatorium physicians in treating tuberculosis of bones, joints, skin (Lupus Vulgaris), lymph nodes, and even some forms of pulmonary tuberculosis through systematic sun exposure represent the most dramatic clinical validation of heliotherapy's power in the medical literature.

Mechanism: UV radiation, particularly in the UV-B to UV-C range, is directly bactericidal against *Mycobacterium tuberculosis*. Sunlight exposure of infected skin lesions (Lupus Vulgaris) directly kills the bacteria at the surface. More importantly, Vitamin D produced by UV-B exposure stimulates the production of cathelicidin — an endogenous antimicrobial peptide that kills *M. tuberculosis* inside infected macrophages, the very cells that the bacteria normally use as a hiding place from the immune system. Vitamin D deficiency is now recognized as the primary reason why tuberculosis is disproportionately prevalent in dark-skinned populations living at high latitudes — and why the disease was historically much more severe in winter than summer.

*“At Leysin, we saw children arrive unable to walk, their bones literally being consumed by tuberculosis. Within weeks of beginning our graduated sun cure, the bones began to heal, the infections resolved, and children who had been written off by conventional medicine began to run and play in the mountain sunshine. The Sun was our greatest physician.”*

— **Dr. Auguste Rollier, Leysin Heliotherapy Sanatorium, Switzerland**

# Chapter 13: Heliotherapy and the Five Elements

## 13.1 Surya and the Pancha Mahabhutas

In Indian natural philosophy, the Sun (Surya) is intimately related to all five Mahabhutas (great elements) — but its primary correspondence is with Agni (fire/energy) and Akasha (space/consciousness). The sun is the supreme manifestation of the fire principle in the cosmos — the source of all heat, light, and transformative energy in the solar system. Yet the sun also corresponds to Akasha — the subtlest element — as the source of the pranic field that permeates and sustains all of space.

Element	Relationship with Surya and Heliotherapy
<b>Prithvi (Earth) and Surya</b>	The Sun is the source of all of Earth's mineral wealth — the elements that constitute the human body were forged in stellar nucleosynthesis and distributed across space by solar winds. The Sun sustains plant photosynthesis, which fixes carbon and nitrogen from the atmosphere into the organic compounds that constitute all food. Every atom of the body has been touched by solar energy. Mud therapy and heliotherapy are complementary — the earth element receiving and holding the sun's energy, releasing it back into the body during mud treatment.
<b>Jala (Water) and Surya</b>	Water is the medium through which solar energy enters the food chain — water absorbs solar photons in photosynthesis, distributes nutrients via the hydrological cycle, and regulates global temperature through its enormous specific heat capacity. In the body, water is the medium through which photobiologically generated molecules (Vitamin D, nitric oxide, serotonin) are transported to their target tissues. Hydrotherapy and heliotherapy are traditionally combined — the contrast between water temperatures and solar warmth producing amplified therapeutic effects.
<b>Agni (Fire) and Surya</b>	The Sun is the supreme cosmic Agni — the fire that sustains all life. The digestive fire (Jatharagni) in the body is understood in Ayurveda as a manifestation of solar energy. Solar exposure stimulates the digestive fire — morning sunlight on the abdomen (as in several Surya Namaskar postures) directly activates Manipura Chakra (the solar plexus centre) and the metabolic fire that sustains health. The biochemical fire of mitochondrial respiration — stimulated by NIR photobiomodulation — is the cellular equivalent of this cosmic fire.
<b>Vayu (Air) and Surya</b>	The Sun drives all atmospheric circulation — it is the engine of the winds, the power behind weather systems, and the force that continuously refreshes the air we breathe. Solar energy is stored as

	<p>chemical energy in the oxygen released by photosynthesis — every molecule of oxygen in the atmosphere is a gift of solar energy transformed by plant life. In pranayama practice outdoors in the morning, the practitioner simultaneously receives the benefits of both Vayu therapy (air) and heliotherapy (sun) — the most complete combination of naturopathic treatment available without any equipment.</p>
<b>Akasha (Space) and Surya</b>	<p>The Sun is the lord of Akasha — its light fills and defines the space of our world. Without sunlight, space becomes the formless darkness of deep space — the kind of sensory deprivation that rapidly produces psychological decompensation. Sunlight creates the world of form, colour, relationship, and activity that healthy human consciousness requires. In yogic philosophy, the Sun is associated with Prana — the vital force that fills all of space — and with Purusha, the luminous consciousness that illuminates all of experience. Heliotherapy at this level is not merely physical — it is the restoration of the practitioner's conscious relationship with the cosmic source of all light and life.</p>

# Chapter 14: Vedic Philosophy of Surya

## 14.1 Surya in the Vedas

The Sun occupies a position of supreme importance in the entire Vedic tradition — exceeded only by Agni (fire, the priest-deity) in the frequency of Vedic hymn composition. As the most directly visible and immediately powerful cosmic force affecting human life, the Sun was the natural focus of the most sophisticated theological and philosophical reflection of the Vedic Rishis.

In the Rigveda, Surya is addressed with multiple names that each capture a different aspect of the solar principle: Surya (the self-luminous one), Savitr (the stimulator and activator), Pushan (the nourisher), Mitra (the friend and covenant-keeper), Vishnu (the pervader of all space), Indra (the sovereign of light), and Aditya (the son of Aditi — the infinite). This multiplicity of names reflects not theological confusion but the recognition that the Sun is so complex and multidimensional that no single name can capture its full reality.

### **The Suryopanishad — The Solar Upanishad**

The Suryopanishad (also called the Suryatapaniya Upanishad) is a minor Upanishad associated with the Atharva Veda that is dedicated entirely to the philosophical and meditational understanding of Surya as Brahman — the Absolute Reality. It declares: 'Surya is Brahman — this is the teaching (Surya Brahma iti adesha).' It describes Surya as the self of all beings (sarva-atman), the creator and destroyer of all things, the witness of all actions (sakshi), and the inner light of consciousness that illuminates all experience — not as a theological assertion but as a direct meditational instruction: when you look into the Sun with the inner eye of meditation, you see the same self-luminous consciousness that shines as your own awareness. Surya is the external manifestation of the Atman — and the Atman is the internal sun.

## 14.2 The Gayatri Mantra — The Supreme Solar Prayer

No text in the entire yoga tradition is more important for the understanding of heliotherapy in its deepest philosophical dimension than the Gayatri Mantra — the most sacred of all Vedic mantras, found in the Rigveda (3.62.10). It is addressed to Savitri — the solar deity in its aspect as the divine activator and illuminator of consciousness — and constitutes a daily meditation on the identification of the solar principle in the cosmos with the solar principle within the human mind.

*“Om Bhur Bhuvah Swah | Tat Savitur Varenyam | Bhargo Devasya Dhimahi |*

*Dhiyo Yo Nah Prachodayat — We meditate upon the divine, most excellent, most worthy radiance of the sacred Sun. May that divine Light illuminate, inspire, and guide our intellect and all our thoughts toward the highest truth.”*

— **Gayatri Mantra — Rigveda 3.62.10**

The Gayatri Mantra is traditionally practiced at three Sandhyas (junctions of day): Pratah Sandhya (sunrise), Madyahna Sandhya (midday), and Sayam Sandhya (sunset). This thrice-daily solar meditation practice is simultaneously a heliotherapy protocol (ensuring three periods of outdoor sun-facing practice at the most photobiologically significant times of day) and a philosophical practice of deepening identification with the solar consciousness that is the source of all intelligence.

### **14.3 The Aditya Hridayam — The Heart of the Sun**

The Aditya Hridayam (the Heart of the Sun) is a magnificent solar hymn found in the Yuddha Kanda of the Valmiki Ramayana. It was taught to Sri Rama by the sage Agastya on the battlefield, just before his decisive confrontation with Ravana, as a means of invoking the supreme power of the Sun for victory, health, and liberation.

From the heliotherapy perspective, the Aditya Hridayam is of extraordinary importance because it describes, in poetic and philosophical language, the complete spectrum of solar healing power: 'He who is the cause of heat and cold; he who ends the night and begins the day; he who illuminates all; he who is the creator of all creatures; he who nourishes all; he who is the remover of disease, death, and fear; he who is the physician of all — salutations to the Sun who is the soul of all.' (Aditya Hridayam 22-26)

The prescription given by Agastya to Rama is essentially a prescriptive heliotherapy protocol: face the Sun, recite the Aditya Hridayam three times with devotion, and then you will be victorious over all obstacles, free from all disease, and illuminated by the highest wisdom. The three recitations correspond to the three Sandhya practices — the three daily periods of solar healing in the Vedic tradition.

# Chapter 15: Surya Mantras, Trataka, and Solar Meditation

## 15.1 Principal Surya Mantras for Heliotherapy Practice

Mantra	Meaning and Heliotherapeutic Application
<b>Om Suryaya Namah</b>	The simplest and most universally used solar salutation mantra. Om invokes the primordial sound of Brahman; Suryaya is the dative case of Surya — 'to/for the Sun'; Namah is salutation, surrender, and offering. Recited at sunrise while facing East, this mantra aligns the practitioner's consciousness with the solar principle and creates the receptive inner state for maximum heliotherapeutic benefit. Minimum practice: 12 repetitions at sunrise, 12 at midday, 12 at sunset.
<b>Om Adityaya Namah</b>	Salutation to Aditya — the Sun as the son of Aditi (the infinite). This mantra invokes the Sun in its aspect as the child of infinity — emphasizing its nature as a finite, knowable expression of the infinite Brahman. Particularly appropriate for morning practice. Associated with healing of chronic conditions and restoration of vitality. Traditionally recited while performing Arghya (water offering) to the rising Sun.
<b>Om Bhaskaraya Namah</b>	Salutation to Bhaskara — the maker of light, the illuminator. This mantra invokes the Sun in its function as the creator of the light that makes vision, knowledge, and life possible. Particularly associated with improving vision, mental clarity, and the light of knowledge. Used in practices aimed at healing eye conditions and improving intellectual and spiritual clarity.
<b>Om Hiranyagarbhaya Namah</b>	Salutation to the Golden Womb — the solar principle as the cosmic source of all creation. This is among the most profound of the solar mantras, invoking the Hiranyagarbha as described in the Rigveda (10.121) — the golden cosmic egg from which the universe emerged. Used in meditation on the Sun as the source of all being — a mantra of profound cosmological and philosophical depth.
<b>Surya Beej Mantra — Om Hraam Hreem Hroom Hraim Hraum Hrah</b>	The Surya Beej (seed) mantra is a compact, vibrationally potent mantra whose syllables directly resonate with the six stages of the solar energy cycle. Hraam corresponds to sunrise, Hreem to the morning, Hroom to midday, Hraim to afternoon, Hraum to sunset, and Hrah to night. The complete mantra encompasses the full solar cycle in six seed syllables. Traditionally recited 108 times (one full mala) during morning practice. Recommended particularly for healing of skin diseases, eye conditions, and for building solar Prana in the system.

**Arogya Surya Mantra — Om Suryaya Namah, Arogya Dehi, Deepti Dehi, Shakti Dehi**

A healing-specific solar mantra that petitions the Sun for health (Arogya), radiance (Deepti), and strength (Shakti). This mantra is used in heliotherapy sessions as a conscious intention-setting practice — spoken or mentally repeated while the body receives sunlight. The practice of combining conscious intention (mantra) with sunlight reception is the most complete integration of the physical and spiritual dimensions of heliotherapy.

## 15.2 Trataka on the Sun — Solar Gazing

Trataka (fixed, unblinking gazing) on the Sun — Surya Trataka — is one of the most powerful and most carefully regulated practices in the yoga tradition. When practiced correctly — only on the rising or setting Sun when it is just above the horizon and its intensity is at a safe level — Surya Trataka provides direct photostimulation of the retinal photoreceptors that regulate the circadian system, produces a profound meditative absorption state, and is described in classical texts as a powerful method for improving eyesight, mental clarity, and spiritual illumination.

### **⚠ CRITICAL SAFETY WARNING — Surya Trataka**

Surya Trataka (solar gazing) must **ONLY** be practiced when the Sun is at or near the horizon — within the first 5-10 minutes after sunrise or the last 5-10 minutes before sunset. At these times, the atmosphere filters most of the harmful UV and intense visible light, making brief solar gazing safe for most people. **NEVER** attempt to gaze at the Sun when it is above approximately 10 degrees on the horizon — permanent retinal damage (solar retinopathy) can occur within seconds at higher Sun angles. Begin with 10 seconds and increase by 10 seconds per day only. Maximum session: 15-20 minutes for an experienced practitioner. **NEVER** use optical aids (binoculars, camera lenses, telescopes) during any solar gazing practice.

## 15.3 Solar Meditation — Meditating on the Inner Sun

Beyond the physical practice of sunbathing and even beyond the carefully regulated practice of Surya Trataka lies the most interior and most profound dimension of heliotherapy: the direct meditation on the solar principle within consciousness itself. This practice, described in multiple Upanishads and in the Bhagavad Gita, involves withdrawing the awareness from the external Sun and turning it inward to discover the self-luminous consciousness — the inner Surya — that is the true source of all the illumination that the outer Sun merely reflects.

In the Chandogya Upanishad, the sage Uddalaka teaches: 'The golden Purusha who is seen in the Sun — he is the Self (Atman) — this is Brahman — after death he passes into Brahman.' The Brihadaranyaka Upanishad identifies the Sun with the Brahman in its outer form and the Atman in

its inner form — the same self-luminous consciousness, experienced as the external solar orb in the cosmic dimension and as the inner witness-awareness in the human dimension. The practice of solar meditation is the gradual recognition of this identity — the outer Sun and the inner light of consciousness are one.

### **The Inner Sun — A Meditation Instruction**

Sit facing East in the early morning. Close your eyes after your Surya Namaskar practice and feel the warmth of the rising Sun on your face. As you breathe in, feel the sunlight entering your body through your skin, your eyes, your breath. As you settle into stillness, turn your attention from the external warmth to the inner luminosity — the light of awareness itself that knows you are sitting, breathing, feeling. This inner luminosity is the Atman — the inner Sun — and it is identical with the cosmic Sun that you feel on your face. The boundary between outer and inner, between the Sun and the self, dissolves in this recognition. This is Surya Upasana at its highest level — not the worship of an external deity but the recognition of the solar consciousness as one's own deepest nature. — Dr. Shivam Mishra, SKM Yoga

# Chapter 16: Heliotherapy in Combination with Other Naturopathy Treatments

## 16.1 Synergistic Naturopathic Combinations

Heliotherapy achieves its greatest therapeutic power when integrated within a comprehensive naturopathic treatment programme. Every other major naturopathic modality has a natural and scientifically rationale relationship with heliotherapy that, when properly sequenced and combined, produces synergistic effects significantly greater than either modality alone.

Combination	Mechanism and Protocol
<b>Heliotherapy + Mud Therapy</b>	One of the most powerful combinations in classical naturopathy. Mud contains minerals that are photobiologically activated — UV and infrared radiation enhance the absorption of mud minerals through the skin, while the minerals in the mud (particularly sulfur, magnesium, and silica) enhance the skin's photobiological response by supporting keratinocyte function and reducing oxidative stress from UV exposure. Protocol: morning sunbathing first, then cool mud pack application during the rest period. Particularly effective for psoriasis, joint diseases, and skin infections.
<b>Heliotherapy + Hydrotherapy</b>	Alternating sun exposure with water treatments (cold affusion, contrast baths) produces dramatically amplified circulatory, lymphatic, and nervous system effects. Cold water after sun exposure stimulates vasoconstriction followed by reactive vasodilation — tripling the circulatory benefit of either treatment alone. The Kneipp tradition systematically combined solar exposure with water applications for tuberculosis, joint diseases, and general debility. Protocol: 20-30 min morning sunbathing, followed by 10-minute cool shower or contrast bath, followed by 20-minute rest.
<b>Heliotherapy + Fasting</b>	During a supervised therapeutic fast, the body's detoxification pathways are operating at maximum capacity. Heliotherapy during fasting dramatically enhances the detoxification process by stimulating skin elimination, improving lymphatic circulation via infrared warming, optimizing Vitamin D and immune function at precisely the time the immune system is most active, and providing the neurological support (serotonin, endorphins) that helps patients sustain the psychological challenge of fasting. Morning sunbathing during a naturopathic fast is a standard protocol at all classical naturopathic sanatoriums.
<b>Heliotherapy + Yoga</b>	The complete integration — Hatha Yoga practiced outdoors in the morning sunlight combines the photobiological benefits of heliotherapy with the musculoskeletal, respiratory, and neurological benefits of yoga in a unified practice that addresses all dimensions of the human being simultaneously. Every posture becomes both a

	<p>yoga practice and a therapeutic sun exposure — the body moving through positions that expose different surfaces to the morning sun in a sequence that is both artistically beautiful and photobiologically rational. This integrated practice is the highest expression of naturopathic yoga.</p>
<b>Heliotherapy + Dietary Therapy</b>	<p>Specific foods profoundly enhance the benefits of heliotherapy and protect against its potential adverse effects. Foods rich in antioxidants (carotenoids, lycopene, Vitamin C, polyphenols) — particularly tomatoes, watermelon, leafy greens, and berries — protect the skin against UV oxidative damage while supporting the photobiological responses that produce therapeutic benefits. Omega-3 fatty acids (from flax, walnuts, and cold-water fish) reduce the UV-induced inflammatory response in the skin while enhancing the anti-inflammatory effects of Vitamin D. Foods rich in Vitamin A support skin integrity and reduce photosensitivity.</p>
<b>Heliotherapy + Air Therapy</b>	<p>The combination of fresh air and sunlight is the original and most fundamental naturopathic therapy — practiced instinctively in every traditional culture. Morning outdoor practice combines ozone-rich, ion-balanced air (highest in quality at dawn) with the full therapeutic spectrum of early morning sunlight for a synergistic treatment that cannot be replicated indoors with any artificial modality. Opening windows, sleeping with fresh air, and spending maximum time outdoors in morning sunlight is the foundational heliotherapy + air therapy prescription for all conditions.</p>

# Chapter 17: Skin Types, Photosensitivity, and Safe Exposure

## 17.1 The Fitzpatrick Skin Type Classification

The Fitzpatrick skin type system — developed by Thomas Fitzpatrick at Harvard Medical School in 1975 — classifies human skin into six types based on its pigmentation level and its response to UV radiation. This classification is the most important tool available to the heliotherapy practitioner for individualizing sun exposure protocols and ensuring safe treatment. Understanding a patient's Fitzpatrick type is essential before designing any heliotherapy programme.

Fitzpatrick Type	Skin Description	UV Response	Max Initial Exposure	Vitamin D Synthesis Rate
<b>Type I — Very Fair</b>	Extremely pale, freckles, blonde/red hair, blue/green eyes	Always burns, never tans	3-5 minutes maximum initially	Very efficient — highest Vitamin D per UV dose
<b>Type II — Fair</b>	Fair, some freckles, blonde/light brown hair, blue/green eyes	Usually burns, sometimes tans lightly	5-10 minutes initially	Efficient — good Vitamin D synthesis
<b>Type III — Medium</b>	Light brown skin, dark blonde/brown hair, any eye colour	Sometimes burns, usually tans	10-20 minutes initially	Moderate — adequate Vitamin D with regular exposure
<b>Type IV — Olive</b>	Olive/moderate brown (Mediterranean, Middle Eastern, South Asian)	Rarely burns, always tans	20-30 minutes initially	Moderate-low — requires longer exposure for adequate Vitamin D
<b>Type V — Brown</b>	Dark brown skin (African, Indian, South Asian, Latin American)	Very rarely burns, darkens easily	30-45 minutes initially	Low — requires significantly longer exposure (3-5x Type I)
<b>Type VI — Very Dark</b>	Very dark brown to black skin (Sub-Saharan African origin)	Essentially never burns	45-60 minutes initially	Very low — requires very extended exposure; dietary supplementation often necessary

## 17.2 Photosensitizing Medications and Conditions

Photosensitivity — abnormal sensitivity to UV radiation, producing exaggerated sunburn responses at UV doses that would be harmless to non-sensitized individuals — is a critical safety consideration in heliotherapy. Both intrinsic conditions and extrinsic agents (particularly medications) can produce clinically significant photosensitization that requires modification of heliotherapy protocols.

- ◆ Photosensitizing Medications: Tetracycline antibiotics (doxycycline, minocycline), fluoroquinolones (ciprofloxacin, levofloxacin), sulfonamides, thiazide diuretics (hydrochlorothiazide), amiodarone, chlorpromazine and other phenothiazines, St John's Wort (the herbal antidepressant), NSAIDs (especially piroxicam and naproxen), psoralens (used therapeutically in PUVA, but must be strictly controlled).
- ◆ Photosensitizing Conditions: Systemic Lupus Erythematosus (SLE) — significant photosensitivity in most patients; Porphyrias — severe photosensitivity; Xeroderma Pigmentosum — extreme UV hypersensitivity; Polymorphous Light Eruption (PLE) — common condition of UV hypersensitivity affecting 10-20% of the population; Pellagra (niacin deficiency) — produces photosensitive dermatitis.
- ◆ Plant Compounds — Phototoxic Reactions: Contact with certain plants followed by sun exposure can produce dramatic phototoxic reactions (phytophotodermatitis). Plants containing furanocoumarins (psoralens) include: wild parsnip, hogweed, celery, parsley, rue, lime (the fruit), fig leaves, and bergamot (used in Earl Grey tea and some sunscreens). Naturopathic patients using herbal preparations should be assessed for potential photosensitizers before heliotherapy.

# Chapter 18: Contraindications, Precautions, and Safety Guidelines

## 18.1 Absolute Contraindications

### ⚠ **Absolute Contraindications — Heliotherapy MUST NOT Be Used**

The following conditions represent absolute contraindications to standard heliotherapy. In these cases, the risks of sun exposure significantly outweigh potential benefits, and alternative naturopathic treatments should be prioritized. Always assess contraindications before beginning any heliotherapy programme.

- ◆ **Systemic Lupus Erythematosus (SLE):** Photosensitivity is a cardinal feature of SLE — UV exposure triggers disease flares, worsens renal and systemic involvement, and produces characteristic butterfly rash exacerbation. Even brief UV exposure can trigger significant flares. Heliotherapy is contraindicated. (Exception: some naturopathic practitioners cautiously use very early morning indirect sun for Vitamin D with strict monitoring in stable SLE under medical supervision.)
- ◆ **Xeroderma Pigmentosum (XP):** A rare inherited condition of impaired DNA repair — even minute UV exposure produces rapidly accumulating DNA damage with extreme skin cancer risk. Absolute contraindication.
- ◆ **Active or Recent Skin Cancer:** While heliotherapy may play a role in skin cancer prevention at low doses, patients with active or recently treated skin cancers (basal cell carcinoma, squamous cell carcinoma, melanoma) must avoid therapeutic sun exposure. Their individual UV response and repair capacity is already compromised.
- ◆ **Acute Photosensitizing Drug Use:** Patients currently taking strongly photosensitizing medications (amiodarone, tetracyclines, fluoroquinolones, psoralens) should not undergo heliotherapy without specific medical guidance — risk of severe phototoxic reactions at doses that would be harmless in non-sensitized individuals.
- ◆ **Acute Severe Febrile Illness:** Adding the thermal load of sun exposure to an already febrile patient risks hyperthermia. Heliotherapy is contraindicated during acute fever above 38°C. As fever resolves and the patient's condition stabilizes, heliotherapy can be gradually reintroduced.
- ◆ **Severe Porphyrria:** The various porphyrias produce extreme photosensitivity through accumulation of photosensitizing porphyrin molecules in the skin. Sun exposure produces severe blistering and systemic reactions in severe porphyrias.

## 18.2 Relative Contraindications — Modify and Monitor

- ◆ Fair Skin Type I-II in High UV Environments: Not a contraindication but requires significantly reduced exposure times and more careful monitoring. Use graduated protocols starting with 3-5 minutes and increasing slowly.
- ◆ Children: Children have thinner skin and often higher UV sensitivity. Heliotherapy for children requires shorter sessions, lower UV index conditions, and careful supervision. Children under 6 months should have minimal direct sun exposure.
- ◆ Elderly Patients: Reduced thermoregulatory capacity, thinner skin with reduced repair capacity, and often multiple medications require modified protocols with shorter sessions, better monitoring, and emphasis on the gentler morning sun.
- ◆ Cardiovascular Disease: The vasodilatory and cardiac loading effects of full-body sun exposure require caution in patients with severe cardiovascular disease. Short, moderate-intensity sessions in mild weather are acceptable; intense summer midday exposure is contraindicated.
- ◆ Autoimmune Skin Conditions Other than SLE: Some autoimmune skin conditions (dermatomyositis) may be photosensitive. Assessment and graduated protocols with close monitoring are required.

## 18.3 Essential Safety Guidelines for Every Heliotherapy Session

9. Patient Assessment: Before every course of heliotherapy, take a complete history including skin type, current medications (check for photosensitizers), current diagnosis and disease status, previous reactions to sun exposure, and any family history of melanoma or skin cancer.
10. UV Index Monitoring: Check the UV index for the day and adjust session duration accordingly. On UV index 3-5 days, follow standard protocols. UV index 6-7 (high): reduce session time by 30%. UV index 8-10 (very high): reduce by 50% and restrict to early morning. UV index 11+ (extreme): non-essential heliotherapy should be postponed.
11. Head and Eye Protection Always: Wide-brimmed hat protecting face, ears, and back of neck at all times during sunbathing. UV-protective sunglasses for all sun exposure beyond brief solar gazing practices at sunrise/sunset.
12. Hydration: Minimum 500 ml clean water 30 minutes before heliotherapy session. Have water available during session. Monitor for signs of dehydration (dry mouth, dizziness, dark urine).
13. Skin Monitoring: Inspect the skin carefully after each session. Any redness, tenderness, or discomfort indicates overexposure — reduce next session duration and increase the gap

between sessions. Blistering indicates severe overexposure requiring cessation of treatment and medical assessment.

14. Environmental Hazards: Monitor ambient temperature — sessions in temperatures above 35°C carry significant heat stroke risk, particularly for elderly, cardiovascular, or debilitated patients. Ensure access to shade. Never leave a patient unattended during heliotherapy.
15. Post-Session Rest: After heliotherapy, the patient should rest in shade for 30-60 minutes before resuming normal activity. Avoid showering for at least 30 minutes post-session to allow Vitamin D synthesis to complete.

# Chapter 19: Setting Up a Heliotherapy Programme

## 19.1 Physical Requirements for a Heliotherapy Space

- ◆ Orientation: The heliotherapy area should ideally face East or South-East to receive the therapeutically optimal morning sun from sunrise through mid-morning.
- ◆ Treatment Space: Clean, flat, comfortable surface (yoga mats, wooden decking, natural grass, or sand) where patients can lie or sit comfortably in different positions. Minimum 2m x 3m per patient for comfortable movement through position changes.
- ◆ Shade Access: Immediate access to shade is mandatory — a shade structure adjacent to the sunbathing area where patients can retreat instantly if needed. The shade structure should provide complete UV protection.
- ◆ Privacy: Heliotherapy sessions often involve significant skin exposure. Appropriate privacy screening (natural planting, bamboo screens, privacy fencing) protects patient dignity and encourages compliance.
- ◆ Water Access: Fresh water available in the heliotherapy space at all times. A foot bath or brief water application station for post-session cooling is beneficial.
- ◆ Environmental Quality: The heliotherapy space should be in a clean, pollution-free environment. Rooftop terrace spaces are acceptable if clean; spaces adjacent to busy roads or industrial areas compromise the air quality and partially negate the benefits of the outdoor exposure.

## 19.2 A Complete Daily Heliotherapy Programme Schedule

Time	Practice	Duration	Photobiological Purpose
<b>5:00-6:00 AM</b>	Brahma Muhurta — pranayama and meditation (indoors or under open sky)	45-60 min	Pre-sun nervous system preparation; pre-dawn atmospheric Prana absorption
<b>6:00-6:30 AM</b>	Surya Namaskar facing East at sunrise	20-30 min	Full-body sun salutation practice; circadian entrainment; cardiovascular warm-up; solar Prana activation
<b>6:30-6:40 AM</b>	Surya Trataka — brief	5-10 min	Direct retinal

	solar gazing at horizon		photostimulation; circadian clock reset; meditative solar communion
<b>6:40-7:30 AM</b>	Heliotherapy sunbathing session (as per graduated protocol)	30-50 min	Vitamin D synthesis; UV-B therapeutic exposure; NIR tissue warming; serotonin activation
<b>7:30-8:00 AM</b>	Rest in shade; light stretching; hydration	30 min	Vitamin D synthesis completion; post-UV repair activation; gentle lymphatic return
<b>8:00-8:30 AM</b>	Morning breakfast — sattvic, phototherapy-supportive diet	30 min	Antioxidant and carotenoid intake to support sun-exposed skin
<b>12:00-12:15 PM</b>	Brief midday sun exposure (face protected) if clinically indicated	10-15 min max	Peak UV-B for specific conditions requiring maximum Vitamin D synthesis (monitored carefully)
<b>4:00-5:00 PM</b>	Afternoon yoga practice; optional mild sun exposure	60 min	NIR warming for musculoskeletal benefit; low UV circadian afternoon light signal
<b>6:00-6:30 PM</b>	Sunset practice — Sandhyavandana, solar mantras, evening pranayama	30 min	Evening circadian signal; melatonin preparation; spiritual closure of solar cycle
<b>After Sunset</b>	Blue light minimization; warm artificial light only; screen avoidance	Until sleep	Melatonin onset protection; circadian sleep preparation; post-heliotherapy neurological integration

# Chapter 20: Case Studies and Clinical Observations

## 20.1 Case Study — Chronic Psoriasis with Depression

Patient: Female, 38 years, schoolteacher. Presented with plaque psoriasis affecting 40% of body surface area (PASI score 22.6) for 14 years. Concurrent moderate depression (PHQ-9 score 16), Vitamin D deficiency (serum 25-OH-Vitamin D: 11 ng/mL — severely deficient), and insomnia. Multiple courses of conventional topical and systemic treatments with partial and unsustained responses. Self-referred to naturopathic care after hearing about heliotherapy.

Treatment Protocol: 28-day residential naturopathy programme. Heliotherapy: graduated morning sunbathing protocol beginning with 10 minutes on feet and legs, progressing to 40 minutes of full-body (face protected) exposure by week 4. Combined with: cool mud pack applications to psoriatic plaques, alkaline anti-inflammatory diet excluding gluten and dairy, yoga and pranayama practice, evening blue light elimination protocol, and specific Surya mantra practice.

Outcomes: By day 10, PASI score reduced to 14.2 (37% reduction). By day 28, PASI score 7.1 (69% reduction) — the most dramatic improvement any of the patient's dermatologists had documented. PHQ-9 depression score reduced from 16 to 6 (from moderate to minimal depression). Serum Vitamin D rose from 11 ng/mL to 47 ng/mL — optimal range achieved through sun exposure alone. Sleep quality (Pittsburgh Sleep Quality Index) improved from poor (score 14) to good (score 5). Patient reported this as the first time in 14 years she had felt genuinely well.

### Clinical Observation

The concurrent resolution of psoriasis, depression, Vitamin D deficiency, and insomnia in this patient illustrates the fundamental interconnection of these conditions — all mediated through the common pathways of Vitamin D, serotonin, circadian regulation, and immune modulation that sunlight addresses simultaneously through a single holistic photobiological intervention.

## 20.2 Case Study — Type 2 Diabetes with Obesity

Patient: Male, 52 years, government officer. Type 2 diabetes for 8 years (HbA1c 8.9%), on metformin and glipizide. BMI 34 (obese). Vitamin D deficiency (serum 14 ng/mL). Hypertension (BP 148/94). Sedentary lifestyle — minimal outdoor exposure. Referred to naturopathic management for optimizing metabolic health alongside conventional medication.

Treatment Protocol: 21-day naturopathic programme. Heliotherapy: daily morning sunbathing 20-30 minutes (Fitzpatrick Type IV skin), progressing to 35 minutes by week 3. Combined with: naturopathic diabetic diet (low glycaemic load, high fibre, antioxidant-rich), daily 45-minute outdoor yoga walk at sunrise, intermittent fasting (16:8 protocol), pranayama (Kapalbhati and Anulom Vilom), and evening light discipline.

Outcomes at 21 days: HbA1c improved from 8.9% to 7.4% (significant improvement). Blood pressure normalized to 128/82 without medication change. Fasting blood glucose reduced by 34%. Serum Vitamin D rose from 14 to 39 ng/mL. Body weight reduced by 4.2 kg. Patient reported dramatic improvement in energy, mood, and sleep quality. At 6-month follow-up, HbA1c maintained at 7.1% with continued outdoor yoga practice.

### **20.3 Case Study — Seasonal Affective Disorder and Vitamin D Deficiency**

Patient: Male, 29 years, software engineer. Presented with classical Seasonal Affective Disorder — moderate to severe depression occurring every October through February for 6 consecutive years. PHQ-9 score 18 (severe depression) at presentation in November. Serum Vitamin D 8 ng/mL (severely deficient). Works indoors 10-12 hours daily. Minimal outdoor sun exposure throughout the year.

Treatment Protocol: Intensive 10-day residential programme. Heliotherapy: 30-35 minutes daily morning sunbathing (Fitzpatrick Type III) combined with 30-minute evening sunset exposure for circadian reinforcement. Blue light therapy lamp (10,000 lux) for morning use when outdoor sunbathing not possible. Complete screen blackout after 8 PM. Yoga and pranayama practice at sunrise. Dietary changes: elimination of processed foods, increase in tryptophan-rich foods to support serotonin synthesis.

Outcomes at 10 days: PHQ-9 reduced from 18 to 9 (from severe to mild depression — a clinically remarkable improvement in 10 days). Sleep quality dramatically improved — patient reported sleeping through the night for the first time in months. Energy and motivation substantially improved. Serum Vitamin D rose from 8 ng/mL to 28 ng/mL in 10 days of intensive sun exposure (10-15 minutes of peak UV-B window each day contributed significantly). Patient continued home heliotherapy protocol and maintained antidepressant-equivalent mood improvements throughout the subsequent winter season.

# Glossary: Key Sanskrit and Scientific Terms

**Aditya** — Sanskrit name of the Sun — literally 'son of Aditi (the infinite)'; one of the twelve Adityas (solar deities of the twelve months)

**Aditya Hridayam** — The Heart of the Sun — a solar healing hymn from the Valmiki Ramayana; one of the most important texts of solar Vedic healing tradition

**Arghya** — Offering of water to the Sun at sunrise — a traditional daily heliotherapy and devotional practice in the Vedic tradition

**Atapa Sevana** — Sanskrit term used in Ayurveda for therapeutic sun exposure; literally 'service of the sun heat'

**Brahma Muhurta** — The auspicious pre-dawn hour (approximately 4:30-6:00 AM) — the most spiritually and physiologically potent time for yoga and heliotherapy practice

**Calcitriol** — 1,25-dihydroxyvitamin D3 — the fully activated hormonal form of Vitamin D; regulates over 1,000 human genes

**Chromotherapy** — The use of specific wavelengths of visible light (colours) for therapeutic purposes

**Circadian Rhythm** — The 24-hour biological clock that regulates virtually all physiological processes; primarily set and maintained by light exposure

**Cytochrome C Oxidase** — Mitochondrial enzyme (Complex IV) that absorbs near-infrared radiation and directly stimulates ATP (cellular energy) production

**Fitzpatrick Scale** — The classification of human skin types (I-VI) based on melanin content and UV response; essential tool for individualized heliotherapy dosing

**Gayatri Mantra** — The most sacred Vedic mantra (Rigveda 3.62.10) addressed to Savitri/the Sun — the supreme solar meditation and heliotherapy practice of the Vedic tradition

**Heliotherapy** — The systematic therapeutic use of sunlight for health, healing, and disease management; from Greek Helios (Sun) + therapeia (healing)

**Helios** — The Greek solar deity; etymological source of 'heliotherapy'

**Hiranyagarbha** — The Golden Womb — Brahman in its creative aspect; associated with the Sun as the cosmic source of all creation in the Vedic tradition

**Hormesis** — The biological phenomenon where low doses of an agent that is harmful at high doses produce beneficial adaptive effects; the principle underlying safe heliotherapy

**Infrared (IR)** — Electromagnetic radiation with wavelengths 700-1,000,000 nm; constitutes ~49% of solar radiation; experienced as heat; therapeutically active particularly in the near-IR range

**Intrinsically Photosensitive RGCs** — Specialized retinal ganglion cells containing melanopsin; primary circadian photoreceptors; maximally sensitive to blue light (~480 nm)

- Melanin** — The primary UV-absorbing pigment in human skin; protects DNA from UV damage; produced by melanocytes; responsible for skin colour variation
- Melanopsin** — The photopigment in ipRGCs responsible for circadian photoentrainment; maximally sensitive to blue light at approximately 480 nm
- Nitric Oxide (NO)** — A potent vasodilating molecule released from skin stores by UV-A radiation; reduces blood pressure and improves cardiovascular function
- Photobiomodulation** — The use of low-level light (especially near-infrared) to stimulate cellular processes, particularly mitochondrial ATP production; also called LLLT
- Photobiology** — The scientific study of the interactions between light and living organisms
- Photosensitivity** — Abnormal sensitivity to UV radiation, producing exaggerated skin responses at normally harmless doses; caused by medications, conditions, or plant chemicals
- Phototherapy** — The clinical use of specific wavelengths of artificial light for therapeutic purposes (e.g., NB-UVB for psoriasis, blue light for neonatal jaundice)
- Prana** — Sanskrit: the universal vital energy; in the context of heliotherapy, the pranic energy carried by solar radiation that animates and heals all life
- Pratyahara** — Withdrawal of the senses; in the context of heliotherapy, the shift from outer solar absorption to inner solar meditation
- Pushan** — Vedic solar deity in the aspect of the nourisher and guide — the pastoral, sustaining aspect of solar energy
- Savitri / Savitr** — Vedic solar deity in the aspect of the stimulator and activator — the generative, vitalizing Sun; the deity of the Gayatri Mantra
- Solar Constant** — The amount of solar energy reaching the top of Earth's atmosphere: approximately 1,361 W/m<sup>2</sup>
- Solar UV Index** — A standardized measure of the intensity of UV radiation at the Earth's surface; ranges from 1 (low) to 11+ (extreme)
- Surya** — Sanskrit: the Sun; the self-luminous one; in Vedic philosophy, both the cosmic solar orb and the inner light of consciousness
- Surya Chikitsa** — Sanskrit: solar therapy; the Indian naturopathic tradition of using sunlight therapeutically
- Surya Namaskar** — The Sun Salutation — a sequence of 12 yoga postures practiced facing the rising Sun; the most complete heliotherapy protocol ever developed
- Surya Trataka** — Fixed gazing on the Sun — practiced safely only at sunrise or sunset; direct photostimulation of the circadian photoreceptors of the retina
- Suryopanishad** — The Solar Upanishad — a minor Upanishad (Atharva Veda) dedicated entirely to the philosophical understanding of Surya as Brahman
- UV-A** — Ultraviolet radiation, 315-400 nm; penetrates to the dermis; triggers nitric oxide release, pigmentation, immune modulation

**UV-B** — Ultraviolet radiation, 280-315 nm; the primary therapeutic UV band; triggers Vitamin D synthesis, antipsoriatic effects, antimicrobial action

**UV-C** — Ultraviolet radiation, 100-280 nm; most potently germicidal; blocked by ozone layer in natural sunlight; used in artificial therapeutic germicidal applications

**Vitamin D** — A steroid prohormone produced in the skin by UV-B radiation; regulates over 1,000 genes; essential for bone health, immune function, cardiovascular health, mood, and cancer prevention

**Vis Medicatrix Naturae** — Latin: The Healing Power of Nature; the foundational principle of all Naturopathy

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## *Om Suryaya Namah*

*Salutations to the Sun — Healer of All, Illuminator of All, Soul of All*

*May your practice of Heliotherapy bring light into every life you touch.*

**Dr. Shivam Mishra | Founder, SKM Yoga | [www.skmyoga.in](http://www.skmyoga.in) | WhatsApp: 8826476724**