

470 nm blue light therapy

470 nm Blue Light Therapy: A Comprehensive Analysis

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Editor: Dr. David Chen, MD, PhD, a renowned dermatologist and expert in photodynamic therapy and light-based treatments. Dr. Chen's extensive experience in clinical trials and his in-depth understanding of photobiology bring unparalleled credibility to the editing of this article.

Introduction: Understanding the Power of 470 nm Blue Light Therapy

470 nm blue light therapy, a specific type of phototherapy, has gained significant traction in recent years for its potential therapeutic applications in various dermatological conditions. This analysis will delve into the historical context of its development, the underlying mechanisms of action, current applications, ongoing research, and future prospects of 470 nm blue light therapy. We will examine its efficacy, safety profiles, and limitations.

Historical Context: From Discovery to Application

The use of light therapy dates back centuries, with ancient civilizations employing sunlight for its therapeutic benefits. However, the understanding of specific wavelengths and their targeted effects emerged much later. The development of lasers and LED technology in the 20th century allowed for the precise delivery of specific wavelengths, including 470 nm blue light. Early research focused on the effects of blue light on bacteria, demonstrating its bactericidal properties. This paved the way for investigating its potential applications in treating skin conditions associated with bacterial infections like acne vulgaris. The discovery of porphyrins' photosensitizing properties further broadened the understanding of 470 nm blue light's therapeutic potential, leading to its application in photodynamic therapy (PDT) for certain cancers and precancerous lesions.

Mechanism of Action: How 470 nm Blue Light Works

The efficacy of 470 nm blue light therapy stems from its interaction with specific cellular components. In the context of acne treatment, 470 nm light targets *Propionibacterium acnes* (P. acnes), a bacterium implicated in the pathogenesis of acne. The light's energy disrupts the bacterial cell wall and DNA, leading to bacterial inactivation and a reduction in inflammation. Furthermore, 470 nm blue light has been shown to influence sebum production, a key factor contributing to acne development. In other applications, such as in photodynamic therapy, 470 nm light activates photosensitizing agents, triggering a cascade of reactions that ultimately lead to the destruction of targeted cells.

Current Applications of 470 nm Blue Light Therapy

Currently, 470 nm blue light therapy finds its most prevalent application in the treatment of acne vulgaris. Numerous studies have demonstrated its efficacy in reducing acne lesions and improving overall skin clarity. Its non-invasive nature and minimal side effects make it a popular choice among patients seeking acne treatment. Beyond acne, ongoing research explores its potential in:

Wound healing: 470 nm light may stimulate cell proliferation and collagen synthesis, promoting faster wound healing.

Psoriasis: Preliminary studies suggest potential benefits in reducing inflammation and scaling associated with psoriasis.

Eczema: Similar to psoriasis, 470 nm blue light might offer benefits in managing eczema symptoms.

Photodynamic therapy (PDT): In conjunction with photosensitizing agents, 470 nm light is employed in PDT for the treatment of certain skin cancers and precancerous lesions.

Ongoing Research and Future Directions

Research into 470 nm blue light therapy is constantly evolving. Scientists are exploring new applications, optimizing treatment parameters, and investigating potential synergistic effects with other therapies. Areas of active research include:

Combination therapies: Investigating the combined efficacy of 470 nm blue light with topical treatments or other light wavelengths.

Personalized treatment: Developing strategies to tailor treatment protocols based on individual patient characteristics and disease severity.

Novel applications: Exploring the potential of 470 nm blue light therapy in treating other skin conditions and systemic diseases.

Efficacy, Safety, and Limitations of 470 nm Blue Light Therapy

While 470 nm blue light therapy has shown promise in various applications, it's crucial to acknowledge its limitations. While generally well-tolerated, some patients may experience mild side effects like redness or temporary skin irritation. The efficacy of 470 nm blue light therapy can vary depending on factors such as the severity of the condition, treatment parameters, and individual patient response. Furthermore, the long-term effects of 470 nm blue light therapy still require further investigation. It is essential to follow prescribed treatment protocols and seek professional guidance from a qualified healthcare provider.

Conclusion

470 nm blue light therapy represents a significant advancement in the field of phototherapy. Its established efficacy in treating acne vulgaris, coupled with its potential applications in other dermatological conditions, underscores its importance in modern dermatological practice. Ongoing research promises to further refine its application and expand its therapeutic potential. However, a cautious approach is warranted, with careful consideration of individual patient characteristics and potential side effects. The future of 470 nm blue light therapy is bright, with continued research paving the way for safer, more effective, and broader applications of this innovative treatment modality.

FAQs

1. Is 470 nm blue light therapy painful? Generally, no. Most patients describe the sensation as a mild warmth.
2. How many treatments are needed for 470 nm blue light therapy? The number of treatments varies depending on the condition being treated and individual response.
3. Are there any side effects associated with 470 nm blue light therapy? Mild side effects, such as temporary redness or skin irritation, are possible.
4. Is 470 nm blue light therapy suitable for all skin types? While generally suitable, individual responses may vary. Consultation with a dermatologist is crucial.
5. How does 470 nm blue light therapy compare to other acne treatments? It offers a non-invasive alternative with minimal side effects compared to some topical or oral treatments.
6. How long does a 470 nm blue light therapy session typically last? Session durations vary, usually ranging from a few minutes to several minutes.
7. Is 470 nm blue light therapy covered by insurance? Coverage depends on the individual insurance plan and the specific condition being treated.
8. Can 470 nm blue light therapy be used at home? At-home devices are available, but professional guidance is recommended for optimal results and safety.
9. What are the long-term effects of 470 nm blue light therapy? Long-term studies are ongoing, but currently, no significant long-term adverse effects have been reported.

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the context of skin cancer, vitamin D and cardiovascular and metabolic health are also covered.

470 nm blue light therapy: Photoimmunology Jean Krutmann, 1995 The skin immune response/photoallergy/photoimmunology of lupus/UV & infectious disease/therapeutic photoimmunology.

470 nm blue light therapy: Handbook of Lasers in Dermatology Keyvan Nouri, 2014-08-29 This book discusses lasers and light technologies in dermatology. The innovation is due to the book format: a handbook. It is the first handbook of lasers in dermatology, facilitating access to information to all individuals interested in lasers in this specific medical field. The most recent lasers devices and its applications will be discussed. Illustrations and tables will make the book didactic and comprehensive. Lasers in dermatology are a constantly evolving field. Over the past few decades, novel devices have been developed and new indications for their use have emerged. A broad understanding of the relationship between science and laser principles is the foundation of a solid dermatologic practice. The Lasers in Dermatology Handbook is a tool to understand the use of lasers in clinical practice. Important topics such as vascular lesions, warts, acne, scars, and pigmented lesions are presented and discussed in all aspects. The wide spectrum of laser and light technologies available for skin resurfacing and rejuvenation will be covered as well. Written by internationally renowned authors, this handbook serves as a cornerstone for laser applications and provides updated information for all physicians, particularly dermatologists, interested in implementing lasers in their practice.

470 nm blue light therapy: Photodynamic Inactivation of Microbial Pathogens Michael R Hamblin, Giulio Jori, 2011-06-06 Photodynamic therapy (PDT) was discovered over one hundred years ago after observing the death of microorganisms upon exposure to dyes and light. It is the combination of non-toxic dyes and harmless visible light that, in the presence of oxygen, produce highly toxic reactive species. The principal medical application during the last century was in cancer therapy but, in these days of rising antibiotic resistance, PDT shows increasing promise as an alternative approach to treating infections. PDT has also been used in blood product sterilization, periodontology, acne reduction, and the treatment of viral lesions such as those caused by human papilloma virus. It may also have potential as an environmentally friendly pesticide. This is the first and only book to comprehensively cover the use of light and photosensitising agents for controlling microbial pathogens. It provides a comprehensive and up-to-date coverage of an emerging field. There are several chapters on the design of antimicrobial photosensitizers, their use to kill pathogenic organisms and their success in treating infections in animal models. It has long been known that gram-positive bacteria are highly susceptible to photoinactivation but the book also discusses means of widening the range of microorganisms that can be tackled by PDT. Edited by two pioneers in the application of PDT to medical and environmental issues, this book covers the basic science, translational research in animals, and the clinical applications in various medical specialities. It represents an indispensable resource for microbiologists and infectious disease doctors as well as dentists, dermatologists, gastroenterologists and transfusion specialists.

470 nm blue light therapy: Lasers, Lights and Other Technologies Maria Claudia Almeida Issa, Bhertha Tamura, 2018-02-23 The series "Clinical Approach and Procedures in Cosmetic Dermatology" intends to be a practical guide in Cosmetic Dermatology. Procedures in cosmetic dermatology are very popular and useful in medicine, indicated to complement topical and oral treatments not only for photodamaged skin but also for other dermatosis such as acne, rosacea, scars, etc. Also, full-face treatments using peeling, lasers, fillers and toxins are increasingly being used, successfully substituting or postponing the need for plastic surgeries. Altogether, these techniques not only provide immediate results but also help patients to sustain long-term benefits, both preventing/treating dermatological diseases and maintaining a healthy and youthful skin. Throughout this series, different treatments in Cosmetic Dermatology will be discussed in detail covering the use of many pharmacological groups of cosmeceuticals, the new advances in nutraceuticals and emerging technologies and procedures. This volume addresses the most important physical approaches in cosmetic dermatology, disclosing their uses and advantages. Here

are discussed in detail the applicability of lasers and other lights, photodynamic therapy, radiofrequency, ultrasound and transepidermal drug delivery.

470 nm blue light therapy: Proceedings of Light-Activated Tissue Regeneration and Therapy Conference Ronald Waynant, Darrell B. Tata, 2008-09-11 This book is the first to present the mechanism which explains why light is an effective treatment for so many illnesses and diseases. The book not only explains this mechanism, but describes uses for the mechanism, as well as what new work is planned and what changes will be seen in FDA regulations. Extensive papers and coverage on many interesting topics are included.

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470 nm blue light therapy: Electromagnetic Technologies in Food Science Vicente M. Gómez-López, Rajeev Bhat, 2021-12-13 A comprehensive source of in-depth information provided on existing and emerging food technologies based on the electromagnetic spectrum *Electromagnetic Technologies in Food Science* examines various methods employed in food applications that are based on the entire electromagnetic (EM) spectrum. Focusing on recent advances and challenges in food science and technology, this is an up-to-date volume that features vital contributions coming from an international panel of experts who have shared both fundamental and advanced knowledge of information on the dosimetry methods, and on potential applications of gamma irradiation, electron beams, X-rays, radio and microwaves, ultraviolet, visible, pulsed light, and more. Organized into four parts, the text begins with an accessible overview of the physics of the electromagnetic spectrum, followed by discussion on the application of the EM spectrum to non-thermal food processing. The physics of infrared radiation, microwaves, and other advanced heating methods are then deliberated in detail—supported by case studies and examples that illustrate a range of both current and potential applications of EM-based methods. The concluding section of the book describes analytical techniques adopted for quality control, such as hyperspectral imaging, infrared and Raman spectroscopy. This authoritative book resource: Covers advanced theoretical knowledge and practical applications on the use of EM spectrum as novel methods in food processing technology Discusses the latest progress in developing quality control methods, thus enabling the control of continuous fast-speed processes Explores future challenges and benefits of employing electromagnetic spectrum in food technology applications Addresses emerging processing technologies related to improving safety, preservation, and overall quality of various food commodities *Electromagnetic Technologies in Food Science* is an essential reading material for undergraduate and graduate students, researchers, academics, and agri-food professionals working in the area of food preservation, novel food processing techniques and sustainable food production.

470 nm blue light therapy: Introduction to Modern Sleep Technology Rayleigh Ping-Ying Chiang, Shih-Chun Kang, 2012-12-14 Sleep medicine has been developing for more than 40 years. The current concepts in sleep technology are mainly centered on polysomnography (PSG) and issues related to sleep technicians. However, the editors believe that the true value of technology is revealed only when benefits to humanity are manifest. To this end, they endeavor to create a new era in sleep technology, one that will improve the quality of people's sleep and daily lives. This edited book, *Introduction to Modern Sleep Technology*, provides a comprehensive reference volume to the latest advancements in the area of Sleep Technology. It offers an excellent range of insights and opinions from leading researchers and experts in multiple disciplines spanning academia, clinical practice and industry. Up-to-date insights into the current research topics in this field are featured in addition to the latest technological advances with reference to appropriate working examples. The current book combines the five dimensions of knowledge, i.e., sleep medicine, clinical

psychology engineering, industrial design and technology management to ensure the content is applicable to people's daily lives.

470 nm blue light therapy: *Nanomaterials for Photodynamic Therapy* Prashant Kesharwani, 2023-01-14 *Nanomaterials for Photodynamic Therapy* takes a unique approach to this area, with a key focus on the use of nanomaterials and nanocarriers for photodynamic therapy (PDT). The book introduces the history and mechanism of action behind PDT, covering the variety of sensitizers currently available. Subsequent chapters review existing and emerging nanomaterials for PDT, including hydrogel nanocomposites, fullerenes, quantum dots, polymeric micelles, and more. Challenges and translational aspects of PDT are also discussed, touching on the issues and hindrances of drug resistant cancers. The book bridges the gap between the physics and clinical aspects of PDT, offering a unique nanomaterials-focused perspective. This book will prove useful for materials scientists, biomedical engineers, electrical and optical engineers, and pharmaceutical scientists interested in cancer treatment. - Reviews a broad range of nanomaterials for PDT, such as graphene oxide, dendrimers, solid lipid nanoparticles, and more - Provides a helpful introduction to the history and mechanism of action behind PDT - Discusses challenges in clinical translational, particularly in drug-resistant cancers

470 nm blue light therapy: *Healing with Red Light Therapy* Stephanie Hallett, 2020-04-28 Discover the revolutionary power of low-level laser therapy (aka photobiomodulation) for the pain-free treatment of arthritis, psoriasis, hair loss, acne, cold sores, joint pain, scarring, and more. Red light therapy is dramatically changing the world of health care. Studies show using red and near-infrared light can have incredible effects, from managing chronic pain to even slowing the signs of aging. This natural, drug-free, red light therapy treatment can be found at your doctor's office, spa, and even in the comfort of your own home. These at-home lights are increasing in popularity as they become more affordable and accessible online, but using them safely and effectively is crucial. With so many different devices, online advisories, and treatment options, this book is your go-to guide to understanding the ins and outs of this revolutionary therapy. Inside you'll find information about: - How light therapy works - Easy-to-understand breakdown of recent studies - Different light source devices and types - The importance of correct dosage - Treatment of chronic pain, skin aging and other conditions, joint pain, and more With patient testimonials and interviews with leading health professionals, *Healing with Red Light Therapy* will give you all the tools you need to harness the healing power of light therapy.

470 nm blue light therapy: *Light Therapies* Anadi Martel, 2018-05-15 A comprehensive guide to the therapeutic benefits of light and color and how they affect our physical and psychological well-being • Shares scientific research on how different wavelengths of light influence our cells, brain function, sleep patterns, and emotional stability • Examines several forms of light therapy, including chromotherapy, heliotherapy, actinotherapy, and thermotherapy • Explains how to use light and color therapy, maximize the benefits of sunlight, and avoid the health risks of new light sources such as compact fluorescents and LEDs Beginning with sun worship in prehistory and sunshine therapies in ancient Egypt, Greece, and India, light has long been associated with the sublime, the divine, and healing. Yet only recently have we begun to understand how different parts of the light spectrum, from infrared to ultraviolet, can affect our physical and psychological well-being. Covering the historic, scientific, and spiritual aspects of light and its role in energy medicine, Anadi Martel explores the vibrational nature of light and the interaction between light, biology, and consciousness. He demonstrates light's incredible effects on the physical, energetic, and cognitive dimensions of life and examines several forms of light therapy, including chromotherapy (color therapy), heliotherapy (sun therapy), actinotherapy (ultraviolet therapy), and thermotherapy (infrared therapy). He details how to use light therapy daily, get optimal benefits from sunlight, and avoid the health risks of new artificial lighting such as compact fluorescents and LEDs. Combining his own 30 years of research with practical insight from the many phototherapy pioneers he's encountered, the author examines scientific studies on how specific wavelengths of light influence our cells and DNA, brain function, sleep patterns, and emotional stability; speed the

healing of wounds; and are effective in the treatment of disease, including arthritis, stroke, Alzheimer's, Parkinson's, and brain and nerve injuries. Exploring the spiritual aspects of light, the author explains why auras and halos have been used to represent sages and saints of all traditions, revealing the intimate link between light and consciousness. Investigating the many laser, monochrome, audiovisual, and infrared machines designed to heal disease and treat emotional disorders, Martel also reveals promising medical applications for light that are currently in development, inviting the reader not only to appreciate the complexities of light but to maximize its therapeutic dimensions.

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470 nm blue light therapy: Handbook of Low-Level Laser Therapy Michael R. Hamblin, Tanupriya Agrawal, Marcelo de Sousa, 2016-10-14 Low-Level Laser Therapy (LLLT) also known as photobiomodulation is almost 50 years old, and recently has been getting increasing acceptance from the scientific, medical, and veterinary communities. Discoveries are constantly being made about the cellular and molecular mechanisms of action, the range of diseases that can be treated is also rising, and home use LED devices are becoming common. This book compiles cutting-edge contributions from the world's leading experts in Photobiomodulation and LLLT. Chapters cover general concepts, mechanisms of action, in vitro studies, pre-clinical animal studies, veterinary applications and a wide range of clinical topics. Edited by Michael Hamblin from Massachusetts General Hospital and Harvard Medical School, aided by two prominent researchers (Marcelo Sousa and Tanupriya Agrawal), this book will appeal to anyone involved in the basic science, translational aspects and clinical applications of LLLT.

470 nm blue light therapy: Naturally Pain Free Letha Hadady D.Ac., 2012-07-01 TACKLE YOUR PAIN THE NATURAL WAY Whether you've dealt with a lifetime of chronic aches and pains or suffer from a specific ailment, when you're in constant pain, relief is the only thing on your mind. Are you using the same over-the-counter painkiller to treat everything from toothaches to knee pain? If so, you may only be providing a temporary mask to your suffering—not healing it—and it's only a matter of time before the pain returns. Every pain is unique, from headaches to back strains to arthritis, and there's no one-solution-fits-all to alleviate your suffering. Natural remedies expert Letha Hadady knows that to treat pain you must focus on the cause. Organizing her advice by both symptom and type of pain, Hadady guides you on how to use a variety of all-natural herbs, extracts, and pills to ease and control the source of your suffering. Find Natural Pain Remedies For: Arthritis Sciatica Backaches Chest Pains Nerve Pain Migraines Burns Knee Discomfort Carpal Tunnel Syndrome And More... Praise for Letha Hadady There is no one else of Letha's stature, experience, and knowledge in the field of alternative medicine. —ALICE RHEE, NBC NEWS The Martha Stewart of herbs. —CONDE NAST TRAVELER Her encyclopedic knowledge of health and beauty is evident. —DAILY NEWS Letha unearths the wisdom of the ancients. —NEW YORK POST

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470 nm blue light therapy: Circadian Lighting Design in the LED Era Maurizio Rossi, 2019-02-06 This book explores how lighting systems based on LED sources have the ability to positively influence the human circadian system, with benefits for health and well-being. The opening chapters examine the functioning of the human circadian system, its response to artificial lighting, potential health impacts of different types of light exposure, and current researches in circadian photometry. A first case study analyzes the natural lighting available in an urban interior, concluding that it is unable to activate the human circadian system over the entire year. Important original research is then described in which systems suitable for artificial circadian lighting in residential interiors and offices were developed after testing of new design paradigms based on LED sources. Readers will also find a detailed analysis of the LED products available or under development globally that may contribute to optimal artificial circadian lighting, as well as the environmental sensors, control interfaces, and monitoring systems suitable for integration with new LED lighting systems. Finally, guidelines for circadian lighting design are proposed, with identification of key requirements.

470 nm blue light therapy: Clinical Photomedicine H.W. Lim, 2018-10-03 Offering broad coverage of the basic, clinical and curative aspects of photomedicine, this reference reflects the recent expansion of knowledge on the effects of light on normal skin as well as photosensitivity disorders and the use of light in treating various diseases and conditions.;The book demonstrates how light acts as a therapeutic agent by means such as phototherapy, photochemotherapy, extracorporeal photopheresis, and the use of lasers in photomedicine and photodynamic therapy.;Providing a detailed introduction to the subject, *Clinical Photomedicine*: discusses the fundamental principles of photomedicine such as skin optics, light sources, and pharmacology; explicates the acute and chronic effects of light on normal skin, including sunburn reaction, photoaging, and skin cancer; considers photoimmunology; examines clinical photosensitivity diseases as well as topical and systemic photoprotection; and much more.;With over 1300 literature citations, *Clinical Photomedicine* is designed as a resource for dermatologists and photobiologists, as well as residents and fellows in these disciplines.

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470 nm blue light therapy: Integrative Veterinary Medicine Mushtaq A. Memon, Huisheng Xie, 2023-05-31 *Integrative Veterinary Medicine* Practical guide integrating holistic modalities into Western veterinary practice to help with patient treatment *Integrative Veterinary Medicine* provides a clinically oriented, evidence-based guide to integrating complementary and conventional therapies into veterinary practice. Covering acupuncture, manual therapies, botanical and herbal medicine, integrative nutrition, and physical rehabilitation, the book draws information on these modalities together into a single resource. Rooted in evidence-based medicine, it demonstrates how to use these modalities in veterinary practice. The book begins by discussing the basic concepts of integrative veterinary medicine, then examines each modality in detail. A companion website offers video clips showing acupuncture techniques. In *Integrative Veterinary Medicine*, readers can expect to find detailed information on topics such as: Anatomy and physiology of acupuncture with relation to soft tissue and neurologic concepts, and traditional Chinese theory of acupuncture (Yin and Yang,

Five Element Theory, and The Meridians) Veterinary manipulative therapy (neurology, biomechanics, and available evidence), and massage therapy and myofascial principles Origins and major systems of herbal therapy with selected evidence-based interventions and adverse events, herb-drug interactions, supplement evaluation, and regulation Trends in nutrition, such as raw diets, home-prepared diets, grain-free diets, owner perception, and current marketing Covering common modalities across all species in one volume, Integrative Veterinary Medicine is an essential reference for any veterinary practitioner wishing to use integrative techniques in their practices, as well as veterinary students, academics, and researchers involved in programs of study related to integrative veterinary medicine.

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470 nm blue light therapy: Photodynamic Therapy in Dermatology Michael H. Gold, 2011-04-11 Photodynamic therapy is a proven effective treatment of actinically damaged skin cells, nonmelanoma skin cancers, and acne and other pilosebaceous conditions. As an agent for general facial rejuvenation it has untapped potential. The current state of PDT therapy and future applications are discussed in detail in this exciting new volume. Throughout, the focus is on evidence-based clinical uses of PDT, including pretreatment regimens, avoidance and management of complications, and posttreatment suggestions.

470 nm blue light therapy: Clinical Handbook for the Management of Mood Disorders J. John Mann, Patrick J. McGrath, Steven P. Roose, 2013-05-09 Provides a one-stop evidence-based guide to the management of all types of mood disorders.

470 nm blue light therapy: The Science of Phototherapy: An Introduction Leonard I. Grossweiner, James B. Grossweiner, 2005-01-27 This volume emphasizes the science underlying the various phototherapy procedures, which encompasses aspects of classical and molecular photophysics, biological photochemistry, photobiology and biophotonics. Suitable as an introductory reference or textbook.

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470 nm blue light therapy: Neuronal Input Pathways to the Brain's Biological Clock and their Functional Significance Jens Hannibal, J. Fahrenkrug, 2006-06-07 Rhythmic changes in physiology

and behaviour within a 24 h period occur in living organisms on earth to meet the challenges associated with the daily changes in the external environment. The circadian pacemaker responsible for the temporal internal organisation and the generation of endogenous rhythms of approximately 24 h is located in the hypothalamic suprachiasmatic nucleus (SCN) in mammals. The endogenous period generated by the pacemaker is close to, but generally not equal to 24 h and the biological clock therefore needs to be daily adjusted (entrained) by external cues. The daily alteration of light and darkness due to the rotation of our planet on its own axis in relation to the sun is the most prominent zeitgeber which adjusts the phase of the circadian rhythms to the astronomical day length, a process known as photoentrainment. In mammals, light is perceived only through photoreceptors located in the retina. Light information is mediated to the SCN via the retinohypothalamic tract (RHT) by activation of the classical photoreceptor system of rods and cones and a more recently identified system of intrinsic photosensitive retinal ganglion cells (ipRGCs) using melanopsin as a photopigment.

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