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14th Allied Health Scientific Conference 2025
Innovate, Integrate, Inspire: Sustainable Healthcare Through Allied Health

iROViS
Centre for Research in Optometry & Visual Sciences

Ergonomic and Clinical Setting Lighting: Improving Productivity and Well-Being Among Healthcare Provider

By:
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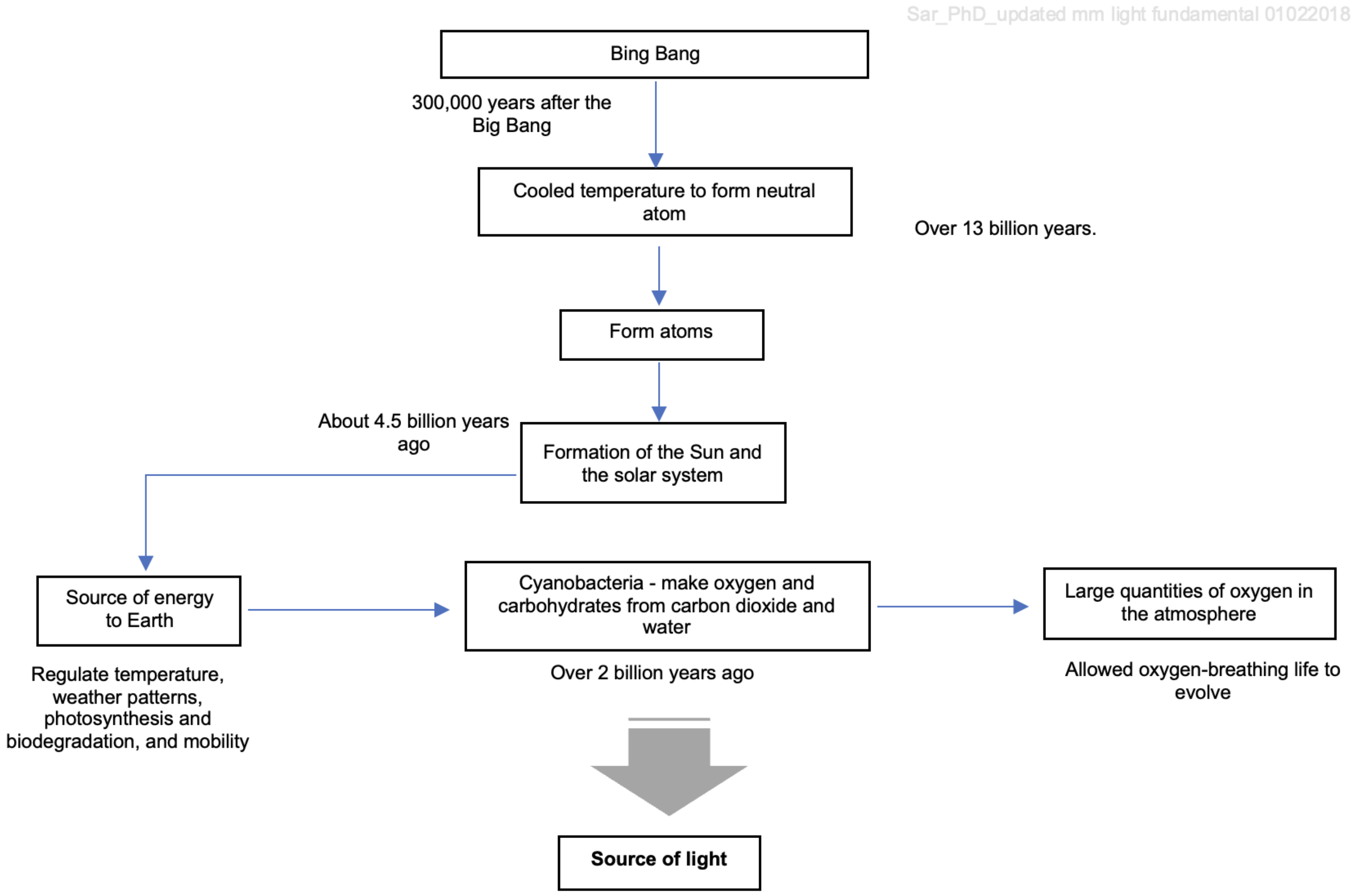
B.Optom (Hons.), M.Optom, PhD (Optometry)

Lighting – brief introduction in vision science perspective – theory, terminology, concept



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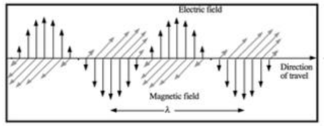


Light quantity → Amplitude, Frequency and Wavelength → From Young and Fresnel (1800) → Visible light roughly in the range, 400 nm to 700 nm

Speed of light in vacuum is fixed, each wavelength corresponds to a different frequency

Reveal wavelengths looks coloured.

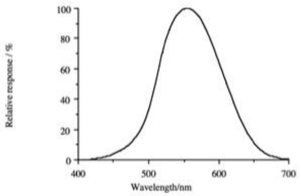
The colours correspond to those in the rainbow, ranging from violet (upwards of 400 nm) through blue, green (around 550 nm) and yellow, to red (up to about 700 nm).

Visual photoreceptors in the human eye absorb energy in this wavelength range and thereby initiate the process of seeing.

Other creatures are sensitive to different parts of the electromagnetic spectrum, but light is defined by the visual response of humans.

The eye is more sensitive to some frequencies than to others

Eye is about seven times more sensitive to green light at 550 nm than it is to blue light at 480 nm



Interaction on light and eye – photometric quantities

Symbol	Name	Description	Units
Q_v	Luminous energy		lumen sec (lm s)
Φ_v	Luminous flux	Rate of transfer of luminant energy	lumen
M_v	Luminous Excitance or flux density (formerly luminous emittance)	Luminant power per unit area	lm m^{-2}
L_v	Luminance (formerly brightness)	Luminous flux per unit solid angle per unit projected area	nit (nt) or candela/m^2 or lm/sr·m^2
I_v	Luminous Intensity (formerly candlepower)	Luminous power per unit solid angle from a point source	candela or lm/sr
E_v	Illuminance (formerly illumination)	Luminous power per unit area incident upon a surface	lux or lx or lm/m^2
K	Luminous efficacy	$K = \Phi_v / \Phi_e$	lm / w

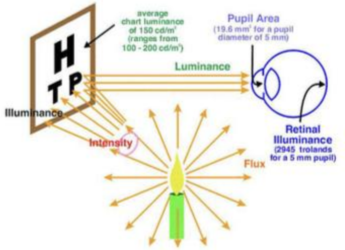


Figure 8. Photometric quantities illustrating flux, intensity, illuminance and luminance. Retinal illuminance of 2945 trolands is achieved through a pupil diameter of 5 mm and a chart luminance of 150 cd/m2.

Application of illuminance e and luminance

Typical Illuminance and Luminance Values

Situation	Illuminance (lm/m²)	Typical Surface	Luminance (cd/m²)
Clear sky in summer in temperate zones	100,000	Grass	3,200
Overcast sky in summer in temperate zones	16,000	Grass	500
Textile inspection	1,500	Light grey cloth	140
Office work	500	White paper	120
Heavy engineering	300	Steel	20
Good road lighting	10	Concrete road surface	1.0
Moonlight	0.5	Asphalt road surface	0.01

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International Association of Traffic and Safety Sciences

Research Article

Assessing the color status and daylight chromaticity of road signs through machine learning approaches

Roxan Saleh [a,b,*], Hasan Fleyeh [a], Moudud Alam [a], Arend Hintze [a]

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A R T I C L E I N F O

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Keywords:
Road signs
Daylight chromaticity
Regression
Classification
Prediction
Machine learning algorithms

A B S T R A C T

The color of road signs is a critical aspect of road safety, as it helps drivers quickly anc
spond to these signs. Properly colored road signs improve visibility during the day ar
to make informed decisions while driving. In order to ensure the safety and efficiency
to maintain the appropriate color level of road signs.
The objective of this study was to analyze the color status and daylight chromaticit
supervised machine learning models, and to explore the correlation between road si
maticity. Three algorithms were employed: Random Forest (RF), Support Vector Ma
Neural Network (ANN). The data used in this study was collected from road signs tl
Sweden.
The study employed classification models to assess the color status (accepted or rejec
on minimum acceptable color levels according to standards, and regression models t
maticity values. The correlation between road sign's age and daylight chromaticity wa
sion analysis. Daylight chromaticity describes the color quality of road signs in dayligh

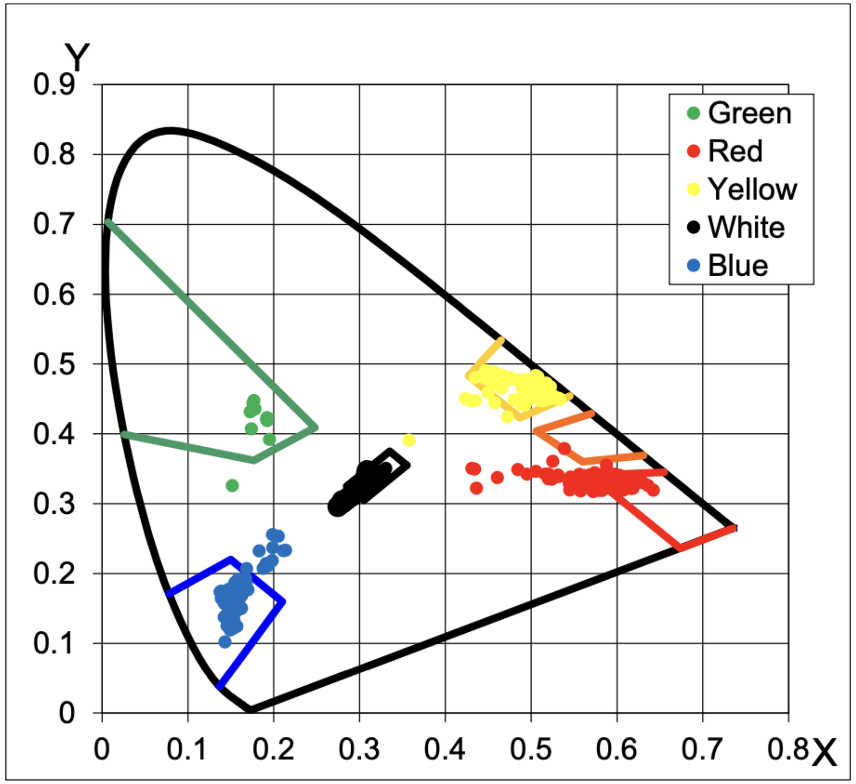


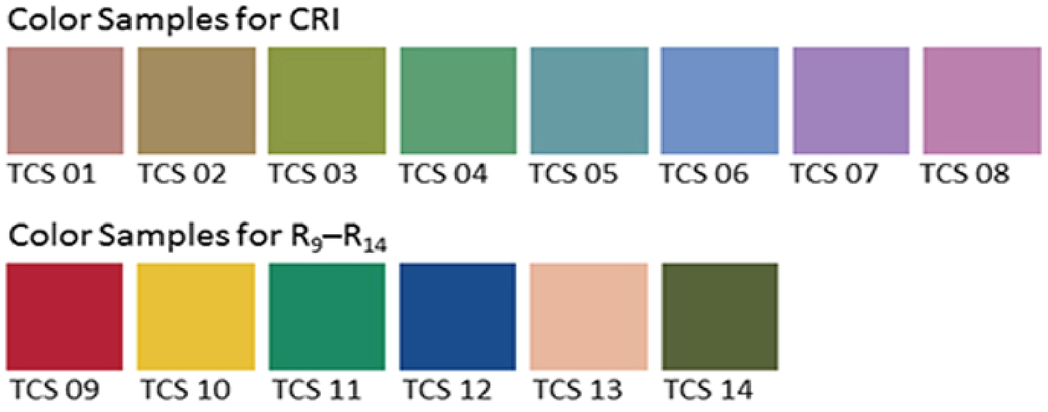
Fig. 2. Location of the measured road signs on CIE diagram (points falling outside the respective color box indicate rejected state).

Light measurement – illuminance/lux meter (unit: lux)

Illuminance Spectrophotometer

Light measurement - lux meter – application

	LED 5000K			LED 2700K			Halogen 2400K		
	2000 lx	3000 lx	4000 lx	2000 lx	3000 lx	4000 lx	2000 lx	3000 lx	4000 lx
Ra	**83**	**83**	**83**	**92**	**92**	**93**	**99**	**99**	**99**
R1	81	81	81	93	93	92	99	99	99
R2	87	86	86	97	97	96	100	100	100
R3	91	91	91	99	98	98	100	100	100
R4	83	83	83	92	92	92	99	99	99
R5	82	82	82	92	92	92	99	99	99
R6	82	82	81	96	96	95	100	100	100
R7	87	87	87	92	92	92	99	99	99
R8	69	69	69	81	81	81	98	98	98
R9	10	10	10	60	59	59	96	96	97
R10	68	68	68	91	91	90	99	99	99
R11	83	83	83	92	92	92	99	99	99
R12	63	63	64	82	82	82	99	99	99
R13	82	82	82	94	94	93	99	99	99
R14	95	95	95	99	98	98	100	100	100
R15	75	75	75	89	89	89	99	99	99
S/P Ratio	**1.97**	**1.97**	**1.97**	**1.30**	**1.30**	**1.30**	**1.33**	**1.39**	**1.40**



*Source: Dept. of Energy

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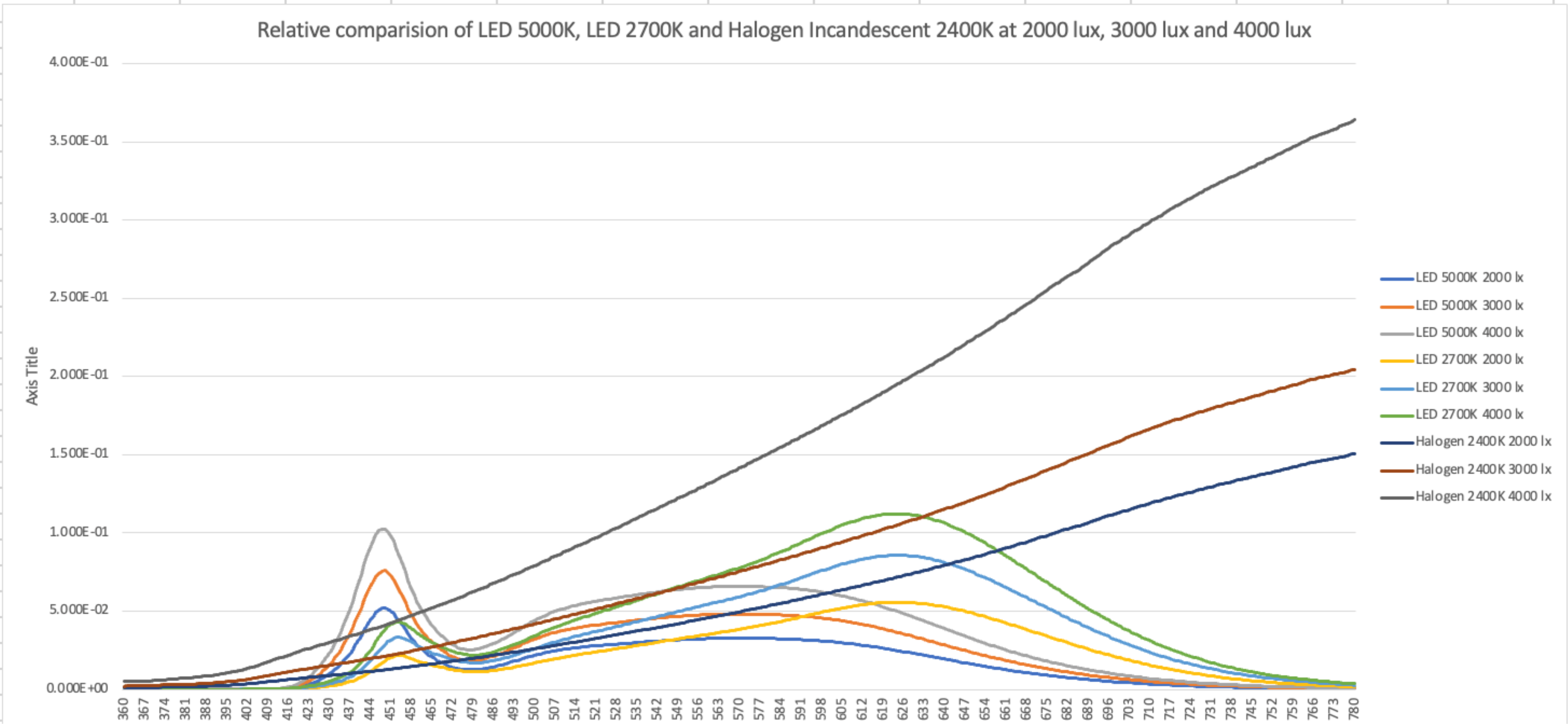
Light measurement - lux meter – application



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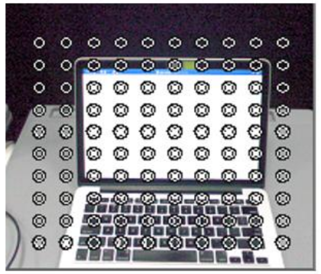
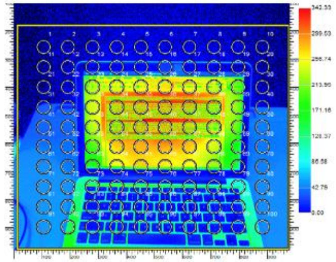
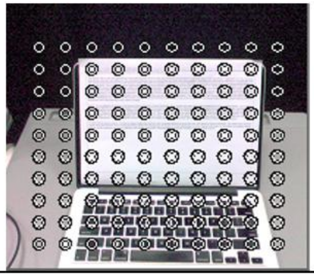
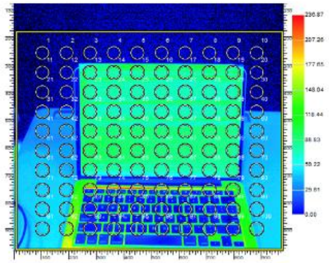
Light measurement – luminance meter (unit: cd/m^2

2D Colour Analyser CA-2500

Light measurement - luminance meter – application

Table 3.9
The View and Luminance Evaluation on The Electronic and Non-Electronic Surface Against Background

Reading Media	Subject view	Luminance evaluation on display and background
Electronic (Laptop)		
Non-electronic (Hardcopy on laptop)		

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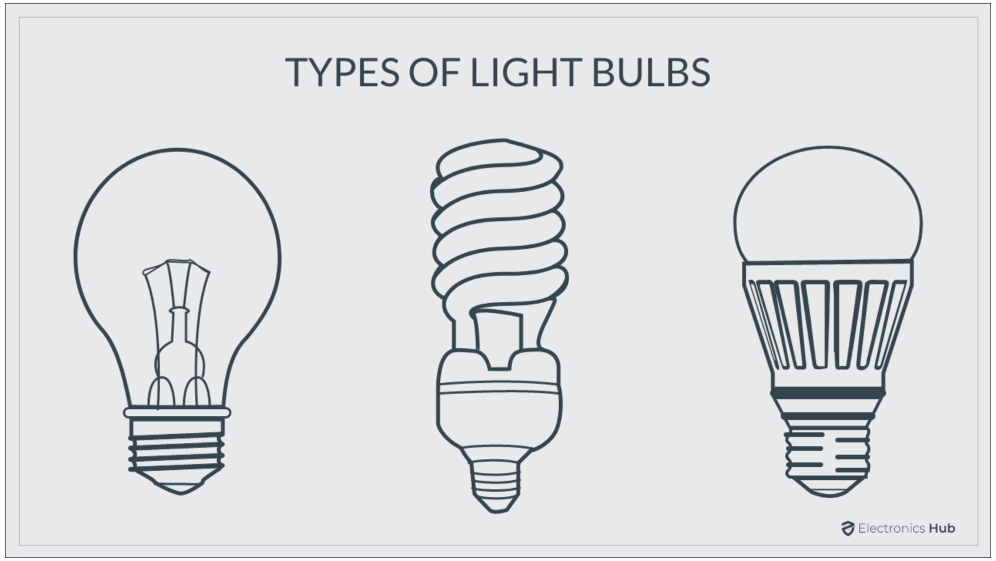
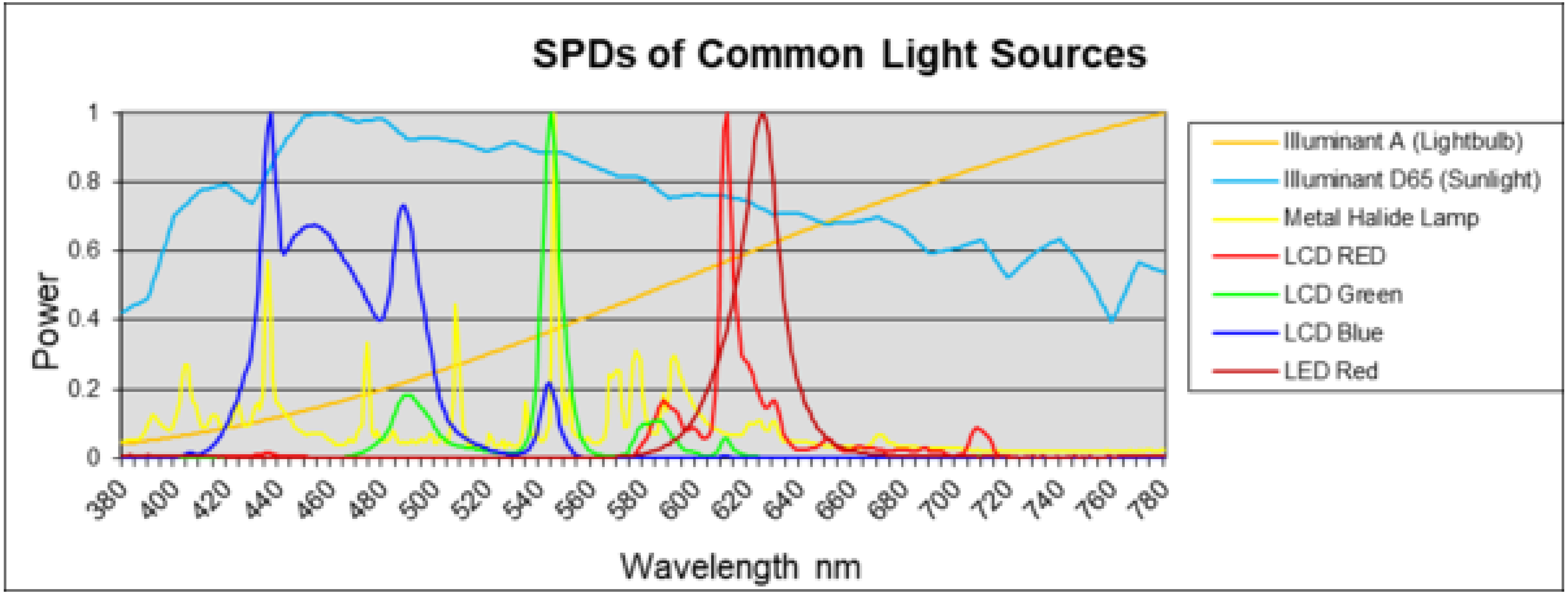
Types of light



Spectral Power Distribution (SPD)



Why Lighting Matters in Healthcare?

Impact on Patient Health and Recovery

- Physical and Mental Health (Aghajari & Chen, 2024; Zhang et al., 2024)
- Circadian Rhythm (Aguilar-Carrasco et al., 2025; Ritchie et al., 2015)
- Sleep Quality (Hadi et al., 2019)

Impact on Healthcare Staff

- Job Satisfaction and Stress Reduction (Lo Verso et al., 2016)
- Visual Comfort and Performance (Aguilar-Carrasco et al., 2025)

Energy Efficiency and Cost Reduction

- Energy Consumption (Aghajari & Chen, 2024)
- Natural Light Utilization (Alsarraf & Alobaidi, 2020)

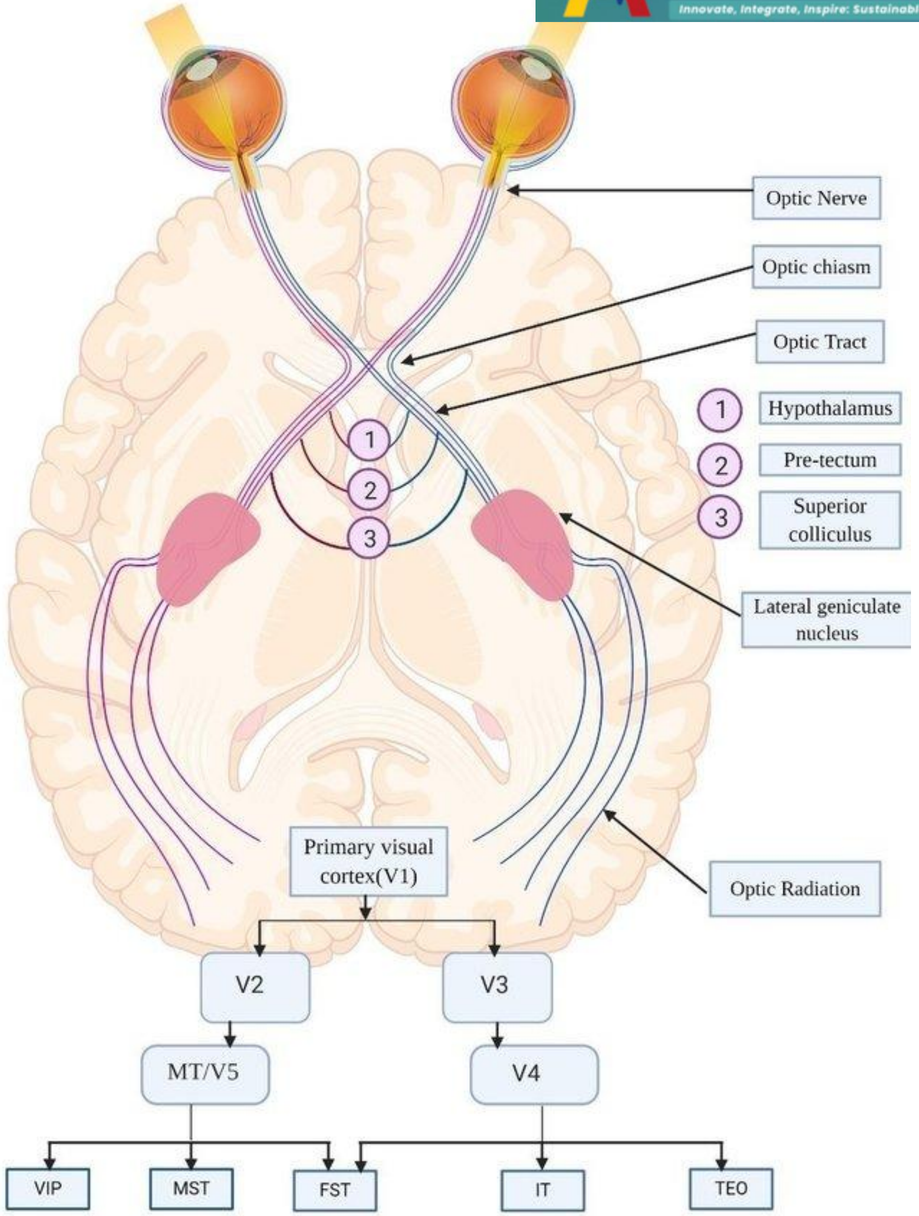
Visual vs Non-Visual Pathway

Feature	Visual Pathway	Non-Visual Pathway
Primary Function	Vision (image formation, object recognition, spatial awareness)	Regulation of physiological and behavioral responses to light (e.g., circadian rhythm, hormone secretion)
Main Light-Sensitive Cells	Retinal photoreceptors (Rods & Cones)	Intrinsically photosensitive retinal ganglion cells (ipRGCs)
Photopigment	Rhodopsin (rods) and Photopsins (cones)	Melanopsin (ipRGCs)
Pathway to the Brain	Retina → Optic Nerve → Lateral Geniculate Nucleus (LGN) → Primary Visual Cortex (V1)	Retina → ipRGCs → Suprachiasmatic Nucleus (SCN) & Other Brain Regions
Conscious Perception?	Yes (responsible for sight, color vision, and depth perception)	No (modulates circadian rhythms, pupil size, mood, and alertness)
Role in Lighting Response	Determines brightness, contrast, and color	Regulates sleep-wake cycles, alertness, and hormone production (e.g., melatonin suppression)
Effect of Blue Light	Enables color vision and enhances contrast sensitivity	Strongly influences circadian rhythms and alertness (high sensitivity to blue light ~480 nm)

The Visual Pathway

Components:
Includes the retina, optic nerve, optic chiasm, optic tracts, lateral geniculate nucleus (LGN), optic radiations, and the visual cortex

Function:
Responsible for processing visual stimuli, including visual acuity, color vision, depth perception, and contrast sensitivity. It supports the perception and high-order association of visual information

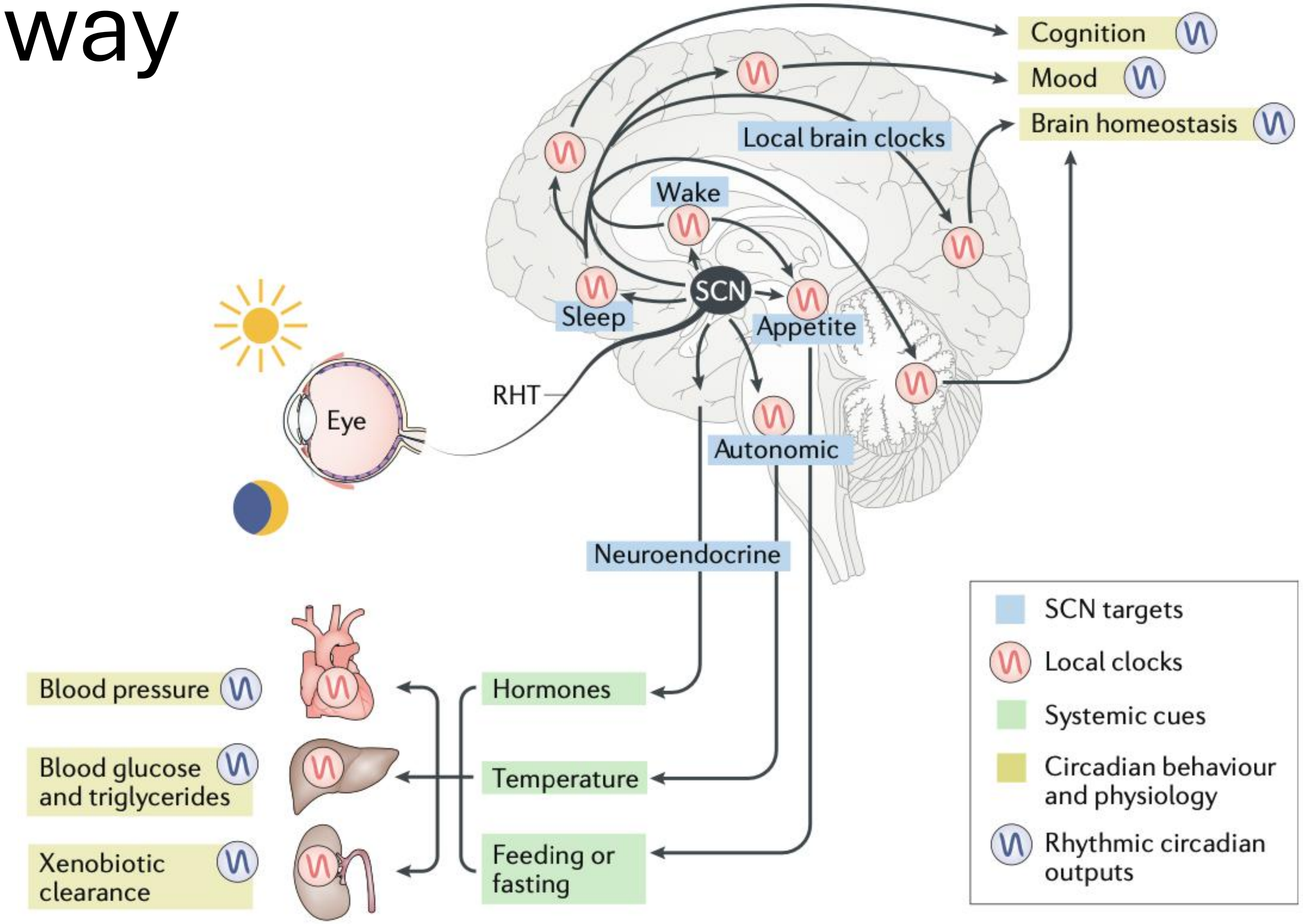


Uploaded by Pratibha Ahirwal

Non-Visual Pathway

Components:
Subcortical structures such as the superior colliculus, pulvinar nucleus, and amygdala

Function:
Processes non-visual stimuli, such as light affecting biological rhythms and emotional responses. It is involved in rapid processing of emotion-related information and can function independently of the primary visual cortex



Hastings, M. H., Maywood, E. S., & Brancaccio, M. (2018). Generation of circadian rhythms in the suprachiasmatic nucleus. *Nature reviews. Neuroscience*, *19*(8), 453–469.

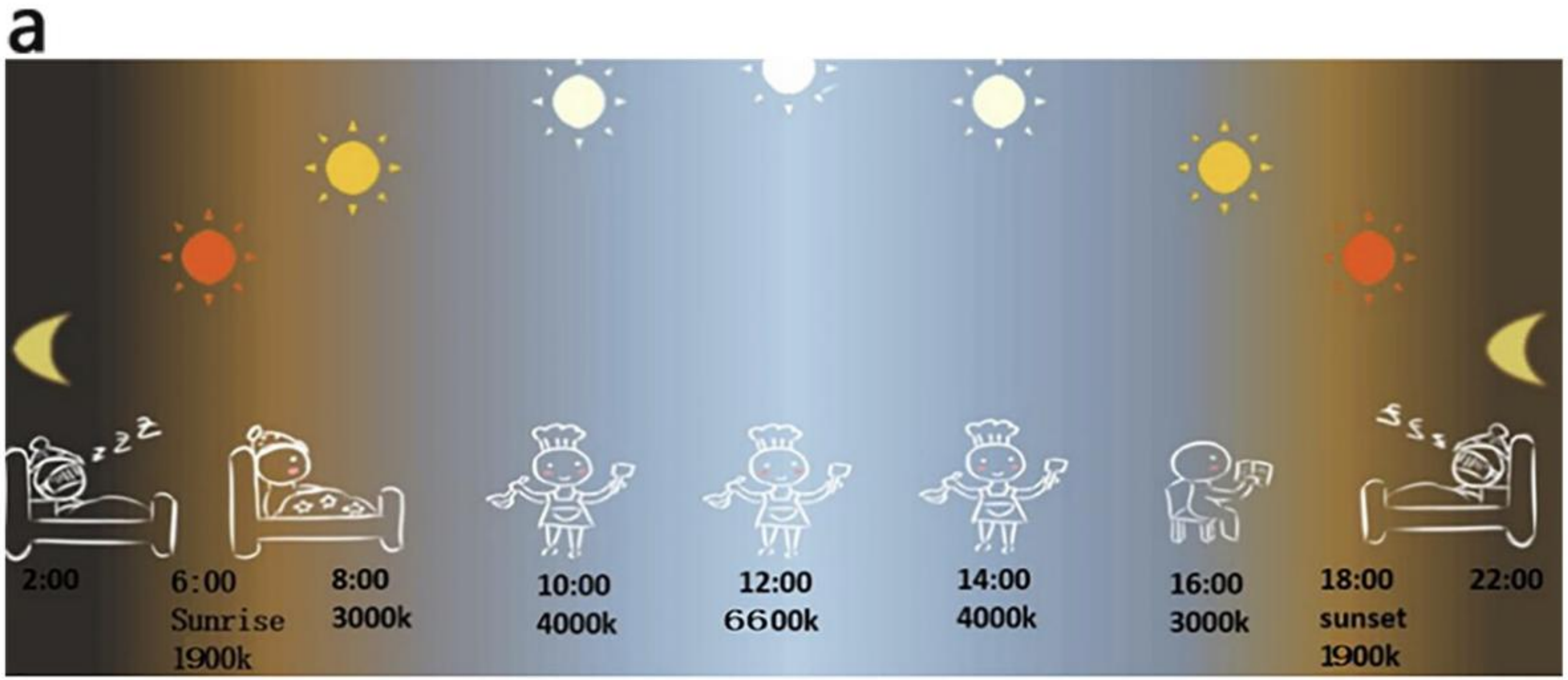
Optimal Lighting Standards

Our Gool

- Preventing eye strain
- Promoting comfortable vision
- Supporting visual development
- Human body regulation

Sufficient Brightness (Illuminance)	• Recommended brightness: 300 to 500 lux for reading or writing. • Even distribution of light
Appropriate Color Temperature	• Cool white light (4000K–5000K) • Warm light (2700K–3000K)
Minimizing Glare	• Indirect lighting • Anti-glare screens or filters
Balanced Natural and Artificial Light	• Natural daylight • Artificial light
Lighting for Screen Use	• Reduce blue light exposure • Adjust ambient lighting
Eye Health Considerations	• Frequent breaks • Vision check-ups

Appropriate Light Intensity and Color Temperature



Schematic illustration of the relationships between sun and human's biological rhythm

Lin, J., Ding, X., Hong, C. *et al.* Several biological benefits of the low color temperature light-emitting diodes based normal indoor lighting source. *Sci Rep* **9**, 7560 (2019)

Warm white light (2700–3000K)

+

Lower intensity of **100-300 lux**

→ **Relaxation or Bedtime**

Cool white light (4000–5000K)

Intensity of **300-500 lux**

Mimicking natural daylight

→ **Visual task**

✅ Positive Effects of Blue Light

Circadian Rhythm Regulation

- Helping to reset the body clock to align with the natural day-night cycle (Benke & Benke, 2013)

Cognitive Performance and Alertness

- Enhance cognitive functions such as attention, alertness, and reaction time (Charkhabi et al., 2025)
- Improve mood and alleviate symptoms of seasonal affective disorder (SAD) by boosting alertness and cognitive performance (Benke & Benke, 2013)

⚠️ Harmful Effects of Blue Light

Sleep Disruption

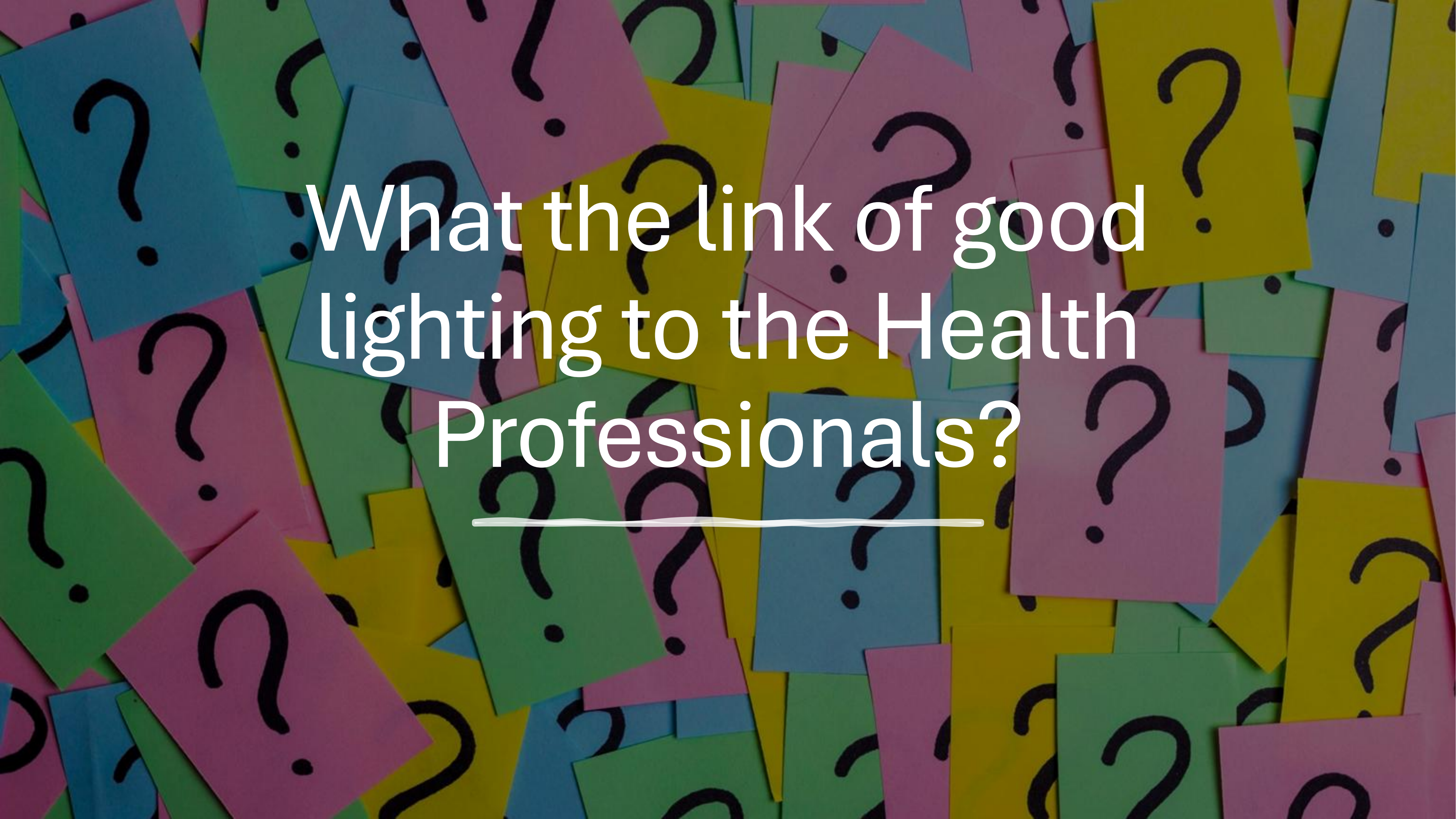
- Exposed at night, suppresses melatonin → circadian misalignment, poor sleep, reduced performance (Benke & Benke, 2013).

Health Risks

- Metabolic dysregulation, increased risk of type 2 diabetes, obesity, and certain cancers such as breast and prostate cancer (Benke & Benke, 2013).

Eye Health

- Long-term exposure → retinal damage, ↑ risk of AMD, cataracts; causes digital eye strain, headaches, dry eyes (Tosini et al., 2016).



What the link of good lighting to the Health Professionals?

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Castro *et al. Critical Care* 2011, **15**:218
http://ccforum.com/content/15/2/218

CRITICAL CARE

REVIEW

The effect of light on critical illness

Ricardo Castro[1]*, Derek C Angus[2], Matt R Rosengart[3]

This article is one of eleven reviews selected from the *Annual Update in Inte*
co-published as a series in *Critical Care*. Other articles in the series can be fo
information about the *Annual Update in Intensive Care and Emergency Medici*

"We shape our buildings, and afterwards our buildings shape us."
Winston Churchill

Introduction

The research of this decade has yielded substantial improvements in the delivery of and technology with which to provide care for critically ill intensive care unit (ICU) patients. Garnering less attention from the medical and scientific community is the environment in which that care is provided, which remains impersonal, noisy, and over illuminated. Noticeably, the nursing and business literature is replete with studies on the matter [1,2].

This discussion will focus on the available evidence regarding associations between the ICU environment, specifically light, and patient outcome. Definitions of

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The Impact of Windows and Daylight on Acute-Care Nurses' Physiological, Psychological, and Behavioral Health

Rana Sagha Zadeh, MArch, PhD; Mardelle McCuskey Shepley, BA, MArch, MA, DArch; Gary Williams, MSN, RN; and Susan Sung Eun Chung, PhD(c)

ABSTRACT

OBJECTIVE: To investigate the physiological and psychological effects of windows and daylight on registered nurses.

BACKGROUND: To date, evidence has indicated that appropriate environmental lighting with characteristics similar to natural light can improve mood, alertness, and performance. The restorative effects of windows also have been documented. Hospital workspaces generally lack windows and daylight, and the impact of the lack of windows and daylight on healthcare employees' well being has not been thoroughly investigated.

METHODS: Data were collected using multiple methods with a quasi-experimental approach (i.e., biological measurements, behavioral mapping, and analysis of archival data) in an acute-care nursing unit with two wards that have similar environmental and organizational conditions, and similar patient populations and acuity, but different availability of windows in the nursing stations.

RESULTS: Findings indicated that blood pressure ($p < 0.0001$) decreased and body temperature increased ($p = 0.03$). Blood oxygen saturation increased ($p = 0.02$), but the difference was clinically insignificant. Communication ($p < 0.0001$) and laughter ($p = 0.03$) both increased, and the subsidiary behavior indicators of sleepiness and deteriorated mood ($p = 0.02$) decreased. Heart rate ($p = 0.07$), caffeine intake ($p = 0.3$), self-reported sleepiness ($p = 0.09$), and the frequency of medication errors ($p = 0.14$) also decreased, but insignificantly.

CONCLUSIONS: The findings support evidence from laboratory and field settings of the benefits of windows and daylight. A possible micro-restorative effect of windows and daylight may result in lowered blood pressure and increased oxygen saturation and a positive effect on circadian rhythms (as suggested by body temperature) and morning sleepiness.

KEYWORDS: Critical care/intensive care, lighting, nursing, quality care, work environment

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Research Manuscript

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DOI: 10.1177/1937586720972078
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SAGE

Lighting the Patient Room of the Future: Evaluating Different Lighting Conditions for Performing Typical Nursing Tasks

Ethan Graves, MS[1], Robert G. Davis, PhD[2], Jennifer DuBose, MS[1], Gabrielle C. Campiglia, BS[1], Andrea Wilkerson, PhD[2], and Craig Zimring, PhD[1]

Abstract

Purpose: This study explores how aspects of lighting in patient rooms are experienced and evaluated by nurses while performing simulated work under various lighting conditions. The lighting conditions studied represent design standards consistent with different environments of care—traditional, contemporary, and future. **Background:** Recent advances in lighting research and technology create opportunities to use lighting in hospital rooms to improve everyday experience and provide researchers with opportunities to explore a new set of research questions about the effects of lighting on patients, guests, and staff. This study focuses on the experience of nurses delivering simulated patient care. **Method:** Perceptions of each of the 13 lighting conditions were evaluated by nurses using rating scales for difficulty of task completion, comfort, intensity, appropriateness of the lighting color, and naturalness of the lighting during the task. The nurses' ratings were analyzed alongside qualitative reflections to provide insight into their responses. **Results:** Significant differences were found for several a priori hypotheses. Interesting findings provide insight into lighting to support circadian synchronization, lighting at night, the distribution of light in the patient room and the use of multiple lighting zones, and the use of colored lighting. **Conclusion:** The results of this study provide insight into potential benefits and concerns of these new features for patient room lighting systems and reveal gaps in the existing evidence base that can inform future investigations.

Issues....

VISUAL PERFORMANCE

PATIENT CARE QUALITY

OVERALL WELL-BEING

Key connections between good lighting and health practice

Reducing Eye Strain and Fatigue

Long Shifts

Nurses work extended hours in different lighting environments.

Lighting Issues

Poor lighting can lead to discomfort and reduced performance.

Optimal Lighting

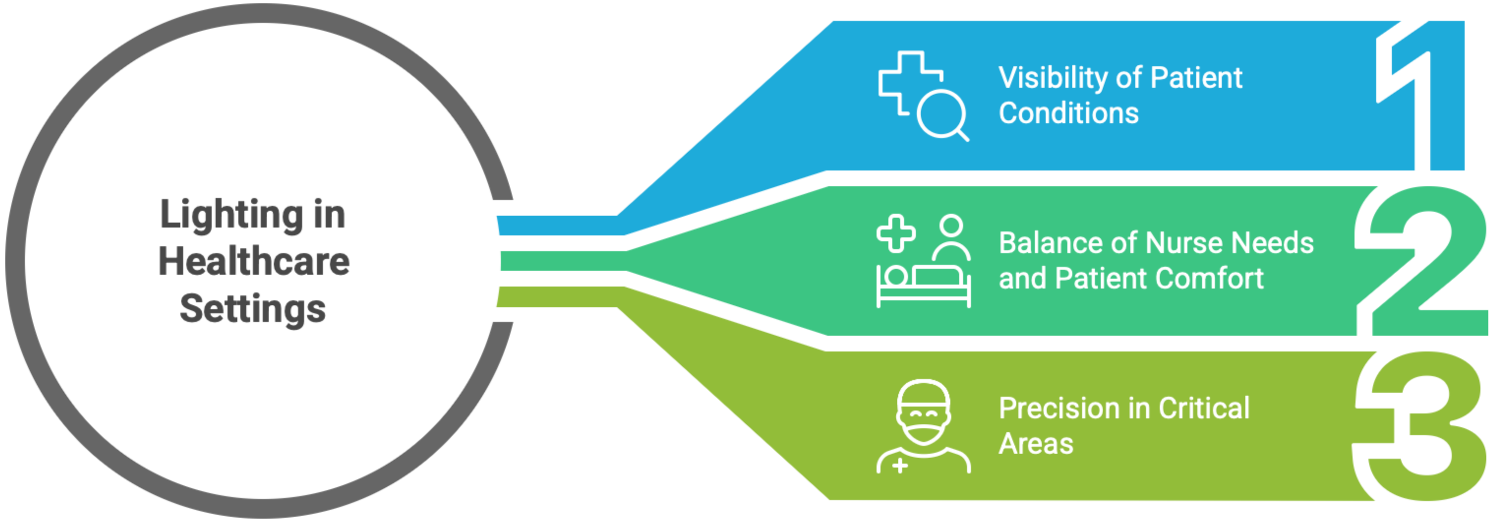
Proper lighting can help minimize visual strain and improve focus.

Key connections between good lighting and health practice

Supporting Circadian Rhythms and Shift Work

Key connections between good lighting and health practice

Enhancing Patient Safety and Care



Key connections between good lighting and health practice

Ergonomic Lighting in Workspaces

What the effect of circadian disruption on human health?

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REVIEWS

Rhythms of life: circadian disruption and brain disorders across the lifespan

*Ryan W. Logan and Colleen A. McClung**

Abstract | Many processes in the human body — including brain function — are regulated over the 24-hour cycle, and there are strong associations between disrupted circadian rhythms (for example, sleep–wake cycles) and disorders of the CNS. Brain disorders such as autism, depression and Parkinson disease typically develop at certain stages of life, and circadian rhythms are important during each stage of life for the regulation of processes that may influence the development of these disorders. Here, we describe circadian disruptions observed in various brain disorders throughout the human lifespan and highlight emerging evidence suggesting these disruptions affect the brain. Currently, much of the evidence linking brain disorders and circadian dysfunction is correlational, and so whether and what kind of causal relationships might exist are unclear. We therefore identify remaining questions that may direct future research towards a better understanding of the links between circadian disruption and CNS disorders.

Logan, R.W., McClung, C.A. Rhythms of life: circadian disruption and brain disorders across the lifespan. *Nat Rev Neurosci* **20**, 49–65 (2019).

Pflügers Archiv - European Journal of Physiology
https://doi.org/10.1007/s00424-020-02381-6

INVITED REVIEW

Check for updates

Metabolic implications of circadian disruption

Narjis Fatima [1] · Sobia Rana [1]

Received: 23 January 2020 / Revised: 16 April 2020 / Accepted: 17 April 2020

Abstract

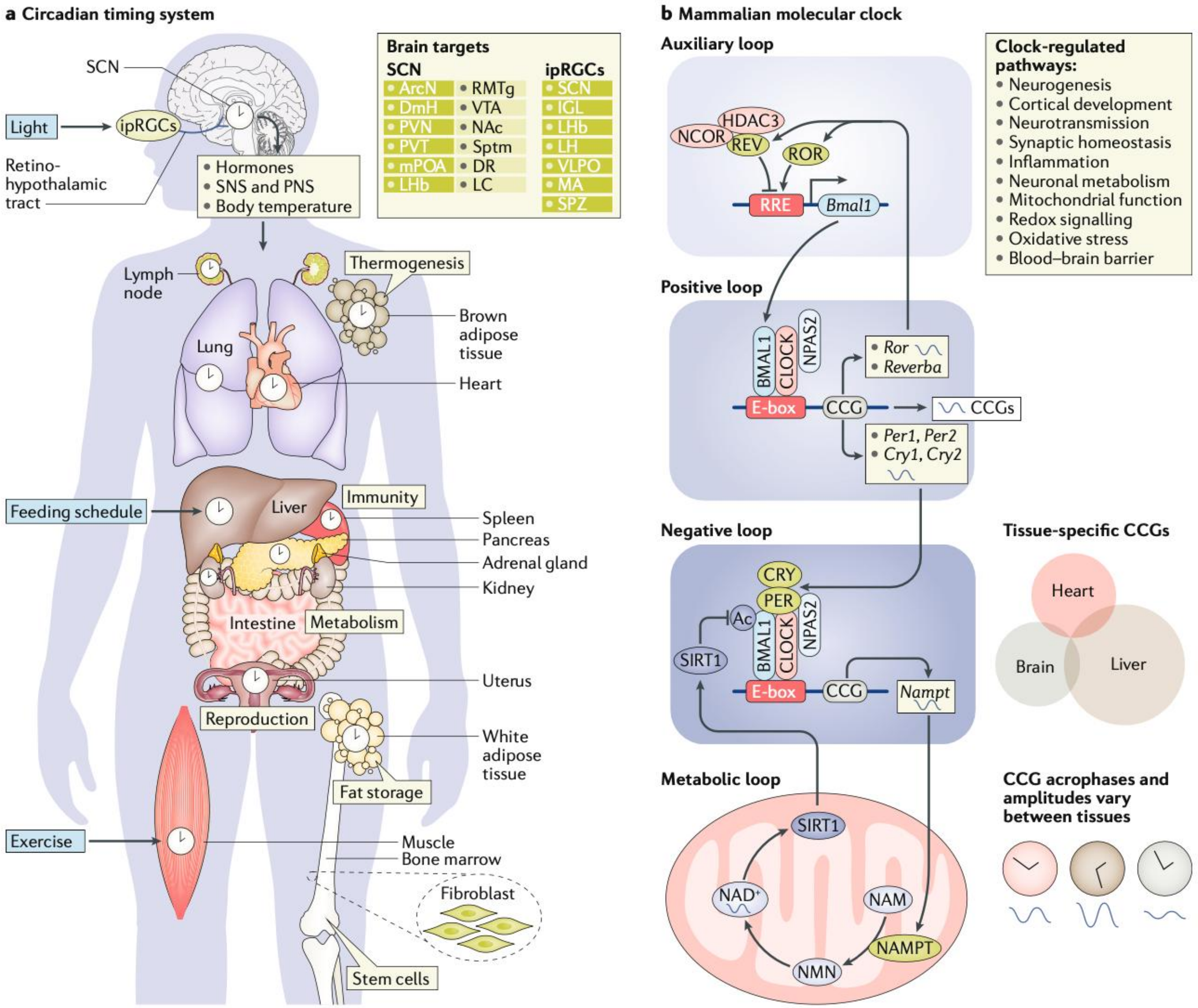
Circadian rhythms are generated by the circadian clock, a self-sustained internal timing system that exhibits 24-h rhythms in the body. In mammals, circadian rhythms are driven by a central clock located in suprachiasmatic nucleus and various peripheral clocks located in different tissues and organs of the body. Many cellular, behavioral, and physiological processes are regulated by the circadian clock in coordination with environmental cues. The process of metabolism is also under circadian regulation. Loss of synchronization between the internal clock and environmental zeitgebers results in disruption of the circadian rhythms that seriously impacts metabolic homeostasis leading to changed eating behavior, altered glucose and lipid metabolism, and weight gain. This in turn augments the risk of having various cardio-metabolic disorders such as obesity, diabetes, metabolic syndrome, and cardiovascular disease. This review sheds light on circadian rhythms and their role in metabolism with the identification of gaps in the current knowledge that remain to be explored in these fields. In this review, the molecular mechanisms underlying circadian rhythms have been elaborated first. Then, the focus has been kept on explaining the physiological significance of circadian rhythms in regulating metabolism. Finally, the implications for metabolism when these rhythms are disrupted due to genetic mutations or social and occupational needs enforced by modern lifestyle have been discussed.

Keywords Circadian rhythms · Metabolism · Clock genes · Shift-work · Gut microbiota · Metabolic disorders

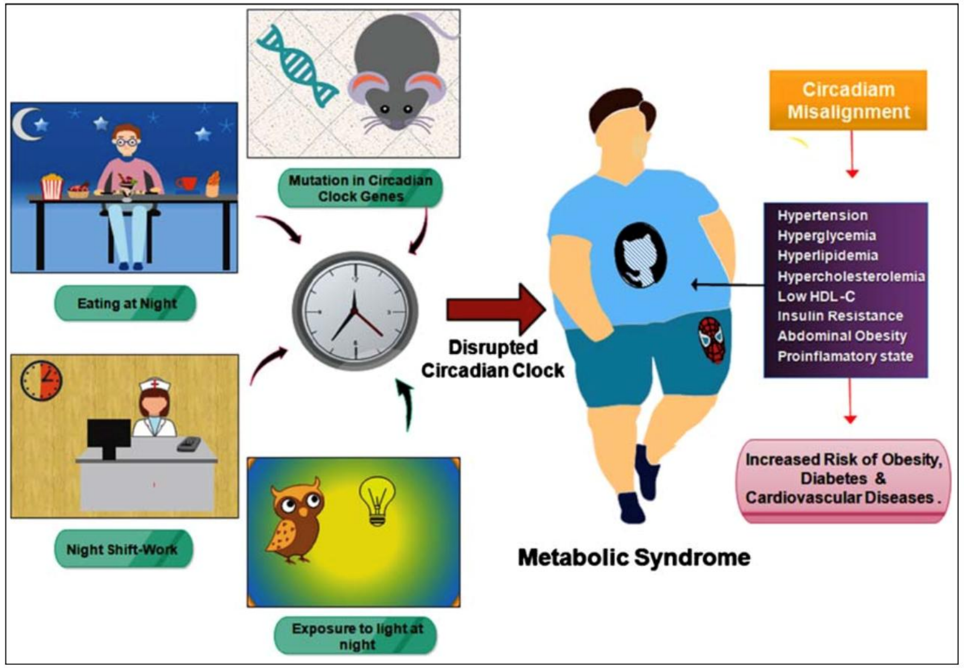
Introduction

Since the dawn of life, organisms have undergone evolutionary ... cellular, biochemical, physiological, and behavioral processes with changing solar cycles throughout the seasons. The envi-ronmental cues that synchronize the body's internal clock with

Fatima, N., Rana, S. Metabolic implications of circadian disruption. *Pflugers Arch - Eur J Physiol* **472**, 513–526 (2020).



Logan et al (2019).



Fatima et al (2020)

- Circadian disruption occurs when the body's **internal biological clock** is misaligned with the external environment, often due to **irregular light exposure, shift work, jet lag, or excessive screen time**.

- This misalignment can negatively impact **physiological, mental, and metabolic health**

Effect of circadian disruption on human health

- Sleep Disorders & Fatigue
- Mental Health Disorders
- Metabolic Disorders & Obesity
- Cardiovascular Diseases
- Increased Cancer Risk
- Reproductive Health Issues

Sleep Disorders & Fatigue

Delayed or irregular sleep patterns lead to **insomnia, reduced sleep quality, and daytime drowsiness**.

Increased risk of **shift work sleep disorder (SWSD)** in individuals working **night shifts**.

Poor sleep hygiene results in **chronic fatigue and decreased cognitive performance**.

Mental Health Disorders

Circadian disruption is linked to **higher risks of depression, anxiety, and mood disorders**.

Reduced melatonin production (due to excessive artificial light exposure at night) affects **sleep-wake stability**, worsening **mental health**.

Bipolar disorder and schizophrenia are associated with **circadian misalignment**.

Metabolic Disorders & Obesity

Nighttime eating and disrupted meal timing can impair metabolism, leading to **weight gain and obesity**.

Increased risk of **type 2 diabetes** due to impaired **glucose metabolism and insulin sensitivity**.

Altered **leptin (satiety hormone) and ghrelin (hunger hormone) levels** cause **unhealthy eating behaviors**.

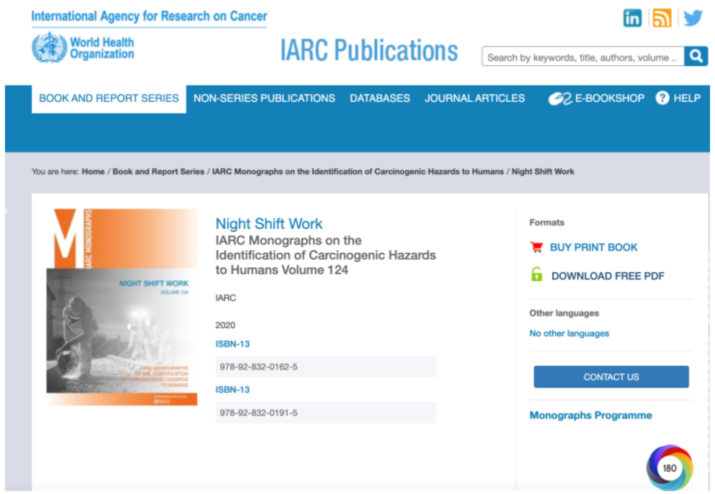
Cardiovascular Diseases

Shift workers have a higher risk of **hypertension, heart disease, and stroke**.

Circadian misalignment affects blood pressure regulation, increasing **cardiovascular strain**.

Disrupted sleep cycles may lead to **elevated cholesterol and inflammation**, contributing to **atherosclerosis**.

Increased Cancer Risk



Night shift work is classified as a **Group 2A probable carcinogen** by the **International Agency for Research on Cancer (IARC)**.

Melatonin suppression (due to light exposure at night) leads to **increased cancer cell growth** and **DNA damage**.

Higher risk of **breast cancer, prostate cancer, and colorectal cancer** in those with **long-term circadian disruption**.

Reproductive Health Issues

Irregular menstrual cycles and **reduced fertility** in women due to hormonal imbalances.

Circadian misalignment affects **testosterone levels and sperm quality** in men.

Increased risk of **pregnancy complications, low birth weight, and preterm birth**.

Some tips to help health professional to reduce the risk of circadian disruption due to the shift work schedule

1. Optimize Light Exposure

Bright Light During Night Shifts:

- Exposure to **blue-enriched bright light (5000K–6500K)** during **night shifts** can improve **alertness and cognitive performance**.
- **Strategically timed light exposure** helps align the circadian rhythm with the work schedule.

Avoid Bright Light After Night Shifts:

- Wear **blue-light-blocking glasses** or **sunglasses** when leaving the hospital in the morning to **minimize melatonin suppression**.
- Keep the **bedroom dark** with **blackout curtains** or an **eye mask** to promote deeper sleep.

2. Follow Sleep Hygiene & Recovery Strategies

Prioritize Sleep After Night Shifts:

- Aim for **7–9 hours of uninterrupted sleep** in a cool, quiet, and dark environment.
- **White noise machines or earplugs** can help block daytime disturbances.

Use Strategic Napping:

- A **20–30-minute power nap** before a night shift can improve **alertness**.
- Avoid long naps (>1 hour) during the shift to prevent **sleep inertia**.

3. Nutrition & Meal Timing

Avoid Heavy Meals & Caffeine Late in the Shift:

- Large meals can disrupt **digestion and melatonin production**, making sleep harder after work.
- **Limit caffeine** to the **first half of the shift** to avoid sleep delays post-shift.

Eat Light, High-Protein Snacks:

- **Complex carbohydrates + protein** (e.g., nuts, yogurt, whole grains) help maintain steady energy levels.

Stay Hydrated:

- Dehydration can worsen **fatigue and cognitive decline**. Drink enough **water** throughout the shift.

4. Exercise & Mental Health Support

Moderate Exercise:

- **30 minutes of moderate-intensity exercise** before a shift improves **alertness**.
- Avoid **strenuous workouts before bedtime**, as they may delay sleep onset.

Manage Stress & Mental Health:

- Mindfulness, deep breathing, and relaxation techniques **help reduce shift work stress**.
- **Social support from colleagues & family** helps maintain emotional well-being.

5. Smart Scheduling & Work Adjustments

Use Forward-Rotating Shifts (If Possible):

- Shifts rotating **morning → evening → night** are **easier to adjust to** than backward rotations.

Encourage Breaks & Rest Areas:

- Short **rest breaks** (including naps if allowed) help maintain **alertness and reduce errors**.

Limit Consecutive Night Shifts:

- Working **more than three night shifts in a row** increases **fatigue and health risks**.

Conclusion

For health professionals, **good lighting is not just a matter of comfort but a critical factor in safety, efficiency, and well-being**.

Hospitals and healthcare facilities should **invest in evidence-based lighting solutions** to enhance **visual performance, reduce fatigue, support circadian rhythms, and improve overall patient care outcomes**.

Take home message

LIGHTING AFFECTS BOTH VISUAL AND NON-VISUAL PATHWAYS

POOR LIGHTING CAN HARM HEALTH AND PERFORMANCE

BLUE LIGHT IS A DOUBLE-EDGED SWORD

SHIFT WORK AND CIRCADIAN DISRUPTION CAN BE MANAGED

ERGONOMIC LIGHTING SUPPORTS LONG-TERM EYE AND GENERAL HEALTH

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We welcome any collaboration in future

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