

**International Journal of Biology and Medicine**

Mini Review

Open Access

**Light: Regulator of Life****PD Gupta**

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**Received Date:** Jun 20, 2022 / **Accepted Date:** Jun 26, 2022 / **Published Date:** Jun 30, 2022

**Abstract**

The biological clock residing within us regulates many vital functions in the human body and in turn this is regulated by light. Perpetually we cannot survive in dark. When light falls on objects then only our eyes can see the object. However, perpetually we cannot live in light also if this condition prevails, we develop many diseases.

**Keywords:** Light–Dark cycle; Melatonin; Gonadal Functions; Etiology

**Cite this article as:** PD Gupta. 2022. Light: Regulator of Life. Int J Biol Med. 4: 22-23.

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Life depends on light but light existed long before life came in existence. In the course of human evolution light regulated biological clock and circadian rhythms [1]. Before electric lighting became common in the early 20th century, the Sun was the major source of light though people used candles, gas lights, oil lamps, and fires. Until that our biological clock was regulated by the sunlight i.e. 12h light and 12h dark. But now light is available 24h therefore our clock is disturbed. This thoughtlessness and the freedom light grant us many diseases. Ninety-eight percent Sunlight enters the human body through eyes and the other 2% by way of skin. Every 2 hours approximately 99% of the body's new blood volume is exposed to light as it circulates through the blood vessels on the back of the eye, continually altering blood chemistry. An interesting observation was made and reported [2] that the effect of changes in laboratory light intensity on chemistry and whole blood analysis show that the platelet counts is sensitive to

changes in laboratory light intensity at clinically unacceptable levels. The lipase, alkaline phosphatase, creatinine and iron tests are also sensitive to changes in laboratory light intensity, but at clinically acceptable levels.

Light and biological clock were synchronized and in turn humans were dependent on light for many of their physiological functions including, menarche and menopause, the two very significant mile stones in female's life. Production of melatonin (Dark reaction) in pineal gland is controlled by light [3], which in turn regulates some of the endocrine glands. In our earlier publication we have shown that estrogen is inversely proportion to melatonin [4]. The sunlight stimulates immune system which in turn offers resistance to diseases. A new study has found that chronic disruption of one of the most basic circadian (daily) rhythms resulted in increased incidence of hormone dependent cancers in humans [5]. Indirect evidence for a role of exposure to light in human puberty comes from the fact that blind

girls have delayed menarche than normal sighted girls. Menarche varies from population to population and is influenced by a wide variety of factors including geographical connotations. Several studies have suggested that menarche starts relatively more frequently in summer than in winter in normal girls, suggesting an inhibitory effect of photo stimulation [6]. However, in the Arctic area, the dark winter months may be associated with reduced pituitary-gonadal function and low conception rates. Thus, the influences of light and temperature on the human reproductive axis are uncertain and rather minor as compared with the seasonally breeding animals [7]. The effects of light-darkness rhythms can be mediated through the pineal gland hormone, melatonin, which circulates in high concentrations at night. The most obvious decrease in melatonin secretion, however, occurs after onset of puberty. This might suggest that melatonin secretion decreases as a consequence of increase in sex steroid levels at puberty, a concept further supported by studies in isolated gonadotropin deficiency and delayed puberty.

The role of melatonin in human puberty warrants further longitudinal and mechanistic studies correlating melatonin secretion with other hormonal parameters. An influence of seasonal factors on sexual precocity in migrating children cannot be excluded at this point, although the average period of 4 yr between migration and early onset of puberty is inconsistent with the time sequence of changes in melatonin secretion and puberty in normal children. Deviation from this alignment was found to be the etiology for many diseases in humans including breast cancer. However, it is not yet very clear how these two important physiological events in visually handicapped female subject's life will be regulated [8,9].

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