

Light Pollution and Human Health

Humans are a daytime species. Although we can see at night, our vision is significantly reduced compared to the daytime. In the past, starlight provided sufficient levels of illumination for most activities. However our modern fast paced and mechanized activity requires better visual acuity for driving cars, bicycles and avoiding urban hazards.

Some level of artificial lighting is required for nighttime activities. But this lighting must be designed to increase visibility. Paradoxically, more light can reduce visibility, especially for persons over 40 years of age¹.

The proliferation of outdoor lighting has a significant impact on the health and behaviour of humans². “Biological clocks control our sleep patterns, alertness, mood, physical strength, blood pressure, and other aspects of our physiology”³. The dominant mechanism for synchronizing this biological clock to our activity (the circadian rhythm) is the day-night contrast and the timely release of the hormone melatonin. This hormone regulates the ebb and flow of other hormones in our bodies. These “repair the damage” we do to our bodies each day. Without the timely release of these hormones, healing takes longer and our bodies are less able to fend off disease⁴.

Our circadian rhythm prepares the hormones that are needed at during various periods of the day. This rhythm and our environment time their release. However like many complex and reactive chemicals, they have a limited “shelf life”. If not released soon after they are formed, they will decay and be re-absorbed. If they are eventually released they may have less potency resulting in incomplete or inadequate repairs.

Even our memories are affected. Without deep sleep our daily memories may not be stored or compressed sufficiently for rapid recall when they are needed. We become forgetful.

The timing of the circadian rhythm also affects our behaviour. For example, Seasonal Affective Disorder (SAD) is an emotional condition experienced by travellers and others. The symptoms can be reduced with exposure to bright light⁵ as it shifts (or entrains) and resets our biological clock. If this entrainment occurs during the late evening or at night due to artificial outdoor lighting, the biochemistry that controls our physiological well-being will also be shifted away from the proper daytime hours.

¹ Work, Aging, and Vision: Report of a Conference, ISBN-10: 0-309-07793-1

² Light Research Organization, Electric Power Research Institute, (www.epri.com/LRO/index.html)

³ WebMD, March 06, 2007, www.webmd.com/cancer/news/20040908/light-at-night-may-be-linked-to-cancer

⁴ ⁴ “Light at night and cancer risk”, Schernhammer E, et.al., Photochem Photobiol. 2004 Apr;79(4):316-8.

⁵ “Shutting Off the Night”, H. Marano, Psychology Today, Sep/Oct 2002