

KRYSTYNA SKWARŁO-SOŃTA

Department of Animal Physiology

Institute of Zoology

Faculty of Biology

University of Warsaw

Miecznikowa 1, 02-096 Warszawa

LIGHT POLLUTION – WHAT DO WE KNOW ABOUT ITS EFFECT ON HUMAN PHYSIOLOGY?

Summary

Diurnal rhythms and seasonal cycles operating in humans and other living organisms adjust their function to the sequence day/night, and allow to anticipate the next day sunrise. Generated by the endogenous molecular mechanism (i.e. biological clock), diurnal rhythms are synchronized with the actual external conditions by the environmental cues, with light being the most potent of them. Coordinating effect of light is exerted through the non-visual pathway starting in the melanopsin containing receptors of the retina and going to the master clock. Located in mammals in the suprachiasmaticus nucleus (SCN), master clock controls majority of downstream physiological processes and behavior. Information on the daily light cycle is sent also to the pineal gland, producing and releasing its main hormone melatonin as a biochemical substrate of darkness, perceived by the effector organs. Interruption of the natural circadian light-dark cycle desynchronizes functioning of the master clock and disrupts the normal melatonin rhythm, leading to the serious pathophysiological consequences. Increasing prevalence of the inappropriate presence of light, i.e. light pollution, adversely affects human physiology, and seems to be responsible for an important increase in several civilization-related illness and, even more dangerous, increased resistance to the conventional treatments. Present article discusses some aspects of the effect of light pollution based on the population studies.