

MELATONIN: THE HORMONE OF SLEEP OR DARKNESS?

Summary

Terrestrial organisms are influenced by the cyclical nature of geophysical variations in the solar daylength and seasonal changes of the environmental day/night cycle. Adaptation to these changes includes regulation of the intensity of majority (all?) physiological processes generated by an endogenous mechanism known as the biological clock. In mammals, main biological (master) clock, is located in the suprachiasmatic nucleus (SCN) of the hypothalamus, and its periodicity is synchronized to 24 hs by the external cues, called time givers. Main synchronizing external factor is light/dark cycle, and in particular length of darkness, which is a period of elevated synthesis of melatonin, a neurohormone produced in the pineal gland, existing in all vertebrate species. As the duration of night vary according to the season, melatonin being a biochemical substrate of darkness acts within the body as “a clock and a calendar”. Melatonin released to the cir-

culatation adjusts activity of SCN to the external lighting conditions and also modulates diurnal rhythmicity of several physiological processes. Various environmental conditions perturbing nocturnal rise of melatonin synthesis (e.g. transmeridian flights, shift work, blue-violet light emitted by several electronic devices equipped with LED) lead to the desynchronization of these circadian rhythms giving increased frequency of different illness appearing in the modern societies, including sleep disorders. Correction of this kind of disorders seems to be possible, at least partly, by the evening treatment with exogenous melatonin or its analogs. It is, however, necessary to keep in mind that melatonin action within the body is much more extended as its receptors are present in majority of organs and modulatory influence of melatonin on several physiological processes must be taken into consideration.