

Melatonin secretion in reindeer (*Rangifer tarandus tarandus* L.)

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Abstract: Seasonal breeding cycles in many mammalian species in polar or temperate latitudes enable optimal survival of the offspring. This, however, is obtained only by adjusting the whole reproductive cycle to respond to environmental cues. The cue most frequently used is the annual change in photoperiod. The environmental photoperiod regulates the secretion of melatonin through two effects on the daily rhythm of melatonin synthesis and secretion. Firstly it suppresses melatonin production and secondly it sets a circadian pacemaker in the suprachiasmatic nuclei to the light-dark rhythm. In this study circadian and circannual variations of serum melatonin were investigated in ten adult female reindeer and five calves housed outdoors in the latitude 69° 10' N. Samples were taken 4-hourly for 24 h every 3 months. Serum levels of melatonin were determined by the RIA developed by Vakkuri et al. (Acta Endocrinol. 106:152. 1984). Serum melatonin levels exhibited a pronounced seasonal rhythm ($F = 5.88, P < 0.001$). A circadian rhythm in melatonin secretion was discernible in autumn, winter and spring in adults with acrophases at night ($P < 0.001$ vs. day). However no circadian rhythm was observed in summer. In calves the circadian melatonin rhythm was observed in autumn and spring, but in the autumn the peak levels were lower than those of adults ($P < 0.05$). In winter and in summer the melatonin levels were equal and no circadian melatonin rhythm was observed. Our present results indicate that a large circannual change in the secretion of melatonin occurs in Finnish reindeer in all age groups. No summer diurnal rhythm in melatonin is seen.

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