cally be classified as 'idiopathic' may indicate that Sertoli cells are congenitally lacking in normal content of energetic substances and related enzymes; on the other hand, the presence and distribution of glycogen and 1–4 AP in the 'acquired' case may represent a condition similar to the normal Sertoli cell. The large amount of 1–4 AP, in correspondence to the peritubular muscle cells found in the 'true aplasia', may be related to lack of utilization of glycogen, caused by the absence of the tubular motility, which probably plays a role in the spermatogenesis[18].

Riassunto. Nella «sindrome da sole cellule di Sertoli congenita o idiopatica» (aplasia germinale vera) la 1–4 AP, ricercata con metodi istochimici, risulta assente in corrispondenza dell'epitelio del tubulo seminifero e si presenta in quantità apprezzabile in sede peritubulare (cellule muscolari). Nella «sindrome da sole cellule di Sertoli acquisita», conseguente a trattamento radiante, il comportamento della 1–4 AP è del tutto simile a quello del testicolo normale. Il metodo appare pertanto utile per la diagnosi differenziale fra le due forme, su base istochimica.

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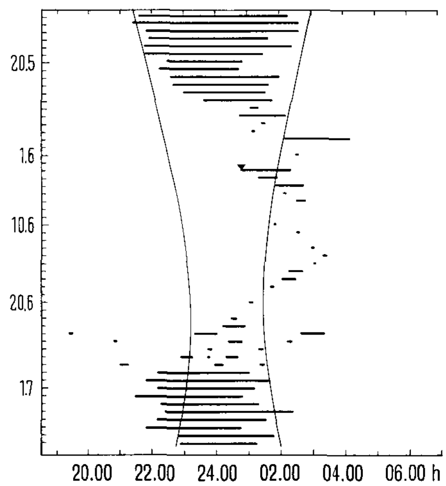
Free-Running Circadian Rhythm in Wood Mouse (*Apodemus flavicollis* Melch.) under Natural Light-Dark-Cycle

Under natural conditions, circadian rhythms are always influenced by periodically changing circumstances and therefore not free-running. For mammals and birds at least, light is the most important 'Zeitgeber', which develops the spontaneous rhythm to exactly 24 h. The locomotory activity of the wood mouse (*Apodemus flavicollis* Melch.) was registered continuously in the running wheel in Oulu (Finland) (65°1′ N, 25°28′ E). The mouse was in an isolated room with naturally fluctuating temperature and with a window looking NW.

From 20.5 to 1.6 the mouse ran with the period τ = 24.4 h with reduced activity. In the last 2 of these days the beginning of activity took place after sunrise. On 3.6. the mouse was disturbed by feeding, and after a phase-shift it ran again with the same length of period, τ = 24.4 h, as before, until 7.6. The last 3 beginnings of activity again took place after sunrise. After 2 days, with completely reduced activity and after a new phase-shift it ran 5 days again with τ = 24.4. The beginning of activity took place during these 5 days always after sunrise: on 10.6. 7 min and on 14.6. 1 h 46 min after sunrise. Thereafter, although the nights were growing still shorter and average light-intensity of the day was higher, the circadian rhythm became shorter (τ = 23.6) in the time of 14..6 to 30.6., after which it was again synchronized to 24 h by means of natural light-dark-cycle. One special feature was that the resynchronization took a long time, more than a fortnight.

The natural light-dark-cycle has a rather constant range of oscillation, but towards the north and south pole it changes greatly according to the season. In the polar regions the range of oscillation is much smaller in winter and summer than in spring and autumn. Although Oulu is situated 172 km south of the Arctic circle, the light intensity, on the bright nights in the beginning of June, is at midnight 50 lux and in midsummer 100 lux according to my measurements. Because the minimum value of the light intensity in the night is so great, the range of oscillation becomes smaller and also the 'Zeitgeber' weaker. On the other hand, it is known that if the 2 light intensities have the same duration (in nature LD 12:12), the weak 'Zeitgeber' is strongest, but the more the LD-ratio deviates from this, the weaker becomes the ,Zeitgeber.' And lastly if (as in this case) dark-time becomes too short, the range of development is exceeded and the biological oscillation is no longer synchronized, in spite of the 24 h 'Zeitgeber' periodicity[1]. Because the range of forcing oscillation became small owing to the great light intensity in the night, and, at the same time, the LD-ratio grew to its greatest value 21.7:2.3, the 'Zeitgeber' was too weak to synchronize the locomotory activity of the wood mouse.



The activity of a wood mouse in the summer 1967. Horizontal bars, time when the mouse was active; black triangle, feeding on 3.6. The vertical curves show sunset and sunrise.

Zusammenfassung. Bei Versuchen mit Waldmäusen (*Apodemus flavicollis* Melch.) wurde im Sommer 1967 172 km südlich des Polarkreises (kürzeste Zeit zwischen Sonnenuntergang und -aufgang 2,3 h, Beleuchtungsstärke um Mitternacht bis 100 Lux) freilaufende zirkadiane Periodik gemessen.

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[1] R. WEVER, Kybernetik 2, 127 (1964).