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FREE-RUNNING CIRCADIAN RHYTHMS IN AGING

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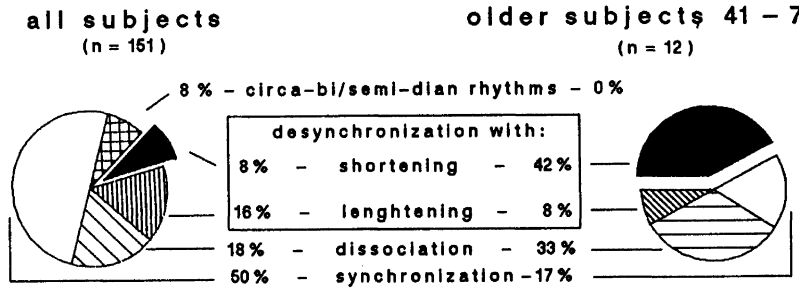
An endogenous clock system regulates a broad set of psychological and physiological variables, leading to typical variations of the functions during the day. With aging a reduction of the circadian amplitude, a shortening of the autonomous circadian periodicity, and a weakened coupling of the variables become obvious. The latter result comes from the finding, that an increased frequency in the occurrence of internal desynchronization with aging has been found. Since this state is mainly seen as an uncoupling of the rhythms by a lenghtening of the sleep-wake cycle, it would be in contradiction to the finding of a shortening of the ryhthm. However, a reanalysis of the group of older subjects from the isolation studies under "free-run" condition in our institute, revealed that only the frequency of "internal desynchronization with shortening of the activity rhythm" in the older subjects increases (see figure). Since internal desynchronization and dissociation of the rhythms describes only different degrees of variability, the main results are a remarkable decrease in the synchrony of the more unstable rhythms with a shortening of the circadian periodicity and increased tendency for ultradian rhythmicity. Such an assumption is also supported by studies in the 24-h day with a phase-advance of the sleep-wake pattern and an increased occurrence of napping. These results refer not only to sleeping and waking but have also been found in variables such as subjective alertness, body temperature, melatonin, growth hormone and cortisol. Thus it can be assumed, that the biological rhythms in aging show an overall increased disorganization.



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DSIP AND SLEEP STATES IN INFANTS IN THE FIRST YEAR OF LIFE

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Delta sleep-inducing peptide (DSIP) is a naturally occurring nonapeptide that has been reported to affect the rhythmic organization of sleep. In the first year of life sleep organization is changing markedly. So we were interested in plasma levels of DSIP in the first year of life in correlation to the ratio of active and quiet sleep.

2 groups of children were investigated: 1. preterm infants (n=25, 28 investigations), 2. healthy full-term infants (36/37). The age of the infants ranged from -5 (postnatal age was corrected for a gestational age of 40 weeks) to 53 weeks. DSIP was radioimmunoassayed in plasma. All infants were also polygraphically investigated during sleep.

There was a statistically significant increase of the ratio quiet/active sleep in dependence on age, but no correlation between the ratio time of active/quiet sleep and the plasma level of DSIP. The DSIP-plasma-levels were not changing in dependence on age. In healthy full-term infants, the DSIP-level was significantly higher (median: 1885 pmol/l, interquartile range: 757 pmol/l) than in the preterm infants (median: 1595 pmol/l, interquartile range 385 pmol/l). The plasma level of DSIP was comparable to those determined by EKMAN in adults.

In the first year of life, DSIP plasma levels does not seem to be a marker of developmental changes of sleep pattern.

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