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## Neurobiology of Aging

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# Chronobiology of aging: Temperature, sleep-wake rhythms and entrainment

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### Abstract

“Studies were carried out on a group of six young (ages 23–30) and six older (ages 53–70) normal men who lived under conditions of temporal, but not social isolation, from three to eight weeks. During entrained and non-entrained (free-running) conditions, comparative measurements were made of sleep-wake cycles, sleep stages and rectal temperature rhythms for these two age groups. Results demonstrated a reduction in the period and amplitude of the body temperature rhythms during free-running in the older group. Sleep efficiency, total sleep time, REM sleep latency, REM episode length, percent REM in the last 2 hours of sleep, the length and frequency of arousals during sleep, and the terminal wake latency were all age related and dependent on entrainment. The period of the sleep-wake cycle, terminal awakenings from REM and percent REM in the first 3 hours of sleep were not age related but were dependent on entrainment. Sleep stages as percents of total sleep time were found to be age related

but independent of entrainment, while sleep latency, mid-REM to mid-REM cycle length and the ratio of sleep to total time were neither age related nor dependent on entrainment. In addition, individual chronobiological differences were prominent in the older group. Changes of period and of the phase relationship of sleep-wake and temperature rhythms occurred in several subjects during the non-entrained condition.



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## Keywords

Circadian rhythms; Aging; Sleep; Temperature; Entrainment

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