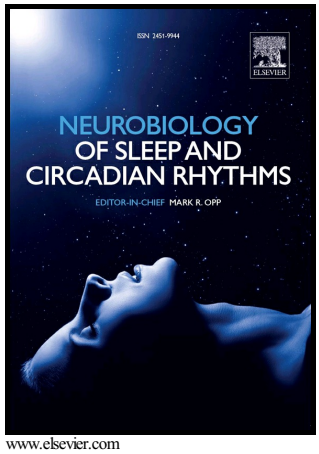

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Chronic social defeat stress suppresses locomotor activity but does not affect the free-running circadian period of the activity rhythm in mice

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Abstract

In mammals, daily rhythms in behavior and physiology are under control of an endogenous clock or pacemaker located in the suprachiasmatic nucleus (SCN) of the hypothalamus. The SCN assures an optimal temporal organization of internal physiological process and also synchronizes rhythms in physiology and behavior to the cyclic environment. The SCN receives direct light input from the retina, which is capable of resetting the master clock and thereby synchronizes internally driven rhythms to the external light-dark cycle. In keeping with its function as a clock and pacemaker, the SCN appears to be well buffered against influences by other stimuli and conditions that contain no relevant timing information, such as acute stressors. On the other hand, it has been suggested that chronic forms of stress may have gradually accumulating effects that can disturb normal clock function and thereby contribute to stress-related disorders. Therefore, in the present study we investigated whether chronic intermittent social stress affects the endogenous period and phase of the free-running activity rhythm in mice. Adult male mice were maintained in constant dim red light conditions and exposed to a daily 20 min social defeat stress session for 10 consecutive days, either during the first half of their activity phase or the first half of their resting phase. The overall amount of running wheel activity was strongly suppressed during the 10 days of social defeat, to about 50% of the activity in non-defeated control mice. Activity levels gradually normalized during post-defeat recovery days. Despite the strong suppression of activity in defeated animals, the endogenous free-running circadian period of the activity rhythm and the phase of activity onset were not affected. These findings are thus in agreement with earlier studies suggesting that the circadian pacemaker in the SCN that is driving the rhythmicity in activity is well-protected