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Investigating the Relationship Between Circadian Rhythm and Learning-Memory

ABSTRACT

The circadian rhythm creates many metabolic changes in our body by influencing the activities of the nuclei and glands in the cerebrum according to the light-dark conditions within a 24-hour period. In these mechanisms, melatonin is particularly important in terms of its inhibition in light, and its secretion in the dark. The circadian rhythm, which operates with a negative feedback mechanism, can contribute to various metabolic and genetic functions with oscillations in the cerebrum. Melatonin has a special role in the circadian rhythm; it is controlled by neural, hormonal and genetic factors. The effects of circadian rhythm on learning and memory are determined by observed chemical activities. In particular, there is a strong link between cAMP responsive element binding protein and pre1, and pre2 activation. This link is the most well-known feature of the molecular mechanism of circadian rhythm in memory and learning. As the circadian rhythm is affected by experiences, there may be remarkable changes in molecular mechanisms as well as neuronal activations and genetic mechanisms involved in learning processes and memory formation. Many experimental models on learning and memory have been created so far. The general conclusion is the necessity of the circadian rhythm for learning and memory formation. At the same time, melatonin to provide a healing effect on learning and memory in various dysfunctions

