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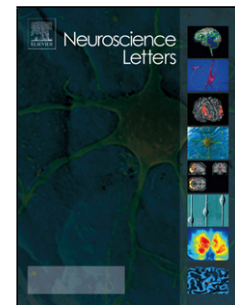
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# Naloxone precipitated morphine withdrawal and clock genes expression in striatum: a comparative study in three different protocols for the development of morphine dependence

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## Highlights

- Morphine treatment protocol can influence the degree of morphine dependence.
- Severity of naloxone induced withdrawal behaviors depends on morphine dependence.
- Morphine treatment protocols affect the expression of clock components in striatum.

## Abstract

The present study has been designed to do a comparative study on the morphine treatment protocols for the development of morphine dependence. We have selected three different previously reported chronic morphine treatment protocols where mice were treated with different doses of morphine for different time intervals of varied number of days to develop morphine dependence. At first, animals were divided into four groups: control or saline treated and three morphine treated groups. Then we determined the differences in naloxone precipitated withdrawal behaviors and checked the expression level of the circadian clock genes in striatum. In addition we examined the level of pERK in brain tissues from cortex, hippocampus and striatum regions. Our studies showed differences in the severity of naloxone precipitated withdrawal behaviors in the three protocols. A significant increase of *Period 2* gene was found in one of the morphine treated group which was absent in the animals subjected to other morphine dose regimen. Increased pERK was observed in the hippocampus of two morphine treated

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