

The role of the neuropeptide Y Y2 receptor in the circadian system of the mouse.

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The neuropeptide Y (NPY) Y2 receptor is thought to mediate the phase advancing effect of NPY during the subjective day. The studies implicating this receptor have been conducted largely in hamsters. In this study we examined NPY Y2 deficient mice to determine if behavioral alterations in circadian rhythmicity were indicative of a role for this receptor in control of circadian rhythms of the mouse. We also examined the brains of the mice using a lacZ transgene marker to localize neurons of the circadian system synthesizing the Y2 receptor via detection of beta-galactosidase. Our previously reported behavioral studies were conducted using offspring from breeding pairs homozygous for the transgene, and suggested that Y2 deficient mice demonstrated a shorter free-running period in constant darkness, but no alteration in the response to a brief light pulse or a full light:dark cycle. Y2 deficient mice differed from controls in that they showed increased total amount of activity and unusual patterns of activity while housed under constant light. Current studies replicate this earlier paradigm using genotyped offspring from breeding pairs heterozygous for the transgene. Anatomical studies of the same animals have exploited the insertion of the lacZ gene in the transgenic to identify the cells synthesizing the Y2 receptor. Results indicated that the Y2 receptor is apparently not synthesized by cells in the suprachiasmatic nuclei. Our further studies will investigate potential mechanisms for the apparent Y2 receptor-mediated NPY actions on terminals within the SCN.

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