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Differential Changes in Expression of Metabolic-related Neuropeptides in the Rat Brain during Morphine Withdrawal-induced Anorexia

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In this study we followed the effects of chronic morphine exposure and naloxone-precipitated morphine withdrawal on energy balance, metabolic related hormone secretion as well as on the transcription of anorexigenic and orexigenic neuropeptides within the hypothalamus. Animals were implanted with morphine pellets and on day 8, morphine withdrawal was precipitated by an injection of naloxone. Rats were decapitated at various time intervals after injection. Food consumption and the body weight change were recorded daily. Morphine treated animals consumed significantly less food than placebo implanted controls and it was accompanied by a reduction in body weight gain. Morphine withdrawal resulted in elevation of CRH and UCNII expression and a decline in POMC levels. The relative quantity of POMC and CART mRNAs in the hypothalamic samples gradually decrease, while NPY expression is only transiently upregulated. Morphine withdrawal results in serious affective and somatic symptoms including activation of the hypothalamo-pituitary-adrenocortical (HPA) axis. The plasma levels of ACTH were increased and lasted up to 2 hours after administration of naloxone.The present data suggest a possible role of hypothalamic CRH and UCNII,- rather than POMC/CART system in mediation of metabolic changes such as weight loss during naloxone precipitated morphine withdrawal in rats.