Hypocretin (Hcrt) neurons within the perifornical area (PeF) project to pontine tegmentum areas involved in sleep-wake control. We report the effects on sleep-wakefulness produced by microinjections of Hcrt delivered in the dorsal (dRPO) or ventral (vRPO) divisions of the oral pontine tegmentum of free-moving cats with electrodes for chronic sleep recordings. Hcrt in dRPO increased wakefulness and decreased both NREM and REM sleep. In contrast, Hcrt in vRPO suppressed REM sleep as the only significant effect on sleep. To determine the cellular mechanisms underlying such effects in dRPO and vRPO, we examined in urethane-anesthetized rats the effects of PeF stimulation and local Hcrt application on the electrophysiological activity of dRPO/vRPO neurons. Electrical stimulation of the PeF elicited orthodromic responses in characterized dRPO and vRPO neurons. Accordingly, anatomical studies showed retrogradely-labeled neurons from both tegmental areas within the PeF, some of which contained Hcrt, and positive Hcrt synapses on dRPO and vRPO neurons. Hcrt-1 application in dRPO provoked an increase in dRPO neurons activity that was blocked with Hcrt-1R antagonists. Iontophoretic application of Hcrt-1 in the vRPO induced an inhibition, which was blocked by previous iontophoretic application of bicuculline, indicating that inhibitory action of hypocretin-1 may be due to GABA<sub>A</sub> receptors activation. Our data also revealed that the dRPO and vRPO neurons exerted a feedback control on neuronal activity of PeF area. Thus, electrical stimulation of dRPO facilitated firing activity of PeF neurons by activation of catecholaminergic receptors while vRPO stimulation inhibited PeF neurons by activation of GABAergic receptors. In conclusion, Hcrt neurons of the PeF area seem to be an important organizer of the wakefulness and sleep stages in order to maintain a normal succession of stages during the sleep-wakefulness cycle. We will discuss how our data may explain both hypersomnia and cataplexy emergence in narcoleptics as a consequence of truncated Hcrt signaling in dRPO and vRPO, respectively.

**RECENT PUBLICATIONS**


-Del Cid-Pellitero E. and M. Garzón. Hypocretin1/orexinA-immunoreactive axons form few synaptic contacts on rat ventral tegmental area neurons that project to the medial prefrontal cortex. BMC Neurosci 15:105. 2014.