

Role of peripheral serotonin in the regulation of central sleep apneas in rats.

Carley DW, Radulovacki M.

Department of Medicine, University of Illinois College of Medicine at Chicago, 60612, USA. DWCarley@uic.edu

STUDY OBJECTIVES: The aim of our study was to **determine the effects of serotonin (5-HT), which does not penetrate the blood-brain barrier (BBB),** and GR38032F, a 5-HT₃ receptor antagonist that may cross the BBB, on spontaneous apneas in adult Sprague-Dawley rats. MEASUREMENTS AND RESULTS: Rats were implanted with electrodes for EEG and electromyographic recording to monitor sleep, with a radiotelemetry transmitter for monitoring aortic BP and heart period (HP) and were placed inside a single chamber plethysmograph for monitoring respiration. Sleep, BP, HP, and respiration were monitored for 6 h following administration of drugs. Intraperitoneal injection of 5-HT (0.79 mg/kg) to rats increased spontaneous central apneas during rapid eye movement (REM) sleep by > 250% in comparison to control recording (p = 0.01). GR38032F (0.1 mg/kg), which produced no effect on apnea expression, completely blocked the 5-HT-induced increase in REM apneas. Administration of 5-HT did not affect apnea expression in non-REM sleep and had no effect on sleep or BP. CONCLUSIONS: From these observations, we conclude that binding at 5-HT₃ receptors in the peripheral nervous system promotes REM-related apnea genesis in rats. These findings further suggest that endogenous 5-HT, acting at least at peripheral 5-HT₃ receptors, may play a baseline physiologic role in the expression of spontaneous central apneas in rats.