

Involvement of the lateral hypothalamic Parvafox^{Foxb1} neurons in defensive behaviors

Cola Reto

Master thesis in Experimental Biomedical Research

The Parvafox nucleus is a longitudinal cluster of PV⁺ and Foxb1⁺ neurons in the lateral hypothalamus of rodents. Studies investigating its function have hitherto only been characterizing its PV⁺ neuronal subpopulation, while the role of its Foxb1⁺ neuronal subpopulation remains elusive. In the herewith presented study, the neuronal activation levels of the Foxb1⁺ neurons of the hypothalamus were selectively altered by employing both chemogenetic and optogenetic tools. Several physiological and behavioral outcomes were assessed to investigate its role in respiration, locomotor behavior, nociceptive behavior, and ultra-sonic vocalizations. Our results show that global Parvafox^{Foxb1} neuronal excitation significantly increases breaths per minute, respiratory minute volume and peak inspiratory flow, while decreasing inspiratory time and total respiratory time. Further we demonstrate, that ChR2-mediated activation of Foxb1⁺ terminals in the periaqueductal gray leads to the induction of a prominent freezing-like behavior and a concomitant reduction of respiratory tidal volume. Considering previous results linking the Parvafox nucleus to nociceptive behavior, we hypothesize the Parvafox nucleus to be involved in the recruitment of defensive behaviors.

Prof. Dr. med. Marco R. Celio