Endocrinology-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Endocrinology

August 26-28, 2013 Raleigh, North Carolina, USA

Are there two sides or two hemispheres? Metabolic asymmetry in the neuroendocrine hypothalamus

Attila Zsarnovszky
Szent Istvan University, Hungary

Abstract

Hypothalamic functional asymmetry had been described decades ago. Yet, since then, most studies in hypothalamic research continued to investigate this brain area as a morphologically and functionally compact midline regulatory center. One of the major neural mechanisms involved in the orchestration of integrated, hypothalamus-driven homeostatic functions is the cyclic synaptic reorganization on hypothalamic neurons. Such morpho-functional changes are highly energy dependent and rely on mitochondrial ATP-production. Therefore, mitochondrial respiration/metabolism plays a permissive role in hypothalamic regulatory events. Here we provided evidence for the functional sidedness of the neuroendocrine hypothalamus of rats by measuring a general metabolic parameter, the mitochondrial respiration, in isolated left and right sides of rat hipothalami. We demonstrated that hypothalamic mitochondrial oxygen consumption, an indicator of mitochondrial respiration and metabolism, shows an asymmetric lateralization during the estrous cycle. Mitochondrial respiration rates, during state 1-5 mitochondrial respiration, were measured in hypothalamic synaptosomes and mitochondria from normal cycling female rats in each phase of the estrous cycle. Observed sidedness in estrous phases and estrous phase-dependent fluctuations in left-right sidedness were analyzed. Besides mitochondrial metabolism, results also indicate that the oxygen supply of the left and right sides of the hypothalamus is unequal. Since patterns of lateralization depended on the estrous phase, our present results suggest that sidedness in mitochondrial respiration may indicate a more general unilateral dominance in the hypothalamus, probably related to the regulation of GnRH secretion and/or energy homeostasis.

Biography

Attila Zsarnovszky is a D.V.M. and has completed his Ph.D from Szent Istvan University Faculty of Veterinary Sciences (SzIU-FVS), Budapest, Hungary. He had completed his postdoctoral studies at Yale University School of Medicine (Dept of Obstetrics and Gynecology). He is associate professor at SzIU-FVS, Department of Physiology and Biochemistry, director of the Neuro-immuno-endocrinology Unit. He has published more than 25 papers in reputed journals and is serving as an editorial board member of Acta Veterinaria Hungarica.