
Right Vestibular Hypo Activity in Depression, the Theory of Suprachiasmatic-Raphe-Vestibular Nuclei System Asymmetry

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Abstract

Depression patients characterized by chronobiologic alterations as diminution of locomotor activity, altered sleep architecture, changes in the cyclic pattern of cortisol, growth, and thyroid hormones secretion, all governed by the Suprachiasmatic Nuclei in the hypothalamus. Several previous studies in animals confirmed anatomical and functional relationships between Suprachiasmatic Nuclei and Vestibular Nuclei through Raphe Nuclei in the brain stem. In our research we demonstrated that vestibular activity is diminished at the right side in Major Depression and Bipolar Disease patients during the Depression phase of the illness. It is hypothesized that the right Vestibular hypo activity is induced by ipsilateral dysfunction of Raphe Nuclei or Suprachiasmatic Nuclei, two neuronal nuclei that modulate vestibular function. To support this idea we analyze, in this chapter, the multiple evidences of anatomical and functional alterations of the serotonergic Raphe Nuclei and of chronobiologic-suprachiasmatic disturbances in depressed patients, and we discuss the importance of studying the right-left asymmetry of activity of both nuclei in the future. The study of the bilateral distribution of cortisol, leptin, orexin and estrogen receptors in Raphe Nuclei is also proposed in order to investigate the possible contribution of those depression-associated hormones in right-left asymmetric Raphe Nuclei activity. In summary, the possibility of an asymmetric modulating effect of Raphe Nuclei on Suprachiasmatic Nuclei could contribute to the development of chronobiologic symptoms including depressed mood, and on the other side, Raphe Nuclei modulating effects on Vestibular Nuclei, could explain the asymmetric vestibular response.