Functional hypothalamic amenorrhea (FHA) is a reversible form of hypothalamic insufficiency related to negative energy balance or severe psychological stress. It is the most common cause of secondary amenorrhea. Impairment of gonadotropin-releasing hormone (GnRH) pulsatile secretion plays a key role in its pathogenesis but the spectrum of neuroendocrine disturbances in FHA is much wider. GnRH-luteinizing hormone (LH) disturbances in FHA is characterized by lower mean frequency of LH pulses, complete absence of LH pulsatility, normal-appearing secretion pattern and higher mean frequency of LH pulses. Numerous neuropeptides, neurotransmitters and neurosteroids play important roles in the physiological regulation of GnRH pulsatile secretion and there is evidence that different neuropeptides may be involved in the pathophysiology of FHA. Particular attention is paid to such substances as allopregnanolone, neuropeptide Y, corticotropin-releasing hormone, leptin, ghrelin and beta-endorphin. Some recent studies showed potent of abnormal kisspeptin signaling patients with FHA. Discovering the patomechanism in neurosecretory aberrations in FHA has a wide potential in developing diagnostic and therapeutic methods in patients with secondary amenorrhea.