Abstract

The immune and neuroendocrine systems comprise a complex physiological network, in which cytokines, peptide hormones, steroid hormones and neuropeptides regulate and modify the immune response, jointly maintaining the homeostasis of the organism. Two of the main components of this network are the hypothalamus-pituitary-adrenal (HPA) and hypothalamic-pituitary-gonadal (HPG) axes. The interactions among the immune system and HPA/HPG axes are transcendental in the initiation and activation of the stress response, which in turn has immunomodulatory functions that are very important in preventing excessive immune responses. In addition, the functions of both axes affect the adaptation and maintenance of homeostasis during severe pathological processes, such as those caused by viruses, bacteria, parasites or autoimmune diseases, to name a few. An important aspect of cellular communication, which has emerged as a result of studying the neuroimmunoendocrine interactions is the redundancy in the use of a large number of chemical messengers. As an example of this redundant role, neurotrophins are mainly present in the nervous system, but are also expressed and secreted by immune and endocrine cells, ultimately regulating the function of the systems named. In this way, the loss of exclusivity in the use of chemical messengers by specific organ systems can be a rule rather than an exception. However, although a large amount of experimental evidence suggests that 1) neuronal, endocrine and immune cells produce, neurotransmitters, neurohormones, steroid and peptide hormones as well as cytokines, and although 2) all of these cell types also express receptors to all these molecules, it still remains to clarify the role of these interactions on the neuroimmunoendocrine network, particularly the one played by the pituitary gland, during health and in various diseases.

Keywords

Disease, parasitic diseases, sex steroids, pituitary, neuroimmunoendocrine network, immune regulation, health.