It is well established that the bidirectional communication between the neuroendocrine and immune systems is involved in the homeostatic regulation of the organism. Accordingly, any imbalance in these physiological circuits could be the origin of disease.

The present issue of Neuroimmunomodulation is completely devoted to the influence of neuroimmunomodulatory interactions in the genesis and outcome of autoimmune diseases. Dr. Flávia Saravia and Dr. Claudia Perez-Leirós kindly agreed to act as guest editors and needless to say they did a remarkable job. Accordingly, the contributions published in this volume provide the readers of Neuroimmunomodulation with a large and integrative spectrum of the most recent advances in the subject.

Contributions were grouped into those dealing with diseases exhibiting common features, including those that are systemic in nature such as rheumatoid arthritis and lupus, followed by those discussing autoimmune disorders that affect patients at both organ and systemic levels such as Sjögren’s syndrome and Crohn’s disease, and finally those dealing with autoimmune disorders that target a main organ or system such as type 1 diabetes mellitus, multiple sclerosis and autoimmune thyroiditis.

This special issue starts with the contribution of Dr. Richard Boyd, which focuses on the neuroendocrine control of primary lymphoid organs, thymus and bone marrow, and the putative changes that can be related to the pathogenesis of autoimmune events, particularly in pregnancy, as exemplified by the onset of lupus erythematosus which is related to a rise in progesterone and prolactin. Accordingly, the blocking of estrogen and prolactin was shown to be beneficial in both experimental animals and patients.

The reviews by Dr. Esther Sternberg and by Dr. Adriana del Rey support the notion that neuroimmune regulation underlies lymphoproliferative and rheumatic diseases. While Dr. del Rey puts emphasis on systemic lupus erythematosus, where she described an altered sympathetic innervation and the corresponding effect on the pathogenesis of the disease, Dr. Sternberg explored the role of glucocorticoid resistance in rheumatoid arthritis.

In a second vein, Dr. Athanasios Tzioufas presents a well-documented update of the wide clinical spectrum of exocrinopathy resembling Sjögren’s syndrome, from organ involvement to systemic disease. The discussion focuses on the behavioral and physical impairments that include disturbances in the hypothalamus-pituitary-adrenal and hypothalamus-pituitary-gonad axes, as well as defects in the expression of neurotransmitter receptors.

The contribution by Dr. Rosa Gomariz and colleagues reports the therapeutic potential of VIP (vasoactive intestinal peptide) to ameliorate signs and symptoms of chronic inflammatory diseases. The authors present evidence to validate a novel mechanism of VIP in human and murine models of Crohn’s disease, involving the modulation of Toll-like receptors (TLR) 2 and 4.
The role of TLR-4 in stress is illustrated in the contribution of Dr. Stefan Bornstein who emphasized the specific physiological role this receptor plays in the endocrine and metabolic adaptation, as well as in the dysregulation that characterizes type 1 diabetes.

Using a neuroendocrine approach, Dr. Flávia Saravia integrates various aspects of type 1 diabetes in the non-obese diabetic mouse model. Her review focuses on central nervous system abnormalities accompanying type 1 diabetes, especially in the hippocampus and hypothalamus. Interestingly, she shows that the diabetic brain and the aging brain have many features in common.

Regarding target organ autoimmunity, the work presented by Dr. Graciela Cremaschi provides substantial evidence of the role of environmental and endocrine factors in the Th1/Th2 imbalance which results in autoimmune thyroid dysfunction. More specifically, she draws attention to the role of stressful stimuli in anti-TSH receptor antibody production in women, the protective ability of pregnancy and the relapse characteristics of the postpartum period. In the same line, Dr. Alejandro De Nicola provides a clear overview of the role of sex steroid hormones (particularly progesterone), acting as neuroprotectors in experimental autoimmune encephalomyelitis, an animal model for the human disease multiple sclerosis.

Finally, the review by Dr. Claudia Perez-Leirós deals with the interplay between early pregnancy and the Th1/Th2 cytokine ratio during acute or chronic inflammatory responses. She provides clues, derived from studies with experimental models as well as clinical studies, reflecting the complex nature of neuroimmune modulation at the local and systemic levels, emphasizing the role of macrophages to integrate such diverse inputs.

As Editor-in-Chief of Neuroimmunomodulation, I express my sincere gratitude to the guest editors Dr. Flávia Saravia and Dr. Claudia Perez-Leirós as well as to all scientists that contributed to this issue for their remarkable work.

Wilson Savino