Role of neuroactive steroids in physiology and in neurodegenerative diseases

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NEUROACTIVE STEROIDS
These molecules, derived from cholesterol, are able to regulate neural functions. This class includes hormonal steroids, neurosteroids (i.e., steroid locally produced in the nervous system) and synthetic steroids. (Melcangi and Panzica, 2009, Psychoneuroendocrinology)

DIABETIC NEUROPATHY:
Diabetes is a pathological condition characterized by hyperglycemia. Peripheral neuropathy, neuropathic pain and encephalopathy are frequent complications reported by diabetic subjects. An experimental model of diabetes is currently studied in the lab. In particular, alterations of neuroactive steroid levels were reported in peripheral and central nervous system. The aim of our experiments is to explore the protective effects of neuroactive steroids in this pathological condition.

Related literature:
- Calabrese et al., 2014 J Endocrinol. (DIABETIC NEUROPATHIC PAIN: A ROLE FOR TESTOSTERONE METABOLITES)
- Giatti et al., 2009 Neuroscience. (NEUROPROTECTIVE EFFECTS OF A LIGAND OF TRANSLATOR PROTEIN-18 KDA (ROS-4864) IN EXPERIMENTAL DIABETIC NEUROPATHY)

MULTIPLE SCLEROSIS:
Multiple sclerosis is a chronic autoimmune disease of the central nervous system, characterized by neuroinflammation and demyelination. Clinical evidences pointed out a role for neuroactive steroids in incidence and progression for this pathology.

An experimental model of multiple sclerosis is currently studied in the lab, in collaboration with Università di Milano Bicocca. The aim of our experiments is to evaluate neuroactive steroid alterations, proposing therapeutic strategy to be applied to multiple sclerosis.

Related literature:
- Caruso et al., 2014. J Neurochem (NEUROACTIVE STEROID LEVELS IN PLASMA AND CEREBROSPINAL FLUID OF MALE MULTIPLE SCLEROSIS PATIENTS)
- Giatti et al., 2013. J Neuroimmune Pharmacol. (MULTIMODAL ANALYSIS IN ACUTE AND CHRONIC EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS.)
- Giatti et al., 2012. J Neuroendocrinol (NEUROPROTECTIVE EFFECTS OF PROGESTERONE IN CHRONIC EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS.)

POST-FINASTERIDE SINDROME:
This pathological condition, only recently described, might occur in men taking finasteride to cure the androgenic alopecia. Few evidences are reported in literature. We described alterations in neuroactive steroid levels in cerebrospinal fluid and plasma of these affected men. These changes were associated with impairment of sexual function as well as depressive/anxiety symptomatology.

We are collecting data in humans and studying the disease in an experimental model.
- Caruso et al., 2014. J Steroid Biochem Mol Biol. (PATIENTS TREATED FOR MALE PATTERN HAIR WITH FINASTERIDE SHOW, AFTER DISCONTINUATION OF THE DRUG, ALTERED LEVELS OF NEUROACTIVE STEROIDS IN CEREBROSPINAL FLUID AND PLASMA)
- Melcangi et al., 2013. Journal of Sexual Medicine. (NEUROACTIVE STEROID LEVELS ARE MODIFIED IN CEREBROSPINAL FLUID AND PLASMA OF POSTFINASTERIDE PATIENTS SHOWING PERSISTENT SEXUAL SIDE EFFECTS AND ANXIOUS/DEPRESSIVE SYMPTOMATOLOGY)

METHODS:
Molecular biology techniques will be used in these projects, in particular: DNA and RNA extraction and purification; Real-time PCR; Protein extraction; Western blot; Colorimetric and fluorimetric analyses; Enzymatic activity; Immune histochemistry; ELISA.