Mood disorders

Mood disorders are currently ranked as one of the major disease categories worldwide. According to the World Health Organization, depression, the most common mood disorder, affects an estimated 350 million people of all ages. The various classifications of mood disorder each display symptoms and signs whose origins and biological substrates are only partly understood.

One of the major challenges with studying affective disorders is efficient and timely disease diagnosis and the development of more efficient pharmacological and non-pharmacological treatments.

In the research community, it is particularly difficult to study and develop treatments for mood disorders because animal models often do not share comparable behavioral/physiological signs or such disease symptoms do not mimic the human condition in a satisfactory manner.

Because of these limitations, scientists have tried to model and treat only a few of the symptoms that are present both in humans and in animal models. Some of the most robust and objectively measurable symptoms (also known as biomarkers) are represented by alterations of physiological parameters such as heart rate or body temperature.

A detailed study of these biomarkers can better clarify the biological substrates, and temporal dynamics of the disease, and help identify better treatments.

Parameters & Behavior:

Physiologic biomarkers for a better translational approach for mood disorder models are:

- Autonomic nervous system dysregulation at the level of the heart, e.g. heart rate variability (HRV) changes 1,2(HRV)
- Aberrant EEG patterns in sleep stages3 (changes in frequency component/sleep deprivation) (Sleep)
- Changes in thermoregulatory mechanisms 4(hyperregulation of the thermoregulatory center)
- (Thermoregulation)

Using DSI devices in the animal models and combining these data with behavioral observations may offer improved temporal resolution that is needed to create objective markers that will help identify novel gene/drug candidates

Selected Publications

1 Sgoifo, A., Carnevali, L., Alfonso Mde, L. & Amore, M. Autonomic dysfunction and heart rate variability in depression. Stress 18, 343-352, doi:10.3109/10253890.2015.1045868 (2015).

2 Viviani, D. et al. Oxytocin selectively gates fear responses through distinct outputs from the central amygdala. Science 333, 104-107, doi:10.1126/science.1201043 (2011).

3 Alenina, N. et al. Growth retardation and altered autonomic control in mice lacking brain serotonin. Proc Natl Acad Sci U S A 106, 10332-10337, doi:10.1073/pnas.0810793106 (2009).

4 Pattij, T. et al. Autonomic changes associated with enhanced anxiety in 5-HT(1A) receptor knockout mice. Neuropsychopharmacology 27, 380-390, doi:10.1016/S0893-133X(02)00317-2 (2002).