«БИОМЕДИЦИНА И БИОМОДЕЛИРОВАНИЕ»: ТЕЗИСЫ ДОКЛАДОВ X НАУЧНО-ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ

The need for multi-modal and multi-functional measurement systems in laboratory animal research and matrix analysis

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Current trends in the Pharmaceutical industry requires new translational approaches for preclinical test. Those aspects can be achieved by animal experiments in which not only one variable (e.g. behavior) at the time is analyzed but rather a multidimensional approach (physiology+behavior) is applied. Therefore, automation and integration of different measuring technologies become the crucial aspects in this process.

There are not right Laboratories for real detailed studies of PTSD model. In many cases there are looking one or maximum two parameters simultaneously.

My approach was different and I think for the properly study of PTSD protocol we need to do multi-dimensional analysis. For mice model of Fear Conditioning protocol researchers are used Freezing and Startle behavior:

Important points for researchers!

Freezing is not immobility behavior

Startle is depends of animals (it is something individual)

Behavior definitions

Immobility behavior, if animal don't make positional changes (X,Y changes)

Freezing behavior, if animal makes no any movement

Animal individuality factor is depends of (EEG, EOG,EMG, Sleep, ECG, BP, Temperature)

My proposal was following

Behavior = function {internal stimuli / external stimuli}

or

Behavior = function {constant internal stimulus/ dynamic external stimuli}),

if internal factors = constant (we need to keep it around constant), for study of environmental influences on PTSD.

By system Laboras, freezing behavior is not immobility behavior and Laboras system recognized it separately as Freezing behavior. Laboras system automatically recognize also Startle respond behavior.

PTSD research and Fear Conditioning Protocol:

In this protocol, mouse model is very important. There are two way of measuring fear responses in mice: Startle response and Freezing behavior. Metris BV developed two special algorithms for automated Startle and Freezing detection.

Having an automated detection system is not sufficient at the behavioral level for excluding false results (e.g. short duration sleeping phases ➔ less movement confounded as freezing). Therefore, the behavioral response needs to be integrated and synchronized with physiological parameter (e.g. EEG, ECG, BP, Data sciences Int. The best way to do so would be using Laboras system (for behavioral study), DSI (for Physiological parameter) and Sonotrack (for ultrasounds vocalization study).

LABORAS – system for fully automatic recognition, recording and analysis of the behavior and tracking of small laboratory rodents (rats, mice), based on the analysis of force and energy. SONOTRACK – system for recording, playback and visualization of ultrasounds vocalizations in laboratory animals (15KHz-125KHz).

DSI – system for measuring physiological parameters remotely (without wire measuring pressure, temperature, ECG, EEG, EMG, identification, activity, respiration).

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