BEHAVIORAL PATTERNS AND EXPRESSION OF GENES CODING SEROTONIN RECEPTORS, SEROTONIN TRANSPORTER AND BRAIN-DERIVED NEUROTROPHIC FACTOR IN RATS WITH ULTRASOUND INDUCED DEPRESSION

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Aims: The aim of our study was to investigate the effects of continuous action of ultrasonic waves of variable frequencies on behavior of rats in 'classical' tests used to reveal depression-like behavior, to evaluate the influence of different antidepressants on rates and to analyze expression of several genes involved in pathogenesis of depression.

Study design: Rats in individual cages were exposed to ultrasonic irradiation of variable frequencies (20-45 kHz) for 21 days.

Methodology: 48 male non-pedigree albino rats were divided into 5 groups: non-ultrasound-saline, ultrasound-saline, ultrasound-fluoxetine, ultrasound-bupropion and ultrasound-tianeptine. Administration of each drug was carried out daily from the first to the last day of the experiment. Behavioral tests were include: Social Interaction test, Porsolt and Anhedonia Test . Than rats were decapitated and expression genes coding serotonin receptors (5HT1, 5HT2 subtypes), SERT and BDNF were measured in prefrontal cortex, midbrain and hippocampus using Quantitative real-time PCR analysis.

Results: Depression-like behavior manifests itself in reduced social activity in Social Interaction Test, increased immobility in Porsolt Test and lower sucrose consumption in Sucrose Preference Tests. The administrated antidepressants demonstrated their effectiveness. RT-qPCR gene expression analysis showed increased expression of SERT gene in all studied structures; decrease expression of 5-HT2A in prefrontal cortex and midbrain, increase 5HT1A in hippocampus. Expression of gene coding BDNF in hippocampus is significant decreased.

Conclusion: The obtained data allow to conclude that this model meets the main requirements set to animal models (face, predictive and construct validity) and can be used in pre-clinical studies of new antidepressants.