Chronic repetitive transcranial magnetic stimulation-induced increases in GABAergic neurotransmission in chronic unpredictable mild stress rat model: 1H-NMR spectroscopy study at 11.7 T

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INTRODUCTION
Repetitive transcranial magnetic stimulation (rTMS) that use magnetic fields to stimulate focal cortical regions with electrical currents has been used for evolving treatment of refractory depression. Despite of its broad use, little information about neither the precise pattern of brain activation nor the molecular mechanisms underlying rTMS effects are known. Recent studies suggest that the serotonergic involvement in depression may linked to the action of GABA [1]. Deficits in GABA-containing neurons are consistently reported in psychiatric disease, particularly in the frontal cortex and hippocampus [2]. Thus, GABA might be potential candidate for rTMS-induced changes on the central nervous system. To investigate this hypothesis, we established an animal model of depression using chronic unpredictable mild stress (CUMS), which the procedure results in a number of behavioral abnormalities that can be seen in patients with depression. Then, the effects of rTMS on GABA in rat brain were assessed using 1H-NMR spectroscopy technique.

MATERIALS AND METHODS:
Animals: Male Sprague-Dawley rats (180 ± 20 g, N=20) were used and randomly divided into four groups: control + sham (N=5), control + rTMS (N=5), CUMS + sham (N=5), and CUMS + rTMS (N=5). During whole experimental procedures, rats were housed in single cages. For 4 weeks, the rats for stressed groups were subjected to a weekly regimen of mild stress [3] (Table 1). And sucrose intake (1 % sucrose solution) and body weight were measured once a week during 1 h window of food and water deprivation. Baseline was measured less than 1 week before the start of CUMS.

RESULTS AND DISCUSSION
The representative 1H-NMR spectra of MCW-extracted sample is shown in Fig.1. Two-way ANOVA test (brain region × treatment).

REFERENCES: