

Effect of ischemic brain damage on bioelectric activity in model of global ischemia in rats

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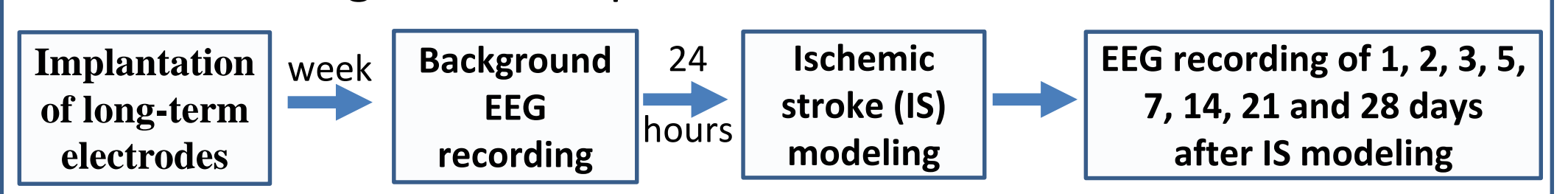
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Ischemic stroke is one of the leading causes of mortality, hence search for the clinically successful compounds and its neuroprotective activity exploration are necessary. Aim of the research was to assess effect of ischemic damage on bioelectric brain activity of rats in model of global ischemia.

Materials and methods: Ischemic Stroke (IS) simulation was performed in rats (n = 17) via occlusion of both carotid arteries. long-term electrodes were implanted into rat brain structures: striatum, cortex, hypothalamus and hippocampus (pic.1). EEG recording was performed in free-motion rats during 3 hours (21-channel hardware-software complex, NEURO-KM with BRAINSYS software).

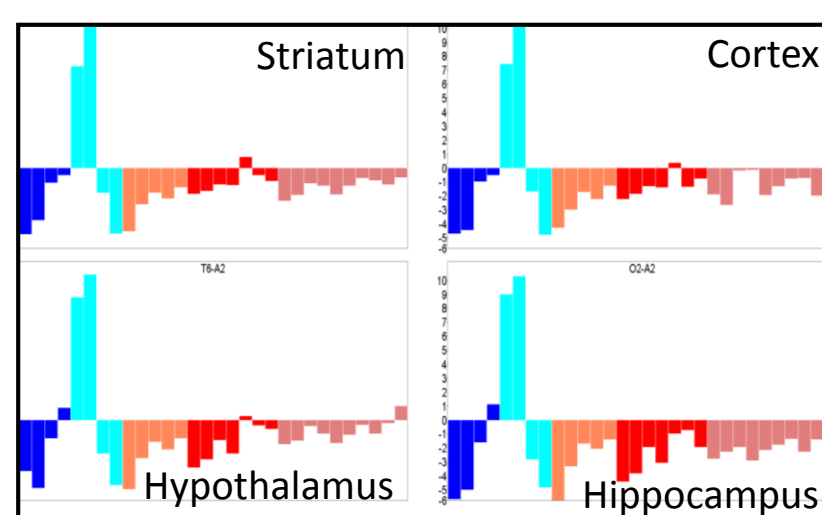
Picture 1. Design of the experiment



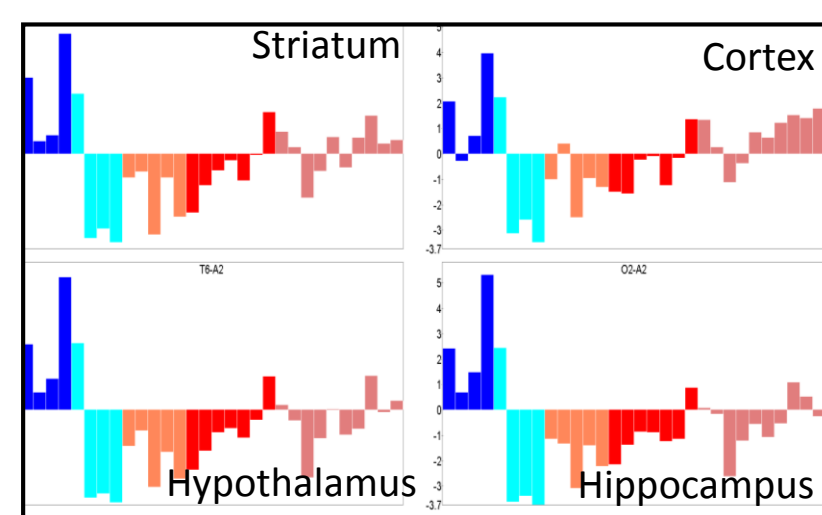
Results:

□ **1: At 1st day after IS** modelling animal's **survival was accompanied by decrease in % of delta activity** power relatively to the background values (pic.2).

1st day after IS
(animal **survived**)



1st day after IS
(animal **died**)



Picture 2. First day after ischemic stroke modeling.

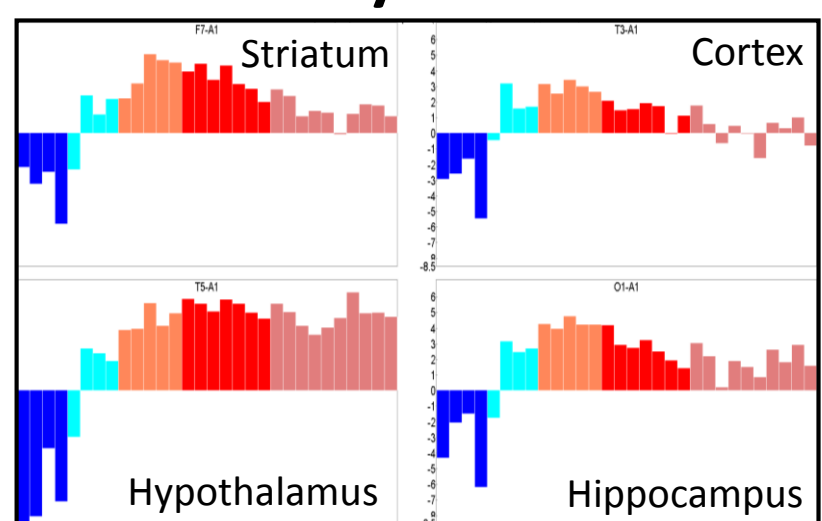
X-axis: delta in the range 0.5-4Hz (dark blue bars), theta1: 4-8Hz (blue bars), theta2: 8-13Hz (orange bars), beta1: 13-20Hz (red bars), beta2: 20-30Hz (pink bars).

Y-axis: change of the waves spectrum activity to the relative values of background recording, background recording is taken as 100% (Student's t-test criteria, $p \leq 0.05$ for $t > 2$; $p \leq 0.01$ for $t > 2.6$).

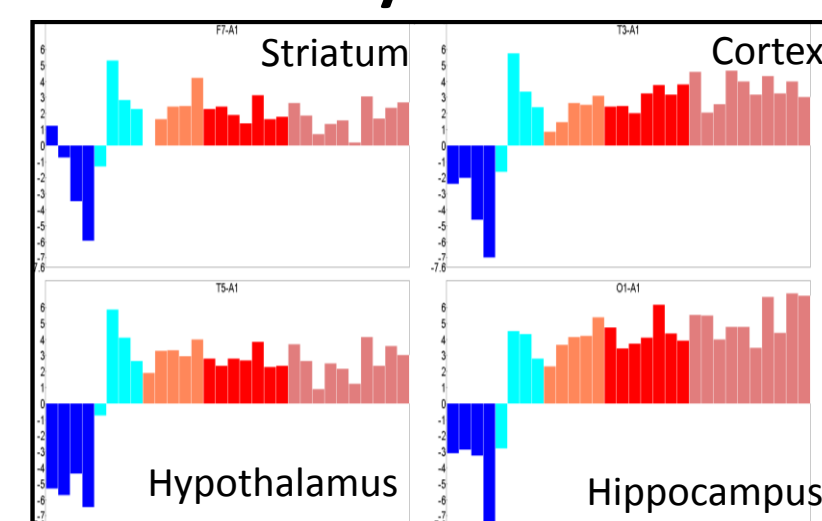
□ **2: Animal's death** (after 7th day from IS) was **accompanied by decrease % of delta waves from 2nd to 7th day after IS**. And degree of delta activity reduction from 2nd day after IS correlated with the severity of the neurological deficit (pic.3).

Picture 3. Bioelectric activity of 2nd, 5th and 7th days after IS modeling (animal **died**)

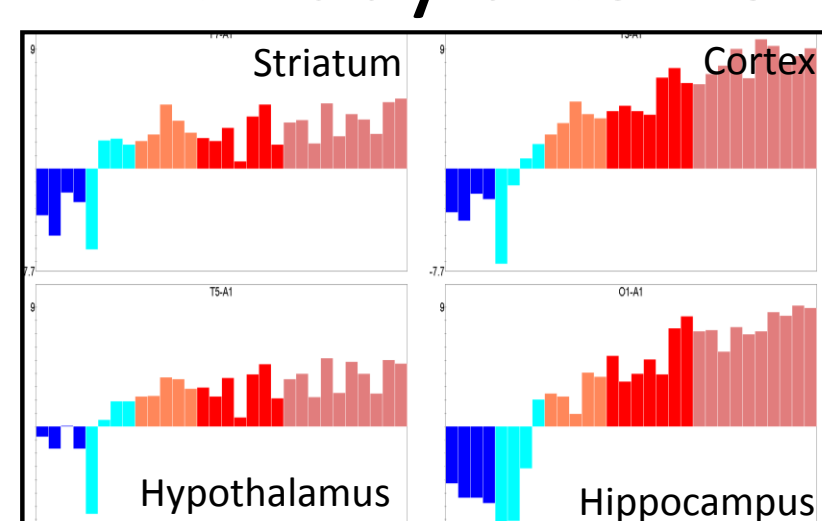
2nd day after IS



5th day after IS



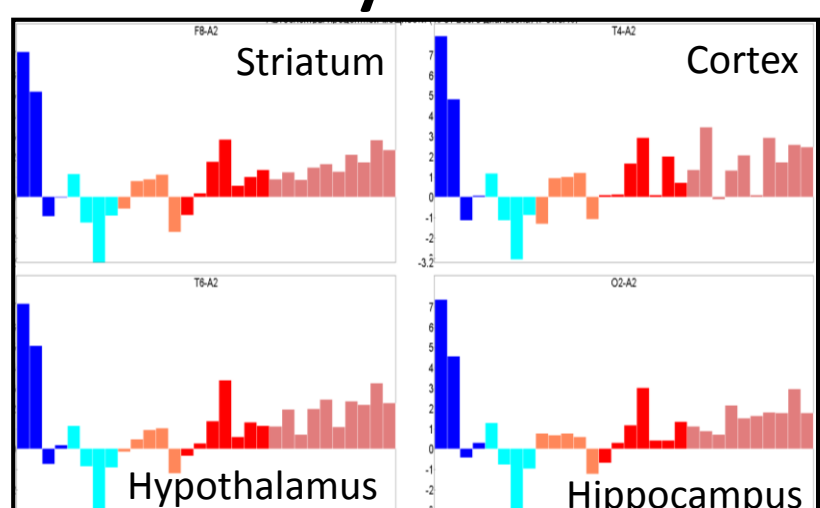
7th day after IS



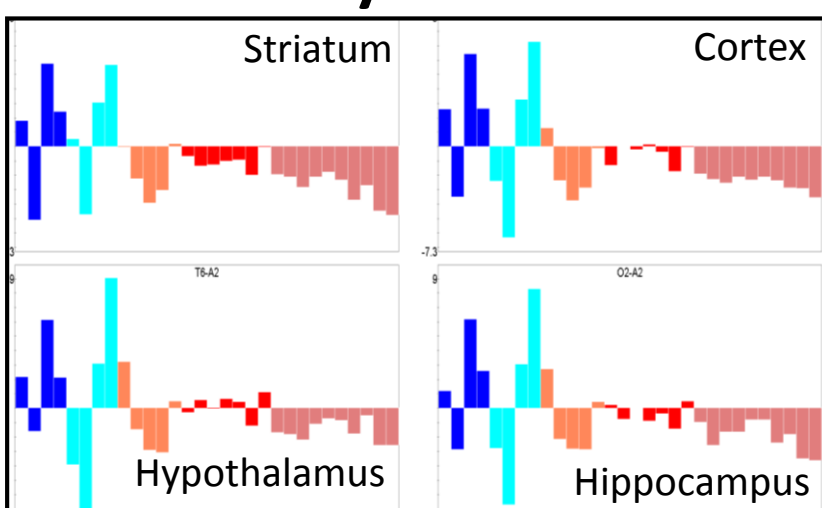
□ **3: Animal's survival** after IS was **accompanied by increase % of delta activity** power relatively to the background values **from 2nd to 7th day of the post-stroke period**. The second prognostic sign of decrease in the neurological deficit and survival of animals was the increase of theta activity in the range of 6-8 Hz after 7-14 days of ischemia modeling (pic.4).

Picture 4. Bioelectric activity of 2nd, 5th, 7th and 14th days after IS modeling (animal **survived**)

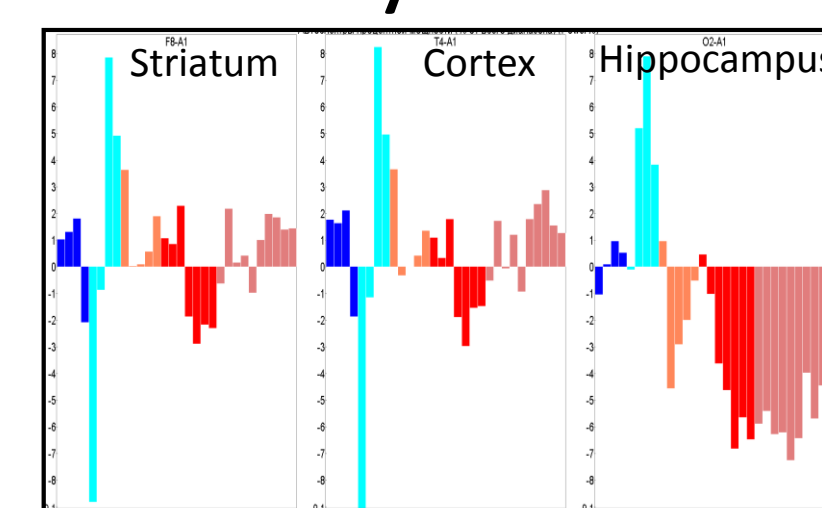
2nd day after IS



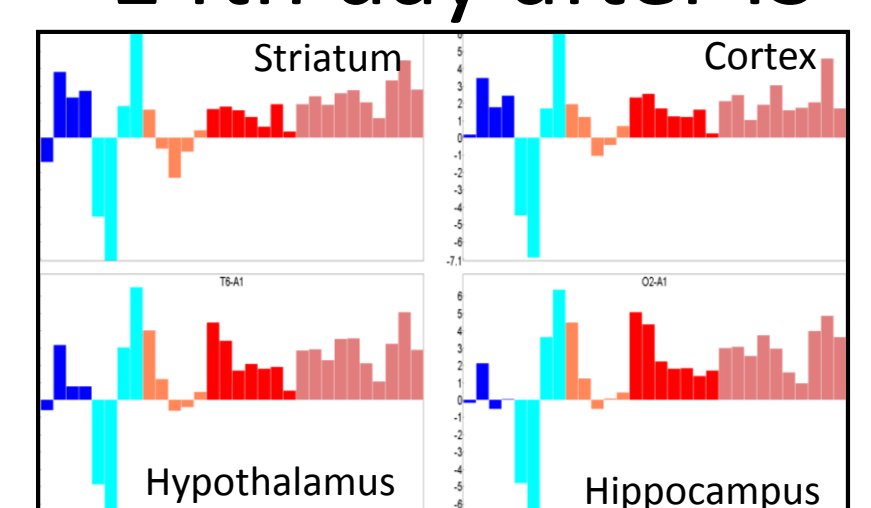
5th day after IS



7th day after IS



14th day after IS



Conclusions: An increase in delta and theta activity from the 2nd day of post-stroke period can be predictive indicator of animal survival and decrease of neurological deficit in the model of ischemic stroke in rats.