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ABSTRACT

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Abstracts

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the formation of stones in the organs of the urinary system that interfere with the release of urine and have a traumatic effect on the organs. Thus, it can be said that practical and high-quality modeling of urolithiasis in vivo will help for further studies of therapy and prevention of this disease.

One of the most common factors of crystallogenesis is glomular and tubulointerstitial damage to the kidneys. Ethylene glycol, sodium oxalate and l-hydroxyproline are used as lithogenic agents in modeling. In our study, to simulate oxalate urolithiasis, we use intraperitoneal administration of sodium oxalate (Na2C2O4) once at a dosage of 7 mg per 100 g. body weight of the animal. The advantage of the chosen method is the rapidity of the formation of oxalate urolithiasis 2-4 hours after the administration of the drug. At the moment, the changes of mass concentration of ions in urine are not described, which does not allow to fully represent the processes occurring in the urine at different stages of urolithiasis formation. Capillary electrophoresis method was used to determine the ionic composition of urine and blood serum.

Rodents are most often used as a test system, although they are not prone to the formation of stones in the organs of the urinary system. However, the use of the most suitable dogs and pigs for this is considered impractical. In our study, a model of oxalate urolithiasis was performed on male outbrand ICR laboratory mice (CD-1).

For the study, two groups of animals were formed, each consisting of 12 male outbrand mature mice. Mice at the beginning of the experiment were clinically healthy and were kept under the same conditions in cages of 12 heads with a 12-hour day-night regimen at a temperature of 20-22℃, a humidity of 60-70% and received a standard diet that did not differ from the usual one. The study was conducted in accordance with the rules for working with laboratory animals and in compliance with the rules of bioethics.

On the day of the start of the experiment, the animals were weighed, marked and divided into two groups, after urine was collected for data collection at the "0 hours" point. Then the first group, the control group (n=12), was injected intraperitoneally with 100 µl of sodium chloride 0.9% once, while the experimental group was injected with 100 µl of sodium oxalate (Na2C2O4) once at a dosage of 7 mg per 100 g. body weight of the animal resuspended in 0.9% NaCl solution. Urine collection for general clinical and biochemical analysis, studies of sediment microscopy, conductivity and ionic composition was carried out at the time of formation of the experimental groups, 4 hours after the start of the experiment and 24 hours after the start of the experiment. Taking samples of blood serum and materials for histological examination of the kidney was carried out at control points 4 and 24 hours. Mice were euthanized by decapitation.

On day 0, no crystals were observed in the urine sediment of the animals of the control and experimental groups, however, already 4 hours after the administration of the drugs, single crystals of calcium oxalate monohydrate and dihydrate were found in the urine of the animals of the experimental group. 24 hours after the administration of the drug in the urine of experimental animals, a decrease in the amount of oxalates is observed throughout the field with sediment microscopy. Crystals in the urine of animals of the control group were not detected during the experiment.

Damage to the renal glomeruli was confirmed by the results of morphological changes in the kidneys during histological examination (dilatation of the tubules, the presence of oxalate crystals in the tubules), biochemical examination of blood serum and urine (increased creatinine concentration), the study of the ionic composition of blood serum and urine, the study of urine conductivity, as well as the presence of crystals in the urine sediment.

In conclusion, the results obtained provide up-to-date information on the modeling of urolithiasis induced by intravenous administration of Na2C2O4 in an in vivo experiment and demonstrating changes in the ionic composition of urine and blood serum.

S9.699. Study of synaptic input in parietal ganglia interneurons of defensive behavior of terrestrial snail

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The nature of learning and memory is based on the cellular mechanisms of synaptic and non-synaptic plasticity[1]. It is well established that both enhancements of individual synaptic connections [2] and changes in the endogenous properties of the neuron and its membrane [3] are what underpins the learning process. One of the most relevant issues of modern neurobiology is the plasticity mechanisms associated with changes in the state (excitability) of neurons involved in the convergence of sensory information and transmitting their signals further along the network [4,5,6]. This work aimed to study changes in the subthreshold background electrical activity of snail command neurons after associative learning. Recording the subthreshold background activity of silent neuronsallows us to infer the total electrical activity of incoming synapses. To that end, a method has to be developed that allows the qualitative and quantitative assessment of the background electrical activity during intracellular recording of a nerve cell and analysis of its changes during the formation of a conditioned reflex of aversion to a certain type of food in the snail.

Electrophysiological measurements were carried out using an improved technique for recording the transmembrane potential, which allows the detection ofexcitatory postsynaptic potentials (EPSPs) with an amplitude of 0.2 mV. EPSPs were determined visually by the characteristic shape of the change in the membrane potential. The recording technique was associated with achieving minimal noise when registering potentials and smoothing signals. To describe the observed changes in the background activity of neurons, the average amplitude and the number of EPSP were analyzed.

It was found that the development of a conditioned defensive reflex of food aversion in the terrestrial snails is associated with a significant increase in the number of low-amplitude single EPSPs in the giant interneurons of defensive behavior. In this case, an increase in the number of low-amplitude single EPSPs may indicate either an increase in the number of action potentials in the corresponding presynaptic neurons or an increase in the amplitude of previously unmeasurable EPSPs (the amplitude is below the threshold of 0.5 mV chosen by us). Unfortunately, despite the fact that giant interneurons of defensive behavior have rather wide sensory inputs, there is very little information in the literature about specific presynaptic sensory neurons [7]. Our analysis of the subthreshold background activity of silent interneurons of the defensive behavior of the terrestrial snail made it possible to find changes in the synaptic input associated with the development of a conditioned defensive reflex of food aversion.

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