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ABSTRACT

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Abstracts

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S9.621. Effects of the NO synthesis inhibitor L-name on the formation of long-term contextual memory in the terrestrial snail

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Nitric oxide (NO) is one of the most important mediators, playing vital roles in the functioning of various body systems. Ample evidence for the participation of NO in the processes associated with plasticity has been established [1, 2]. In molluscs, nitric oxide plays the role of an intercellular messenger and signaling molecule. All experiments were carried out on the terrestrial snail Helix lucorum. The animals were trained to acquire a contextually conditioned reflex (CCR) according to the contextual paradigm "on the ball" - in a situation where the shell of the animal was rigidly attached to a tripod in a fixed position, although at the same time, they retained freedom of movement on the surface of a ball floating in the water. The training consisted in presenting an unconditioned stimulus (electric stimulation) while the snail was in this particular context - on the ball. The training was carried out according to the following protocol: presentation of 5 electrical stimulations per day for 5 days by manually making contact between two metal electrodes and the back and front dorsal parts of the snail leg. Electrical stimulation parameters: rectangular current pulses with a frequency of 50 Hz, current intensity 1-2 mA, duration of stimulation - 1 s. The interval between stimuli was 15-20 minutes [3, 4]. The intensity of the stimulation current was selected to be sufficient to trigger a defensive reaction associated with retraction of the head and anterior part of the body and did not exceed 2 mA. During the training procedure (5 days), the snails did not receive food [5]. Testing was carried out before the start of the training and on the following days after training. To do this, the amplitude of retraction of the ommatophores was measured in response to tactile stimulation, which was a tangential movement of brush hair over the skin of the dorsal side of the front of the leg at a standard speed. The CCR was considered formed if the reaction on the ball significantly exceeded that on a flat surface. The results were statistically processed and presented as mean ± SEM. The significance of differences was assessed using Student's t-test and Mann-Whitney U-test. The SigmaStat32 program was used. Statistical significance was estimated at $p<0.05$. The following day after the confirming test for the development of the CCR, the animals were divided into four groups. Animals of the first group were injected with the NO synthase blocker L-NAME 30 min before the reminder procedure, followed by an anisomycin (AN) injection. A reminder consisted of placing the animals on the ball for 20-30 minutes, the same environment where they acquire the CCR, but without the presentation of tactile and electrical stimuli. The animals in the second were injected with the NO synthase inhibitor L-NAME 30 min before the reminder procedure. The third group underwent a reminder procedure followed by an AN injection. The fourth group was a control group, in which the animals were injected with saline solution (SS) after the reminder procedure. The results obtained show that the injection of SS after the procedure of the contextual reminder does not lead to a change in the amplitude of the defensive reaction to tactile stimulation when tested on the ball. On the other hand, injections of AN after the reminder led to complete forgetting of the formed memory. Administration of the NO-synthase inhibitor L-NAME 30 min before the reminder procedure, followed by an injection of AN, did not lead to a decrease in the amplitude of the defensive reaction to tactile stimulation when tested on the ball. The snails that were injected with L-NAME 30 min before the reminder procedure without inhibiting protein synthesis showed a gradual decrease in the amplitude of the defensive response from 77.9% to 48.2%. in the context "on the ball". The values of tests on the plane in all experimental groups did not differ significantly. These results indicate the involvement of NO in learning and memory formation. Nonetheless, it is possible that inhibiting NO synthase prevents the initiation of the reconsolidation process.

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S9.622. Efficacy of photodynamic therapy against uropathogenic bacteria

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The frequent, prolonged, and uncontrolled use of antibiotics in the treatment of infections has resulted in an increasing number of bacterial strains resistant to a wide range of antibiotics. The antibiotic resistant bacteria such as Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa and Enterobacter species are of great significance in the case of infected urinary stones. During lithotripsy pathogens may diffuse in organ cavity and induce postoperative complications, such as pyelonephritis, systemic inflammatory reaction syndrome, and urosepsis. Antimicrobial photodynamic therapy is considered to be an alternative to the antibiotic treatment of localized infectious processes. The purpose of the study was to evaluate the antibacterial efficacy of photodynamic inactivation against human antibiotic-resistant bacterial uropathogens. Uropathological microorganisms were isolated from renal calculi preliminary selected based on their X-ray density. The disk diffusion susceptibility method was used according to the approved standard. The accumulation of photosensitizer, Fotoditazin, by microorganisms was studied. The overnight culture of microorganisms were diluted to 2.5x108 CFU/mL in a phosphate buffer saline. The photosensitizer was added to the bacteria with subsequent incubation for 15 min in the dark at room temperature. For laser irradiation 100 ul of the bacteria suspension were transferred into a 96-well plate. The fiber-coupled diode laser with a wavelength of 662 nm was used to illuminate samples. Laser irradiation was performed for 9 minutes and various output power.
It was found that 78.7±5.2 % of renal calculi were contaminated. Testing the sensitivity of the isolated strains to 10 antibiotics of different mechanisms of action showed that the studied strains have a high antibiotic resistance. Staphylococcus aureus and Enterococcus faecalis strains were shown to be resistant to all the tested drugs (0 sensitive