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Examination of the rectangle apparatus developed by Asyogh for the purpose of assessing memory and learning in Wistar rats

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Abstract

The purpose of this research was to develop an improved version of Asyogh's rectangle gadget for evaluating rodent memory. Increased transfer latency times shown that rats significantly impaired in memory when administered scopolamine (3 mg/kg i.p.) and diazepam (1 mg/kg i.p.). But when the rats were given Donepezil beforehand, their memory problems disappeared. Thanks to the considerable improvement in TLT, it's clear that pretreatment donepezil may successfully reverse the memory impairments caused by scopolamine and diazepam. This research demonstrated that the device used to detect transfer delay time was an effective instrument for evaluating cognitive function and memory in rats.

keywords: Introducing Asyogh's rectangle device—a groundbreaking tool for assessing learning and memory

Introduction :

Memory is a mental process that includes the brain's encoding, storage, and retrieval of data.Amnesia is the medical term for a loss of memory. Causes of forgetfulness include brain injury, illness, or the side effect of hypnotics or sedatives.According to prior research, the cholinergic system plays an important role in the cognitive processes of living beings.Memory loss caused by a structural lesion or an antagonist at the muscarinic and nicotinic receptors could be the cause of the decreased cholinergic function [3].[4] Animal studies have shown that the anticholinergic medication scopolamine may modulate the cholinergic system, leading to amnesia.Five, six Diazepam causes amnesia in rats, according to the prior research.[7] Currently, there are a plethora of tools tiny creatures.One typical method for studying how rats' brains process painful memories is the passive avoidance test.

References [9,10] In the Morris water maze test, rats became wet and filled with dread; in the passive shock avoidance test, rats learned and remembered things by being shocked. In addition to being unpleasant and excruciating, electric shock made rats fearful and threatened, and it required a lot of training. To get over these issues, the inventor Asyogh came up with a rectangular gadget that rats may use to induce fear of water and electric shock while also providing memory based on the smell sense of food material.

The Subjects and Procedures

The rectangular gadget designed by Asyogh The roof is covered with wire gauge, and it has a rectangle form with dimensions of 42" × 20" × 6". Located midwayavailable for use for assessing rats' memories. The cognitive abilities of individuals are assessed using the Morris Water Maze equipment. As an open access journal, the articles published here are distributed under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License. This means that anyone can use the articles in any way they see fit, including making changes and remixes, without having to pay for the privilege. All they need to do is provide proper attribution and license their own works under the same terms.

One, two, three, and four points are tallied from the point closest to the entrance. Figure 1a shows the rectangular device 1b and 1c, as well as the door point (beginning point) and four points (goal point) of the animal enclosure, which is used for housing and providing food and water.

Animals All rats were allowed unlimited access to food and water, and the room temperature was maintained at around 25°C with a relative humidity of roughly 65%. Furthermore, the rats were fasted for 12 hours before to the experiment. The study was carried out in accordance with the protocols established by the committee responsible for overseeing and controlling animal studies, as well as by the IAEC at UPUMS in Saifai, Uttar Pradesh.

Training rats: male or female rats weighing 60-100 g and 10-12 weeks old were used. After spending the night fasting, rats were placed at the beginning of the apparatus and released when they reached the end, where food was waiting for them. The location of food was something that rats learned and remembered rather often. Six rats each group made up the five groups of trained rats.

For 14 days, the control group (Group I) was given 1 ml/kg of a normal salt solution (0.9% NaCl) intraperitoneally. Group II, which was treated with scopolamine, was given an intraperitoneal injection of 3 mg/kg of the drug 30 minutes before to the 14th day's testing. The third group, which was administered diazepam, had an intraperitoneal injection of 1 mg/kg of the drug thirty minutes before to the fourteenth day's testing. Group IV: Participants in this group were given donepezil orally at a dose of 3 mg/kg daily for 14 days, followed by scopolamine

intraperitoneally at a dose of 3 mg/kg 30 minutes before testing began on day 14. Group V: given diazepam and donepezil beforehand (3 mg/kg/day orally) for 14 days

30 minutes before to the testing on the fourteenth day, administer 1 mg/kg intraperitoneally. The experimental rectangle apparatus developed by Asyogh was used to measure the learning memory of rats on the fourteenth day of the experiment.

The time it takes to move rats from one location to another is known as TLT. The memory and learning abilities of rats were shown to be diminished or enhanced by an increase or reduction in the TLT, respectively.

Data analysis using statistics

To compare numerous groups, one-way ANOVA was used, and for specific group comparisons, Dunnett's test was utilized. A P-value lower than 0.05 indicates statistical significance in the findings.

Final Product

In Video 1, the TLT of rats treated with scopolamine was 30 seconds longer than in the control group (5 seconds longer), and in Video 4, the TLT of rats treated with pretreatment Donepezil was 8 seconds longer than in the control group (Figure 2). The difference between the two groups was statistically significant ($P < 0.0001$).

In Video 3, the TLT of rats treated with diazepam was 20 seconds longer than in the control group (5 seconds longer), and in Video 5, the pretreatment Donepezil group recovered 9 seconds faster than the control group (Figure 3). The difference in duration was statistically significant ($P < 0.001$).

When comparing Group 1 with Group 2, it is clear that the second group (the rats injected with scopolamine) had much higher TLT.The results showed that pretreatment Donepezil considerably reversed the cognitive impairment caused by scopolamine, which is an ant cholinergic. It

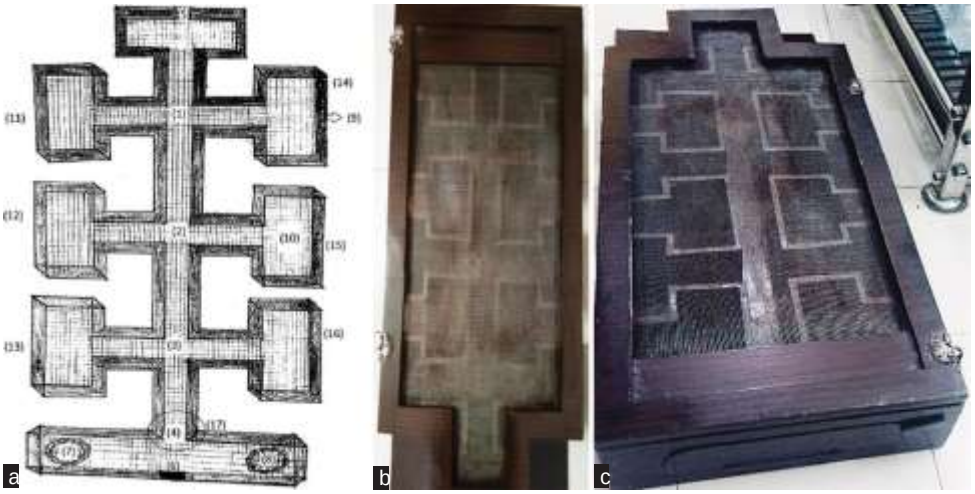
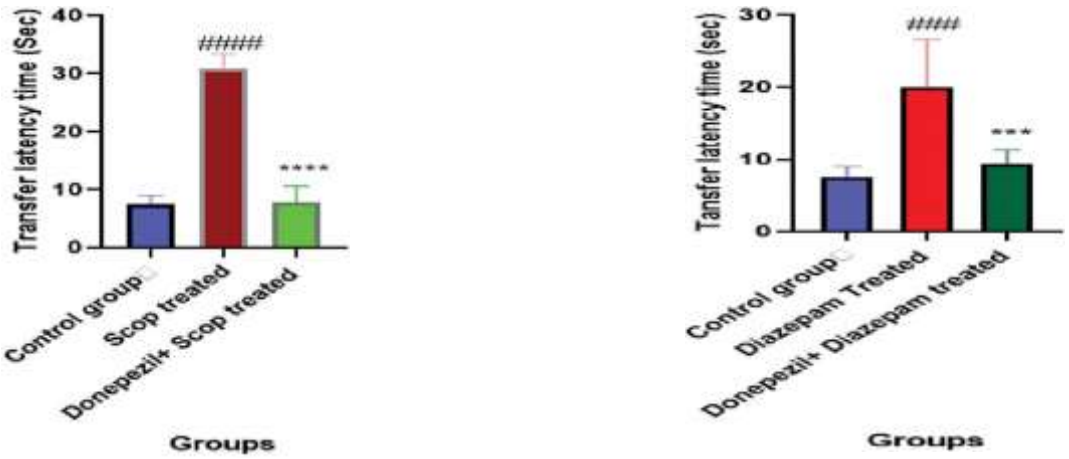


Figure 1: (a) Design of Asyogh's rectangular device, fabricated apparatus (b) Asyogh rectangular device, (c) Asyogh's rectangular device



Novel device for memory testing in rats

Figure 2: Transfer latency time of scopolamine and pretreated donepezil using novel Asyogh's rectangular device test. Results showed means ± standard error of mean, $n = 6$ in each group. Significant differences $^{\#\#\#\#}P < 0.0001$ compared to the control group and $^{****}P < 0.0001$ compared with the scopolamine-treated group

The innovative Asyogh's rectangular device test was used to determine the transfer latency time of donepezil and diazepam, as shown in Figure 3. With n = 6 in each group, the results showed means ± standard error of mean. Compared to both the control group and the group that was given diazepam, there were significant differences ($P < 0.001$).showed that donepezil eliminated the effects of scopolamine, restoring normalcy to the rats.Scopolamine has been shown to cause amnesia or cognitive impairment in previous research.11, 12TLT was substantially higher in rats treated with diazepam compared to Group 1, which exhibited a considerable recovery after pretreatment with donepezil. The study found that diazepam's sedative effects caused rats to experience amnesia. In fact, Zarrindast et al. (2002) found that diazepam impaired memory in rats via activating the gamma amino butyric acid receptor.[13]In the past, researchers have shown that daizepam may alleviate anxiety in rats by causing forgetfulness or cognitive impairment.references 14 and 15It is likely that the improved memory in rats is a result of pretreated donepezil's ability to inhibit acetyl cholinesterase activity in the brain. This, in turn, prevents the breakdown of acetylcholine, which increases its concentration at synapses and improves cholinergic performance, ultimately leading to improved cognitive functions in rats. As a memory test in rats, the results of the current investigation proved that Asyogh's rectangle gadget was effective. Because of its rodent-friendly design, natural ventilation, and TLT foundation, this gadget may be the greatest option for evaluating cognitive skills in rats.

In summary

The results show that the rectangle apparatus developed by Asyogh works well to evaluate rat memory and learning. In addition, it implies that this gadget has the potential to be successfully assessed the impact of medicines on memory enhancement. Future studies may also find uses for it in screening for antianxiety medications.

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