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A COMPARATIVE STUDIES OF THE ACTION OF GLUCOSE AND SCOPOLAMINE ON THE COGNITIVE FUNCTION OF ALBINO RATS USING DIGITAL ZERO MAZE APPARATUS

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ABSTRACT
Objective: The Purpose of the Present study was to compare the action of glucose and scopolamine on the cognitive function using digital zero maze apparatus on albino rats.
Method: The digital zero mazes was made of ply-wood in which to arms positioned at right angled related to each other .This apparatus is like a digital zero maze digit in appearance. Albino rats were given a free exploration session consisting of 10 minutes in the apparatus 24 prior to testing to allow familition to the testing apparatus. Albino rat was treated with glucose to determine the memory performance in second trials scopolamine was injected and effect was observed.
Result: In the present study 2 groups were taken and had given treatment glucose and scopolamine (buscopan).The digital zero maze was design to study animal behavior after supervised training given to the rats the observation glucose and scopolamine were shows that the glucose a have some sought of cognition enhancing activity in experiment animals On the other hand the scopolamine slows down cognition activity of brain.
Conclusion: The result shows that glucose enhanced the activity while scopolamine slows down cognition activity of brain.

Keywords: Cognition , Scopolamine, Albino rat, Exploration, Digital zero maze apparatus.

Introduction:

The term **cognition** (Latin: *cognoscere*, "to know", "to conceptualize" or "to recognize") refers to a faculty for the processing of information, applying knowledge, and changing preferences. Cognition, or cognitive processes, can be natural or artificial, conscious or unconscious [1] [2]. These processes are analyzed from different perspectives within different contexts, notably in the fields of linguistics, anesthesia, neurology, psychology, philosophy, anthropology, systemic and computer science. Within psychology or philosophy, the concept of cognition is closely related to abstract concepts such as mind, reasoning, perception, intelligence, learning, and many others that describe capabilities of the mind and In psychology and in artificial intelligence, cognition is used to refer to the mental functions, mental processes (thoughts) and states of intelligent entities (humans, human organizations, highly autonomous machines).[1][4-6]. In particular, the field focuses toward the study of specific mental processes such as comprehension, inference, decision-making, planning and learning. Recently, advanced cognitive research has been especially focused on the capacities of abstraction, generalization, concretization/specialization and meta-reasoning.[7] This involves such concepts as beliefs, knowledge, desires, preferences and intentions of intelligent individuals, objects, agents or systems. The concept of cognition is closely related to such abstract concepts as mind, reasoning, perception, intelligence, learning, and many others that describe numerous capabilities of the

human mind and expected properties of artificial or synthetics intelligence.[8] The consistent neuropath logical occurrence associated with memory is a cholinergic deficit, which has been correlated with severity of AD.[9] The aim of this study was to compare the cognition activity of glucose and scopolamine on albino rats using digital zero maze apparatus.

Material and Methods:

Drugs: Control (normal saline), Glucose (0.04mg/kg) and scopolamine (buscopan20mg/ml) amp. Were used in the experiment.

Animals: Young albino male rats (72-80gm) were used the animal were housed under standard laboratory condition and facility on a 12:12 hrs light /dark cycle. All the in vivo experiment were carried out between 8.00amto5:30pm each day (light cycle).

Apparatus: Digital zero maze apparatus.

Method:

24 mice were taken and divided into 3 groups of 8 animals each. 4 anticlockwise and 4 clockwise were trained using apparatus. Group1, animals were injected with Normal Saline. Group 2 animal were injected with glucose (0.04mg/kg)for 4 week in both direction (clockwise and anticlockwise). Group 3 animals were injected with scopolamine (buscopan 20mg/ml I.P) for 4 week in clockwise and anticlockwise direction. The apparatus was kept at a place where there were minimal noise distractions. 24 rats were taken, and were numbered, weighed and divided into 3 Groups. The maze was marked by maker for the clockwise and anticlock direction. The rats were exposed to the apparatus to get accosted to the apparatus. Food were used to train the rat was kept at the end point. Than concurrent steps repeated for all the 24 rats in 3 groups' .The rats were trained for 5 to 6 days with food. Expoure of rats as not more than two minutes After this training glucose and scopolamine was injected in separated groups of rats .Now the rats was kept again starting point one by one and door was opened in their respective clockwise and anticlockwise direction. Reading was noted down.

Summary: Study Duration: 4 weeks, Group **Description**: A Group of 8 male Rat's weight between 70-8 gm, **1st Group**: control (Normal Saline), **2nd Group**: Glucose Treated, **3rd Group**: Scopolamine Treated.

Table 1: Average activity time for group 1,2,3 in clockwise and anticlock wise direction with different Treatment

Weeks	Groups	Saline Treatment	Average Body Weight(gm)	Activity time in sec. (Clockwise)	Activity time in sec.(Anticlockwise)
1				33.50	38.75
2		Normal	76.375	31.75	32.25
3	1			30.10	36.25
4		saline		32.25	44.00
1				21.75	27.5
2		Glucose	73.375	26.25	24
3	2			29.25	29
4				29.25	26
1				42.50	56
2		Scopolamine	76.625	81.25	101.4
3	3			93.75	106
4				124.75	63.25

Table: 2 Comparative Studies of Normal Saline and Glucose.

Weeks	Groups	Animal used	Drug treatment	Average bodywt.(gm.)	Activity time in sec.(clockwise)	Activity time in sec.(anticlockwise)
	1		Normal saline	76.125	33.50	33.75
1	2		Glucose	73.625	21.75	27.50
	1		Normal saline	76.125	31.75	32.25
2	2	Albino	Glucose	73.625	26.25	24.00
	1	Rat	Normal saline	76.125	30.00	36.25
3	2		Glucose	73.625	29.25	29.00
	1		Normal saline	76.125	32.25	44.00
4	2		Glucose	73.625	29.25	29.25

Table: 3 Comparison Study of Normal Saline and Scopolamine.

Weeks	***Groups***	***Animal used***	***Drug treatment***	***Average bodywt.(gm.)***	***Activity time in sec.(clockwise)***	***Activity time in sec.(anticlockwise)***
1	1		Normal saline	76.125	33.50	**33.75**
	2		Scopolamine	76.625	42.50	**42.50**
2	1	Albino	Normal saline	76.125	31.75	**32.25**
	2	Rat	Scopolamine	76.625	81.25	**64**
3	1		Normal saline	76.125	30.00	**36.25**
	2		Scopolamine	76.625	93.75	**106**
4	1		Normal saline	76.125	32.25	**44.00**
	2		**Scopolamine**	**76.625**	**124.75**	**126.75**

Table: 4 Comparison Study of Glucose and Scopolamine.

Weeks	Groups	Animal used	Drug treatment	Average body wt.(gm.)	Activity time in sec.(clockwise)	Activity time in sec.(anticlockwise)
1	1		Glucose	73.625	21.75	27.5
	2		Scopolamine	76.625	63.5	42.5
2	1	Albino Rat	Glucose	73.625	26.25	24
	2		Scopolamine	76.625	81.25	64
3	1		Glucose	73.625	29.25	29
	2		Scopolamine	76.625	93.75	106
4	1		Glucose	73.625	29.25	26
	2		Scopolamine	76.625	124.75	126.75

Figure 1: Comparative Affected Cognitive Behavior of Animal between Both Drugs.

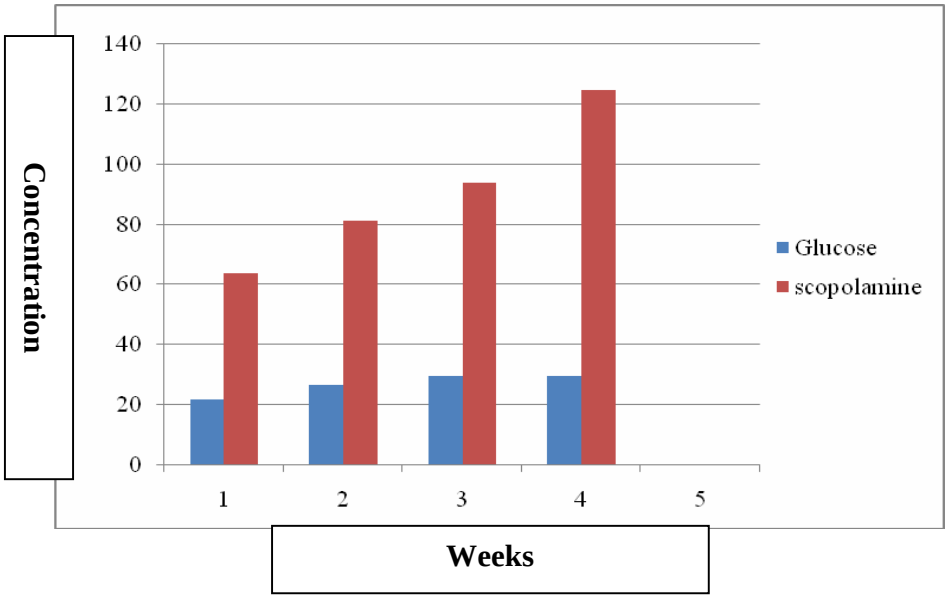
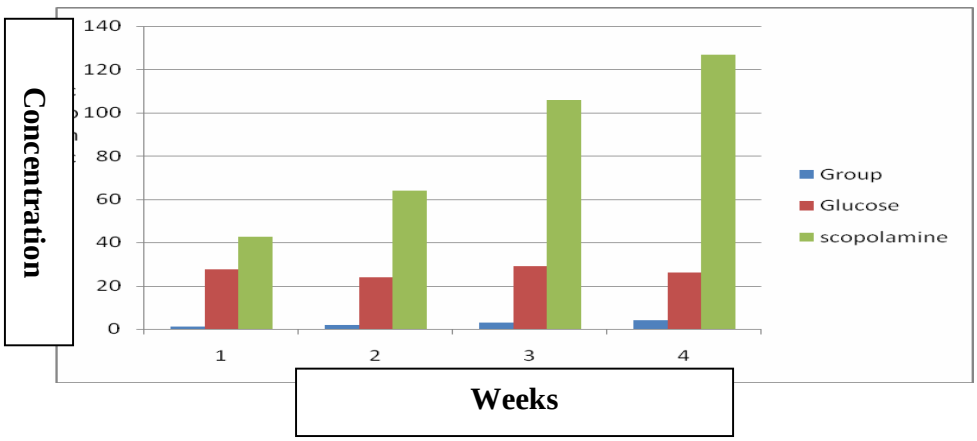


Figure 2: Comparative Affected Cognitive Behavior of Animal between Normal Saline and Both Drug.



Result and Discussion:

In the present study 3 groups were taken and had given treatment glucose and scopolamine (buscopan). The digital zero maze was design to study animal behavior after supervised training given to the rats the observation glucose and scopolamine were shows that the glucose a have some sought of cognition enhancing activity in experiment animals On the other hand the scopolamine slows down cognition activity of brain.

Conclusion:

The result clearly that the Glucose have some sought of cognition enhancing activity in experimental animal. On the other hand the Depressive Scopolamine slows down cognition activity of brain.

So never wonder if candy in your mouth helps you to perform better in Examination.

References:

1. Langley K, Heron J, O'Donovan MC, Owen MJ, Thapar A.Genotype Link with Extreme Antisocial Behavior: The Contribution of Cognitive Pathways. Arch Gen Psychiatry2010: 67(12):1317-1323.

2. Amir H. Rezvani, Edward D. Levin Cognitive effects of nicotine, Biological Psychiatry, 2001:49:3: 258-267

3. Jennifer M. Rusted, Paul A. Newhouse, Edward D. Levin, Nicotinic treatment for degenerative neuropsychiatric disorders such as Alzheimer's disease and Parkinson's disease , Behavioural Brain Research, , 2000: 113: 1-2: 121-129.

4.Andrew J. Waters, Stephen R. Sutton, Direct and indirect effects of nicotine/smoking on cognition in humans, Addictive Behaviors: 2000: 25: 1: 29-43.

5. Nicholas D. Tsopelas, Deborah B. Marin, Cholinergic Treatments of Alzheimer's Disease Functional Neurobiology of Aging, 2001 : 475-486

6. Thomas Sleekier, Wendy Inglis, Philip Winn, Arjun Sahgal, The pedunculopontine tegmental nucleus: a role in cognitive processes? Brain Research Reviews: 1994 : 19: 3: 298-318.

7. Ansgar J. Furst, Gil D. Rabinovici, Ara H. Rostomian, Tyler Steed, Adi Alkalay, Caroline Racine, Bruce L. Miller, William J. Jagust, Cognition, glucose metabolism and amyloid burden in Alzheimer's disease,Neurobiology of Aging, 2010 (Press Proof)

8. John W. Newcomer, Suzanne Craft, Robert Fucetola, Steven O. Moldin, Gregg Selke, Leilani Paras, Ryan Miller , Glucose-Induced Increase in Memory Performance in Patients With Schizophrenia , Schizophrenia Bulletin, 1999: 25: 2: 321-335.

9. Andrew B. Scholey, Susan Harper, David O. Kennedy, Cognitive demand and blood glucose , Physiology & Behavior: 2001: 73: 4 :585-592.

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