



AENSI Journals

## Journal of Applied Science and Agriculture

Journal home page: www.aensiweb.com/jasa/index.html



## Effect of aqueous alcoholic extract of valerian root on memory using passive avoidance learning in male Wistar rats

<sup>1</sup>Rahele Torkzadeh Mahani, <sup>2</sup>Heydar Aqababa, <sup>3</sup>Akbar Vahdati

<sup>1</sup>MSc Student of Animal Physiology, Islamic Azad University, Science and Research of Fars Branch, Iran.

<sup>2</sup>PhD in Animal Physiology, Assistant Professor, Department of Biology, Islamic Azad University, Arsanjan Branch, Iran.

<sup>3</sup>PhD in Animal Physiology, Assistant Professor, Department of Biology, Islamic Azad University, Science and Research of Fars, Iran.

### ARTICLE INFO

Article history:

Received 13 October 2013

Received in revised form 4

November 2013

Accepted 27 November 2013

Available online 10 February 2014

Keywords:

*Valeriana officinalis* L Memory And Learning Rat Passive avoidance Learning

### ABSTRACT

**Background:** *Valerian officinalis* L is a multi-year grass plant among medical plants. **Objective:** It is native of Europe and a part of Asia whose various medical effects have been reported in recent years. The present research investigates the water-alcohol effect of Hyacinth accord on memory with passive avoidance learning. It uses 40 male Wistar rat's heads with. Weight of 180-200 g from Shiraz Medical University animals training center. The animals were grouped into five 8-member groups, i.e. the control group (not receiving any solvent or drug), the sample group (receiving the solvent drug), the treatment group (with minimum drug receiving 50 mg/kg solution), the treatment group with average drug dose (receiving 100 mg/kg solution) and the treatment group with maximum drug dose (receiving 200 mg/kg solution). *Valeriana officinalis* L extract was selected in physiology serum with percolation method in three different concentrations, i.e. 50, 100 and 200 mg/kg being given Intraperitoneally to the animals during a 7-day period. **Results:** Then the adaptation and learning session was held using shuttle Box device. The results of the test indicated that at the end of the experiment, the test groups had gained weight in comparison with the control and sample ones, however it was not significant. During the delay period, the test groups showed a meaningful weight loss in their initial entry to the dark room (STL). **Conclusion:** It was tested with T-test statistical method. Results showed that memory reinforcement in the groups receiving 100 and 200 mg/kg of the extract had a meaningful weight loss in comparison with the control group.

© 2013 AENSI Publisher All rights reserved.

**To Cite This Article:** Rahele Torkzadeh Mahani, Heydar Aqababa, Akbar Vahdati., Effect of aqueous alcoholic extract of valerian root on memory using passive avoidance learning in male Wistar rats. *J. Appl. Sci. & Agric.*, 8(7): 1161-1167, 2013

## INTRODUCTION

Including memory and learning abilities are very important nerve that without them life is disrupted. Understanding of the mechanisms involved in learning and memory in the minds of many professionals neuroscience has to be busy. Despite the many studies that have been done in this field is still not well understood in all its dimensions. Numerous systems involved in learning and memory. For example, numerous studies have shown that drugs that stimulate cholinergic system had positive effects on memory. (Zangeneh & motammedi & Bakhtiarian, 2006), (Bacciottini & Passani & mannaioni & Blandina, 2001). While anticholinergic drugs, anesthetics and effects memory are negative (Pitsikas, 2009). Because of the side effects that these drugs have on the body of the high cost of drugs to treat central nervous system diseases and disorders of learning and memory, increased attention has been paid to the use of herbs. Medicinal plants of the treatment of is highly regarded in traditional medicine is the valerian plant. The scientific name of this plant *Valeriana officinalis* L which includes three varieties named Latyfvlya, Media, Tynvlya is Herb valerian plant grass has strong stems to a height of 5/0 to 5/1 and sometimes 2 meters. These plants to car mode in forests of high tree grow native and Central Asia. Roots and rhizomes that contain tannin, glucose, and formic, acetic acid is titanium. Cylinder of the rhizome and roots attached to the rhizome as a light brown color printers are available in the market (Tang & Liu & yu, 2003). Much of today's medical practice involves the use of this plant in the treatment of sleeping and anti-spasmodic and sometimes such as restlessness, sleep problems, nervousness, and gastrointestinal disease stress used. For example, in African traditional medicine as a treatment for epilepsy, hysteria, are used. Since this herb to treat headaches, migraines, anticonvulsants, passing gas, antispasmodic, persistent hiccups, stomach disorders, menopause, vertigo, reducing the amount of urine diabetics, anxiolytic, relieve insomnia, lowering blood pressure has been noted Pabbn (0.8) Valerian contains several chemical compounds, including lipid compounds, nitrogen-containing compounds, phenolic compounds, terpenoids

**Corresponding Author:** Rahele Torkzadeh Mahani, MSc Student of Animal Physiology, Islamic Azad University, Science and Research of Fars Branch, Iran.

compounds. So.... Which is extracted from the plant nitrogen-containing compounds (amino acids) terpenoid compounds (Valptryat and Brnyvl) affect the central nervous system (*Mckenna&Janes& Hughes, 2002*). It is likely that valerian extract to GABA Arzyk the Cholinergic system and impact on memory and learning. Therefore, we examined the effect of aqueous - ethanol plant on learning and memory in rats using passive avoidance learning in Wistar rats, we conducted this study to examine.

*Methodology:*

## MATERIALS AND METHODS

In this experimental study, 40 male Wistar rats weighing 180-200 g and age range was 5/2-3 months. Razi Vaccine and Serum Research Center Gulf mice were purchased from the Animal Research Ethics at the University of Shiraz mice were kept in groups of 5. The first group (control group), normal water received and the second group (control group) with normal and distilled water were given to the animals in groups 1, 2 and 3, respectively, 50 and 100.200 mg per kg of body weight of the extract blue - alcohol was administered valerian., all the groups, the normal water or valerian extract intraperitoneally in size 2/0 ml received., all experiments were performed in Shiraz University of Medical Sciences. Pets free to water at all times and food were available.

*Preparation of plant extracts:*

About 5 kg of the dried herb valerian root Shiraz was purchased from a local grocery after approval by the relevant expert at the Center for Medicinal Plant Research in Medical Sciences Shiraz were used. First, 150 g of milled powder was dissolved in 600 ml of ethanol and the Machine (Prkvlatvr) will be kept for 72 hours and after 72 hours the milk down to the device open and drops of the extract. The top 50% hydroalcoholic solution is added drop as long as we do not continue to extract more color. Then we extract was then concentrated by machine from another machine called a vacuum desiccator, which is set for 24 hours use. Per 150 grams of powdered valerian 7 g dried extract was obtained. Then extract after dissolving in sterile distilled water at a concentration appropriate 50 mg kg experimental groups at least (1), 100 mg kg experimental groups moderate (2), 200 mg kg maximum experimental group (3) are injected into the attributes to animals.

*Trial passive avoidance learning:*

*A) Habit:*

Animals were used for the training of passive avoidance learning. These methods of training and practice sessions. In practice sessions, the animal is placed in the machine after 10 seconds with a guillotine door removed, the animal to enter the dark and this is done three times.

*B) Education:*

30 minutes after the third adaptation or used by, the acquisition of learning is done in the training session, the animals treated with saline, causing the legs to the legs of the animal is electricity transmission to the animal's electric shock. Mouse to enter the dark door closed after electrical shock intensity 5/0 milliamps to 3 seconds through steel wires embedded in the dark, animal husbandry is applied to the device.

*C) Test to recall:*

24 hours of Education to remind tests done. Pet is placed in the clear and the delay time before the guillotine door open for the first time in the dark room (STL) measurements the. The time Apart from the obvious (TLC) whole time spent in the dark room (TDC) is measured.

*The effect of the parameter can be used STL and TDC:*

- 1) STL: during the test session in which the animal with 4 feet of light into the dark machine to machine.
  - 2) TDC: an animal that is sent during the test session has been set within 600 seconds in the dark.
- After training, the test animals, the drug's effect on memory was investigated.

*Injection:*

The control group was injected with distilled water for 7 days beginning on day 8 of the shuttle box training sessions and ninth day of testing for the technology used to be done. The standard conditions for 12 hours a week in the mice 12 h light and dark adaptation will begin after a week of tests and injections. Thus the experimental group (I), 50 mg of hydro alcoholic extract of valerian for 7 days so that the controls are injected into the third day, so injections are done in the morning and 9-8 hours per day the eighth and ninth day shuttle box used to train and test the technology to be made. For the experimental group (II) also coincides with the day following the first day of the third injection administered 50 hydro alcoholic extract of valerian experimental

group (I), we injected 100 mg valerian extract the experimental group (II) was and can be done within 7 days of injection and the eighth day of the shuttle box, the ninth day training session and used for raising test is done. Experimental group (III) The injection doses of valerian extract is 200 days, which coincides with the third dose of the experimental group, 100 extracts (II), and 7 days after injection occurs and the eighth day of the shuttle box sessions used for training and testing processing occurs on the ninth day. The entire experimental period of 15 days.

#### Results:

The data were examined by SPSS, and at significant differences of  $P < 0.05$ , ANOVA method and Paired Sample T-test were performed. The diagrams referring to each statistical test were drawn by Excel. In this study the results are divided in two general categories as following:

- A) The results for effects of valerian drug on body weight changes in pre and post test conditions.
- B) The results for effects of valerian drug on the rate of learning and memory changes (STL).

#### 1- Paired Sample T-test (two dependent samples)

Paired Sample T-test is used for analysis of tests within each factor in two different situations, before and after, is observed. The acceptance of  $H_0$  hypothesis in paired samples pattern shows that the difference between amounts of means in two paired samples of population is not statistically significant: ( $P > 0.05$ ); on the converse of this hypothesis that says there is a significant differences between the means,  $H_1$  hypothesis is stand at this significance level: ( $P < 0.05$ ).

#### Variance analysis:

Variance analysis examines the relationship between a dependent variable and an independent variable (qualitative), and gives an opportunity to examine the relationship between more than two statistical populations. The dependent variable, in variance analysis, is quantitative and factors, qualitative or grouped variable, are: 1- the factor between subjects or groups, 2- the factor within subjects or groups, also called background errors. In one-way ANOVA there are only two variables, factor variable and dependent variable (by the factor, observations are divided into multiple groups or levels). Thus it's called one-way ANOVA.

#### 3- Diagrams and tables of statistical results

##### 3-1-Examination of the results for effects of valerian drug on body weight changes:

3-1-1-Examination of the results for comparing control and witnesses group in pre and post test situations, at significance level of 0.05 by Paired Sample T-test:

Weight (befor of test)		Paired Differences			Sig. (2-tailed)	
		N	Mean	Std. Deviation		Std. Error Mean
Pair	control - saline	16	-5.625	7.07	2.5	0.059

Table 3-1-1 shows the statistical results for comparing control and witnesses group by Paired Sample T-test. The results are respectively: mean, standard deviation, standard error mean and significance level of two comparing groups. The significance level is larger than 0.05, so null hypothesis will be accepted and control group will be chosen to be compared with experimental groups.

Weight (Aefor of test)		Paired Differences			Sig. (2-tailed)	
		N	Mean	Std. Deviation		Std. Error Mean
Pair	control - saline	16	-1.00	2.138	0.755	0.227

3-1-2- Examination of the results for comparing control group's mean with experimental groups in pre and post test situations

Weight (befor of test)	N	Mean	Std. Deviation	Std. Error Mean	Sig.
Control - minimum(50)	16	185.187	5.11	1.278	0.011
Control - average(100)	16	185.437	6.04	1.510	0.022
Control - maximum(200)	16	185.187	6.02	1.506	0.037

Table 3-1-2 shows the results for comparing control group with experimental groups in pre test situation by ANOVA. The results are respectively: mean, standard deviation, standard error mean and significance level of two comparing groups.

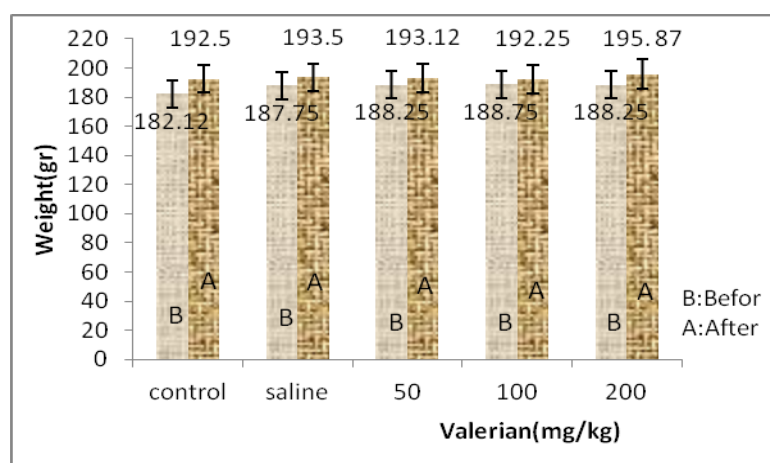
Weight (Aefor of test)	N	Mean	Std. Deviation	Std. Error Mean	Sig.
Control - minimum(50)	16	192.812	6.29	1.573	0.850
Control - average(100)	16	192.375	6.94	1.736	0.948
Control - maximum(200)	16	194.187	6.29	1.573	0.299

Table 3-1-3 shows the results for comparing control group with experimental groups receiving valerian drug by ANOVA. The results are respectively: mean, standard deviation, standard error mean and significance level of two comparing groups. As it seems, in comparing control group with experimental groups with minimum, medium and maximum doses, the significance level is  $P>0.05$ . Therefore, there is not a significant difference between these groups and control group.

3-1-4- Examination of the results for comparing mean and Standard error of the samples (rats) with valerian drug injection in pre and post test situations:

Group	Number	SE± Mean (Befor of test)	SE± Mean (After of test)
Control	8	0.74±182.12	2.63 ±192.5
Saline	8	2.23±187.75	2.04±193.5
Valerian(50)	8	1.94±188.25	1.9 ±193.12
Valerian(100)	8	2.46±188.75	2.44±192.25
Valerian (200)	8	2.54±188.25	1.68 ±195.87

Table 3-1-4 shows statistical results for comparing the effects of amount of valerian drug on body weight of samples, in grams, in pre and post test (end of day 15th) situations in different groups. Based on such statistics as mean and standard error, the table was designed.



**Diagram. 1:** compares mean of the effects of amount of valerian drug on weight of samples, in grams, in pre and post test (end of day 15th) situations in different groups. The animals of different doses (50, 100, 200 mg/kg), control and witnesses groups weighted before and after the test. According to the diagram, their increasing changes are obvious. Each column indicates mean ± standard error for 8 rats. At  $P<0.05$ , there are no significant differences, before and after the test, between control and witnesses groups and experimental groups.

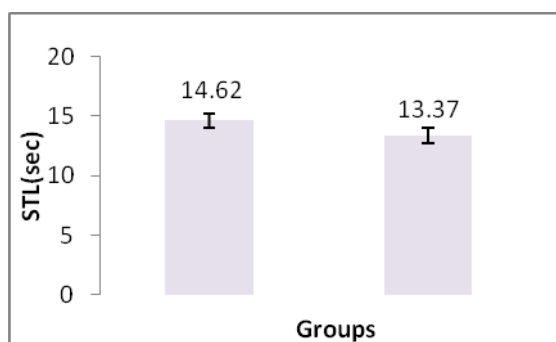
4- Examination of the results for the valerian drug's effect on memory and learning of samples (STL):

4-1- Examination of the results for comparing control and witnesses group at significance level of 0.05 by Paired Sample T-test.

Stl		Paired Differences				Sig. (2-tailed)
		N	Mean	Std. Deviation	Std. Error Mean	
Pair	control - saline	16	1.25	9.15	3.23	0.711

Table 4-1 shows the statistical results for comparing control and witnesses group by Paired Sample T-test. The results are respectively: mean, standard deviation, standard error mean and significance level of two

comparing groups. As it seems, the significance level is larger than 0.05, so null hypothesis will be accepted and control group will be chosen to be compared with experimental groups receiving valerian drug.

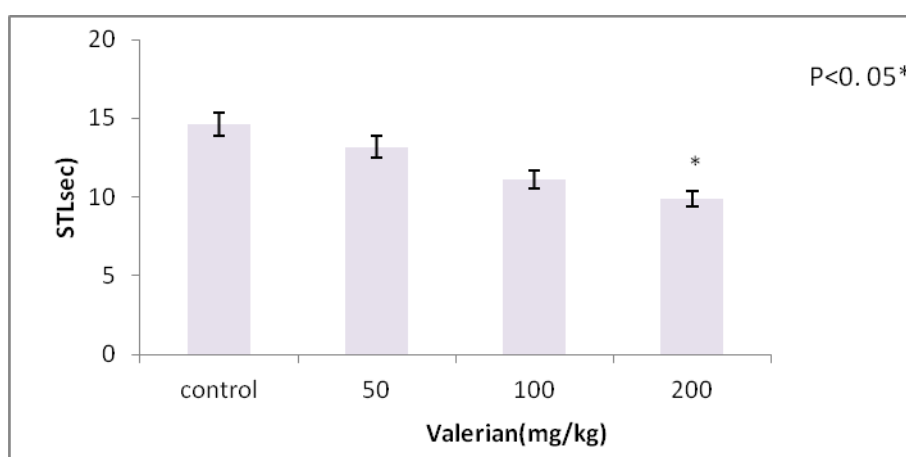


**Diagram. 4-1:** shows the comparison of control and witnesses groups means. According to the result for significance level of the table, witnesses group will be chosen to be compared with experimental groups receiving valerian drug.

4-2- Examination of results for comparing (STL) mean of control group with experimental groups receiving valerian drug by ANOVA.

ANOVA					
Stl	N	Mean	Std. Deviation	Std. Error Mean	Sig.
Control - minimum(50)	16	13.19	7.9	1.97	0.485
Control - average(100)	16	11.12	8.17	2.04	0.086
Control - maximum(200)	16	9.87	8.43	2.1	0.018

Table 4-2 shows the results for comparing control group with experimental groups receiving valerian drug by ANOVA. The results are respectively: mean standard deviation, standard error mean and significance level of two comparing groups. As it seems, in comparing control group with experimental groups with minimum and medium doses (50 and 100), the significance level is  $P > 0.05$ . So, there are no significant differences between those groups and control group. In addition, in comparing control group with experimental groups with maximum dose (200), the significance level is  $P < 0.05$ , thus, there is a significant difference between that group and control group.



**Diagram. 4-3:** indicates comparing mean of control group with experimental groups receiving valerian drug. As it seems and according to the results of the table, for experimental groups with minimum and medium doses (50 and 100), the significance level is  $P > 0.05$ . Therefore, there are no significant differences between those groups and control group. Also, in comparing control group with experimental groups with maximum dose (200), the significance level is  $P < 0.05$ , so, there is a significant difference between that group and control group.

*Discussion:*

The results of this study show that intraperitoneal injection of aqueous extracts - alcoholic valerian, prepared from the root of this plant can reduce the rate of avoidance learning in Wistar male rats, but no significant difference on weight gain. In the present study, mice treated with the extract of valerian control after weight gain relative to controls, although this difference was not significant, but the weight gain was a substance called Brnyvl (*Janovic, 2010*). In previous studies conducted by various scientists acknowledge that bitter substances in the digestive glands secrete significantly stimulate the digestive juices which are secreted by the digestive juices in the stomach are, so this stuff taste in the mouth of the nervous system influence. Material movements bitter as gall bladder and bowel movements are magnified. The bitter substances can be used not only as food appetizing but hasten the digestion and metabolic activity is accelerating. *Valerian* has a bitter taste and the bitterness is due Brnyvl appetite and digestion plays a role in strengthening the digestive secretions is increased (*Hazelh & Malingre & MeiJer , 1982*). Learning and memory in the brain is a complex behavior that can involve multiple areas of the central nervous system. Cortex of the Brain - Amygdala and the hippocampus in particular have a key role in memory formation and storage (*Eichnabaum & cohen, 1993*). In addition, valerian extract could significantly reduce the memory.

This argument is based on reducing the latency to first enter the dark chamber (STL), reducing the total time spent in light chamber (TLC), increasing the total spent in the dark room (TDC) in the test group and control group achieved (*lee & yuancs, 2001*). Previous studies found that valerian can give some positive effects of therapeutic self-expression. Positive effects of this plant can be anti-spasmodic, anti-anxiety, migraine and seizure noted. Recent studies show that extracts aqueous - alcoholic valerian's sedative effects (*Tang&Liu& yu , 2003*). The negative effects of taking valerian is also continuing its long lasting irritability, abnormal heart rhythm, headaches, feeling of choking, chest pressure, fatigue, trembling hands and feet have been reported. Valerian-containing compounds several combinations of lipids (oils), nitrogen compounds (amino acids GABA), terpenoid compounds (Valpvtryat - Brnyvl) is. Trnvyydhayy like Valpvtryat and Brnyvl can be reduced memory and learning (*Kopelman , 1988*). One of the possible mechanisms of learning and memory and reduce the amount of previously existing Valpvtryat valerian is probably through effects on GABA<sub>A</sub> receptors, respectively. In addition to reducing the impact on long-term memory GABA<sub>A</sub> receptors via inhibition of protein synthesis, cell toxic compound that is toxic component is called valtrate. However, many uncertainties remain about the mechanism of action Valpvtryat there is a wide field for future studies (*Lee& Yuancs , 2001*). Since they both seem Brnyvl previous studies of anticholinergic drugs is through the inhibition of acetylcholine release such acts, especially on the part of the brain called acetylcholine in the hippocampus is very much evident in many of the the role of neural-like learning and performance and reduce blocking the action of acetylcholine are impaired learn that our research is the study of the past (*Komorl&Motomura& shiroyama, 2008*). Previous studies have shown that the amino acid GABA receptors in the nucleus of a rule that Mynrt (NBM) has an impact on learning and memory processes (*Hill. & Bowery, 1981*). The region between the amygdala complex and nucleus of the lens-shaped region of gray matter called striated (CBF) within which the cumulative cholinergic neurons in the basal nucleus in several areas including Mgnvslvlarys Mynrt seen (*Hough ton, 1999*). Since the interaction between the cholinergic system and memory and learning Kabaarzhky there. Hippocampus and amygdala in the memory formation of synapses Kvlrynzyky is enriched under the control of muscarinic acetylcholine receptors in the amygdala Kvlrynzyk Gabaarzyk and memory consolidation can prevent our studies is consistent with (*Bacciottini&Passani&mannaioni&Blandina, 2001*). The results of the effect of aqueous - alcoholic valerian extract on memory using passive avoidance learning in male Wistar rats using STL parameters showed that 200 mg is a significant parameter in the STL memory is significantly reduced.

**REFERENCES**

- Ang – lee Mk: Moss J, yuancs, 2001. Herbal medicines and perioperative care. *JAMA.*, 286(2): 208-16.
- Bacciottini, L., M.B. Passani, P.F. mannaioni, P. Blandina, interactions between histaminergic and cholinergic systems in learning and memory behave brain *RES.*, 124(2): 183-94.
- Eichnabaum, H. and N.J. cohen, 1993. Memory Amnesia and the Hippocampal system. *MIL.*, 2: 15.
- Hazelh off, B., T.M. Malingre, D.K. MeiJer, 1982. Antispasmodic effects of valeriana compounds an in – vivo and invitro study on the guinea- pig ileum. *Areh Int pharmacodyn Ther.*, 257: 271-87.
- Hill, D.R. & N.G. Bowery, 1981. 3H- baclofen and 3 H – GABA bind to bicuculline – insensitive GABA<sub>B</sub> sites in rat brain *Nature*, 290: 149-152.
- Hough ton, P.J., 1999. The scientificbasis for the reputed activity of valerian. *J pharm pharmacol.*, 51: 505-12.
- Ivana Damn Janovic, 2010. Contemporary aspects of using valeviana officinalis. *Review article.*322:547-9.
- 8) Kandel Eric R. Principles of neural science. 4th ed. 2005. 1227.

Komorl, T., E. Motomura and T. shiroyama, 2008. The sleep-enhancing effect of valerian inhalation and sleep – shortening effect of lemon in halation. *Chemical Senses*, 31(8): 731-737.

Kopelman, M.D., 1988. The cholinergic neurotransmitter system in human memory and dementia: A review. *Quarterly Journal of Experimental Psychology*, 38: 535-573.

Mckenna, D.J., K. Janes and K. Hughes, 2002. *Botanical medicine. The Desk Reference for major Herbs/Supplements*. 2nd ed. pp: 1007-10310

Pitsikas, N., 2009. Pre-training of anesthetic ketamine differentially affects rats spatial and non-spatial recognition memory. *Neuropharmacology*, 57(1): 1-7.

Tang, X.P., X. Liu and B. Yu, 2003. Two new flavone glycosides from *Valeriana jatamansi*. *G. Asian. Nat. Prod. Res.*, 5: 257-61. From MEDLINE 1460430.

Zangeneh, F., F. Zmotammedi, 2006. Bakhtiarian. Role of cholinergic system on the construction of memory and its interaction with dopaminergic system. *Acta Medica Iranica*, 44(3):172-180.