ISSN: 2320 - 4230

Journal of Drug Discovery and Therapeutics 1 (5) 2013, 26-28

RESEARCH ARTICLE

COMPARITIVE STUDY OF MEMORY ENHANCING PROPERTY OF "MODAFINIL AND *CISSAMPELOS PARIERA"* IN MICE

[*]**Prateek Bisht[1], Rekha.S[1], Chandrashekhara.S[2], Vineeth Chandy[1], Prof. Satyanand Tyagi[3]**

[1]Dept. of Pharmaceutical chemistry, T. John College of Pharmacy, Bangalore, Karnataka, India-560042.

[2]Dept. of Pharmaceutics, M.M College of Pharmacy, Belgaum, Karnataka, India-590016.

[3]President & Founder, Tyagi Pharmacy Association (TPA) & Scientific Writer (Pharmacy), New Delhi, India-110074.

ABSTRACT

Piracetam is established learning and memory enhancing agent which have gained entry into the market. Modafinil, a novel wake-promoting agent and *Cissampelos pariera* , have been reported to have a similar clinical profile . The present study was undertaken to investigate the comparative effect of Modafinil , Piracetam and *Cissampelos pariera* on learning and memory in mice. Elevated plus maze and passive avoidance paradigm were employed to test learning and memory. Common doses of (200mg/kg.) Piracetam[1] *Cissampelos pariera* and Modafinil were administered for 7 successive days in separate group of animals.

KEYWORDS: Piracetam, *Modafinil, Cissampelos pariera,* Passive avoidance paradigm, Elivated plus maize.

INTRODUCTION:

Dementia is a common condition today which can be a consequence of age or mental condition like Alzheimer's disease [AD] is a progressive neurodegenerative brain disorder that is slow in onset but leads to dementia, unusual behavior, personality changes and ultimately death[2,3.] Therefore it is worthwhile to explore different available drugs which can be used as medicines for the treatment of various cognitive disorders[4]. Drugs like piracetam are begning to gain importance in market fot treating dementia and as cognitive agents. Modafinil is known to increase wakefulness and have shown positive results in preliminary tests for its memory enhancing capacity. So this research is aimed at studying its cognitive property when compared with piracetam and *cissampelos pariera*.

DRUG TREATMENT:

For the pharmacological tests, the standard drugs were mixed in normal saline so as to administer the drugs in a concentration of 200mg/kg of body weight and the C.pariera extract was suspended in double distilled water containing carboxy methyl cellulose (1%w/v CMC) in dose of 200-mg/kg The control group was made using distilled water in carboxy methyl cellulose (1%w/v CMC). The doses were fixed based on earlier studies on the 50% aqueous ethanolic extract of *C. pariera* roots extract (CPE) were administered at up to 2 g/kg to individual mice in-group[5,6,7,8] .

ANIMALS:

Swiss mice of either sex weighing 22-25 g were used in present study. They had free access to food and water and were maintained under standard laboratory conditions with alternating light and dark cycles of 12 h each. They were acclimatized to laboratory conditions for 5 days before behavioral studies. All the readings were taken during the same time of the day i.e. between 8 a.m. and 11 a.m. The Institution Animals Ethics Committee (IAEC) had approved the experimental protocol, and care of animals was taken as per guidelines of CPCSEA, Department of Animal Welfare, and Government of India.

EXTEROCEPTIVE BEHAVIORAL MODELS:

ELEVATED PLUS MAZE:

The elevated plus maze served as the exteroceptive behavioural model (wherein the stimulus existed outside the body) to evaluate learning and memory in mice. The apparatus consisted of two open arms (16 cm × 5 cm) and two covered arms (16 cm × 5 cm ×12cm). The arms extended from a central platform (5cm×5cm) and the maze was elevated to a height of 25 cm from the floor. On the first the day, each mouse was placed at the end of open arm, facing away from central platform. Transfer latency (TL) was taken as the time taken by the mouse to move into any one of the covered arms with all its four legs. TL was recorded on the first day for the each animal.The mouse was allowed to explore the maze for another 2 min. and returned to its home cage. Retention of this learned task was examined 24 h after the first day trial.

[*]***Corresponding author: Prateek Bisht; E-mail:*** *prateek.reloaded@yahoo.in*

Mice were divided into 4 groups and each group consisted of a minimum of 6 animals separate animals were used for each experiment.

Group I: It represented the control group. Vehicle was administered orally for seven successive days and transfer latency was measured after 90 min of administration on seven day and again after 24 hr i.e. on eighth day.

Group II: It represented the positive control group. Piracetam (200 mg/kg i.p.) was injected to mice for seven successive days and transfer latency was measured after 60 min of administration on seven day and again after 24 hr i.e. on eighth day.

Group III CPE (200, mg/kg, p.o.) were administered orally to the mice for seven successive days to.TL was noted after 90 min of administration on seven day and again after 24 hr i.e. on eighth day.

Group IV: Modafinil (200 mg/kg, i.p.) was injected to mice for seven successive days and transfer latency was measured after 60 min of administration on seven day and again after 24 hr i.e. on eighth day.

PASSIVE AVOIDANCE PARADIGM:

Passive avoidance behavior based on negative reinforcement was to examine the long-term memory. The apparatus consisted of a box (27 cm × 27 cm×27cm) having three walls of wood and one wall of Plexiglas, featuring a grid floor (made up of 3 mm stainless steel rods set 8 mm apart), with the wooden platform (10 cm × 7 cm ×1.7cm) in the center of the grid floor. The box was illuminated with a 15W bulb during experimental period. Electric shock (20 V, AC) was delivered to the grid floor. Training was carried out in two similar sessions. Each mouse was gently placed on the wooden platform set in the center of grid floor. When the mouse stepped down placing all its paws on the grid floor, shocks were delivered for 15 sec and step-down latency (SDL) was recorded. SDL was defined as the time (in seconds) taken by the mouse to step down from the wooden platform to grid floor with all its paws on the grid floor. Animals showing SDL in the range of 2-15 s during the first test were used for the second session and the retention test .The second session was carried out 90 min. after the first test. When the animals stepped down before 60 s, electrical shocks were delivered for 15 sec. During the second test, animals were removed from shock free zone, if they did not step down for a period of 60 s. Retention was tested after 24 h in a similar manner, expect that the electric shocks were not applied to the grid floor observing an upper cut-off time of 300s. Mice were divided into 4 groups and each group consisted of a minimum of 6 animals. Separate animals were used for each experiment.

Group I: It represented the control group for mice. Vehicle was administered orally for seven successive days. Shock was delivered for 15 secs after 90 mins of vehicle administration on the day seven and SDL was noted after 24 h (i.e. on eighth day).

Group II: It represented the positive control group. Piracetam (200 mg/kg i.p.) Was injected to mice for seven successive days. Shock was delivered for 15 secs after 60 mins of i.p. injection on the day seven and SDL was noted after 24 h (i.e. on eighth day).

Group III: CPE (200, mg/kg, p.o.) was administered orally to the mice for seven successive days to young mice. Shock was delivered for 15 secs after 90 mins of extract administration on the day seven and SDL was noted after 24 h (i.e.
on eighth day).

Group IV: Modafinil (200 mg/kg, i.p.) was injected for seven successive days to mice. . Shock was delivered for 15 secs after 90 mins of extract administration on the day seven and SDL was noted after 24 h (i.e. on eighth day).

RESULTS:

EFFECT ON TRANSFER LATENCY (BY ELEVATED PLUS MAZE):

Treatment of reflected acquisition of learning behavior of animals. Where as TL of next day reflected retention of information or memory. Modafinil (200 mg/kg) administered for 7 days orally did not have any significant effect on TL of seventh day and eighth day in elevated plus maze test. The animals treated orally with 200 mg/kg of CPE showed remarkable reduction ($p<0.05$, $p<0.001$) in TL of seventh day as well as eighth day, indicating significant improvement in learning and memory

Table.1: Effect of the drugson transfer latencies of young mice in elevated plus maze

GROUP	TRANSFER LATENCY(S)	
	Learning	Memory
Normal control (NC)	24	21
Piracetam (PC)	12**	9**
C.P.E.	18*	16*
Modafinil (MF)	21	18

C.P.E Hydroalcoholic Extract of *C. pariera*

*** p< 0.05, ** p< 0.001 when compared with normal control**

EFFECT ON STEPDOWN:

LATENCY (USING PASSIVE AVOIDANCE PARADIGM):

Step-down Latency (SDL) of second day/eighth day of drug treatment reflected the long-term memory of animals. Modafinil (200 mg/kg, p.o.) did not exert any significant effect on SDL of mice as compared to control group . On the other hand, CPE 200 mg/kg administered orally in mice for 7 days markedly ($p<0.05$, $p<0.001$) increased SDL as compared to the control group of mice.

Table.2: Effect of drugs on passive avoidance paradigm

GROUP	STEP DOWN LATENCY(SDL)
Normal control (NC)	120
Piracetam (PC)	240**
C.P.E.	190*
Modafinil (MF)	150

Percentage expressed in MEAN±SEM (n=6) ANOVA followed by Dunnett's Test
*** p < 0.05, ** p < 0.001 when compared with normal Control**

CONCLUSION:

Several complications like Alzheimer's disease are neurodegenerative disorder, which is slow in onset but relentless in progress. It is characterized by aphasia, apraxia and agnosia with the
loss of memory as the main symptom. Despite the severity and prevalence of this disease, allopathic system of medicine is yet to provide a satisfactory drug. Therefore, we were motivated to explore the potential of medicinal plants to manage this deadly disease. In the present study CPE extract administered orally for 7 days improved learning and memory of mice significantly reflected by diminished TL and enhanced SDL values as compared to control animals. We have also studied Modafinil for its possible neuroprotective role in mental conditions , but studies suggest that Modafinil is not as potent a neuroprotective as piracetam and C.pariera , which is evident by the results of Elevated plus maize, and Passive avoidance test on mice. Thus these findings suggest the possible neuroprotective role for *C.pariera.*

REFERENCES:

1. Pramodinee D .Kulkarni ,Mahesh m.Ghaisas , Niranjan d Chivate ,9 feb 2011.
2. Jewart RD, Green J, Cognitive, Behavioral, and physiological changes in Alzheimer's disease patients as a function of incontinence medication. Am J Geriatr Psychiatry 2005, 13:324, 8.
3. Becker R, Giacobini E. Acta Neurol.Scand. 1988, 116, 19-32.
4. Silman I, Sussaman J.Curr.Opin.Pharmacol. 2005, 5, 293-302.
5. Amresh G, Reddy GD.Ethnomedical value of *Cissampelos pariera* extract in experimentally induced diarrhea. Acta Pharm 2004, 54, 27-35.
6. Amresh G, Reddy GD, Rao CV. Evaluation of anti-inflamatory activity of *Cissampelos pariera* root in rats. Journal of Ethno. 2007, 110, 526-531.
7. Amresh G, Singh PN, Rao CV. Antinociceptive and antiarthritic activity of *Cissampelos pariera* roots .Journal of Ethno.2008, 116, 531-536.
8. Amresh G, Singh PN, Rao C. Toxicological screening of traditional medicine Laghupatha in experimental animals. Journal of Ethno.2007, 111, 454-460.