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Supratim Barman
Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Monit Pal
Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Mritunjoy Majumder
Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Anindya Bagchi
Assistant Professor, Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Anusree Raha
Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Prosenjit Mukherjee
Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Correspondence
Anindya Bagchi
Assistant Professor, Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha, West Bengal, India

Activity of ginseng on central nervous system

Supratim Barman, Monit Pal, Mritunjoy Majumder, Anindya Bagchi, Anusree Raha and Prosenjit Mukherjee

Abstract
The experiment was done on albino Wister rat in elevated plus maze and Rotarod apparatus by using dried ginseng roots from which it can be stated that the *Panax ginseng* has CNS stimulant properties. In elevated plus maze apparatus the P ginseng and caffeine treated animals shows increased numbers of entries than the untreated or controlled animals. In other hand in rote rod apparatus the animals treated with caffeine and P. ginseng spend more time on rod than the controlled or untreated animal. From the above findings it was evident that the *Panax ginseng* extract has shown significant CNS stimulant activity as the results were statistically calculated.

Keywords: CNS stimulant, ginseng, rotarod, wistar rat, significant value

Introduction
Ginseng is a medicinal plant widely used for the treatment of various conditions. The pharmacological effects of ginseng have been demonstrated in cancer, diabetes, cardiovascular diseases and have been used for promoting immune function, central nervous system (CNS) function, relieving stress, and for its antioxidant activities [1]. The root of *Panax ginseng* C. A. Meyer, which is known as Korean or Asian ginseng, is a valuable and an important folk medicine in East Asian countries, including China, Korea, and Japan, for more than 2000 years. *P. anax*is derived from the word "panacea," which means a cure for all diseases and a source of longevity as well as physical strength and resistance. As the use of traditional Chinese herbs for medicinal and dietary purposes becomes increasingly popular in Western countries, sales of *P. ginseng* are increasing in North America and Europe as well as in other parts of the world.
The major bioactive components of *P. ginseng* are the ginsenosides, a group of saponins with dammarane triterpenoid structure [2]. Almost 50 ginsenosides have been isolated from *P. ginseng* root (white and red ginsengs), and novel structures continue to be identified, particularly from *Panax quinquefolius* (American ginseng) and *Panax japonica* (Japanese ginseng) as well as their berries [3-6]. In this chapter, we review the structural and pharmacological properties of ginseng, and its active constituents, including ginsenosides, polysaccharides, and polyacetylene alcohols. The pharmacological and clinical usages of ginseng, particularly ginsenosides, are discussed in relation to its anticancer, antidiabetic, immunomodulatory functions, and improving CNS functions including learning, memory, and neurodegenerative diseases.

Review on *Panax ginseng*
Ginseng (*Panax Ginseng*)
Kingdom- Plantae
Subkingdom- Tracheobionta
Super division- Spermatophyta
Division- Magnoliophyta
Class- Magnoliopsida
Subclass- Rosidae
Order- Apiales
Family- Araliaceae
Genus- *Panax L*
Synonyms: Ninjin, Pannag, Panax.
Biological source: Ginseng is the dried root of various species of panax, like *P. ginseng* (Korean ginseng), *P. japonica* (Japanese ginseng), *P. notoginseng* (Chinese ginseng) and *P*

quinquefolium (American ginseng), belonging to family Araliceae. Geographical source: *Ginseng* is found in cooler climates: *Korean ginseng* (P. *ginseng*) native to *Korean* Peninsula, Northeast China, and Russian Far East, and American *ginseng* (*P.quinquefolius*) native to Canada and the United States. Although some species grows in warm regions. South China *ginseng* (P. notoginseng) native to Southwest China. In India it is cultivated in Kohima, Tunsang district of Nagaland.

Material and methods

Collection of plant material

Dried ginseng roots were provided by N.P Dutta and sons. Kolkata and preserved.

Extraction

The roots were hand grinded by using hand grinder and the coarse powder were subjected for cold percolation by using 70% hydro-ethanolic mixture and the extract obtained were dried by open air evaporation.

Animals

Female albino Wister rat weighting between 50-100gm will use throughout the experiment. Animals will be maintained under slandered conditions in an animal house under 12 hour's light and dark cercal. The animals are then divided into three groups, each group contains 3 animals. Group 1 was untreated, group 2 was treated with Caffeine and group 3 was treated with *Panax ginseng*.

Model

Rotarod apparatus: One of the important pharmacological actions of benzodiazepine class of drugs is muscle relaxing property. The skeletal muscle relaxation together with taming or calming effect, these agents reduces anxiety and tension. The loss of muscle grip is an indication of muscle relaxation. Clonazepam (4mg/kg, i.p) was given to the mouse to produce anti-anxiety and muscle relaxation suspended in gum acacia or carboxymethylcellulose. The Rotarod apparatus is to be set at 20-25rpm and after 30 minutes of drug injection. The ideal effect of the drug could be seen. Stock Solution: The stock solution was prepared containing 0.4mg/ml of drug and 1ml/100 gm body weight of the animal was given to those animals.

Elevated plus maze apparatus

Elevated plus maze is the simplest apparatus to study anxiolytic response of almost all type of anti-anxiety agents. Animals have affinity towards high and open space and prefer enclosed arm when animal enters open arm they become immobile, defecate and show fear like movements. Clonazepam (2mg/kg, i.p) suspended in 1% w/v gum acacia or carboxymethylcellulose. The different groups of untreated, standard and test mice are placed in the maze and their time spending in open or closed arms are recorded. When treated with antianxiety agents the anxiety of the mouse reduces and its spending of time in open area increases.

Stock solution

The stock solution was prepared containing 0.2mg/ml of the drug and 1ml/100gm of the body weight of the animal was given to these animals.

Result and Discussion

In Rotarod model control has shown 47 ± 0.866, whereas the caffeine treated group has shown significant increase in falling time i.e. 107 ± 0.347, when the P ginseng treated group was evaluated it has also shown significant increase in falling time 95 ± 0.448 while compared with the untreated control

Table 1: Results from Rotarod model

Treatment	Time spent in rotarod
Control	47 ± 0.866
Caffeine	107 ± 0.347***
Ginseng	95 ± 0.448***

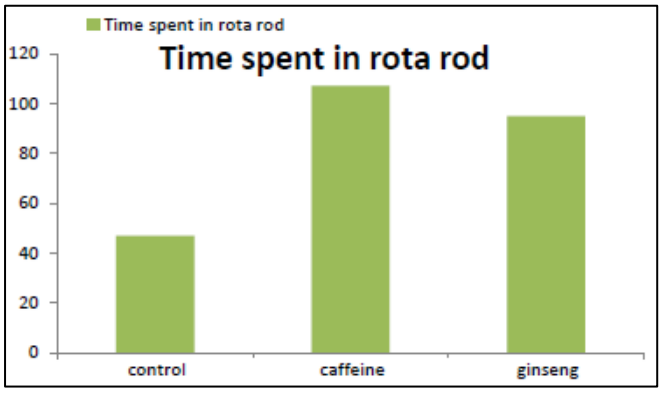

Fig 1: Time spent in rota rod

In the elevated plus maze apparatus control has shown 5± 0.336 number of entries, whereas the number increased in the case of caffeine treated group, 9± 0.661. And the ginseng treated group also has shown significant increase in number of entries while compared with the untreated control.

Table 2: Results from elevated plus maze

Treatment	Time spent in rotarod
Control	5 ± 0.366
Caffeine	9 ± 0.661***
Ginseng	8 ± 0.254***

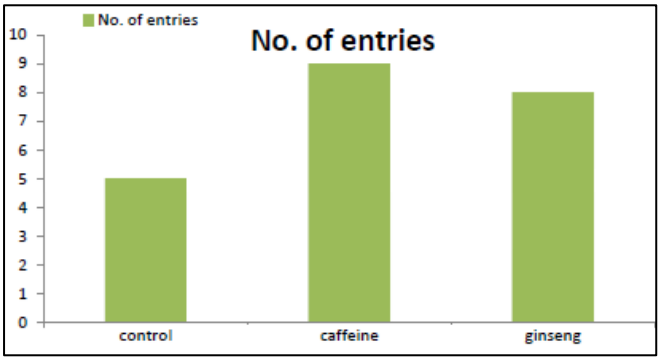

Fig 2: No. of entries

A drug or compound which stimulates the CNS, used to increase its motor activity which all are controlled by centrally. More time spend in Rotarod apparatus or more number of entries in elevated plus maze apparatus are the parameters, which proves the over activity of CNS. A drug which revert these parameters can be stated as CNS

depressants. From the above findings it is obvious that *Panax ginseng* is having potent CNS stimulant activity comparable with the standard drug caffeine.

Conclusion

From the above experiment done on albino Wister rat in elevated plus maze and Rotarod apparatus by using dried ginseng roots which were provided by N.P Dutta and sons. Kolkata and preserved, it can be stated that the *Panax ginseng* has CNS stimulant properties. In elevated plus maze apparatus the P ginseng and caffeine treated animals shows increased numbers of entries than the untreated or controlled animals. In other hand in rote rod apparatus the animals treated with caffeine and P ginseng spend more time on rod than the controlled or untreated animal. From the above findings it was evident that the *Panax ginseng* extract has shown significant CNS stimulant activity.

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