NOOTROPICS

छत्रपति शाहू जी महाराज विश्वविद्यालय कानपुर
CHHATRAPATI SHAHU JI MAHARAJ UNIVERSITY KANPUR
आरोह तमसो ज्योति:

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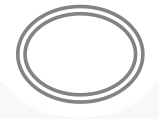

- Introduction
- Classification
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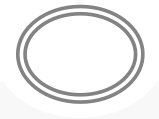
NOOTROPICS

- Nootropic is a compound that increases mental functions including Memory
- Motivation
- Concentration
- Attention

How do Nootropics work



- Increase in Brain metabolism
- Increased Cerebral circulation
- Protection of brain from Chemical damage

CLASSIFICATION

1. Cholinergic activator
   - Rivastigmine
   - Donepezil
   - Galantamine
2. Glutamate antagonist
   - Memantine
3. Miscellaneous
   - Piracetam
   - Pyritinol

Screening Methods

- In Vitro
- Inhibition of acetyl cholinesterase activity in rat striatum
- In Vivo
- Avoidance learning
  - Passive Avoidance
  - Active Avoidance

In vivo

Avoidance Learning

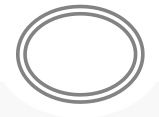
Active Avoidance:

• Active performance of a certain response prevent the dislike stimulus.

Passive Avoidance

- Withholding a response prevents the dislike outcome.

Passive Avoidance



- The testing apparatus is a trough-shaped alley divided into two distinct compartments that are separated by a sliding door.
- The white, brightly lit compartment is free of aversive stimulation whereas the black, dark compartment is equipped with shock capability.
- The training trial begins by placing the animal in the white compartment facing the door.
- The door is opened to allow access to the dark compartment.
- The latency to enter the dark compartment is recorded.

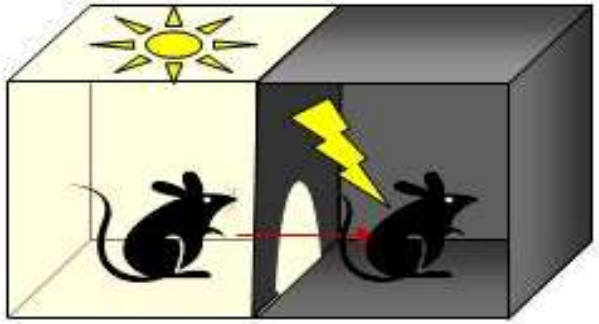
- When the animal steps into the dark compartment with all four paws, the door is closed and a 1-2 second foot shock is delivered
- The animal remains in the dark compartment for an additional 10 seconds after the termination Of the aversive stimulus before being removed and placed back into its home cage.
- The apparatus is cleaned with 70% ethanol in between animals,

Test Trial

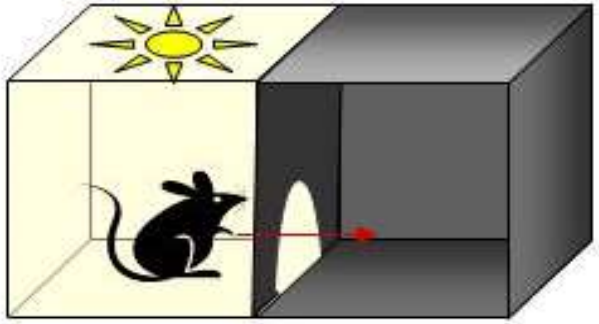
- At the time of the test trial (usually 1-7 days after training), the animal is again placed inside the white compartment and the door is raised to allow access TEST to the dark compartment.
- The latency to re-enter the dark compartment is recorded; however, there is noaversive stimulus applied to animal upon re-entry into the dark compartment during testing.

Step-Through Passive Avoidance

Train

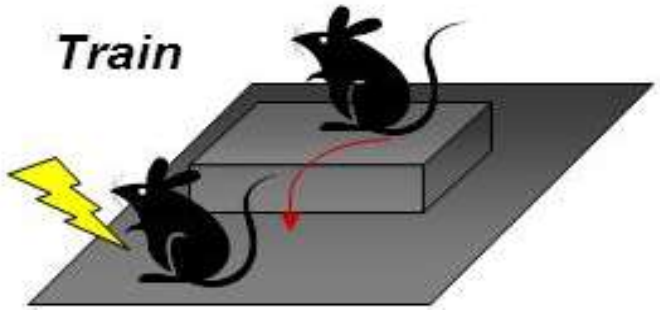


Test:
measure time to step through

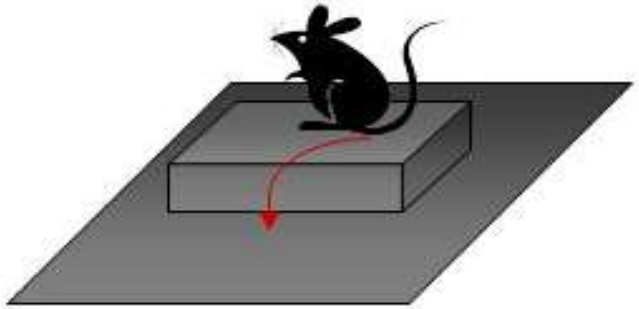


Step-Down Passive Avoidance

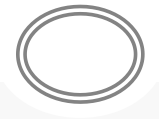
Train



Test:
measure time to step down



Active Avoidance



- In this task, animals are placed in a two-compartment shuttle box and have to learn the association between a conditioned stimulus (CS, e.g. light)
- Conditioned response/Avoidance Subjects give a conditioned response when they avoid receiving the shock, by moving to the opposite compartment during the CS presentation (avoidance response).
- Unconditioned response/Fscape If animals do not act, footshock is delivered, but can be escaped by moving to the opposite compartment (escape response).
- This escape deficit can be prevented by administering nootropics.

Active Avoidance Paradigm

Shuttle Box
Active Avoidance

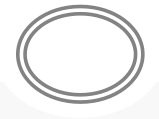
Train

Test:
Can the animal avoid the shock?

Evaluation

- The time the animal need to reach the safe area on both days is measured.
- An addition numbers of errors are recorded.(not reaching the safe area).

APPLICATIONS



- Nootropics used in Ayurvedic traditional medicine to Improve memory.
- Eg- Brahmi
- Nootropics is purported to treat or prevent the following health problems:
- Alzheimer's disease
- Anxiety
- Central nervous system disorders (such as epilepsy)