

CUBE National Meet 2022
Date : 28th june 2022



Giant African Land Snail

Lissachatina fulica

INTRODUCTION

1. Learning & Memory
2. Habituation(Eric Kandel's Exp)



F7. SNAIL DURING CONTROL VERSUS CONTROL OLFATORY ASSAY

Pic Credit: Manasi & Anjani, Elphinstone CUBE lab

Phyllum: Mollusca
Class: Gastropoda



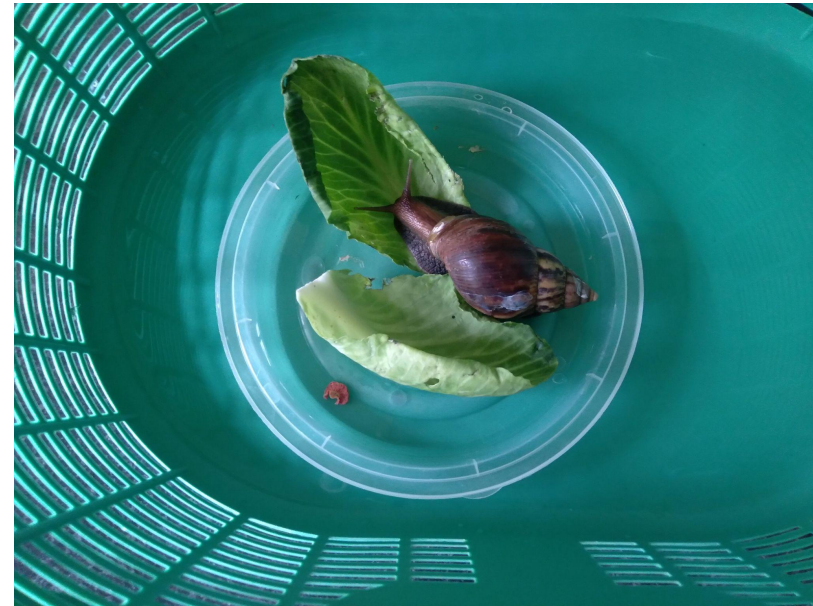
Pic Credit: Aarushi, CUBE St.Xavier's College

HOW TO CULTURE SNAILS ?

- Feed: Cucumber / coriander / cabbage
- Set-up: Keep in a cage with a plate for feed
- Provide water in cage.

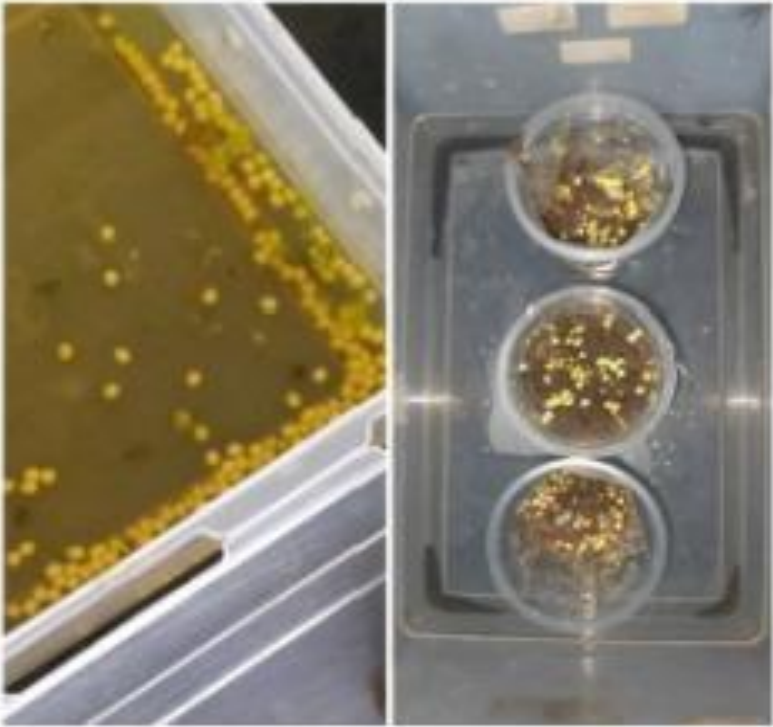


Pic Credit: Manasi & Anjani, Elphinstone CUBE lab



Pic Credit: Gaurav, Somaiya CUBE Lab

Snail Culture



Snail Eggs!!



Young snail feeding on cucumber

RESEARCH QUESTIONS AND OBJECTIVES

1. To study learning and memory in snails (*Lissachatina fulica*)
 - a. To prepare olfactometer
 - b. To prove that snails eat coriander
 - c. To induce a change in behaviour of snails
2. To study habituation and sensitization in snails

To study learning & memory in *Lissachatina fulica*

1. Calibration of olfactometer: [D/W vs D/W assay]
2. To prove that snails are attracted towards the smell of coriander [T vs D/W (1)]
3. Quinine conditioning
4. To prove that snails are not attracted to the smell of coriander [T vs D/W (2)]
5. Short term & Long term memory

Sense of
Smell

OLFACTORY ASSAY

Test

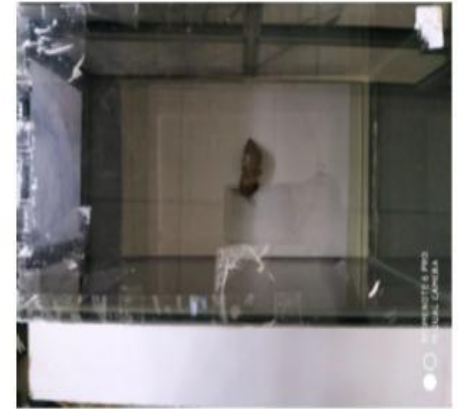
Olfactory assay is done to check the preference of snails towards specific odours.



Assay paper

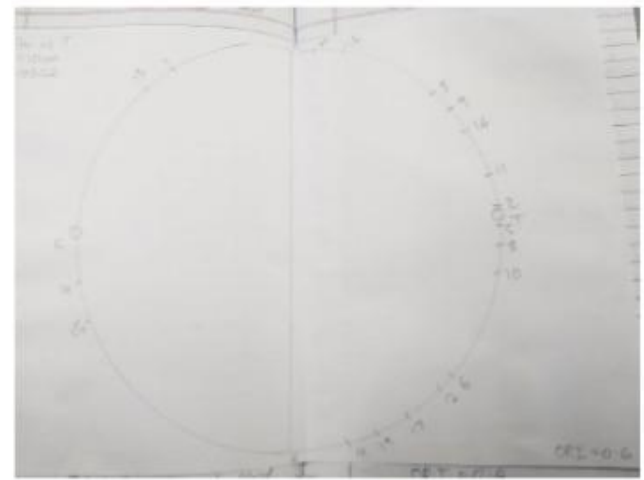
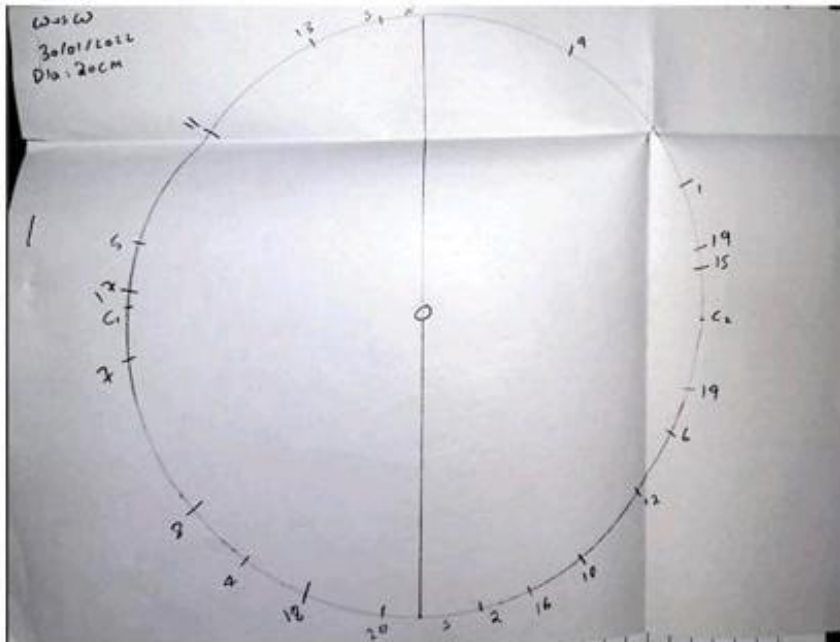


F8. OLFACTOMETER



F9. OLFACTORY SETUP

Olfactometer



T vs
D/W
(1)



T vs
D/W
(2)

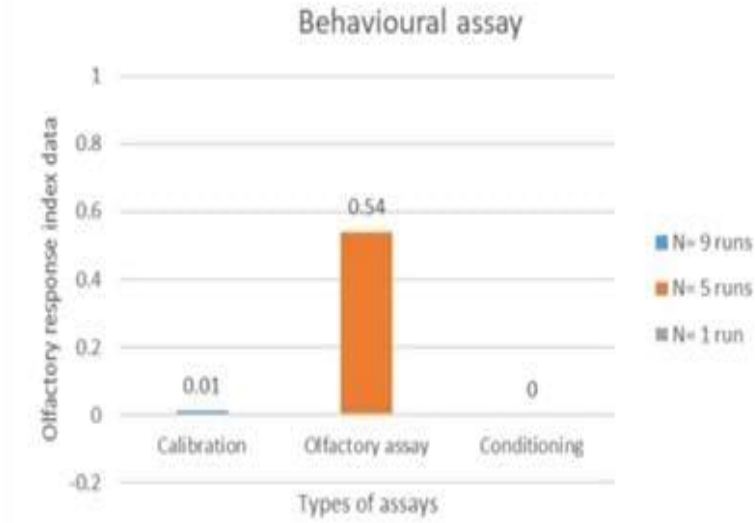
Assay paper

Data Credit: Manasi & Anjani, Elphinstone CUBE lab

RESULTS

1. D/W vs D/W: Random & equally distributed runs in both hemispheres, indicating that the olfactometer is calibrated (no interfering smell)
2. T vs D/W (1): Maximum runs towards coriander extract indicating that they are attracted towards the smell of coriander. They associate the good smell of coriander with the taste of coriander
3. T vs D/W (2): Maximum runs towards distilled water (away from coriander) indicating that they are no longer attracted to the smell of coriander. They associate the good smell of coriander with bad taste of coriander

Olfactory Response Index



Olfactory Assay with conditioned snails - 24 hrs.

>0: Attraction
<0: Repulsion



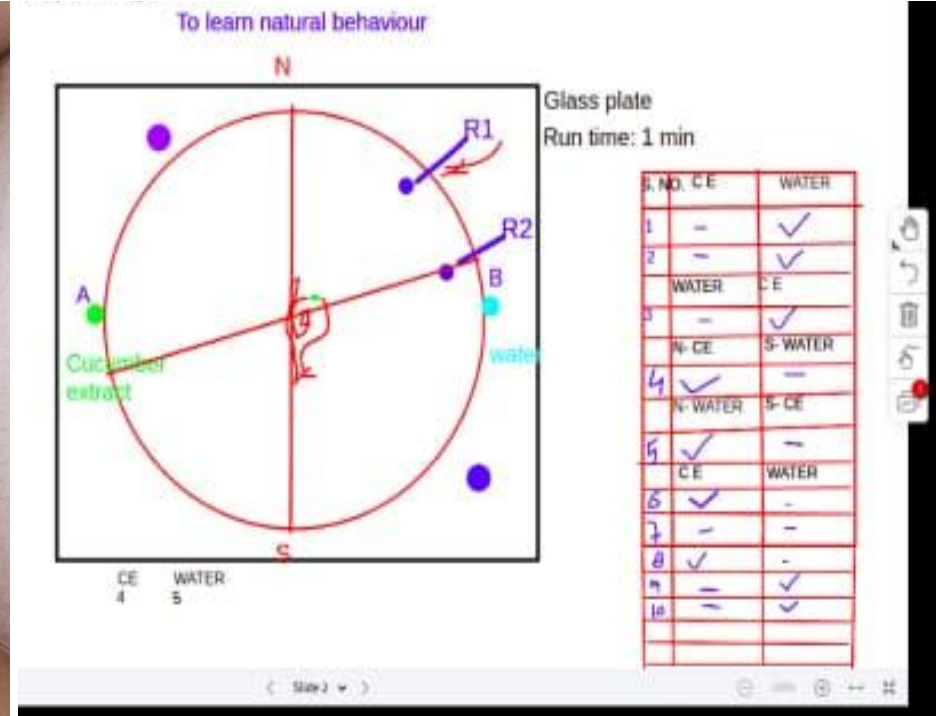
Olfactory Assay with conditioned snails - 48 hrs.

Goof-Ups !!



Cucumber extract vs Water

Pic Credit: Aliza, Somaiya CUBE Lab



CUBE ChatShaala 15.02.22

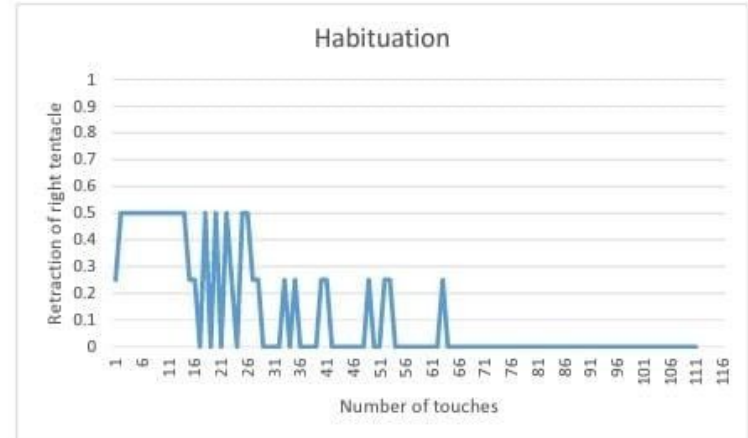
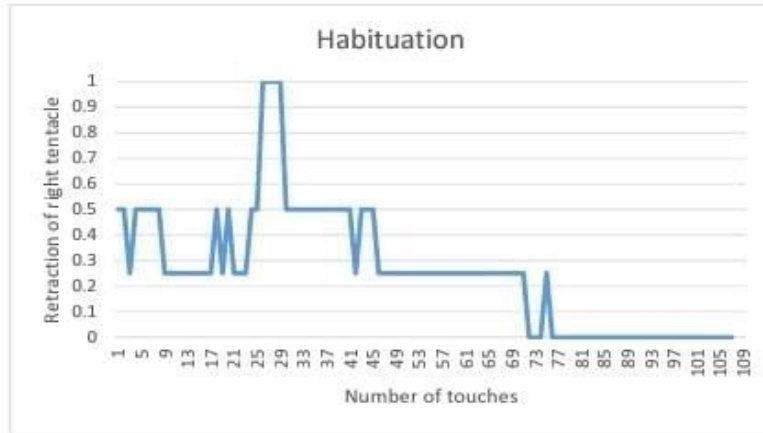
MEET OUR SNAIL, EDDY!

WHAT DID WE DO?



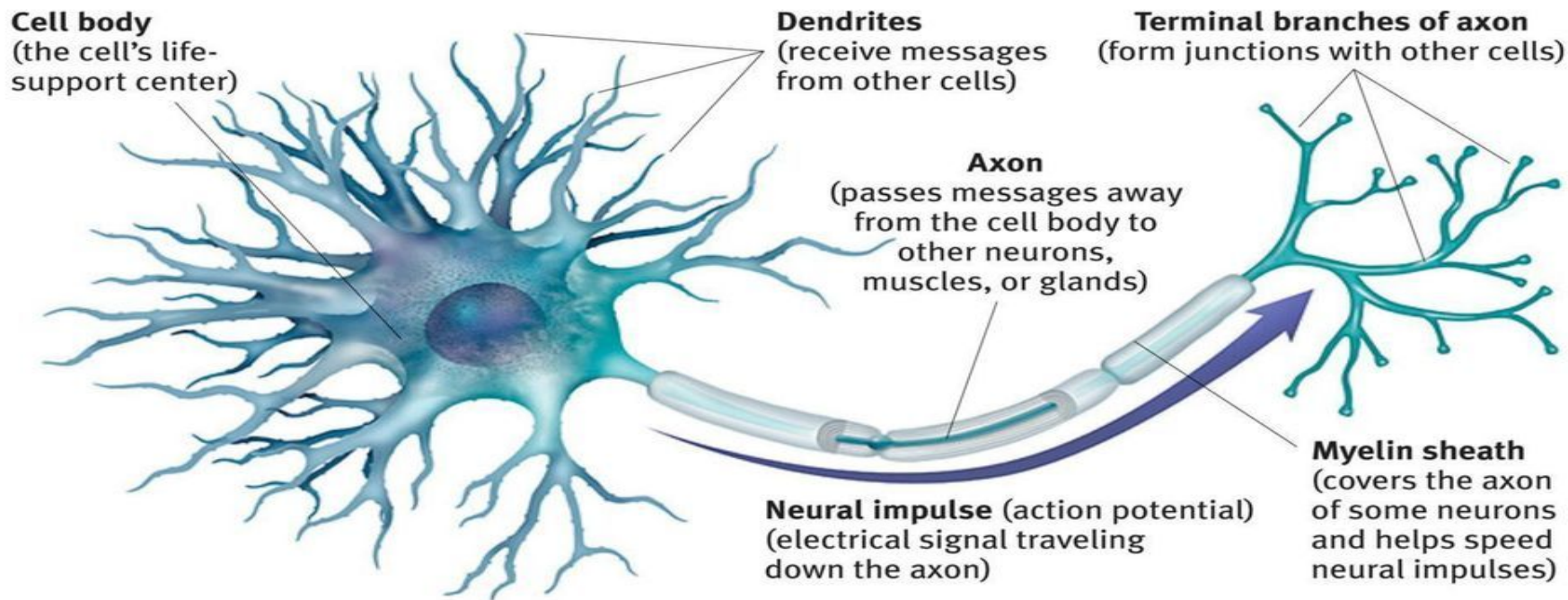
Credit: Aarushi, CUBE St. Xavier's College

Two assays performed on two different days



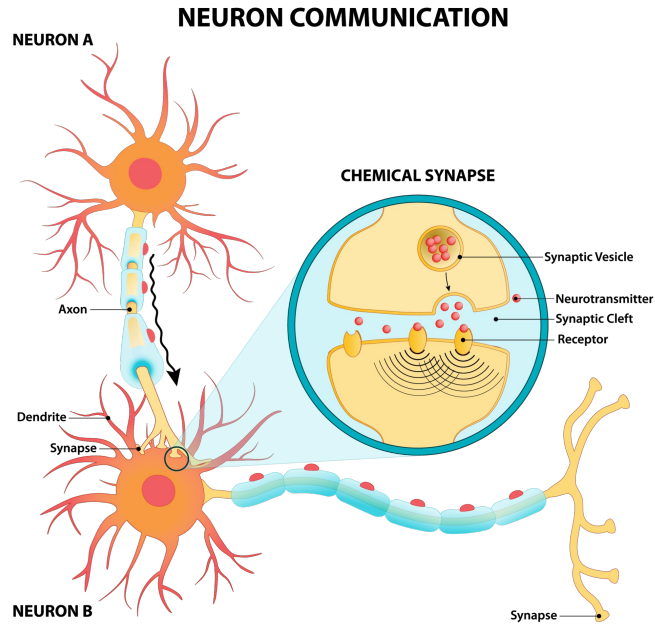
Credit: Manasi, Elphinstone CUBE lab

Neurons and Neuronal Communication: The Structure of a Neuron



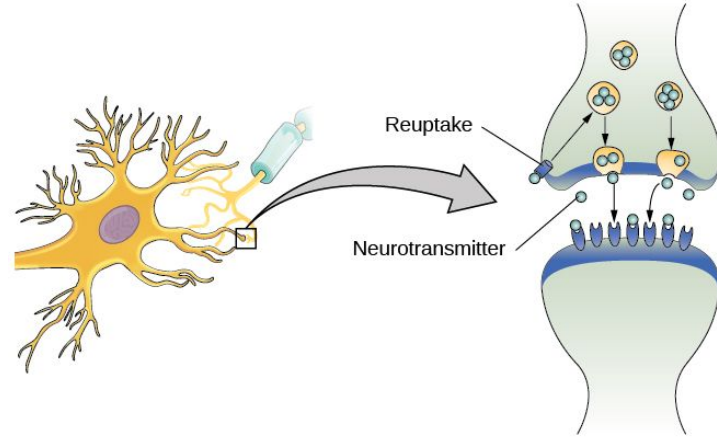
There are billions of neurons
(nerve cells) throughout the body.

How Neuronal Connections work ?



One neuron to the next neuron

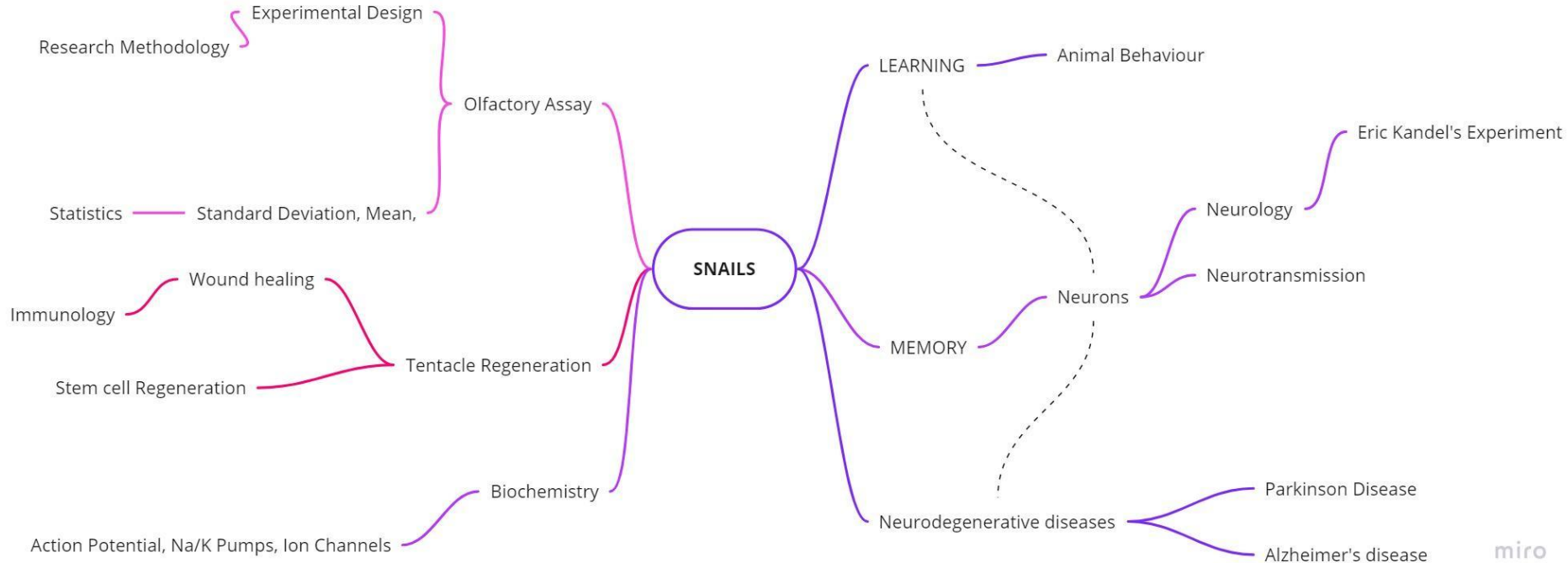
Source: <https://mhanational.org/neurons-how-brain-communicates>



A neuron receiving the signal via dendrites

Source: <https://courses.lumenlearning.com/waymaker-psychology/chapter/reading-neural-communication/>

Context 2 Curriculum CONCEPT MAP



FUTURE PLANS

- 1) Protein isolation from conditioned and unconditioned snail, identifying the protein responsible for memory development.
- 2) Effect of age on learning abilities.
- 3) Effect of age on memory formation
- 4) Development of neurons during infancy and correlation with no robust memories of infancy: INFANTILE AMNESIA
- 5) Isolating neurons from *Achatina fulica*
- 6) Culturing neurons from hippocampus of *Achatina fulica* and observing developing synaptic connections.
- 7) Studying the interaction of neuronal cells.
- 8) Studying neurons on molecular level
- 9) Studying neuron degeneracy on molecular level
- 10) Developing neuron staining techniques
- 11) Tentacle amputation and regeneration

COLLABORATORS

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- Ashritha, CUBE St.Xavier's College, Mumbai
- Anjani Kumar Kashyap, CUBE Elphinstone, Mumbai

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Dr. M.C.Arunan, CUBE Mumbai
Batul Pipewala, CUBE Kolkata
Mayur Gaikwad, CUBE Mumbai
Dr. Subhojit Sen, CUBE Mumbai

Thank you.