

EARTHWORM



CUBE NATIONAL MEET-2022

Classification

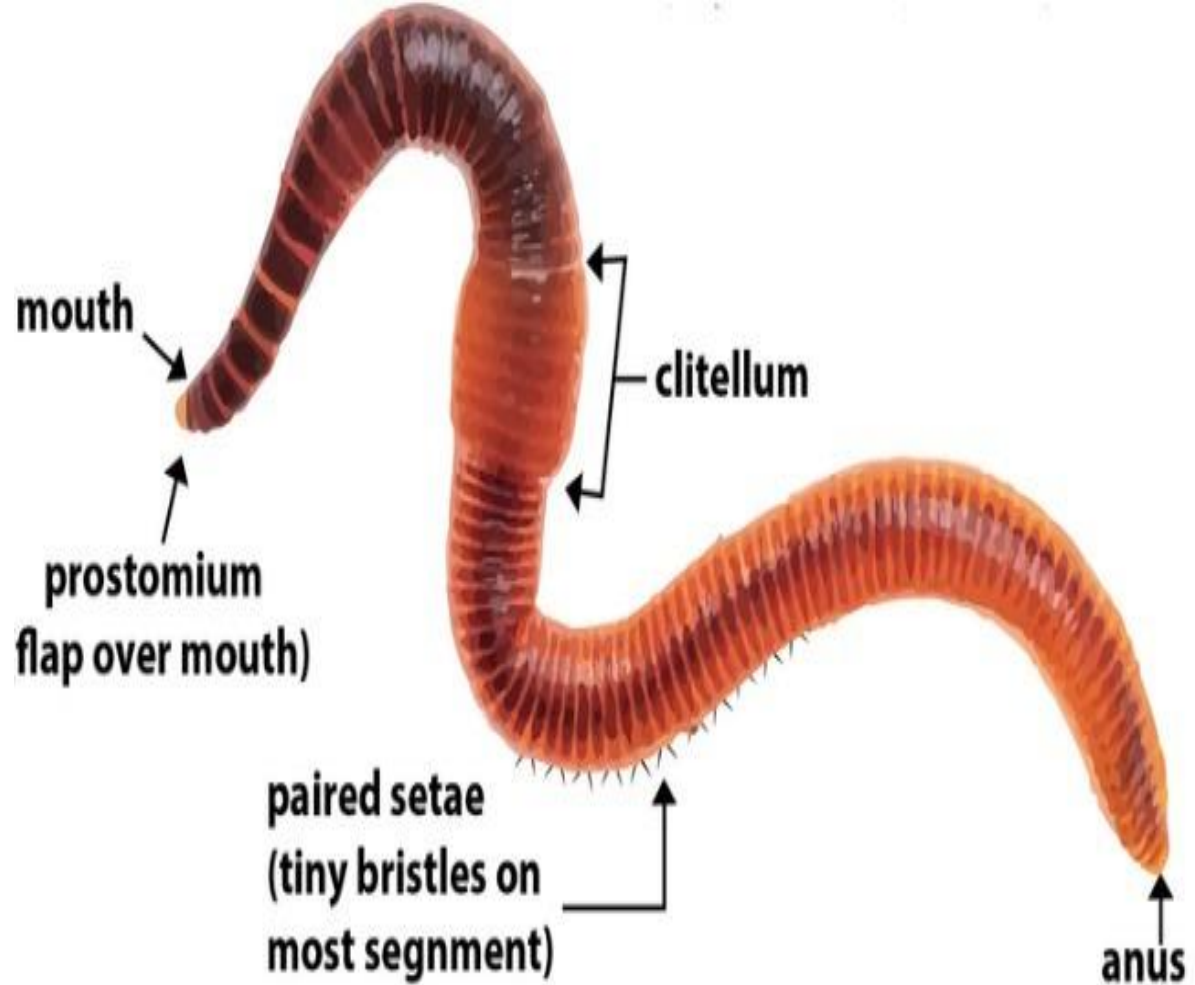
Kingdom: ***Animalia***

Phylum: ***Annelida***

Class: ***Clitellata***

Order: ***Opisthopora***

<https://en.m.wikipedia.org/wiki/Earthworm>



Earthworm a.k.a. Farmer's friend

Earthworms in soil setup



D-1



D-6



D-23

Earthworm in Fruit peel set-up



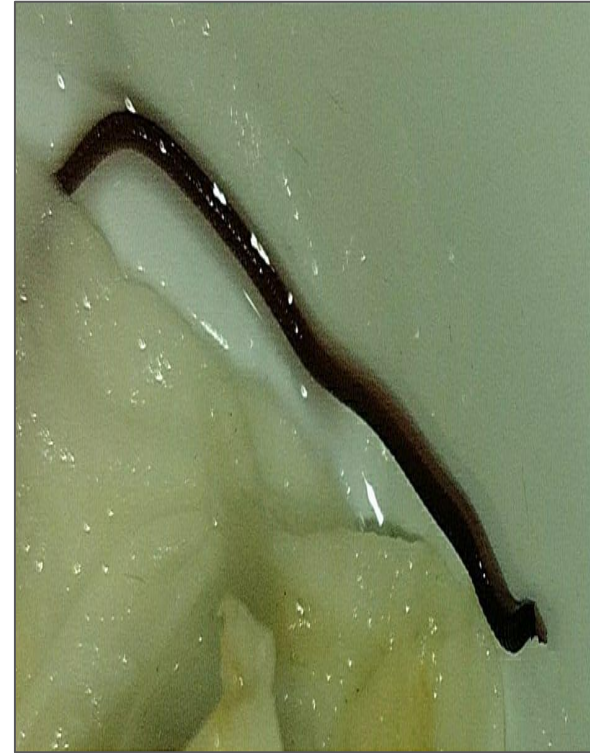
Earthworm in Tissue paper set-up



D-1



D-4



D-23

Goof-ups

- **Improper setup**
- **Lack of moisture in Setups**

MAKING CUP CULTURE



Video captured by Sachin Pradhan in HomeLab Palghar.



**Misbah's HOMELAB
Pune**



Iram's HOMELAB Mumbai

Why Earthworm?

- ❑ **Easy to find**
- ❑ **Easy to culture and Maintain**
- ❑ **Earthworms have Cerebral Ganglion which acts as a simple brain.**
- ❑ **They also have PNS and CNS like humans**
- ❑ **Earthworms and Humans both have closed Circulatory System.**

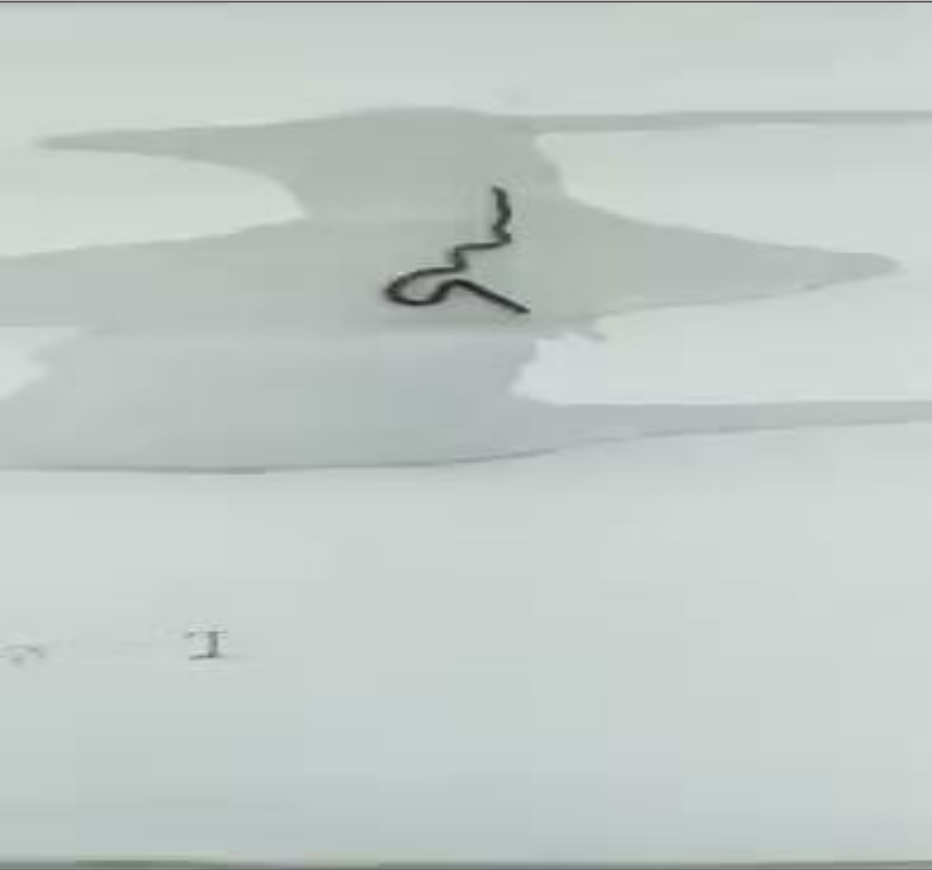


RESEARCH QUESTION

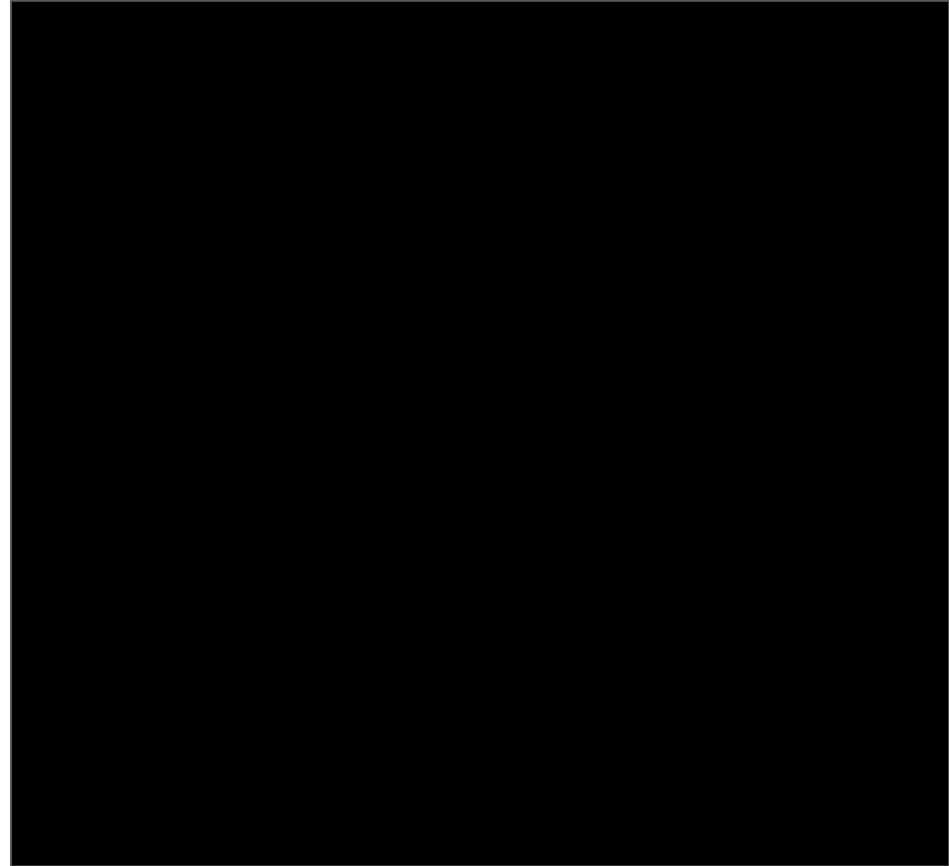
- Earthworm's behavior towards saltwater
- Regeneration In Earthworms
 - Ventral Nerve Cord Regeneration
 - Body Regeneration



Tested Earthworm's behavior towards salt-



With water

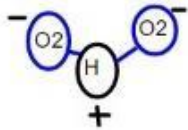


With saltwater

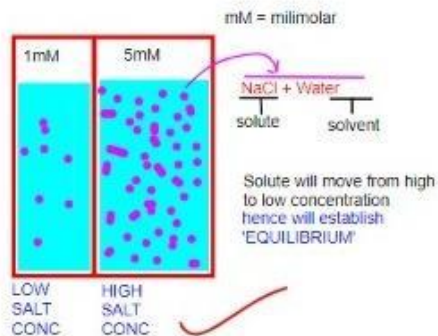
Earthworm Model system

How does earthworm regenerate

Hydrophilic = water loving



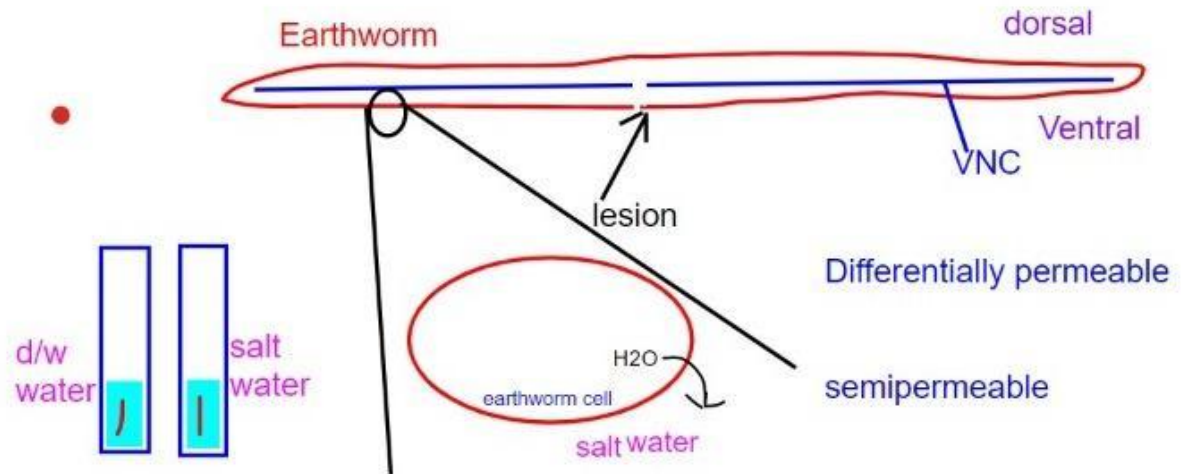
THE CONFUSION OF DIFFUSION



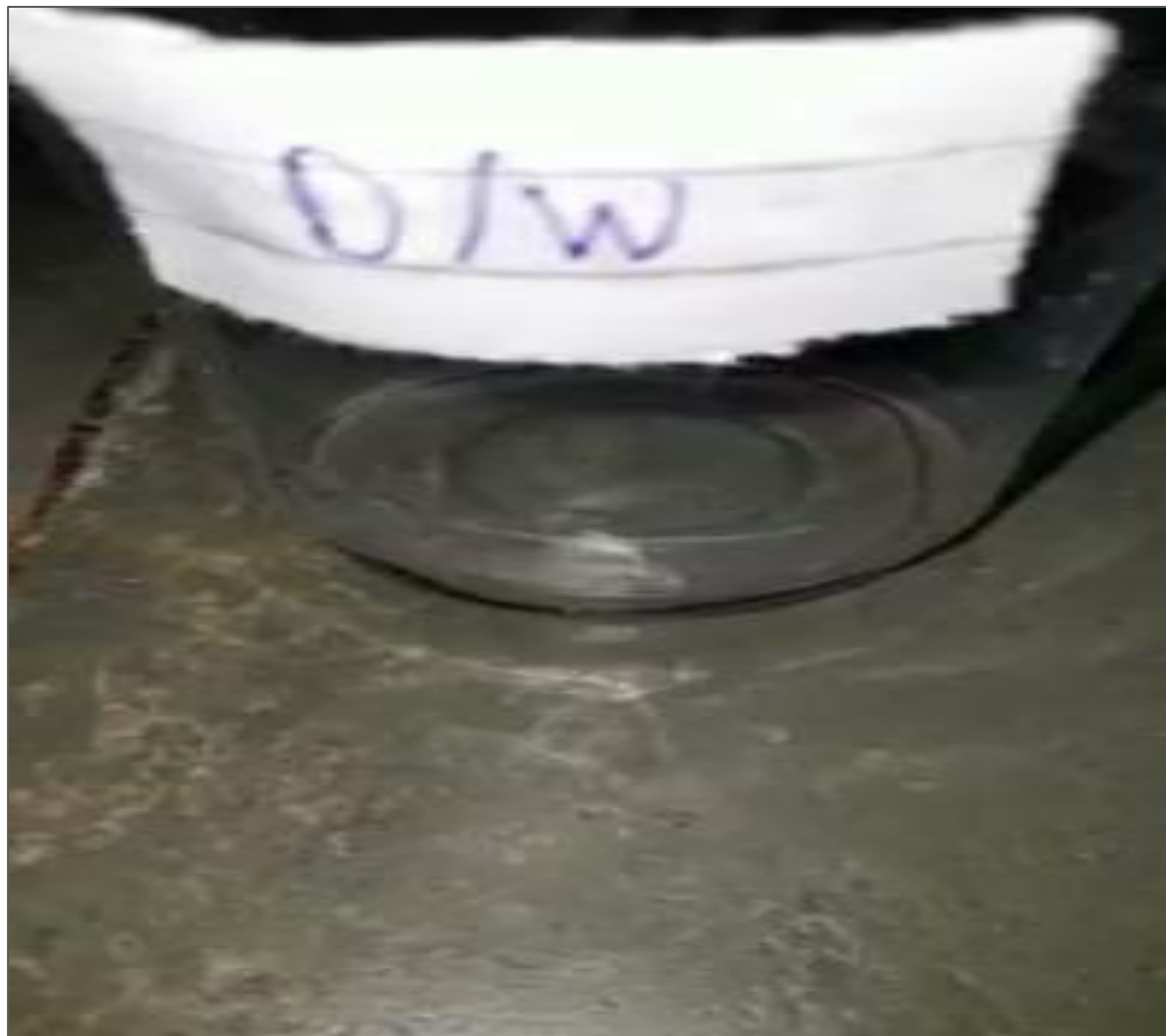
Ventral Nerve Cord

Spinal Cord

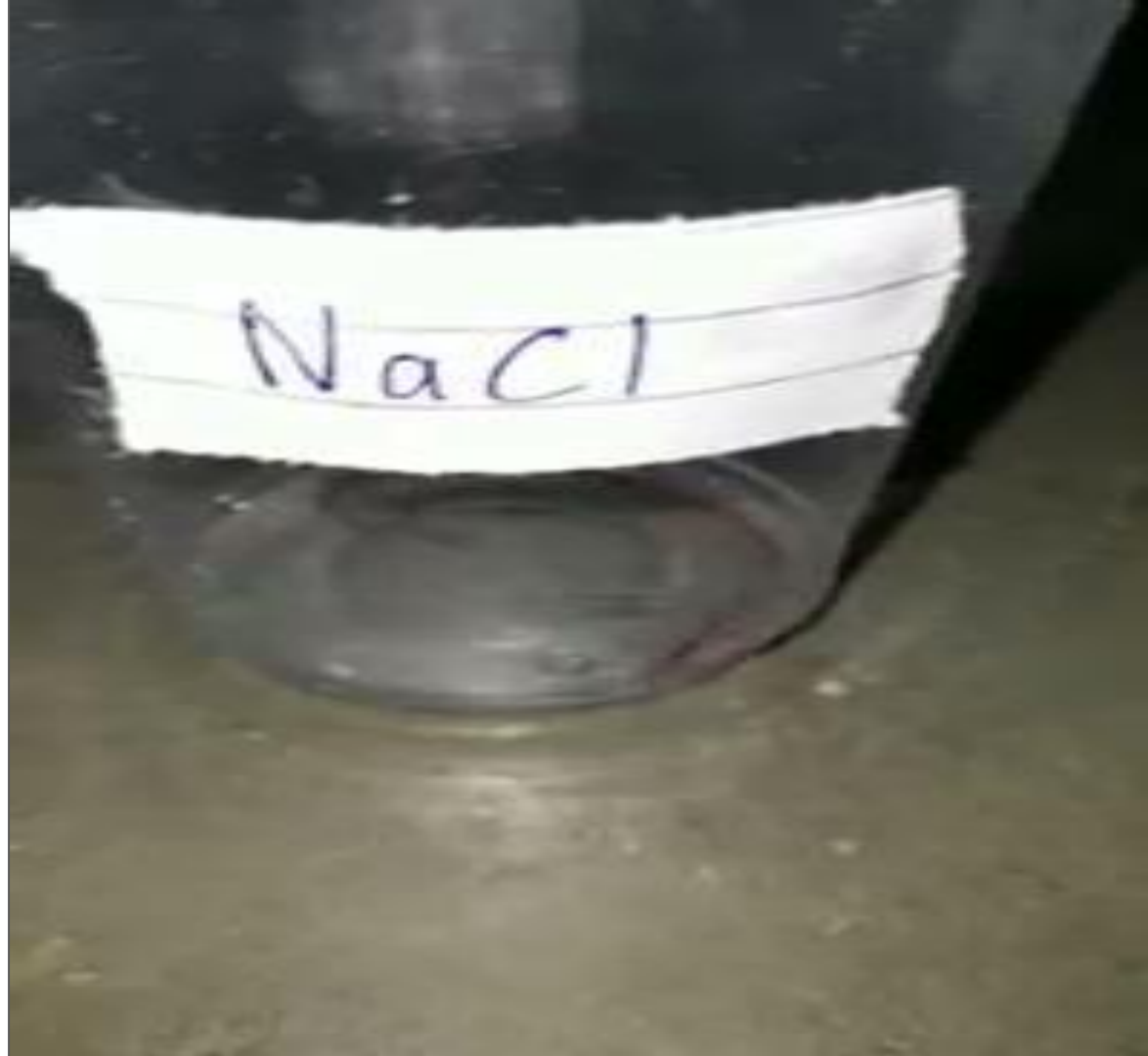
Control and Coordination



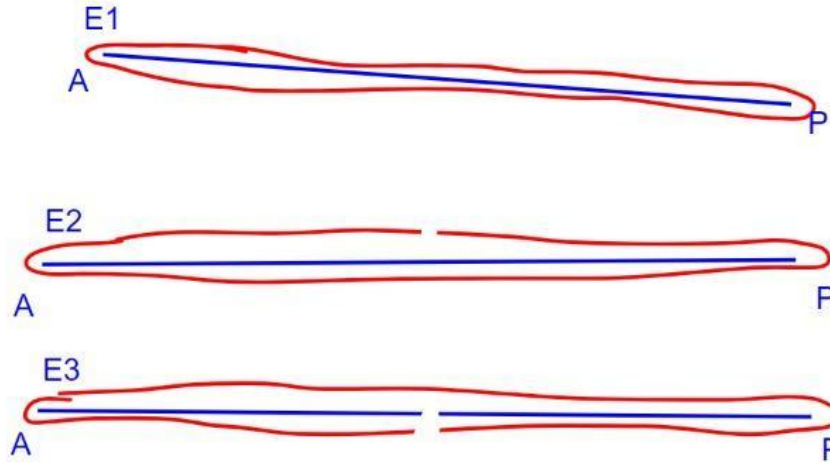
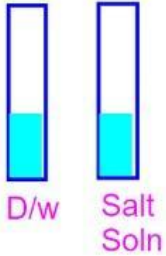
Cup-1
Distilled water



Cup-2
Salt Solution



RER Test



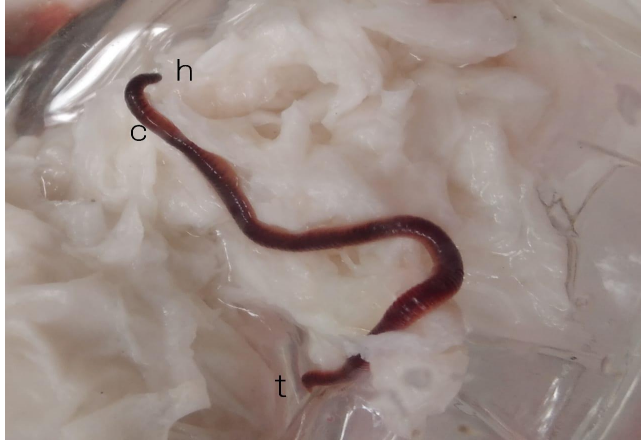
Earthworm will comeout
Before VNC Lesion

RER before Lesion

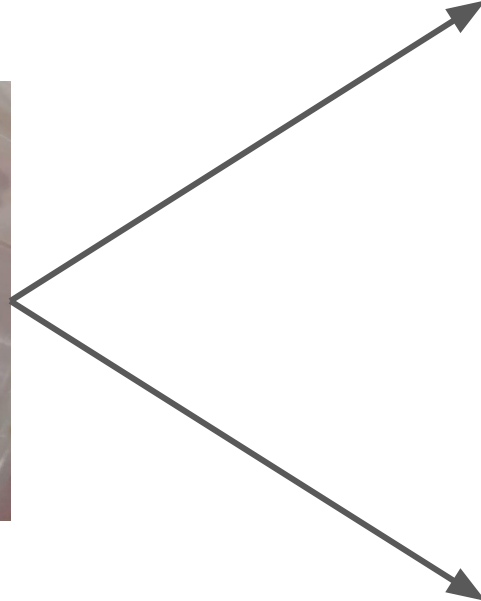
if Eworm that give quick response
are healthy.
if Eworm give late response are not
that healthy

RER (On Day of lesion)

E1- will escape quickly
E2- will escape quicky
E3- Wont be able to come out



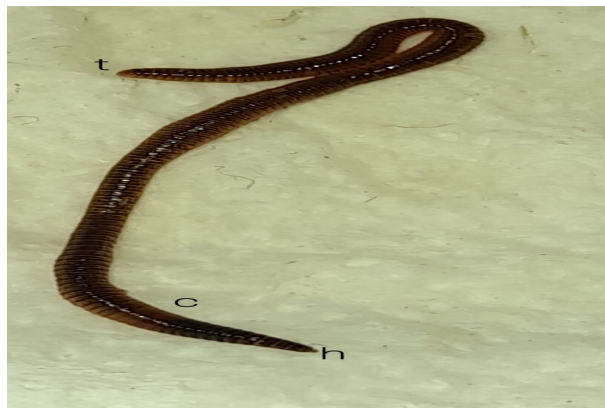
Mature Earthworm



**Head piece
(with
Clitellum)**



**Tail piece
(without
Clitellum)**



E1HP



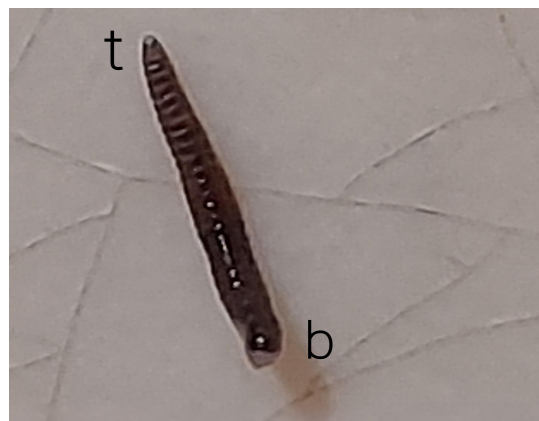
E2HP



E3HP



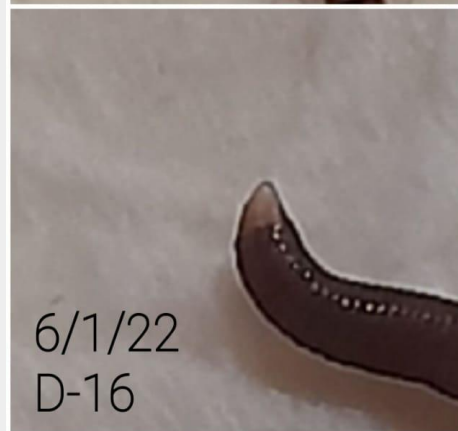
E1TP



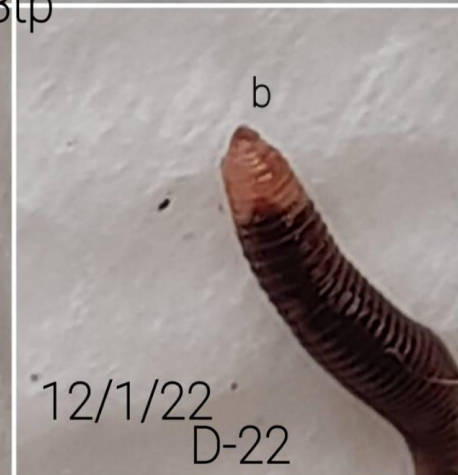
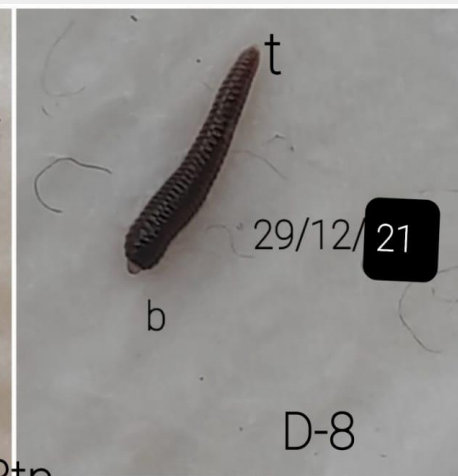
E2TP



E3TP



E3HP



E3TP

Regeneration [edit]



Close up of an earthworm in garden soil

Earthworms have the ability to regenerate lost segments, but this ability varies between species and depends on the extent of the damage. Stephenson (1930) devoted a chapter of his monograph to this topic, while [G. E. Gates](#) spent 20 years studying regeneration in a variety of species, but "because little interest was shown", Gates (1972) published only a few of his findings that, nevertheless, show it is theoretically possible to grow two whole worms from a bisected specimen in certain species.

Gates's reports included:

- [Eisenia fetida](#) (Savigny, 1826) with head regeneration, in an anterior direction, possible at each intersegmental level back to and including 23/24, while tails were regenerated at any levels behind 20/21; thus two worms may grow from one.^[40]
- [Lumbricus terrestris](#) (Linnaeus, 1758) replacing anterior segments from as far back as 13/14 and 16/17 but tail regeneration was never found.
- [Perionyx excavatus](#) (Perrier, 1872) readily regenerated lost parts of the body, in an anterior direction from as far back as 17/18, and in a posterior direction as far forward as 20/21.
- [Lampito mauritii](#) (Kinberg, 1867) with regeneration in anterior direction at all levels back to 25/26 and tail regeneration from 30/31; head regeneration was sometimes believed to be caused by internal amputation resulting from [Sarcophaga](#) sp. larval infestation.

Abstract

Regeneration is a complex mechanism to restore lost or damaged body parts. In earthworms, regeneration capability varies among different species, and it is important to explore the mechanism behind the regeneration process. Interestingly, regeneration in earthworms is either dependent or independent of clitellum segments. In the present study, juvenile earthworms (*Eudrilus eugeniae*) were amputated at 3 different sites, namely the head, clitellum, and tail segments (at segments 10, 15, and 30, respectively), and their regeneration ability was documented using a foldscope. The amputated segments having the intact clitellum were able to heal the wounds and form the regenerative blastema. The smaller portions of the amputated segments (segments 1-10 and 1-15) without intact clitellum were unable to heal the wound, and death occurs within 12-24 h. The larger portions of the amputated segments (segments 15 and 30 to anus) without intact clitellum were able to heal the wound but lacked the regeneration capability. In control worms, alkaline phosphatase (ALP) signals were observed at the anterior tip, clitellum, and gut epithelium tissues, whereas, upon amputation, the enriched signals from the clitellum diminished, but profound signals were observed at the amputation site and regenerative blastema. Interestingly, on days 3 and 4, blastemal tips lacked ALP signals due to initiation of the differentiation process in the regeneration blastema. In summary, using a foldscope microscope, the role of the clitellum in the regeneration mechanism was indicated by ALP activity.

GOOF-UPS

Lack of proper experimental design

Species of earthworm unknown

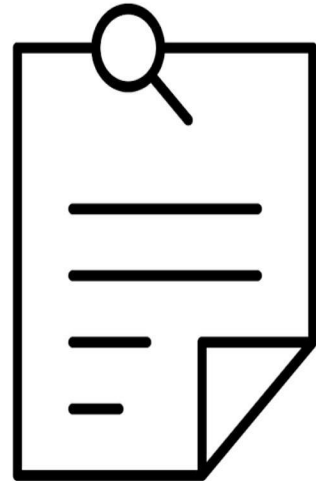
Don't know if the Earthworms were amputated prior to the experiment (when they were in soil)

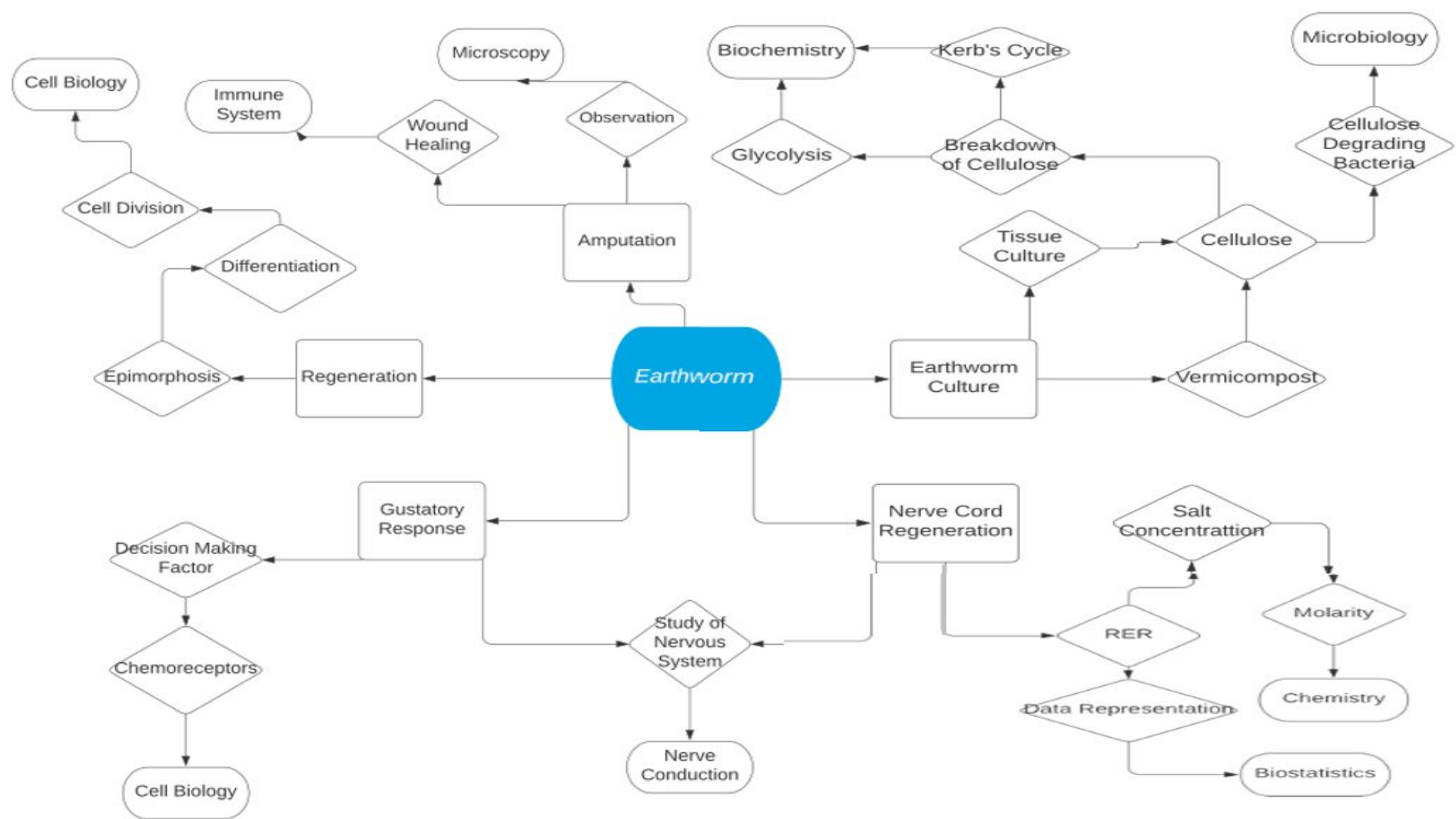
Not sure whether the earthworms are of same age or not.



FUTURE PLANS

- ❏ To Identify Species of Earthworms at HOMELAB
- ❏ To perform amputations to study VNC regeneration and Body Regeneration
- ❏ To study the role of Clitellum in Earthworm Regeneration





Collaborators

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