Simulation of Spinal Cord Compression from Cancer Using the Action Potentials from L. terrestris

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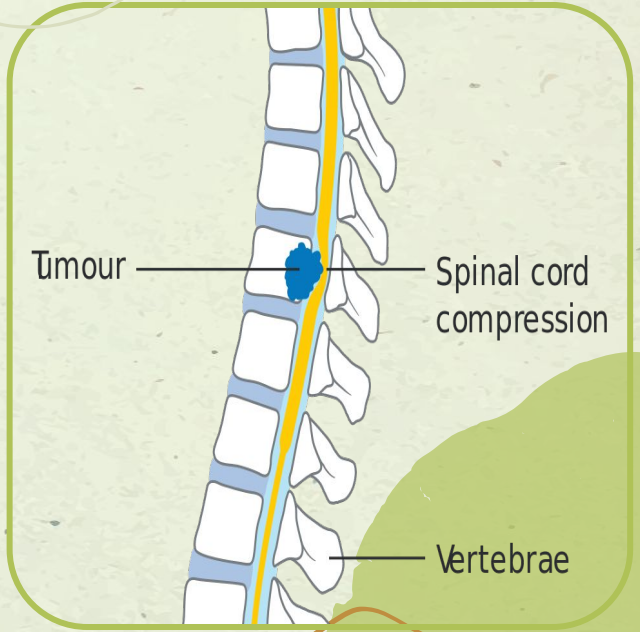
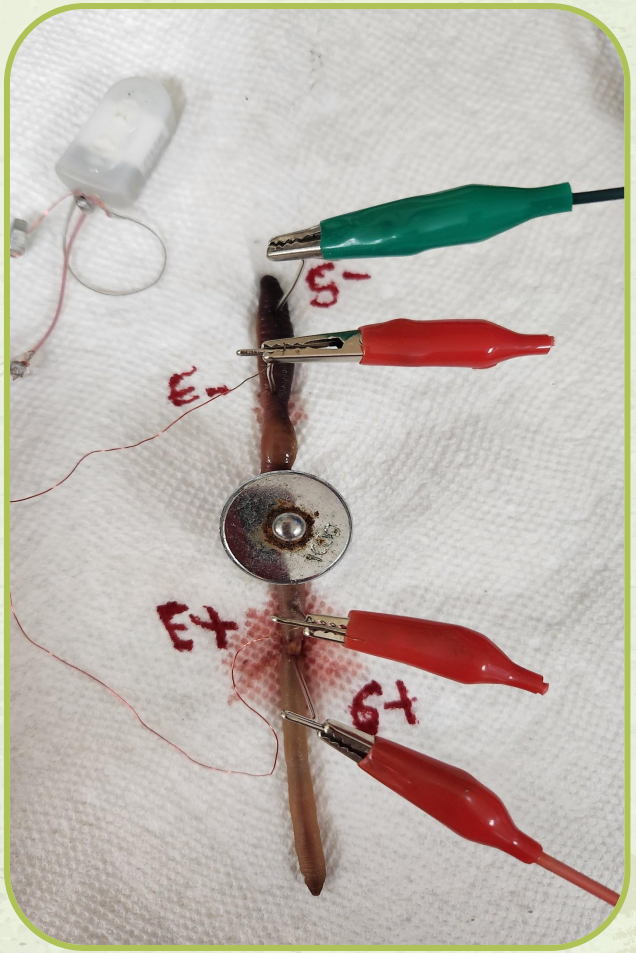
Introduction to Spinal Cord Compression

- Spinal cord compression occurs due to pressure from **tumors** or **injury**.
- It leads to severe symptoms like **back pain, sensory loss, and paralysis**.
- Current research lacks comprehensive animal models to study its effects.



Research Objective

- The goal is to analyze how different weights affect **action potentials** in Lumbricus terrestris.
- We aim to explore the impact of common drugs like **Tylenol, alcohol, and caffeine** on these potentials.
- Understanding these effects is crucial for advancing spinal cord compression treatment.

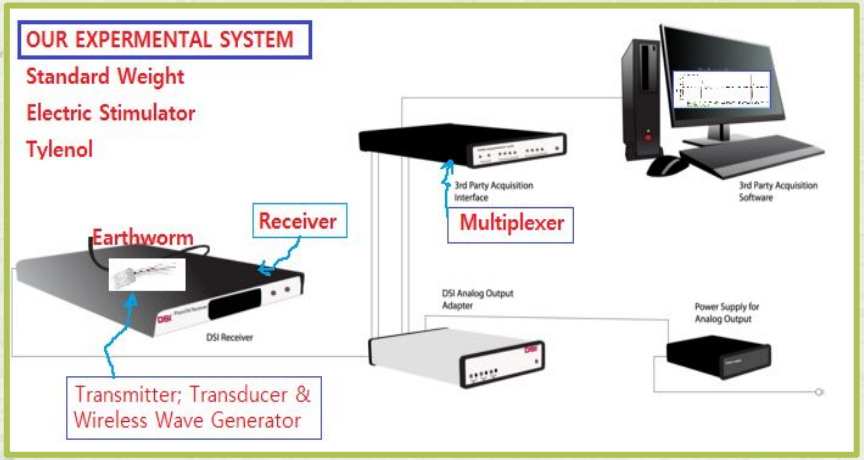


Why Lumbricus Terrestris?

- Lumbricus terrestris offers a simplistic model for studying **complex nervous system responses**.
- Their nervous system allows for **clear measurement** of action potential changes.
- This model provides a new avenue for spinal compression research.

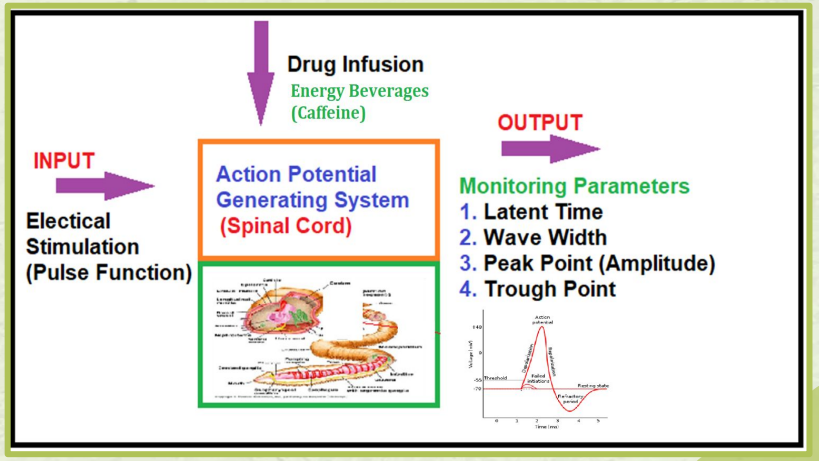
Experimental Methods Overview

- Utilized a **data acquisition system** from Data Science International.
- Subjects were Lumbricus terrestris, procured for their suitable nervous system structure.
- Experiment involved the application of Tylenol, alcohol, and caffeine to study their pharmacological impact.



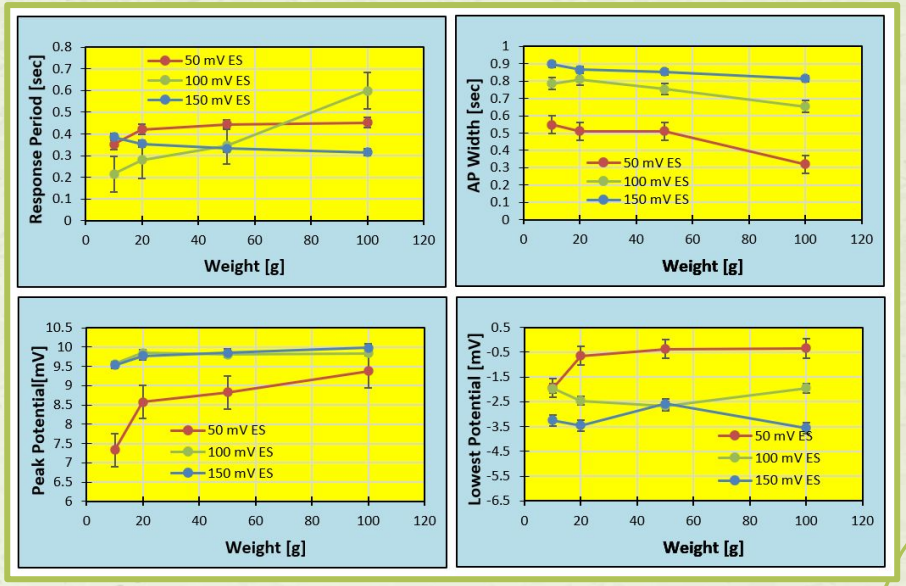
Procedure Highlights

- The procedure started with ensuring the correct operation of the telemetry system and preparing the earthworms via anesthesia.
- Stimulations were applied at varying intensities: **50 mV, 100 mV, and 150 mV.**
- Weights were incrementally placed on the earthworm to simulate spinal pressure.



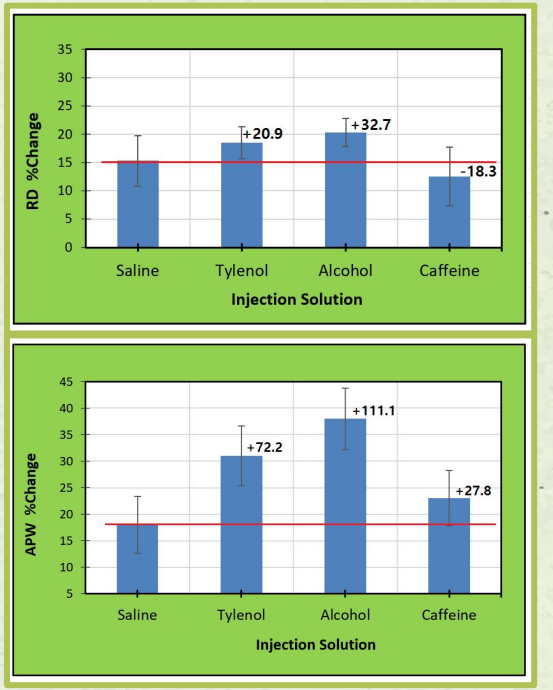
Key Experimental Findings

- Action potential parameters like **RD (Response Duration)** and **NP (Nadir Potential)** showed increases, whereas **PP (Peak Potential)** and **APW (Action Potential Width)** decreased with added weight.
- We observed a direct correlation between weight and action potential changes.
- These changes were consistent and indicative of how spinal pressure affects nervous system function.



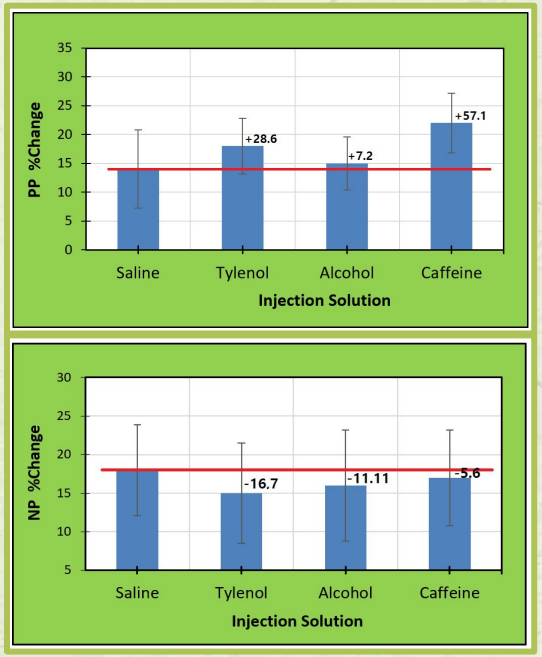
Pharmacological Effects on RD and APW

- The introduction of pharmacological agents - Tylenol, alcohol, and caffeine - showcased significant effects on **RD and APW.**
- Both **increased** RD and APW, suggesting a **dampening effect** on neural responsiveness, possibly simulating sedative properties on the nervous system.
- Caffeine showed a **decrease** in RD, suggesting a **quickening** of neural response times. The effects on APW varied, indicating complex interactions between drugs and neural activity.



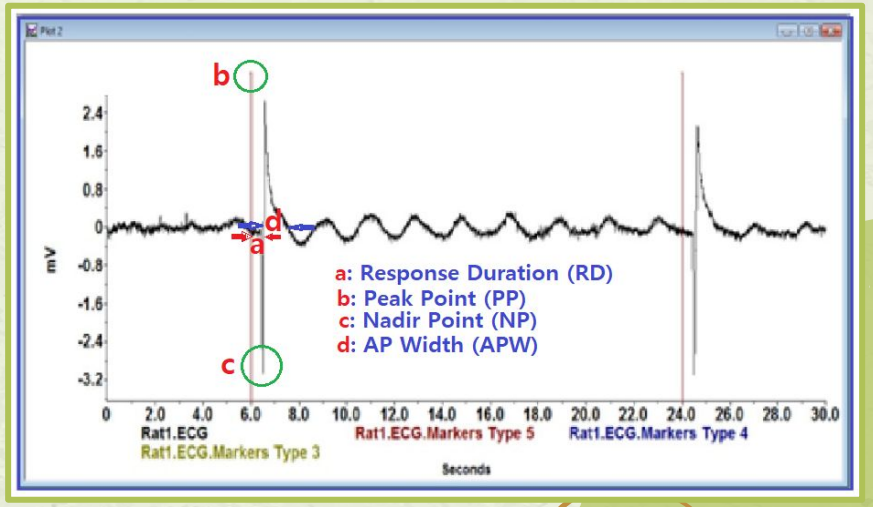
Pharmacological Effects on PP and NP

- Tylenol and alcohol's impact on **PP and NP** suggests modifications in the **maximum and minimum action potential voltages**, potentially affecting the efficiency of neural signaling.
- Caffeine's effects on PP and NP were notable, indicating its ability to **alter both peak and trough levels of action potentials**. This suggests a complex mechanism by which caffeine affects neural excitability and signaling.



Data Analysis and Results

- Data analysis was performed using **Physiotat software**, focusing on waveform analysis from action potentials.
- Our findings were statistically significant, with a **P-value less than 0.05**, indicating the reliability of the observed trends.
- Graphical representations clearly illustrated the impact of weight and pharmacological treatments on action potential parameters.



Conclusions and Acknowledgements

- This study advances our understanding of spinal cord compression and its effects on neural activity, using Lumbricus terrestris as a model.
- We appreciate the support and contributions of colleagues, mentors, and funding bodies in facilitating this research.
- The findings lay the groundwork for future investigations into spinal cord injuries and potential therapeutic approaches.

Thank You!