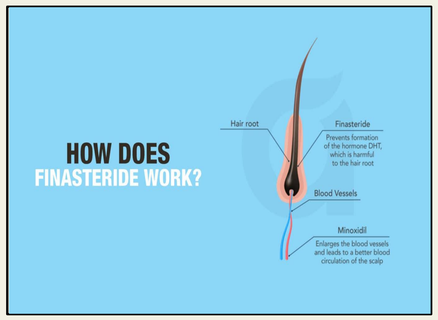
Effects of Finasteride on Cell Regeneration Using Planaria as Model System

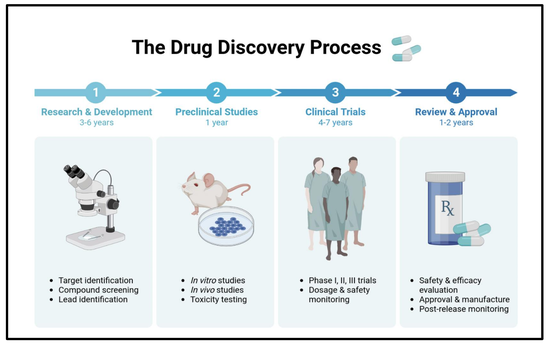
Ja'Hann Hannor and Alba Chavez
Embry Riddle Aeronautical University. Aerospace Physiology Program

1. Abstract

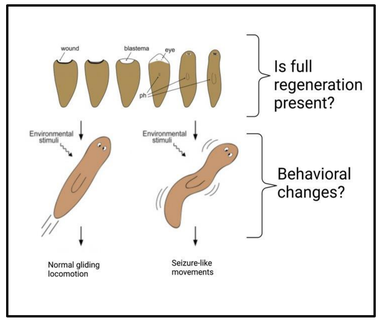
Aerospace physiology observes Cell reproduction within humans and how different substances and different environments can affect cell reproduction among all species. The species that is being observed is known as planaria from the class known as turbellaria, the planarian is an excellent model system. Planaria has been used within the microbiology community to observe the regenerative properties they possess and how different environmental factors affect the rate of regeneration. In previous research, we have observed that microgravity and ultraviolet light significantly impair planaria regeneration. In the present study we aim to study the effect of Finasteride in cell regeneration. Finasteride is a substance used within the medical community to treat male pattern baldness; however, there are detrimental factors that can be present, including cell toxicity. We have tested two different trials with two different concentrations of finasteride, while still observing planaria under regular environmental conditions. This was done to compare life expectancy and the rate of regeneration. Finasteride caused cell death at high doses and decreased regeneration rates at low medical doses. The combined strategies for cell regeneration and study of drug toxicity have now been implemented in a classroom setting to demonstrate and practice the scientific method using a fascinating model system.



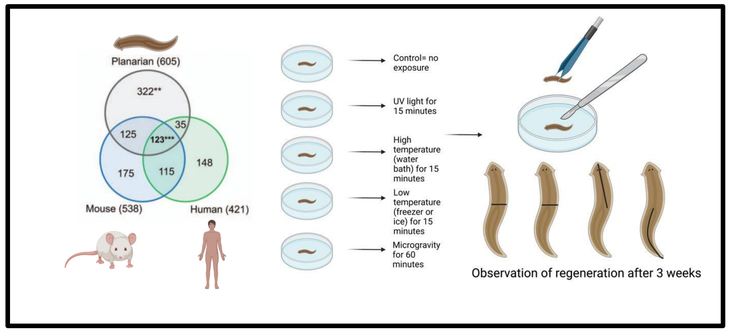
2. Introduction and Methods

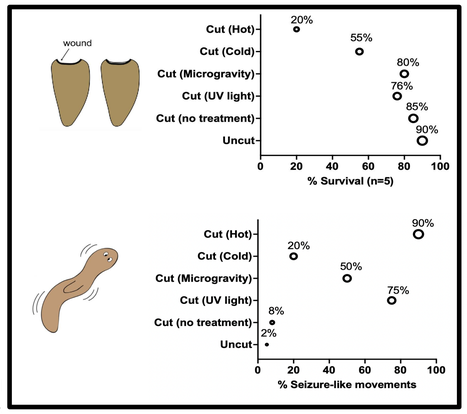


- **Post-Market Surveillance**: Even after a drug is approved and marketed, monitoring for damaging effects continues through post-market surveillance systems. These systems track adverse events reported by healthcare providers and patients to identify any previously unrecognized damaging effects.
- There is an increased need to test adverse effects of drugs using biological model systems such as planaria



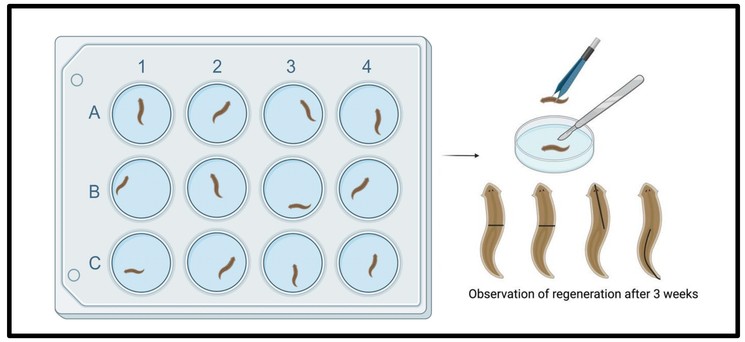
Preliminary Results





- **Planaria** was selected to test the effect of different environmental factors on cell regeneration. Our results indicate that cell development is different according to the stress

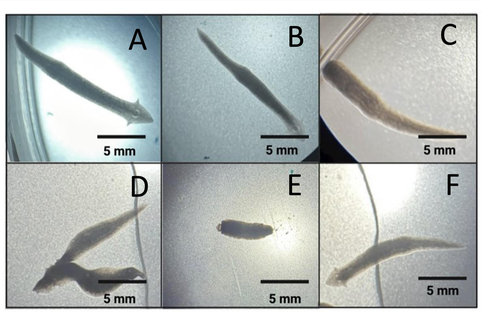
Methodology

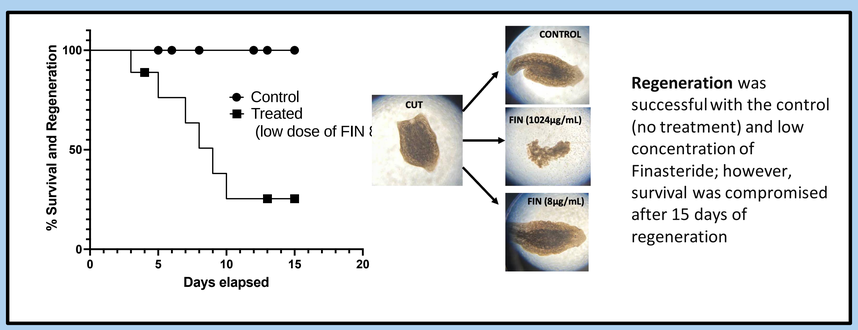


- Finasteride assays → Planaria is exposed to high and low concentrations (1024 and 8 micrograms per mL of spring water) for 5 days.
- Ventral dissection of worms is performed and regeneration is observed qualitatively and quantitatively after 3 weeks.

3. Results

A) Planarian worm after treatment. B) Control produced full regeneration. C) Microgravity and D) UV light produced slow regeneration and mutated heads. E) Hot temperature showed the most severe effect and F) Cold temperature produced full regeneration.

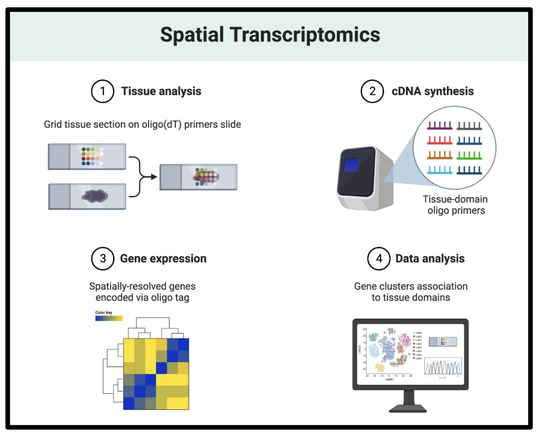




Regeneration was successful with the control (no treatment) and low concentration of Finasteride; however, survival was compromised after 15 days of regeneration

Antimycotic susceptibility tests. Flufenamic acid (A) and Tolfenamic acid (B) two NSAIDs (Non-Steroideal Antiinflammatory Drugs) were tested for their efficacy against *C. parapsilosis* **A** ISS and **B** earth or ATCC strains. More resistance is observed in ISS isolate.

4. Conclusion and Future Perspectives



- Gene expression analysis of planaria exposed to FIN
- qPCR analysis of regenerative genes
- Proteomics and Metabolomics

Aknowdlegements

We would like to thank the Bio 121L students for their participation (Spring 2022 and 2023).

*Corresponding author: Ja'Hann Hannor
Department of Aerospace Physiology
Embry Riddle Aeronautical University