

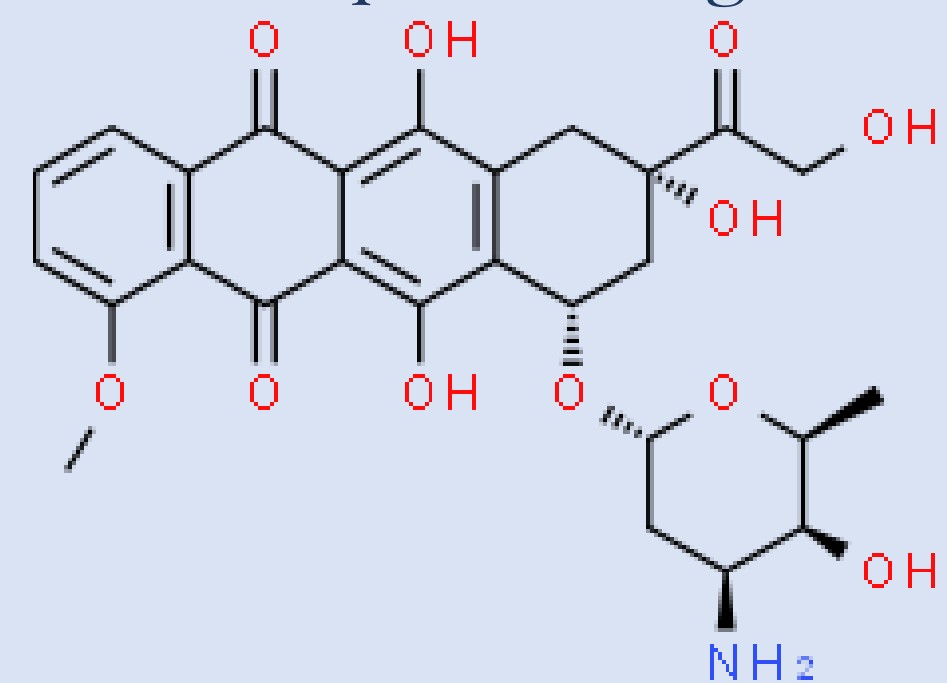


# Behavioral Analysis of Female Long-Evans Rats Treated with Doxorubicin

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## Introduction

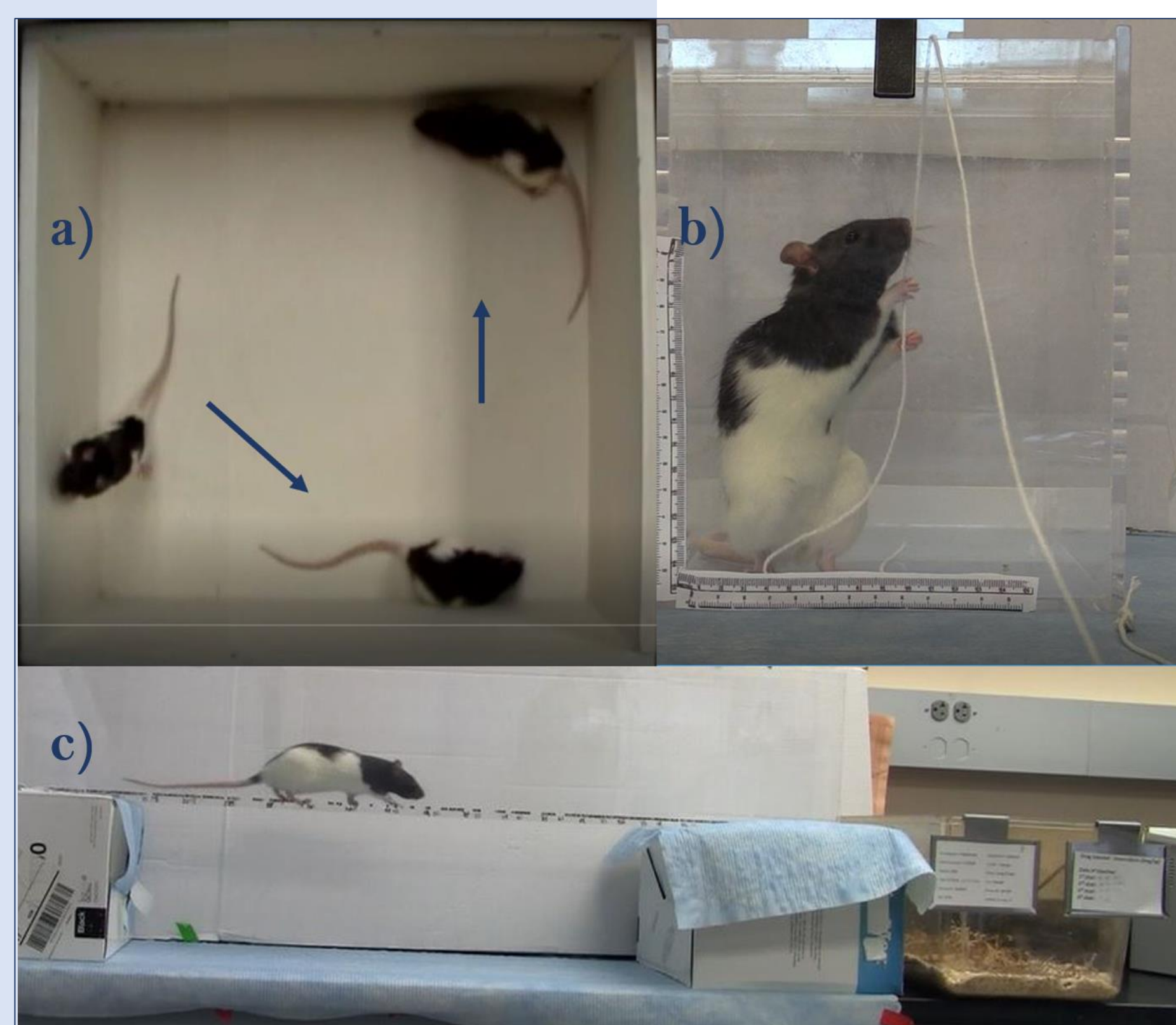
Chemotherapy has been a revolutionary, life-saving, treatment for many individuals throughout the world. However, only a fraction of the various chemotherapy treatments have been studied for their effects on cognition and brain physiology. Specifically, doxorubicin has been found to decrease visuo-spatial skills and total cognitive scores in breast cancer patients (C.E. Jansen et. al.). Much of current research about doxorubicin has been performed in combination with other drugs. Our research eliminates this additional variable as we study doxorubicin independent of other chemotherapeutic drugs.



**Figure 1.** Chemical structure of the chemotherapeutic drug doxorubicin.

## Materials & Methods

Twelve healthy two-month-old female Long-Evan rats were trained in bar-walk (2c) and string pulling (2b) activities before the beginning of the injection cycle. All rats received an intraperitoneal injection of either saline [0.9%] or doxorubicin [6mg/kg] every week for four consecutive weeks. Following the conclusion of this four week cycle, we tested each rat for behavioral changes. Motor activities included, string-pulling, bar-walk, and an open field (2a) test.

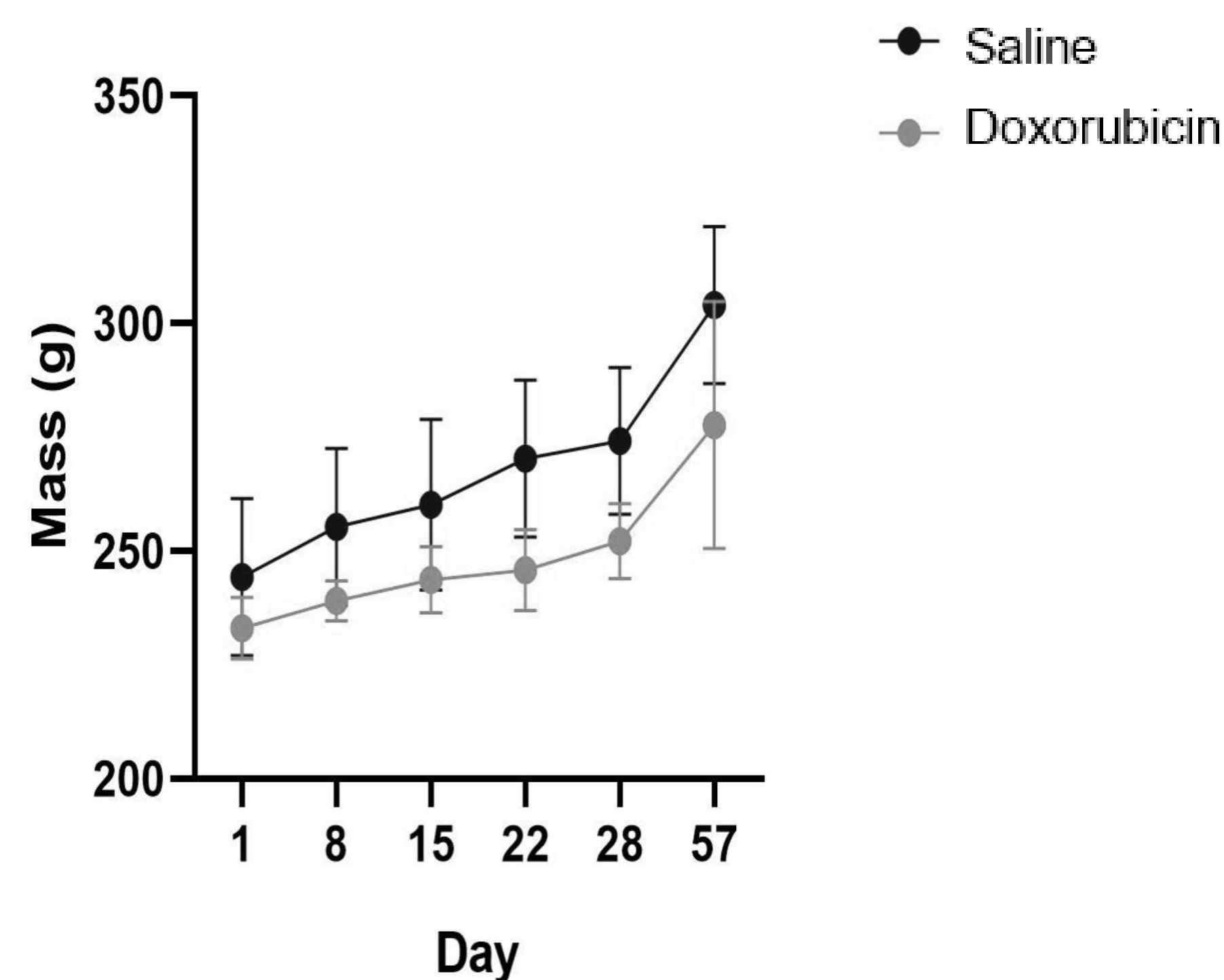


**Figure 2.** a) path of rat in open field test, b) string pulling activity, c) bar walk activity.

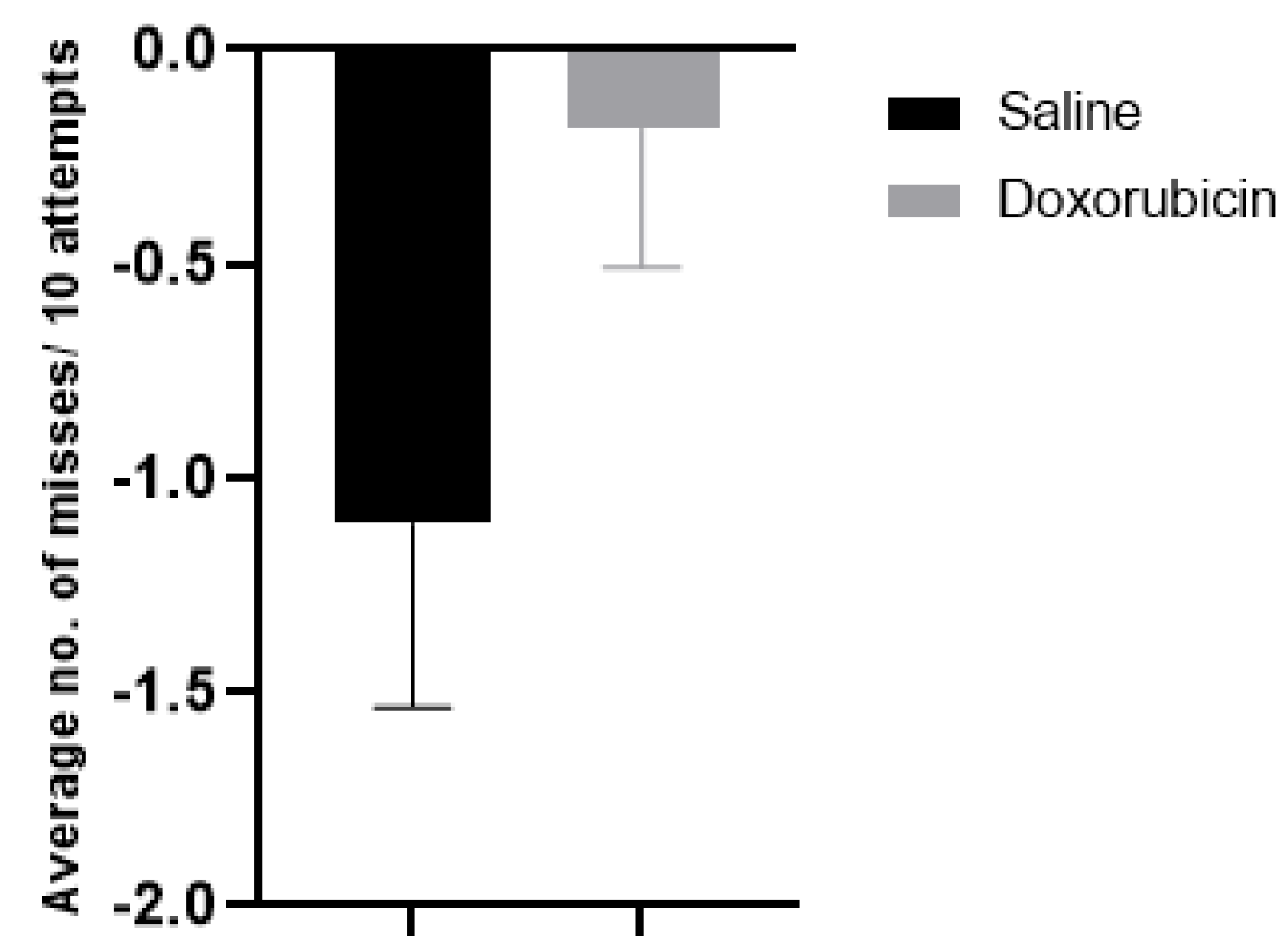
## Acknowledgements

We offer a special thank you to Laxmi Sagwan-Barkdoll, William Browning, and Jason Henry for their outstanding mentorship and guidance. Funding was provided by National Institutes of Health.

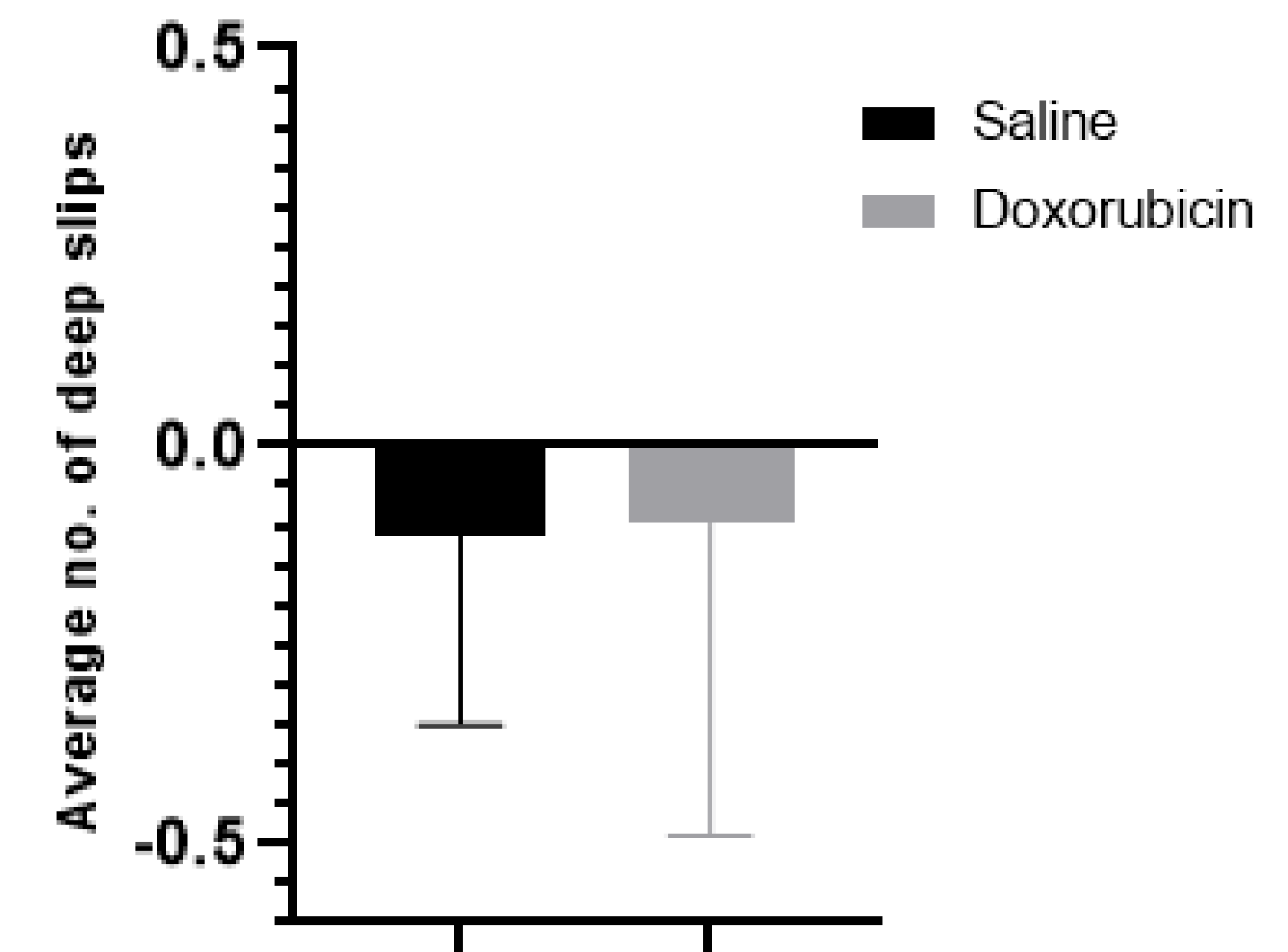
## Results



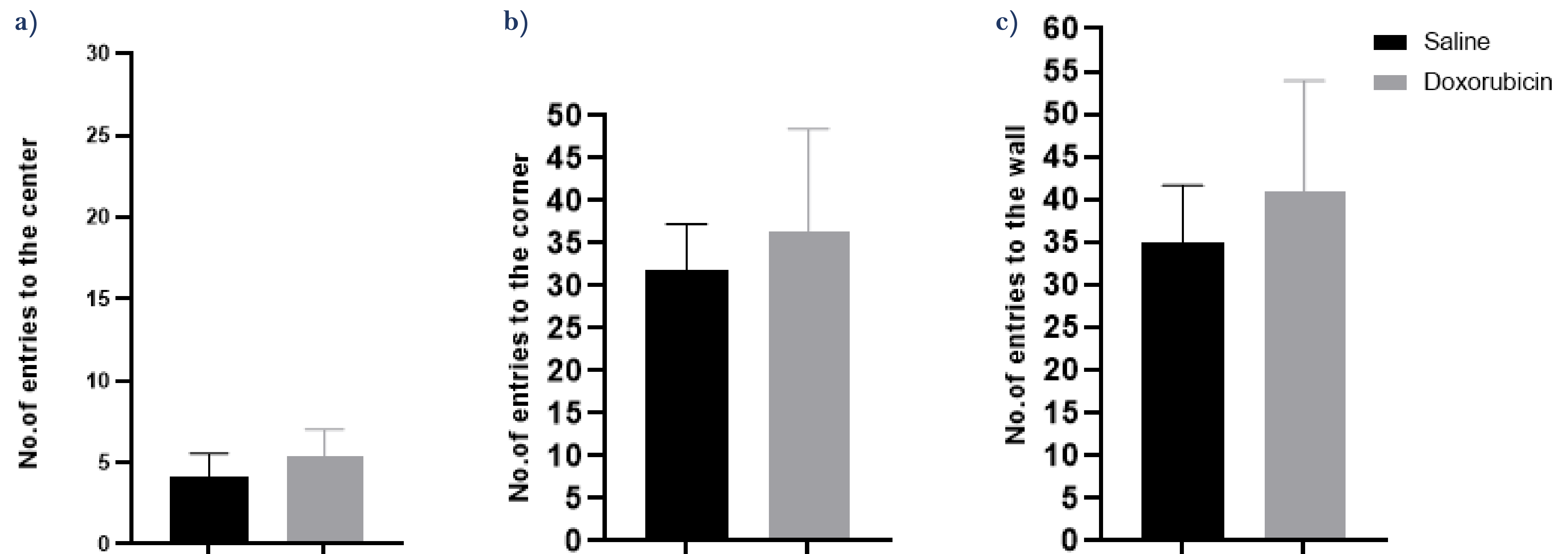
**Figure 3.** The time sequence graph above shows the average mass of each treatment group on a given day. Day 1 indicates the start of injections. The bars on each line indicate standard deviation. No significance was found.



**Figure 4.** The average number of misses per ten attempts following. The above graph represents post-injection score minus pre-injection score. The error bars represent standard error of the mean. No significance was found.



**Figure 5.** The average number of deep slips. The above graph represents post-injection score minus pre-injection score. The error bars represent standard error of the mean. No significance was found.



**Figure 6.** a) represents the number of entries to the center, b) represents the number of entries to the corner c) represents the number of entries to the wall. The error bars represent standard error of the mean. No significance was found.

## Discussion & Future Directions

- At this time, our data does not support the hypothesis that doxorubicin causes movement deficits in Female Long-Evans rats.
- Early stages of data collection reveal no signs of peripheral neuropathy, indicating that this is not likely to be a confounding variable in future study analyzing motor function for behavioral-cognition tests.
- Our lab will continue collecting data regarding behavior, as well as hippocampal and hindbrain morphology and chemistry after chemotherapy administration.

## References

Jansen, C. E., Dodd, M. J., Miasowski, C. A., Dowling, G. A., & Kramer, J. (2008). Preliminary results of a longitudinal study of changes in cognitive function in breast cancer patients undergoing chemotherapy with doxorubicin and cyclophosphamide. *Psycho-oncology*, 17(12), 1189–1195. <https://doi.org/10.1002/pon.1342>