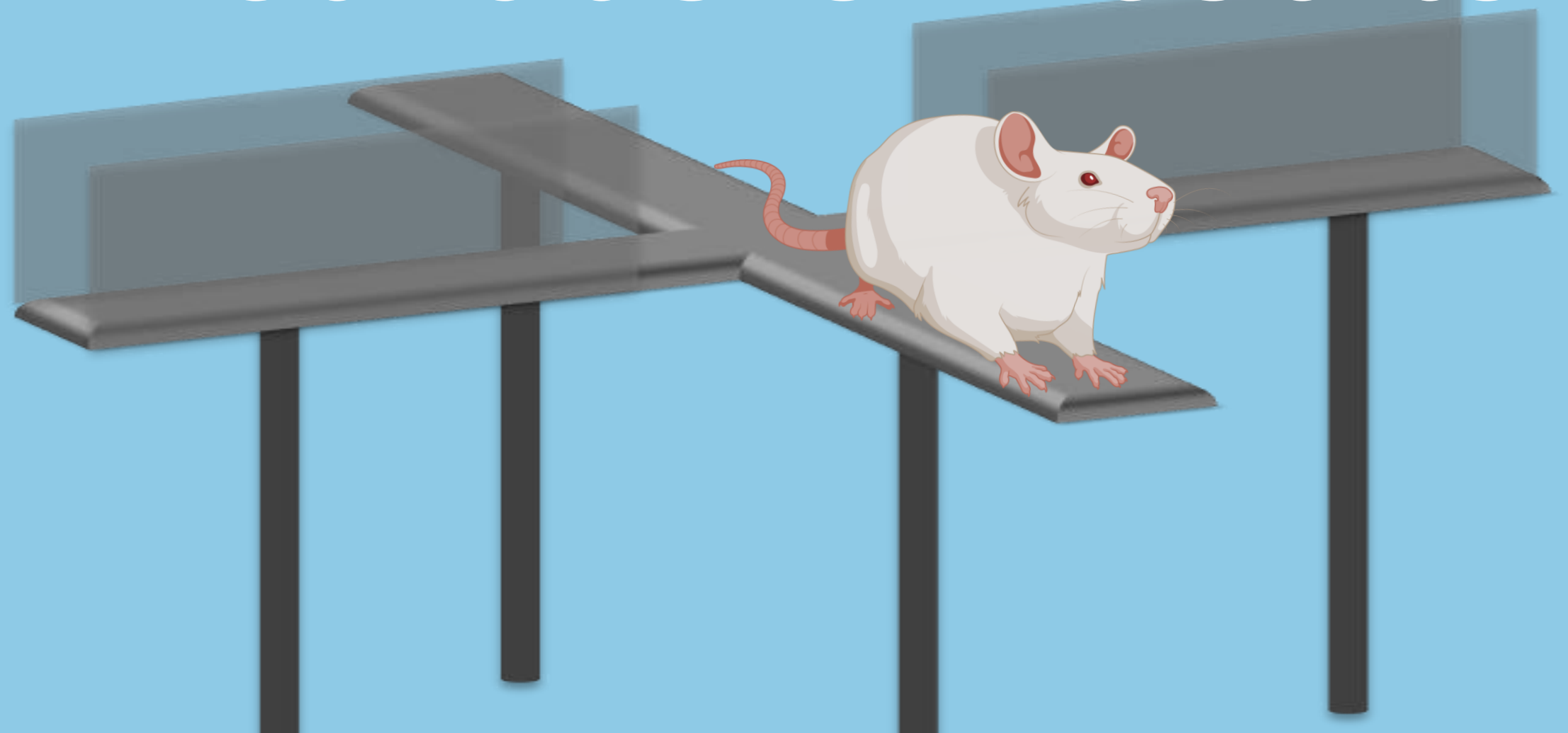


Behavioral Methods & Results



Morphine-induced anxiety was measured using the **Elevated Plus Maze**. More time spent in the enclosed arm indicates more anxiety.

The **experimental design** is shown above. Rats (n=6 per group) ran the maze on day 0 (*baseline*), received morphine or saline twice-daily for 5 days, then ran the maze again 24-hours after the last drug administration (*withdrawal*).



Morphine-dependent rats that received **vibration treatment** spent significantly less time in the closed arm, indicating **less anxiety**.

- The “Morphine” group spent 23% more time in the closed arm than they did before receiving morphine, indicating a large level of withdrawal anxiety.
- “Morphine + Vibration” spent 6% more time; “Saline” spent 4% less time.
- “Morphine + Vibration” and “Saline” are not statistically distinct, indicating that **treatment returns anxiety levels to normal**.

Whole-body vibration alleviates symptoms of morphine withdrawal



Whole-body vibration at 80 Hz has been shown to blunt neuropathological markers and behavioral symptoms of alcohol dependence. Here, we evaluate its ability to ameliorate symptoms of **morphine use** and **withdrawal**.

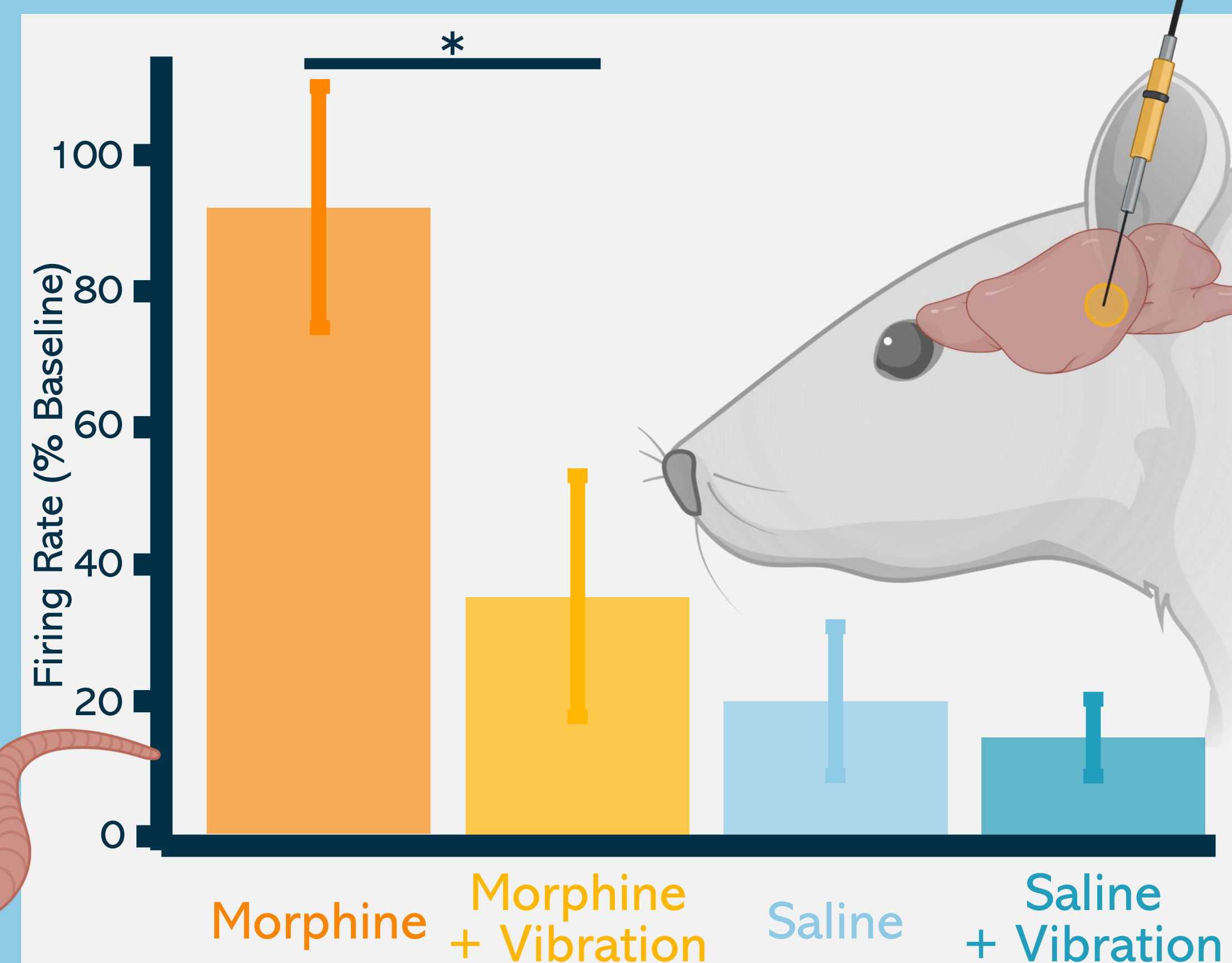


Scan to read a related paper

Gavin C. Jones¹, Dallin Otteson^{1,2}, Christina Small¹, Taylor Purcell², Nathaniel Hill², Tyler Alger², Arren Hill², David Sant², Scott Steffenson^{1,2}, Kyle Bills^{1,2}
¹Neuroscience Center, Brigham Young University
²Department of Biomedical Sciences, Noorda College of Osteopathic Medicine



Physiological Methods & Results



Single Unit Electrophysiology shows that morphine-dependent rats that receive **vibration treatment** have **normal activity** in the Ventral Tegmental Area of the brain, a region implicated in addiction & withdrawal.

GABAergic baseline firing rate was recorded for 10 min. in anesthetized rats (n=6 per group) followed by an injection of morphine. Morphine injection caused the saline groups’ firing rates to drop to 20% of baseline, representing a neurotypical response to opioids. The “Morphine + Vibration” group had a similar depression in GABAergic firing rate which was statistically lower than “Morphine” alone.

Below are representative traces before and after morphine injection for two groups.

