Validation of FosTRAP Technology in an Animal Model of Binge Alcohol Drinking

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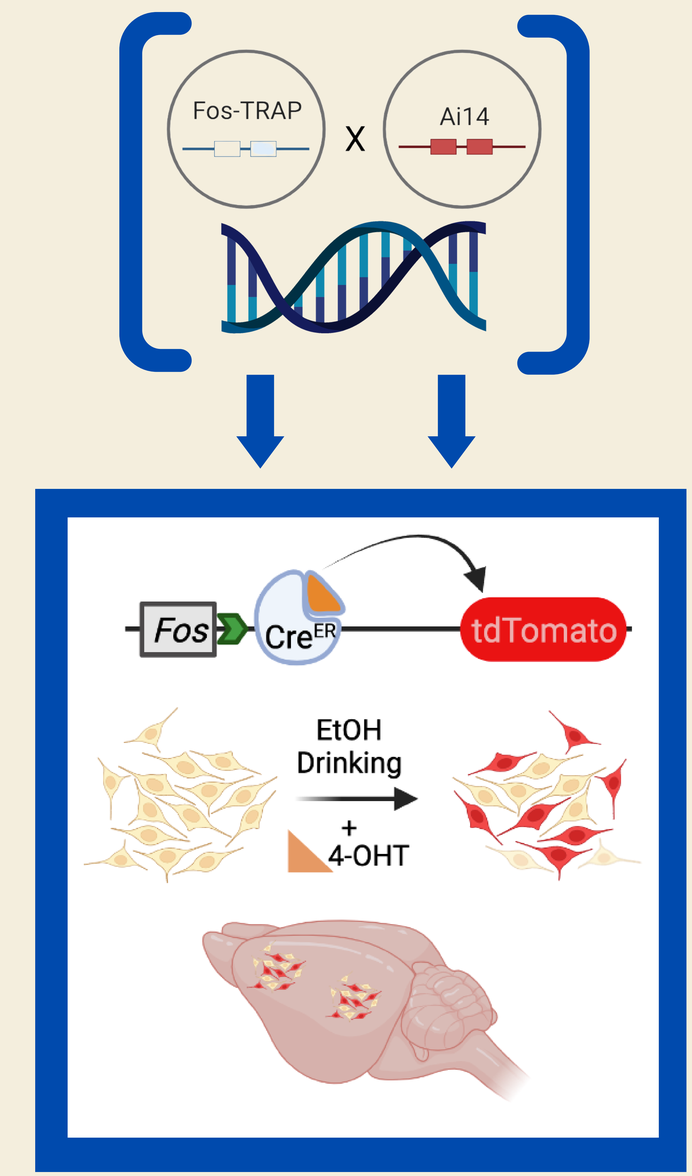
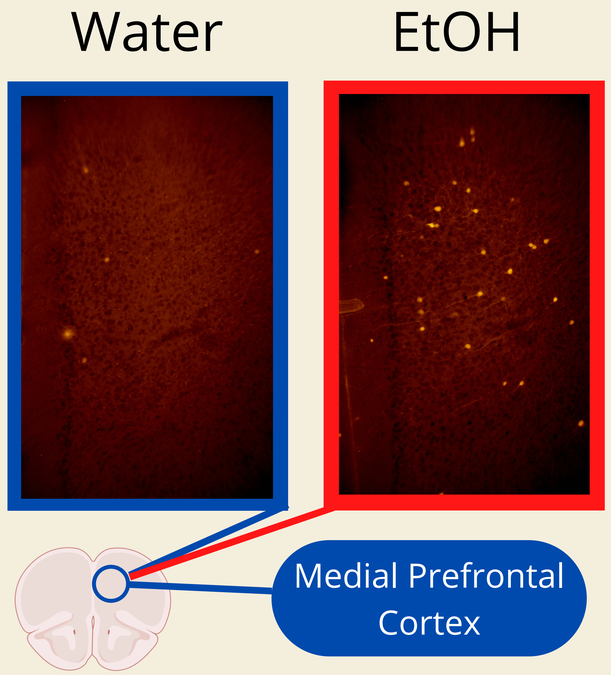
Background

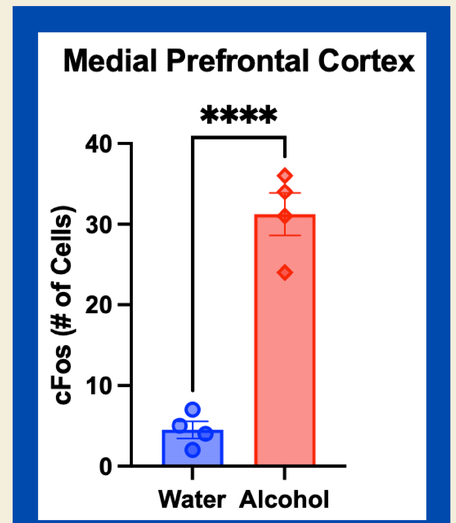
- C-Fos is an immediate early gene expressed in stimulated neurons.
- FosTRAP (c-Fos Targeted Recombination in Active Populations) allows for permanent expression of a fluorophore, tdTomato, in transgenic mice when stimulated and 4-hydroxytamoxifen (4-OHT), an estrogen receptor antagonist, is administered.
- Previous studies have shown the optimal time to inject 4-OHT is immediately after a behavior of interest.
- The aim of this study was to confirm this timing for binge drinking.

Methods

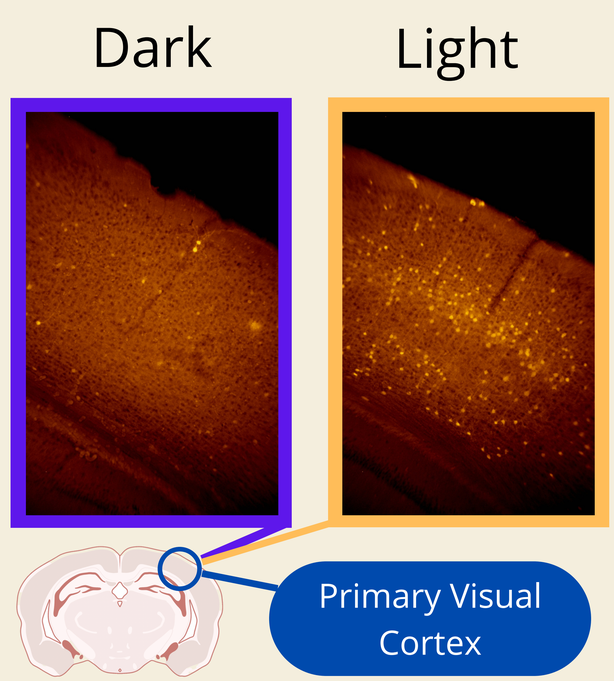
- Two cohorts of FosTRAP mice were used.
- Cohort 1 (n = 4) was deprived of light for 48 hours after which one half was exposed to one hour of bright light while the other half remained in the dark, after which the entire cohort was then injected with 4-OHT.
- In cohort 2 (n = 10), half the mice drank ethanol (20% v/v) for 2 hours/day, 5 days/week for 2 weeks.
- On the final day of drinking, 4-OHT was administered to the entire cohort 30 minutes into the drinking session.
- Five days later brain tissue was extracted and sliced to be visualized.

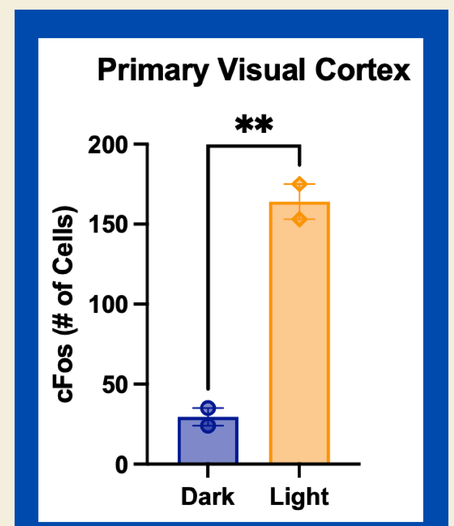






t=9.470, df=6, p<.0001





t=10.94, df=2, p=.0083

Conclusions

- Preliminary analysis suggests that administering 4-OHT immediately after 30 minutes of ethanol consumption successfully traps active neurons in the medial prefrontal cortex and nucleus accumbens, as expected.
- Due to time constraints only a subset of the animals have been imaged and quantified, but we anticipate seeing similar patterns of active neurons in the remaining subjects.

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Illustration courtesy of Grace Joyner