Toward Precision Mechanistic Biomarkers of Acamprosate Response in Alcohol Use Disorder: Methodology of a Longitudinal EEG Trial

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Current Limitations

- Substantial heterogeneity in treatment response
- Lack of scalable, temporally sensitive biomarkers of neurophysiological recovery
- Acamprosate is an FDA-approved treatment (NNT ≈ 12), yet mechanisms and response predictors incompletely characterized

Main Question

Can known EEG markers of AUD serve as biomarkers of acamprosate response and abstinence prediction?

Background

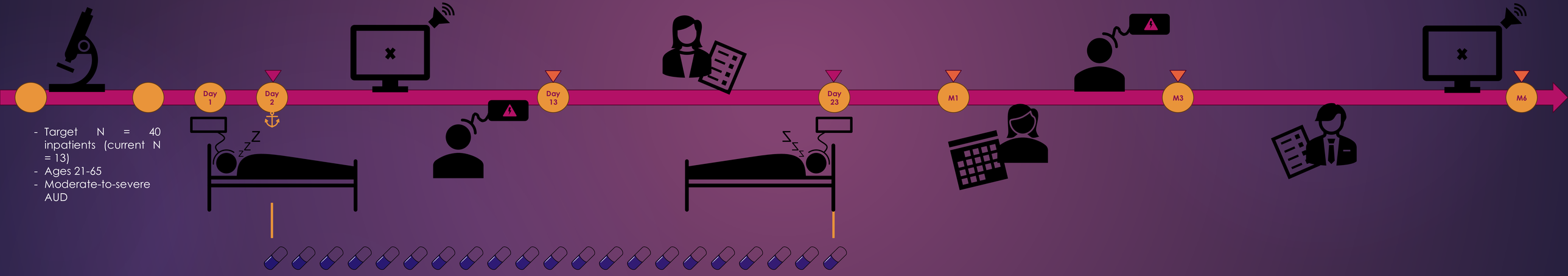
- EEG provides a scalable mechanistic biomarker platform for repeated assessments
- AUD -> **hyperexcitability** (elevated beta, reduced alpha and slow-wave activity) and **impaired cognitive control** (P300)
- Acamprosate -> modulation of glutamatergic and GABAergic signaling, alleviating hyperexcitability and possibly improving impaired cognitive control

EEGAcamp

Phase-IV double-blind placebo-controlled longitudinal RCT

- Target N = 40 inpatients (current N = 13)
- Ages 21-65
- Moderate-to-severe AUD

- Resting-state alpha, beta, delta, and theta
- Theta event-related synchronization
- P300 amplitude and latency



Analyses

- **Primary**: Differential pre-treatment to post-treatment change between groups
- **Secondary**: Associations between changes in EEG biomarkers and changes in craving, anxiety, and PSG measures
- **Exploratory**: Electrophysiological predictors of sustained abstinence

Hypotheses

- **Primary**: Acamprosate treatment will alter electrophysiological markers associated with AUD beyond placebo
- **Secondary**: Treatment-associated electrophysiological changes will correlate with reductions in alcohol craving, anxiety, and sleep-related hyperarousal measures
- **Exploratory**: EEG characteristics will predict sustained abstinence during follow-up assessments

Main Answer

- EEGAcamp trial is designed to test the response tracking and abstinence predicting capabilities of known EEG markers of AUD
- Should at least pick up hyperexcitability changes via beta EEG

Next Steps

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Disclosures
The authors acknowledge the support of the National Institutes of Health to fund this research. The authors report no conflicts of interest for this work.