

Session 14

Research Presentation

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The Florey
Advancing Brain Research



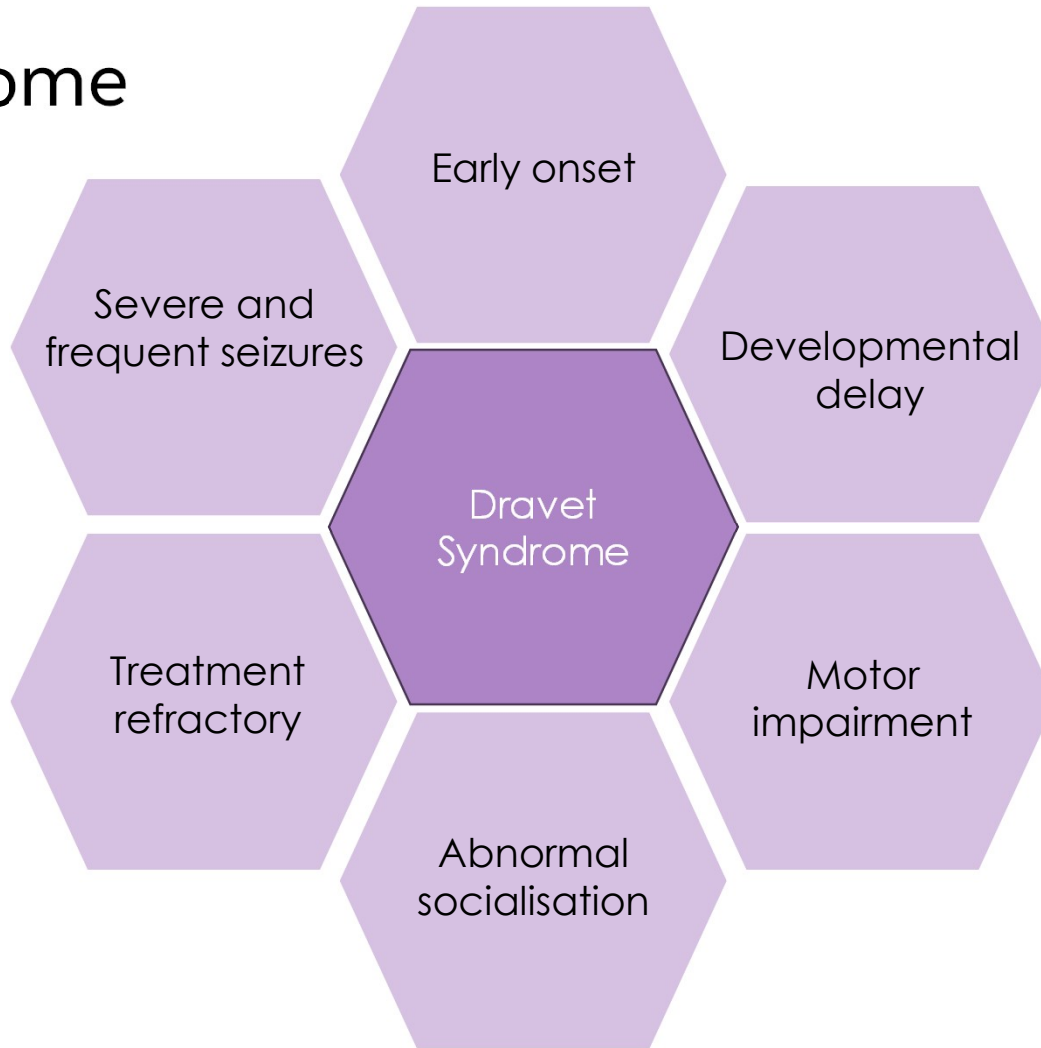
AGRICULTURE

Cannabinoids and *HCN1*- epilepsy

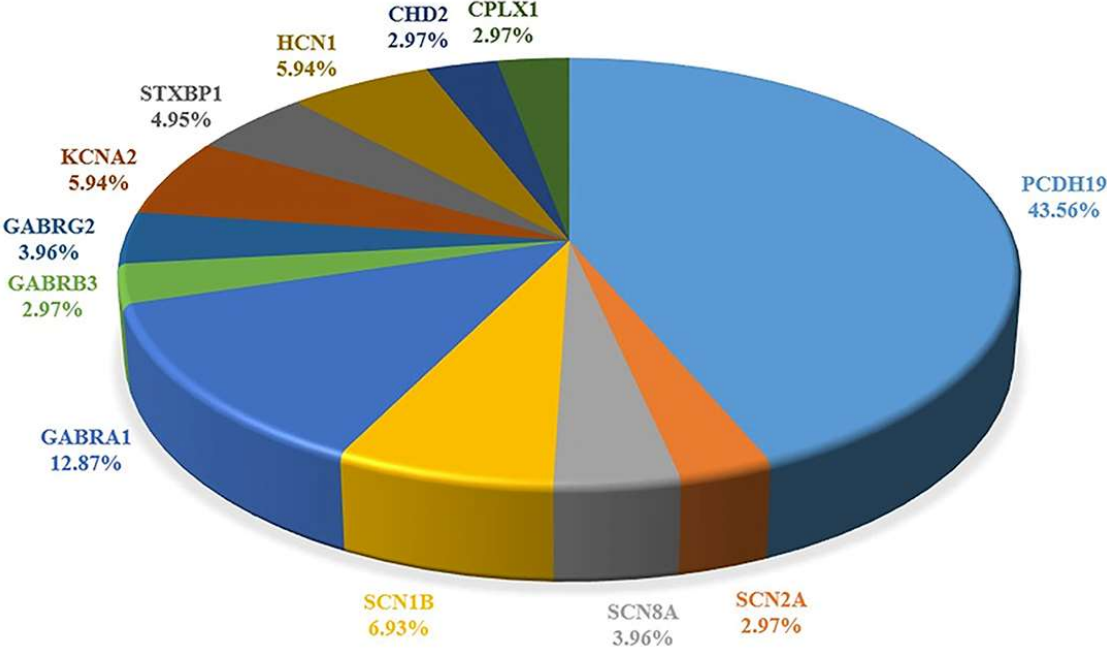
Chaseley McKenzie



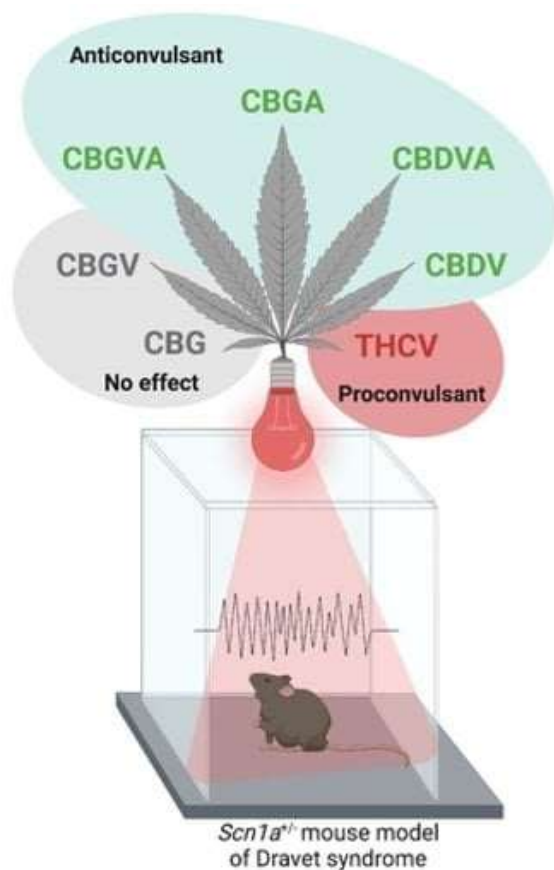
Dravet Syndrome



Dravet Syndrome



Dravet Syndrome and cannabinoids




Treatment options:

- Valproic acid + Clobazam
- Cannabidiol
- Ketogenic diet
- Lorcaserin/Stiripentol



Do cannabinoids work in Dravet
caused by pathogenic variants in other
genes?



Ebony, a young girl with epilepsy

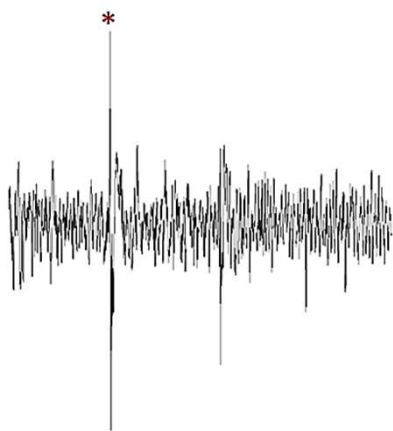


- Ebony has **Dravet Syndrome**
Severe, frequent seizures
Developmental delay
- Her condition is **genetic**, caused by a pathogenic variant in her ***HCN1*** gene
- She is **resistant** to common anti-epileptics

Hcn1-epilepsy mice display EEG spiking

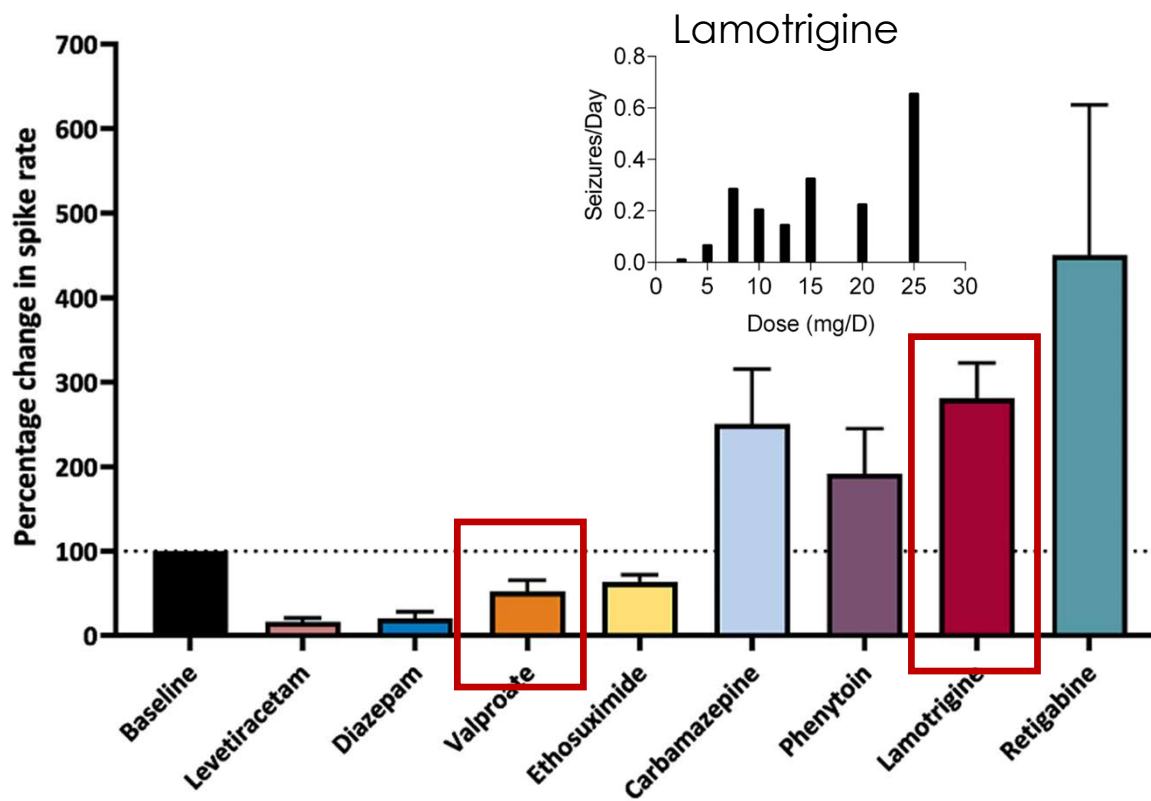
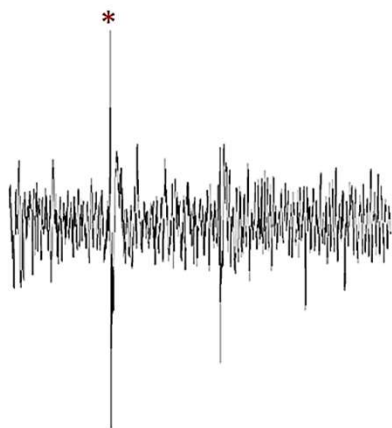


Hcn1^{M294L} mouse model recapitulates many of the human *HCN1*-epilepsy phenotypes



- Developmental delay
- Hyperactivity
- Social and learning deficits
- Epileptiform spiking

Changes in epileptiform spiking predicts anti-seizure medication efficacy



Desperate parents seeking help... solution



Anonymous member · 15 Sep 2023 · 

Hello, is there a source of information available about the treatment of the HCN1 gene? What medications or non-pharmacological treatments can they use? my son's seizures occur every week and last three days, tonic-clonic seizures - tense body and facial grimace, and seizures of the limbs once in the event of infections. Help me



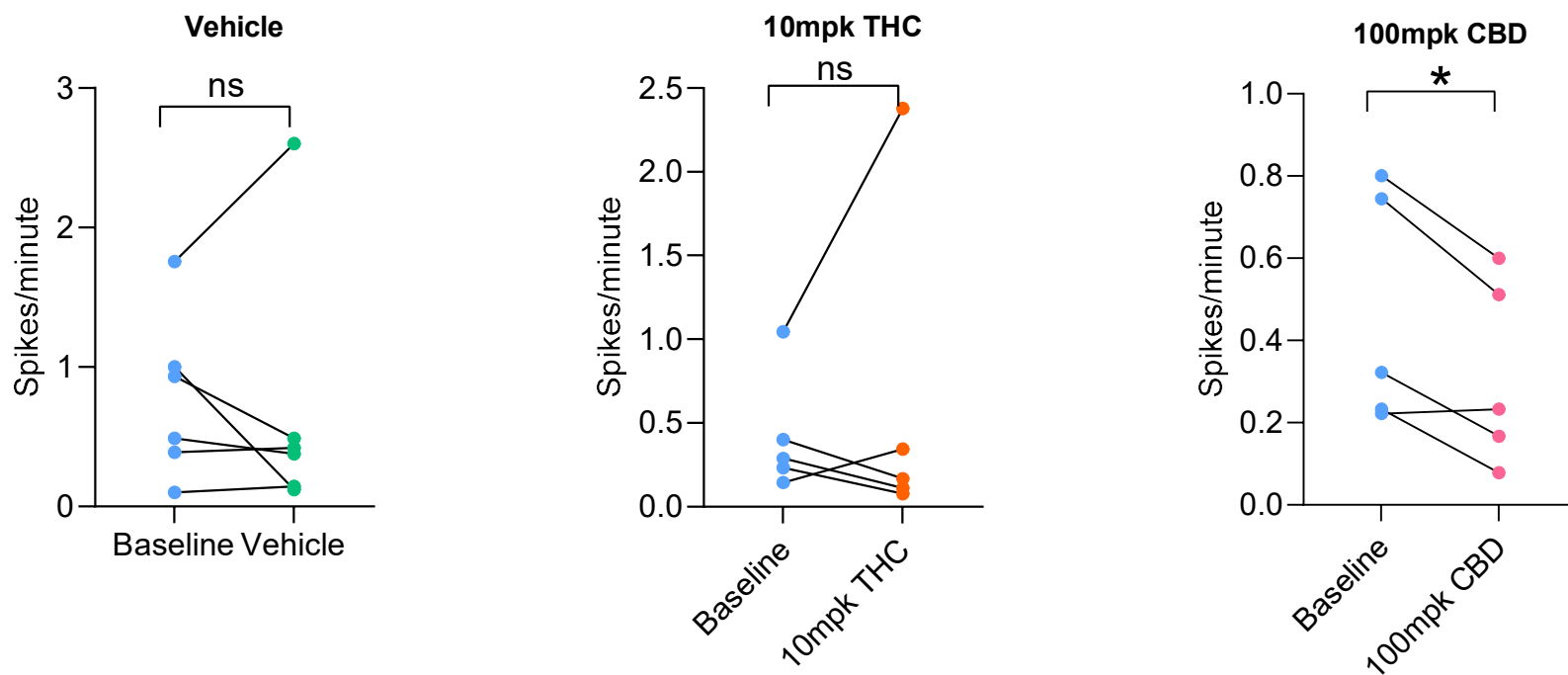
Hi there

We also struggled very much with seizure control last year until we introduced Epilim. This medication has resulted in my daughter being seizure free since December. (She would have a seizure every week or so). There is an article that has been published by a research team in Australia identifying those seizure medications that are successful in controlling seizures in the HCN1 variant and those that can actually make them

Can we test cannabinoids in our model?

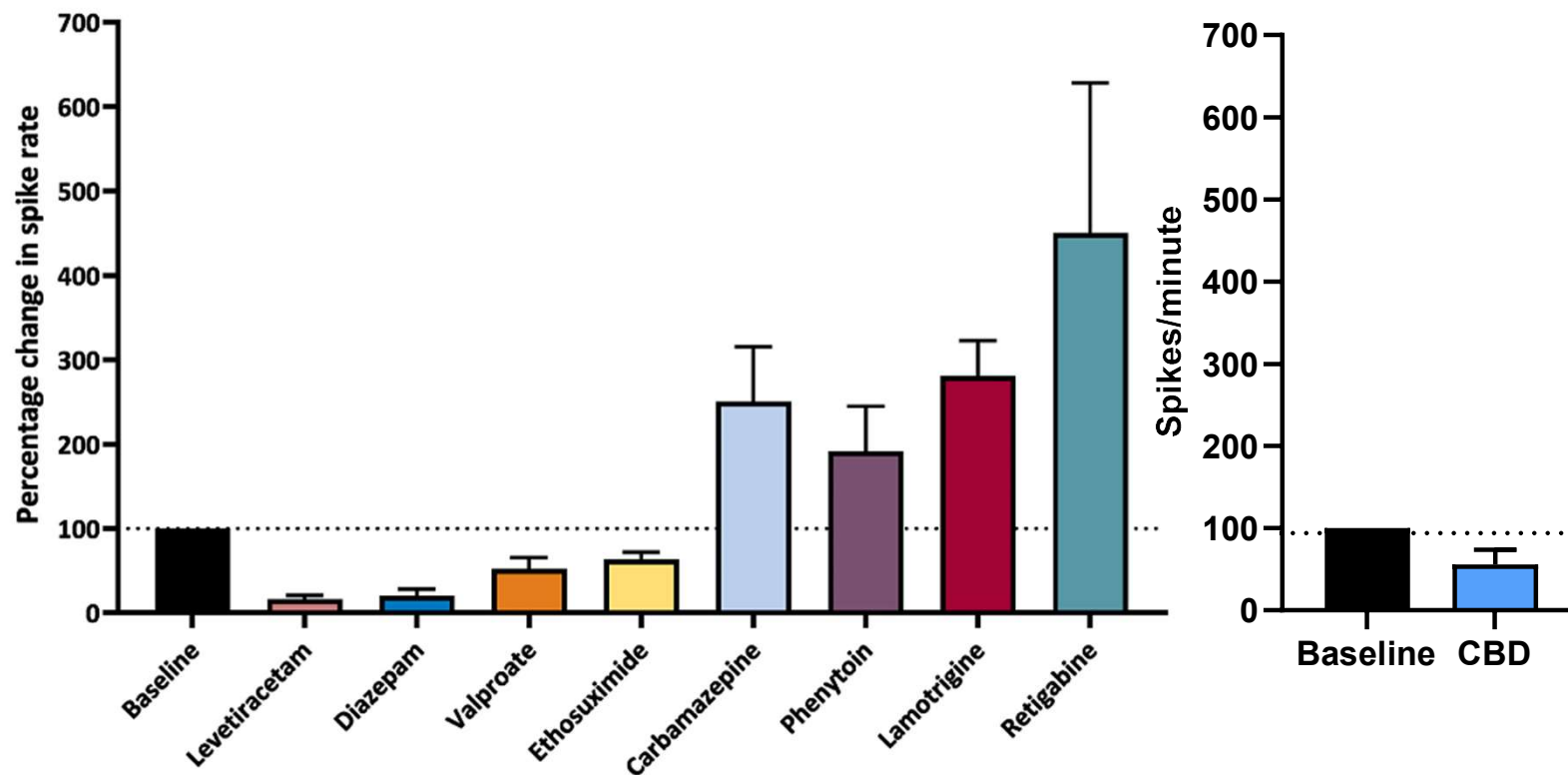


CBD but not THC reduces spiking



Vehicle: ethanol:Tween-80:saline (1:1:18) (n = 6 per group)

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Vehicle: ethanol:Tween-80:saline (1:1:18) (n = 6 per group)

Summary

- The *HCN1* Dravet mouse is a robust preclinical model to test cannabidiol derivatives
- CBD could be a useful adjunct therapy in Dravet caused by pathogenic variants in genes other than *SCN1A*



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Thank you!

Reid Lab (past and present)

- ▶ Chris Reid
- ▶ Ian Forster
- ▶ Lauren Bleakley

La Trobe and ARC Research Hub

- ▶ Tony Bacic
- ▶ Monika Doblin
- ▶ Veronica Borrett

