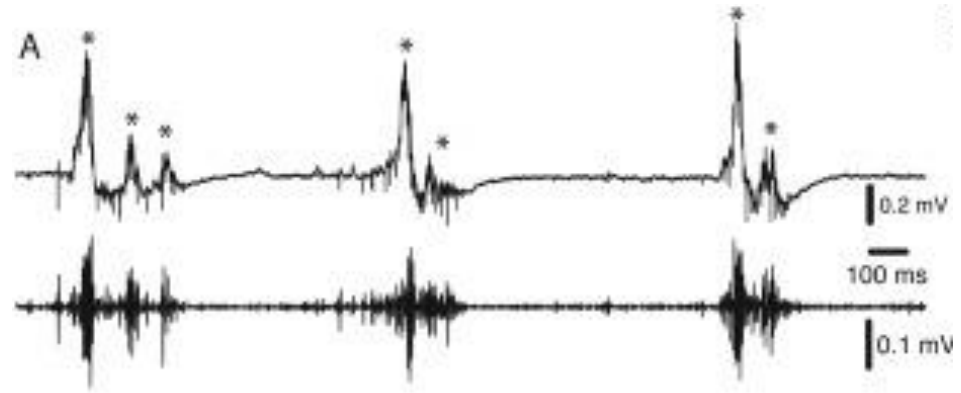


# The Effect of Ketamine on SPW-R *In Vitro*

Georgetown University Dept. of Neuroscience  
Anushka Dar '21

# Sharp Wave-Ripples (SPW-Rs)

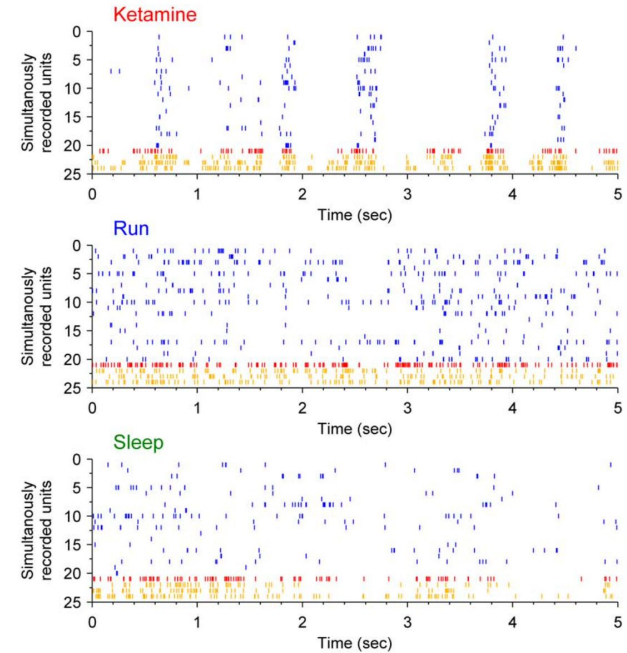
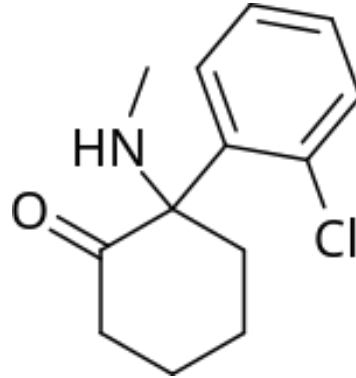
- Spontaneous neuronal patterns in hippocampus once per second
- Essential for memory consolidation
- Occur during slow-wave sleep
- Linked to theta and gamma oscillations



Buzsaki, 2015

# Ketamine

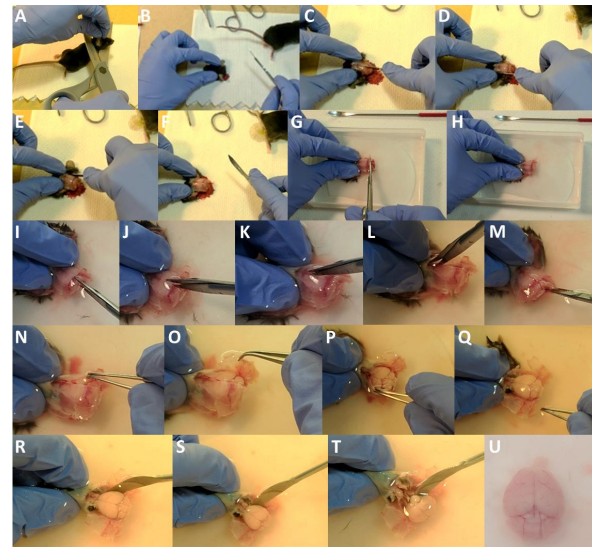
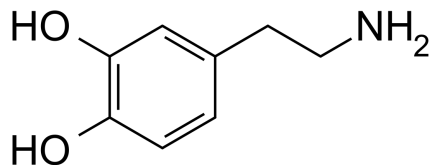
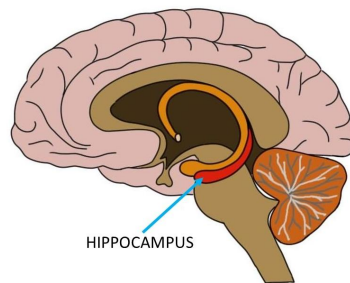
- Rapid antidepressant effect
- NMDA Antagonist
  - Promotes Inhibition
- Causes increase in intensity and synchrony of SPW-R in vivo
  - Unknown in vitro



Kuang, 2010

# My Project - Why *In Vitro*?

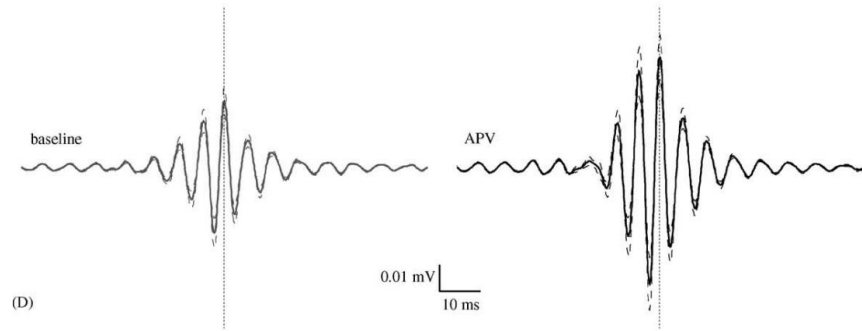
- Must be tested in hippocampus for safety!
- Allows for
  - specificity
  - Distinguishing of indirect/direct effect



Papouin, 2018

# Similar Studies

- Impact on Gamma Band Oscillations (GBOs)
- Similar drugs *in vitro*
  - MK-801
  - APV



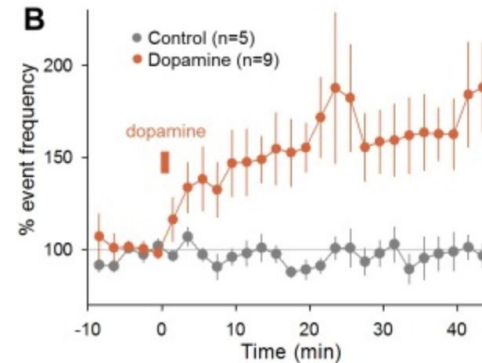
Colgin, 2005

# Predicted Results

- Increases the strength and intensity of SPW-R
- Yet, frequency impacted through hormone action
  - In vivo studies too broad to draw conclusions

| Drugs    | Power           | Event-Frequency |
|----------|-----------------|-----------------|
| MK-801   | Nearly Two-Fold | No Effect       |
| AP5      | Over Two-Fold   | No Effect       |
| Ketamine | Unknown         | Unknown         |

Colgin, Laura et. al., 2005



Miyawaki, Takeyuki et al., 2014

# Impact of COVID-19

- Unable to complete lab work
  - Could not learn methods
  - Could not collect results
- Focused on academic research and the mechanisms of structuring scientific papers



zoom

# My Role

- Gain understanding of SPW-R and Ketamine
- Write paper that highlights my research and outlines necessity of study for future testing and publishing
- Create poster and presentation
- Edit Dr. Wu's papers and comprehend similar projects



# Mistakes Made and Lessons Learned

- Do not be afraid to ask questions!
- Perfection is not the goal; understanding is
- Flexibility is essential - be ready to adapt and change!
- You know more than you think you know - do not sell yourself short.

# Thank you!

Questions?

Acknowledgements:

Dr. Jian-Young Wu

Velvet Zhou

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Dr. Krug