

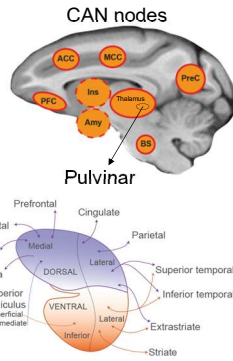
## The effect of dorsal pulvinar inactivation on heart rate, heart rate variability and breathing

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- Cardiac dysfunctions are a complication of stroke in humans and rely on structural and functional alterations in the central autonomous network (CAN).
- Medial pulvinar has reciprocal interconnections with major CAN regions.
- Respiratory arrest and alterations in blood pressure occur after stimulating the posterior part of the pulvinar in the monkey.<sup>1</sup>
- Pulvinar damage seemed to impair oxygen regulation in patients causing hypoxia which is one cause of sudden cardiac death.<sup>2</sup>

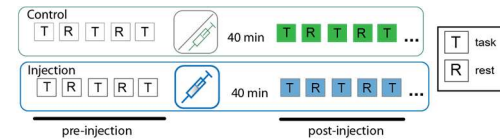
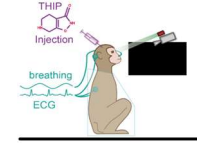


**Is the dorsal pulvinar involved in the regulation of cardiac or respiratory activity?**

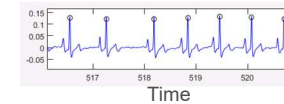
<sup>1</sup>Poirier and Schulmann, 1954; <sup>2</sup>Wandschneider et al. 2015

## Method

- 3 monkeys
- Local injection of THIP (GABA agonist)
- 7 control & 7 injection sessions

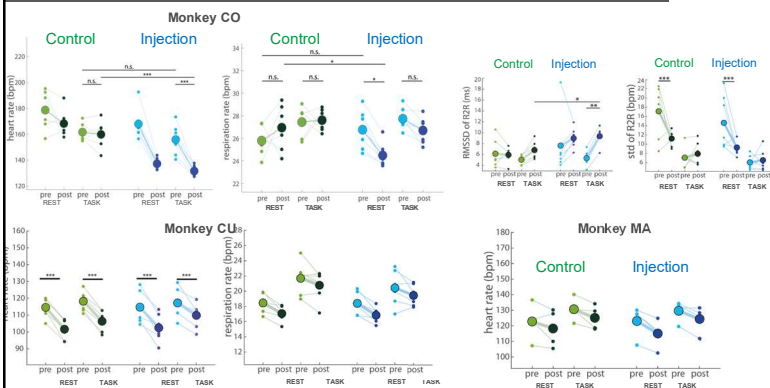


- R-peak and exhaling peak were detected offline



- Dependent variables: heart rate (bpm), heart rate variability (RMSSD in ms, std of R-R interval in bpm) and breathing rate (bpm)

## Is the medial pulvinar causally involved in the regulation of heart and breathing signals?

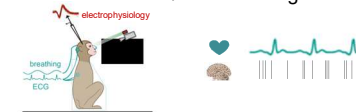


- In one of three monkeys, medial pulvinar inactivation significantly slowed down the average heart rate for rest (~31 bpm) and task (~28 bpm), increased heart rate variability (HRV) during task (~3 ms) and decreased the breathing rate during rest (~2 breaths per minute).

## Summary & Conclusion



- While medial pulvinar has a causal effect on heart rate and its variability, there seem to be additional factors that determine such an effect.
  - The three monkeys differed in their **baseline heart rate**.
    - monkey CO: ~ 170 bpm
    - monkey CU: ~ 110 bpm
    - monkey MA: ~ 125 bpm
  - Bi-hemispheric dorsal pulvinar injections in monkey MA did not have an effect on cardiac or respiratory activity.
- Future research question: Is the neuronal activity of medial pulvinar correlated with the heart rate or/and breathing rate?



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