PHASIC ACTIVATION OF DORSAL RAPHE SEROTONERGIC NEURONS INCREASE PUPIL SIZE

Fanny Cazettes^{1*}, Davide Reato^{1*}, João Morais², Alfonso Renart¹, Zachary F Mainen¹

1. Champalimaud Centre for the Unknown; 2. Catalan Institute of Nanoscience a and nanotechnology

PUPIL SIZE | Variations in pupil size under constant luminance are coupled to rapid changes in arousal state

Modulated by Associated with >> Vigilance » Multiple brain regions

Headplate

>> Salience

The Task

Treadmill

Workflow

Spout A

Spout B

Running

Active Spout

Optic fiber

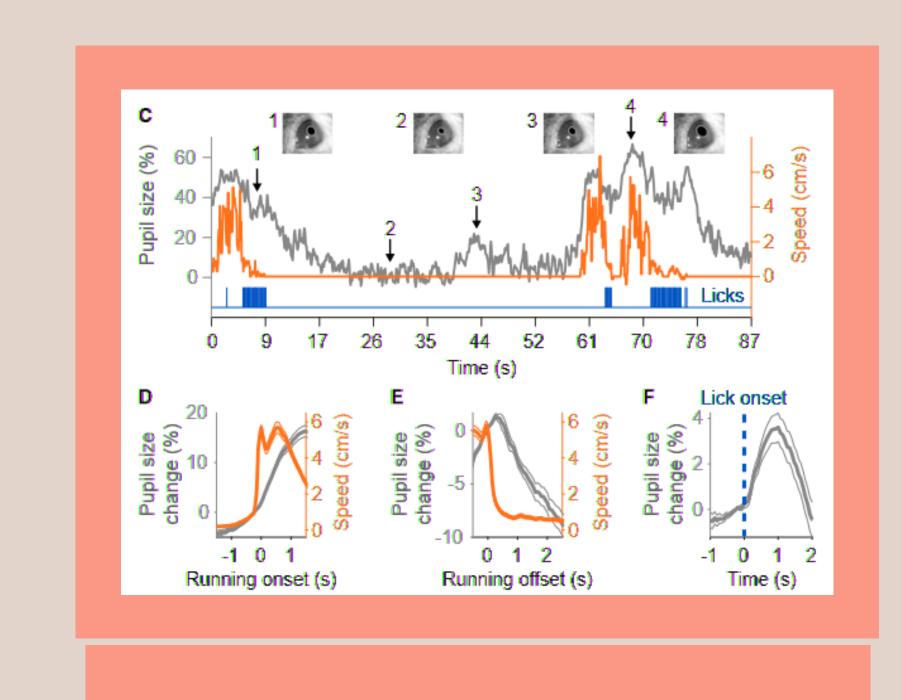
- >> Surprise
- » Noradrenergic system

Camera

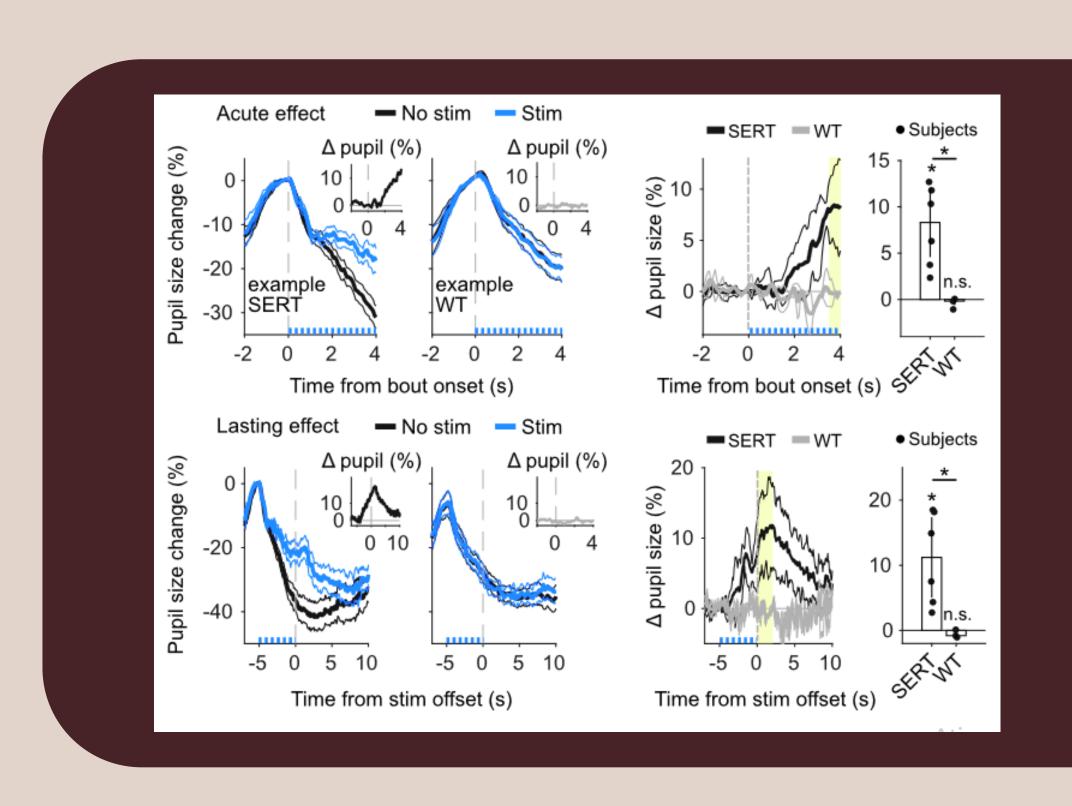
Spouts

»Serotonergic system?

FORAGING TASK | Tracking pupil size during a foraging task for head fixed mice



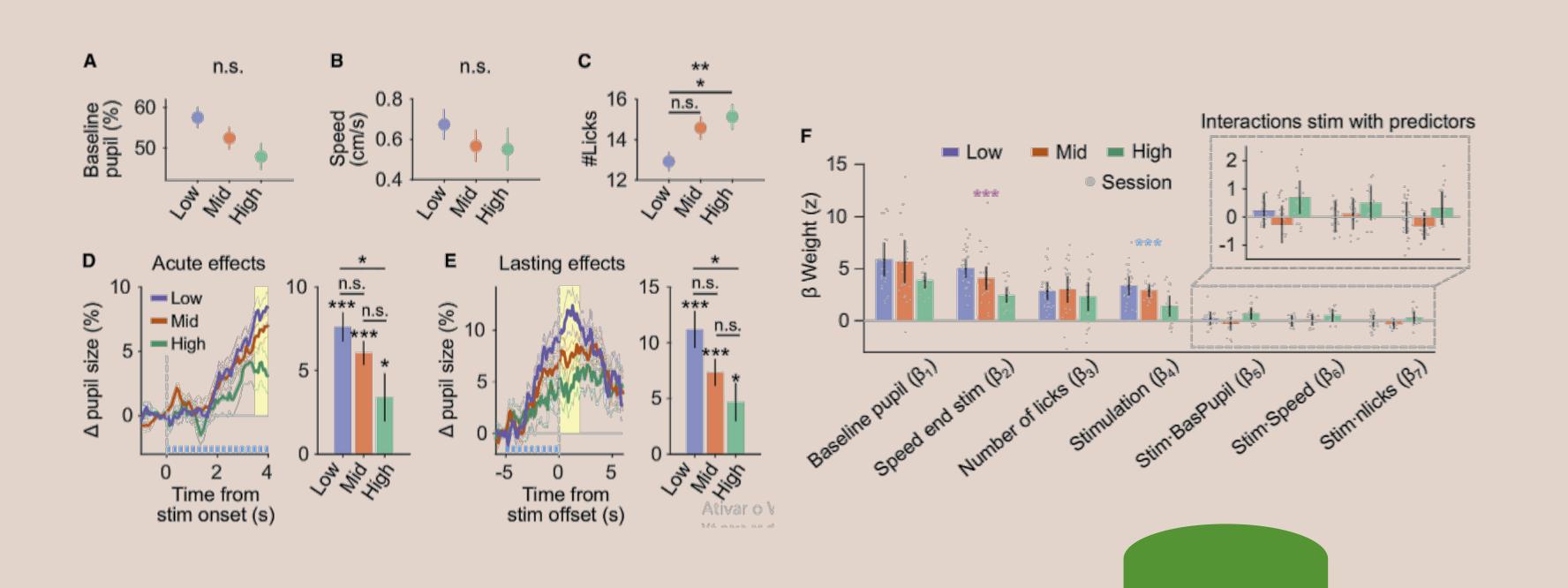
OPTOGENETICS | Activation of DRN-5-HT neurons increases Pupil Size



Stimulation Moving >> SERT-Cre Mice »Injection of **AAV-DIO-ChR2** >> Implanted fiber over **Dorsal Raphe** »Light on for 30% of the trials Starts in the first lick

SENSIBILITY The effects of 5-HT Photostimulation depend on the level of Uncertainty

SPECIFICITY | The effects of 5-HT **Photostimulation** are nor Specific to Behavioral States



Rewarded Lick Unrewarded Lick



