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Area of Investigation with Respect to Reserve and Resilience

- Population Studied: Healthy outbred Long-Evans rats
- We investigate the neural mechanisms of memory in young and older adults against the background of well-characterized individual differences.
- Methods: Behavioral characterization for individual differences in aging outcomes (aged impaired, AI and aged unimpaired, AU)

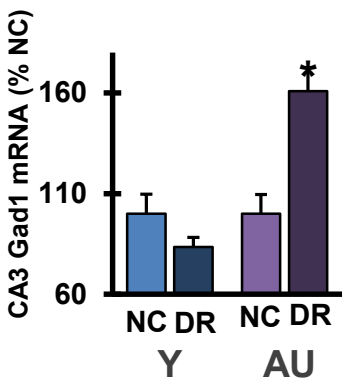
Concepts Used In Research

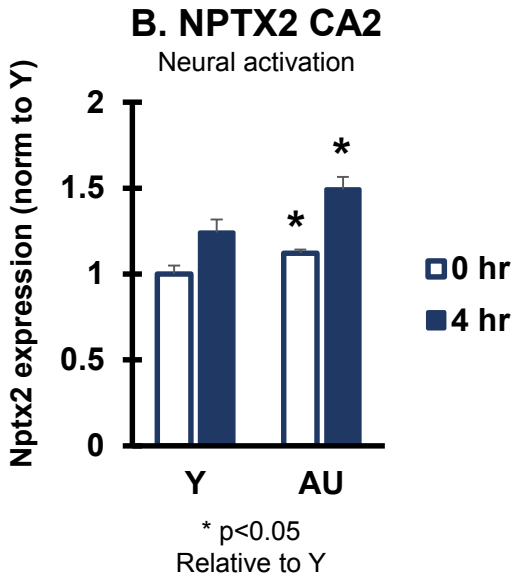
- **Maintenance** → the preservation of neural resources with no indication that aging with preserved cognition (AU) differs from young adults. Preserved cognition is potentially attributable to differences in rate of aging?
- **Neuroadaptation** → Recruitment of neural resources in aging (AU) that are distinctive from young adults to offset neural mechanisms/conditions underlying age-related impairment (AI). NOTE: Neural overactivity is a feature in cognitive aging and early AD

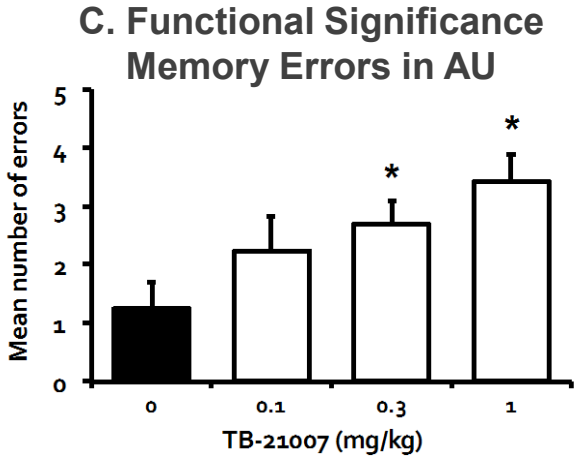
Example of Data that Address One Concept

- Concept: **Neuroadaptation**
- Measure: Recruitment of inhibition in aged rats with preserved cognition (AU) is **increased** relative to young (Y)
- **A.** and **B.** Measures of GAD1 and NPTX2
- Functional significance?
- **C.** Inhibition of $GABA_A$ ($\alpha 5$ NAM) impairs AU memory performance.

(**A.** Published data Branch et al. 2019; **B.** NPTX2 unpublished but see Xaio et al. 2018 for human clinical aging and AD; **C.** unpublished data but see Chambers et al. 2003; Koh et al 2013 for **GABA** α5 **NAM** improves young adult rats**)**







Limiting GABA $\alpha 5$ function impairs AU