

Dopamine Receptor Changes in the Central Amygdala Across Brain Development

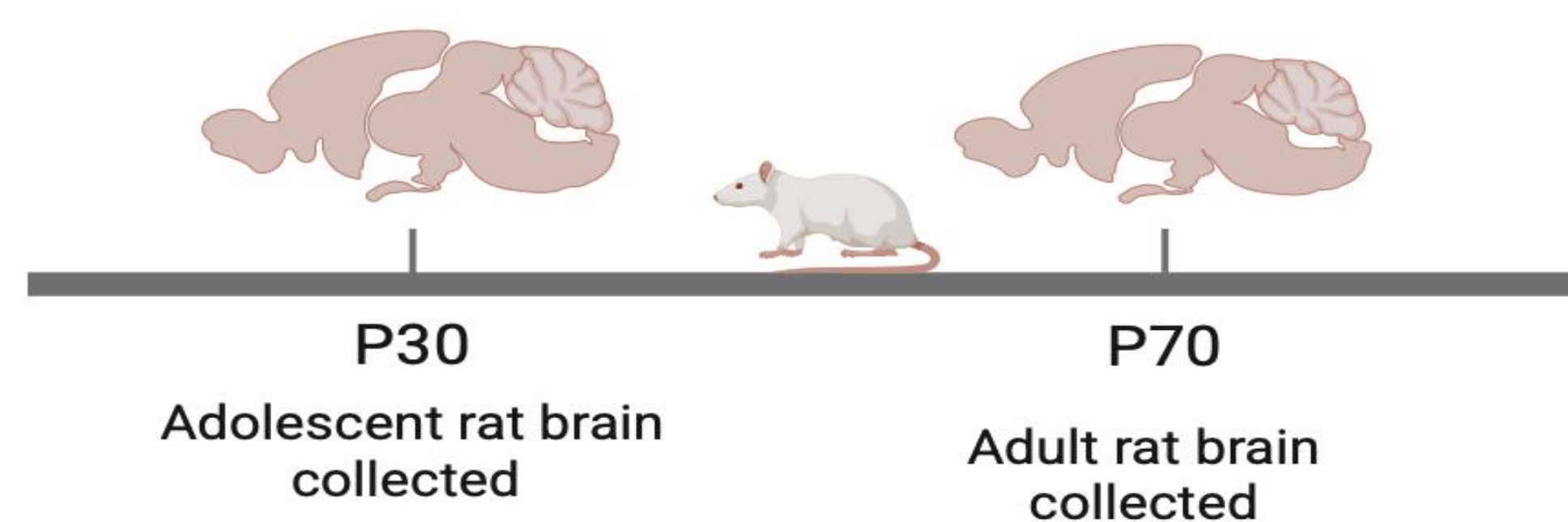
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Introduction

- The central amygdala (CeA) regulates fear and anxiety.
- Dopamine (DA) in the CeA affects stress and emotional behavior.
- Disrupted DA signaling is linked to anxiety disorders.
- Tyrosine hydroxylase (TH) marks DA input; *Drd1* and *Drd2* are key DA receptors.
- Cart* (Cocaine- and amphetamine-regulated transcript) is a DA-regulated peptide involved in stress and reward.
- Most studies focus on adults; developmental patterns remain unclear.
- Adolescence is a critical period for brain development and anxiety risk.
- Examining TH, *Drd1*, *Drd2*, and *Cart* across ages may reveal age-related changes in anxiety vulnerability.
- Hypothesis:** DA input to the CeA changes with development and may underlie shifts in anxiety behavior.

Methods

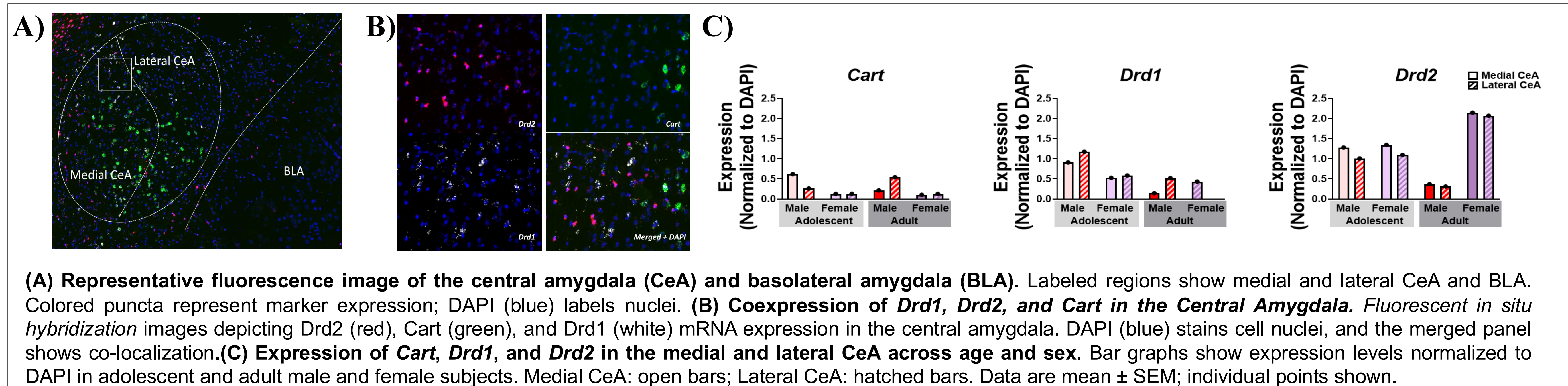


- Male and female Wistar rats were assigned to one of four groups based on age and sex: adolescent males (postnatal day 30; P30), adolescent females (P30), adult males (P70), and adult females (P70), with n = 3 per group.
- **RNAscope:** To evaluate gene expression we used RNAscope to look at *Cart*, *Drd1*, and *Drd2* expression in the CeA
- **IHC:** To evaluate gene TH innervation, we used IHC to look at the fluorescent intensity in the CeA.

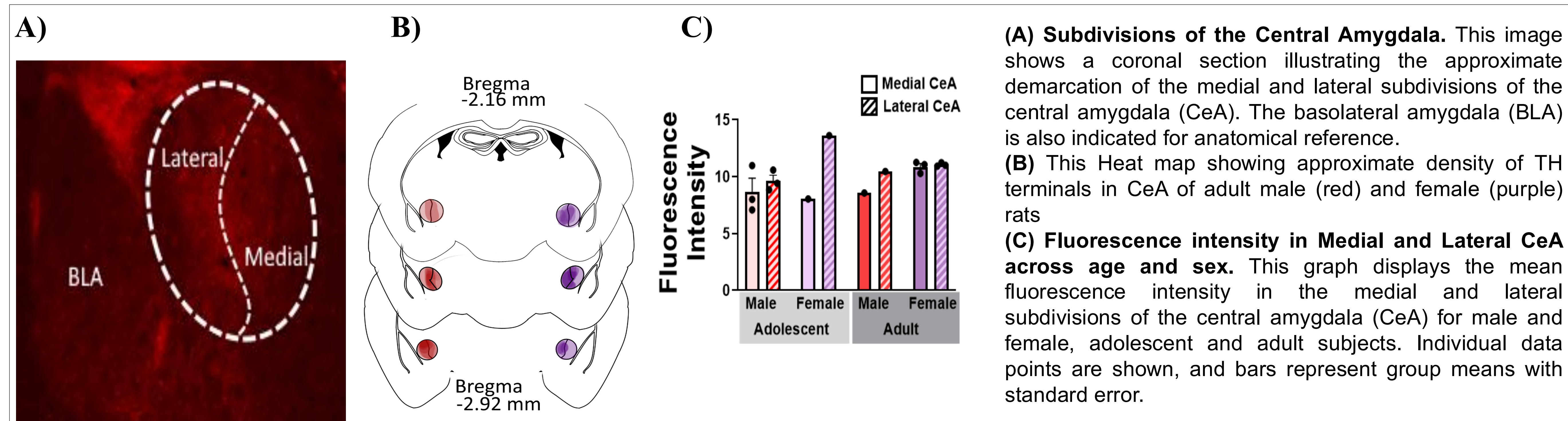
Acknowledgments

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- NIAAA K01 AA028541

Expression of different cell types in the CeA across development



TH innervation into the CeA across development



Results

- Preliminary analysis revealed age-dependent differences in dopaminergic markers within the central amygdala (CeA).
- Variations were observed in tyrosine hydroxylase (TH) fiber density, indicative of dopaminergic innervation, in the CeA.
- Differences were detected in the gene expression levels of dopamine receptors *Drd1* and *Drd2*, as well as *Cart* (Cocaine- and amphetamine-regulated transcript), within the CeA.
- These differences were examined across adolescent (P30) and adult (P70) male and female Wistar rats.

Conclusion

- Replication with larger cohorts to confirm findings.
- Incorporate functional studies (electrophysiology, optogenetics, chemogenetics) to assess direct consequences of developmental changes.
- Correlate neurobiological findings with behavioral measures of anxiety for comprehensive understanding.
- Aims to inform age- and sex-specific therapeutic interventions for anxiety disorders.