

# Effect of Early-Life Stress on Fear Learning and Anxiety-like Behaviour in Adolescent Mice

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## Early Life Stress (ELS)

Infancy is a highly sensitive and critical period for brain development and lays the foundation for future cognitive abilities and emotional regulation<sup>1</sup>.

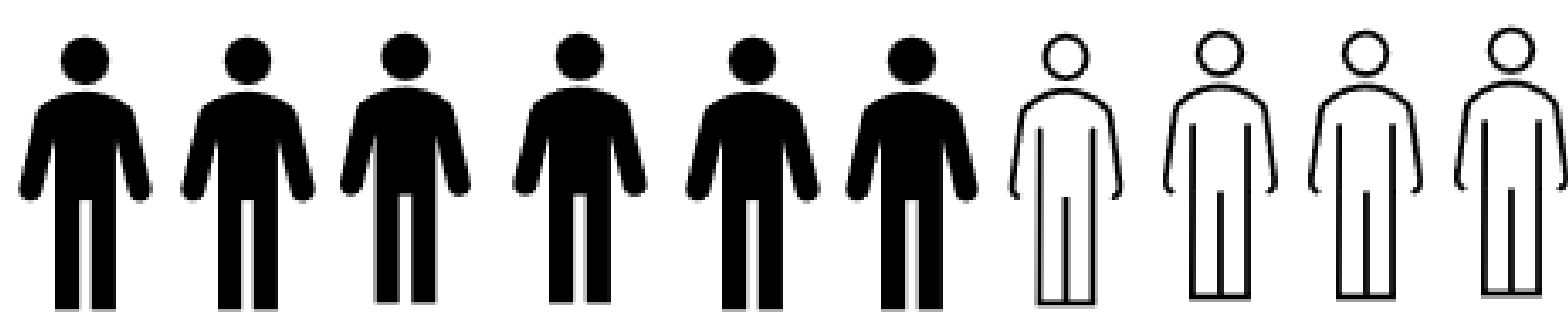
**Early Life Stress** stemming from adverse childhood experiences (ACEs) such as **maltreatment, parental neglect or deprivation** can disrupt important developmental processes during infancy<sup>1</sup>.



**ELS is associated with alterations in the brain circuitry involved in fear responses and increased vulnerability to developing anxiety disorders in adolescence<sup>2</sup>.**

Despite this, the neurobiological mechanisms underlying this phenomenon are not fully understood.

**6 in 10**



adults report **experiencing at least one type of ACE**

### OBJECTIVE

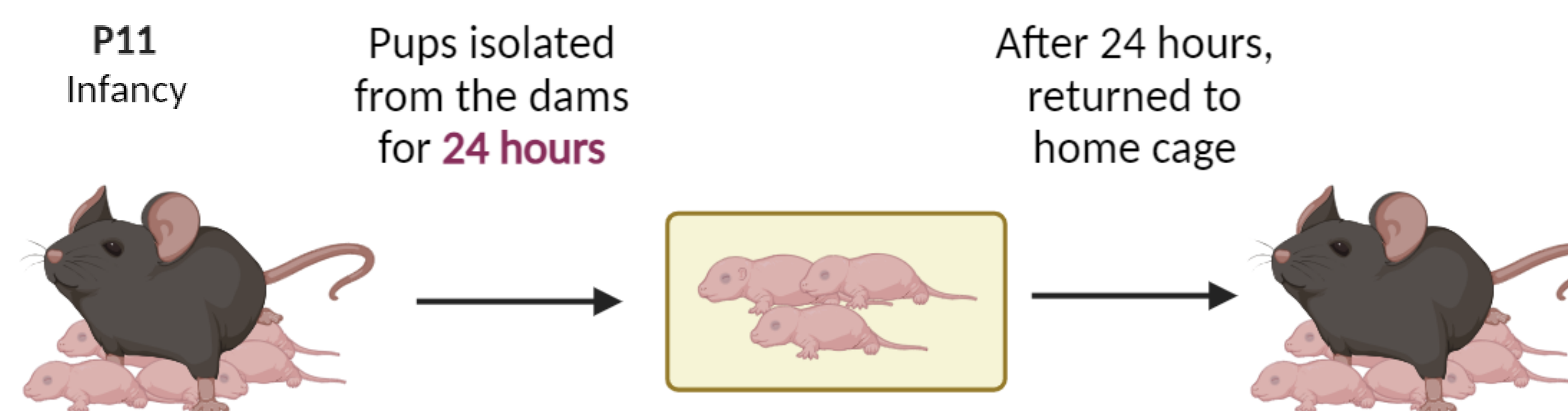
To investigate **how ELS affects fear and anxiety-like behaviors in adolescent mice** using behavioural tests.

### SIGNIFICANCE

Our findings have the potential to **pinpoint novel biological targets** and **optimize early intervention** for psychopathologies that originate in early life.

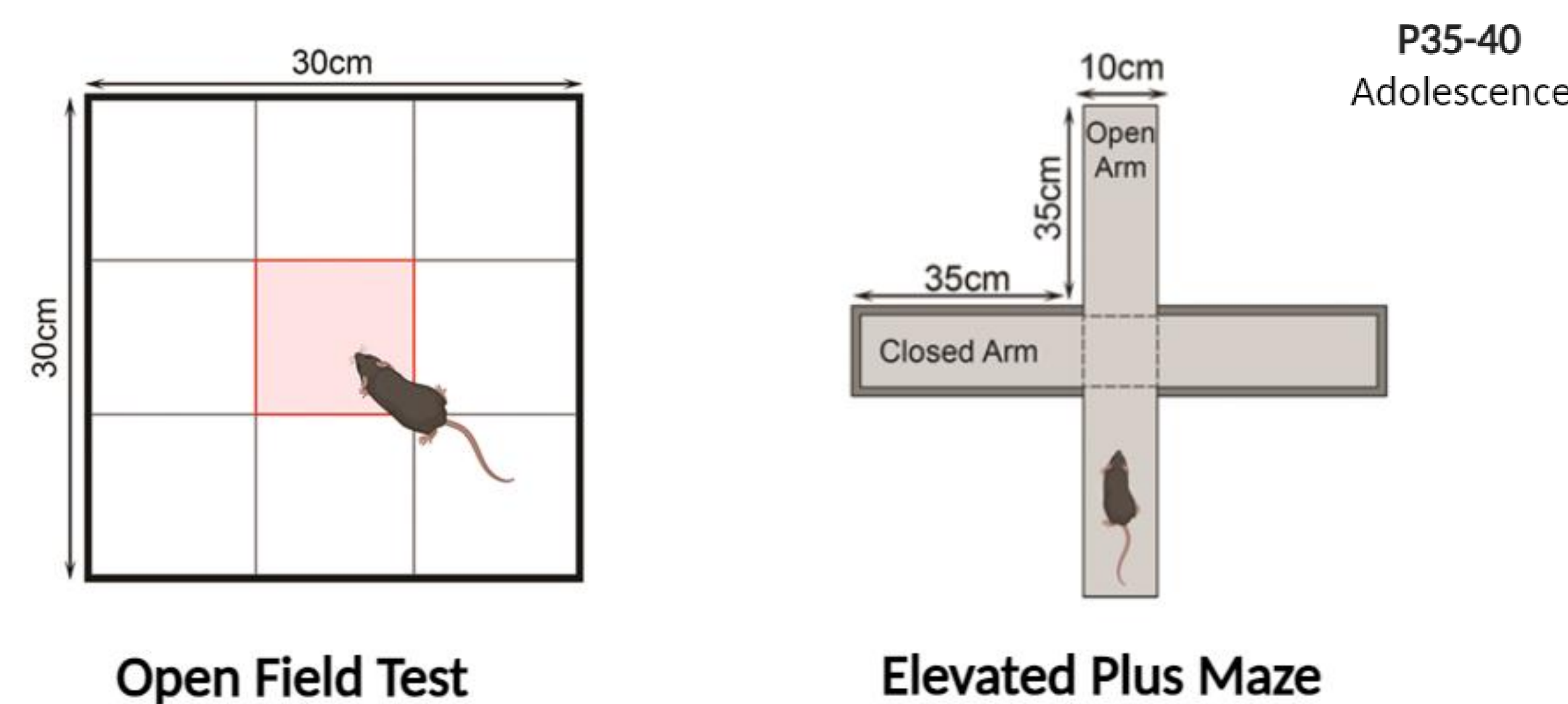
## Mouse Model for ELS

**Maternal Deprivation (MD):** to mimic early-life neglect and loss of parental care as seen in humans.



### Behavioural Tests:

1) **Open Field Test & Elevated Plus Maze:** to assess **anxiety-like behaviour** in adolescent mice.



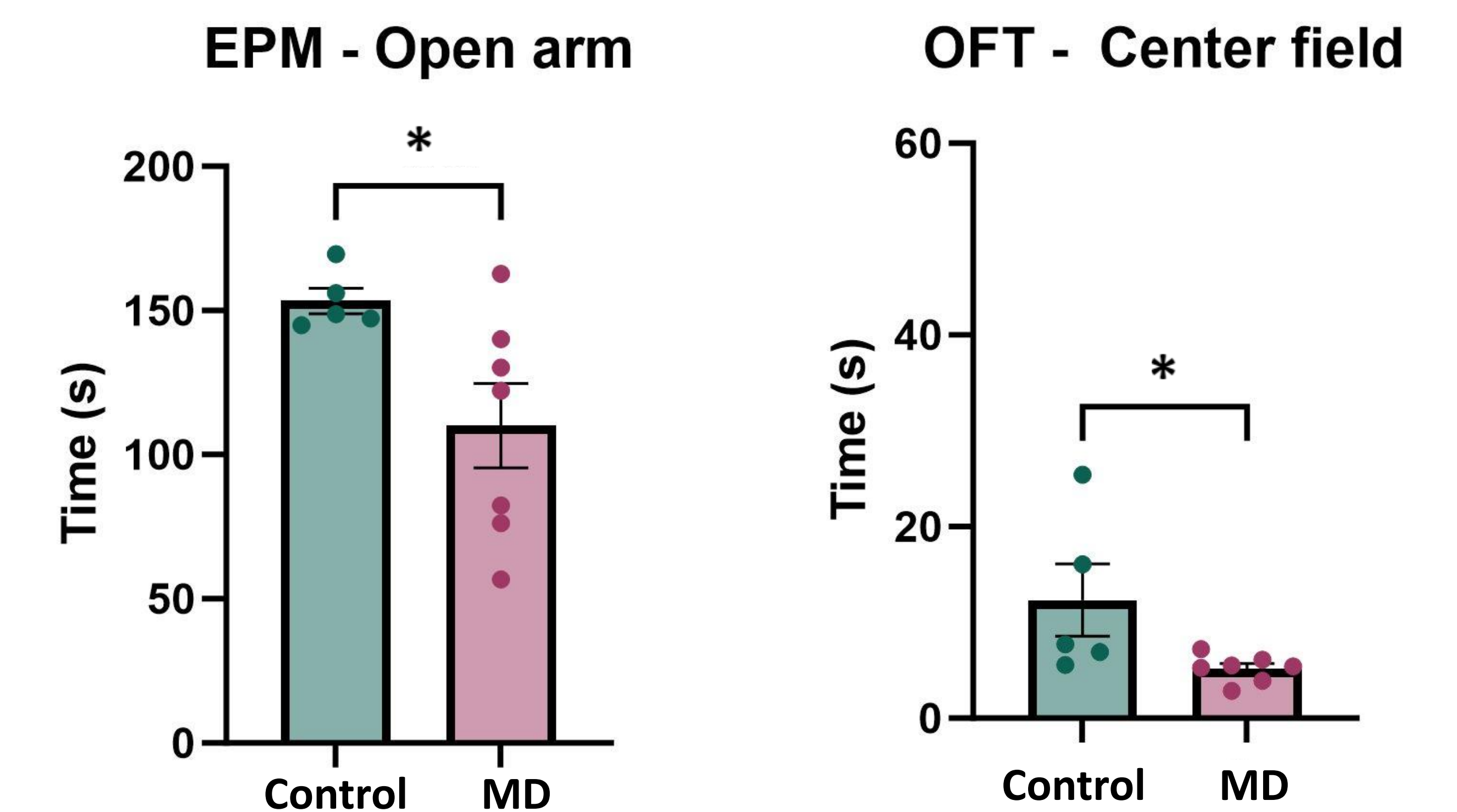
Decreased time in center and open arms serves as an indicator of anxiety-like behaviour.

2) **Fear conditioning:** to assess **fear learning** in adolescent mice.

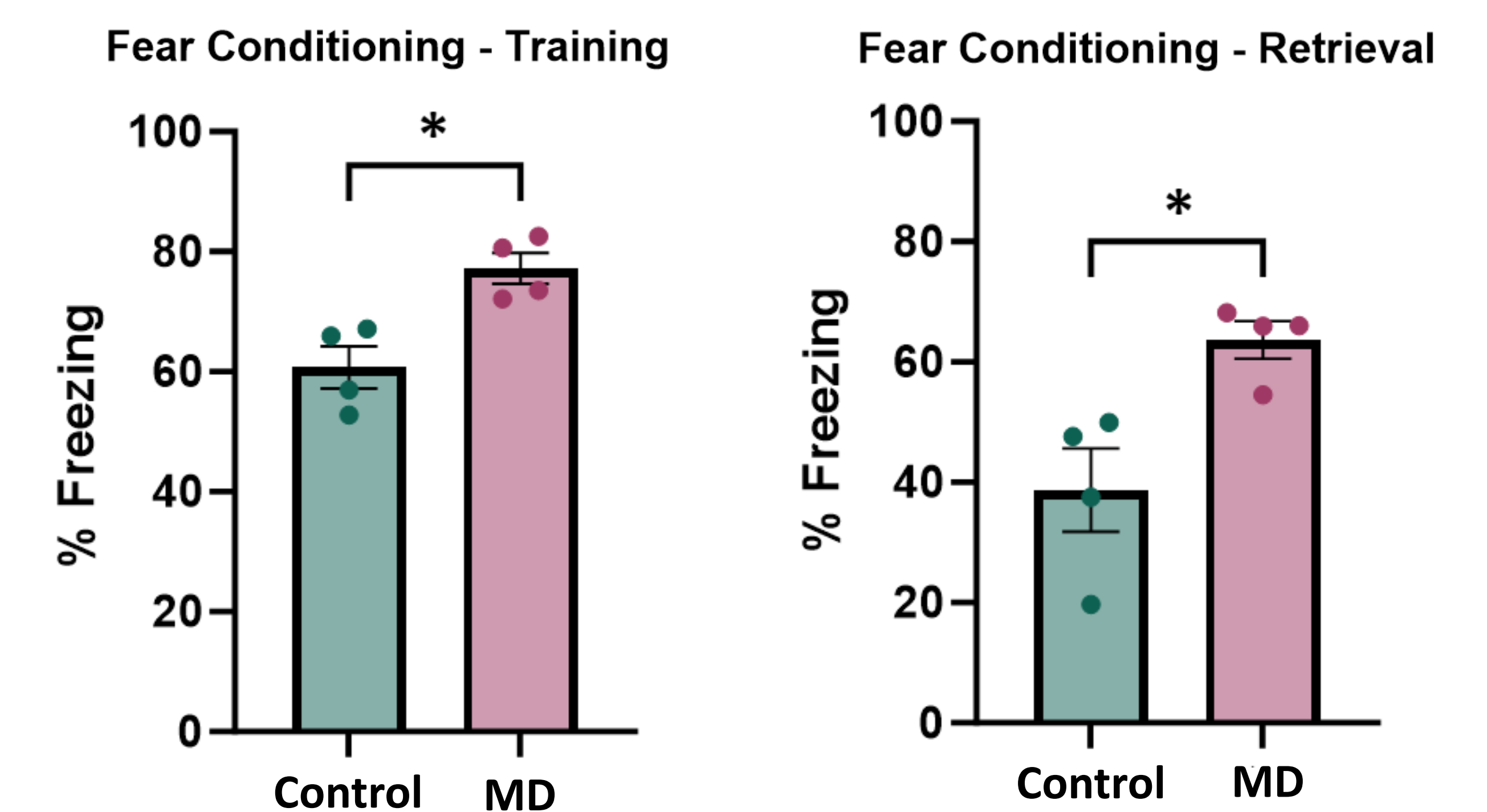


Increased freezing serves as an indicator of increased fear response.

## Results: Anxiety-like Behaviour



## Results: Fear Conditioning



## Conclusion and Future Directions

**ELS increases fear and anxiety-like behaviour in adolescent mice.**

By examining brain slices and performing brain manipulation techniques, we can identify the exact brain circuit(s) responsible for the observed ELS-augmented fear and anxiety-like behaviour.

<sup>1</sup> Malave, L., van Dijk, M. T., & Anacker, C. (2022). Early life adversity shapes neural circuit function during sensitive postnatal developmental periods. *Translational psychiatry*, 12(1), 306.  
<sup>2</sup> Ishikawa, J., Nishimura, R., & Ishikawa, A. (2015). Early-life stress induces anxiety-like behaviors and activity imbalances in the medial prefrontal cortex and amygdala in adult rats. *European Journal of Neuroscience*, 41(4), 442-453.