משרד החינוך
המינהל הפדגוגי
האגף למחוננים ולמצטיינים

# The effects of inhibition of protein synthesis in the medial prefrontal cortex on consolidation of extinction of recent and remote aversive memories

## השפעת עיכוב סינתזה של חלבונים בקורטקס הפרה-פרונטלי על הכחדת זיכרון אברסיבי


מכון הנרייטה סאלד
המכון הארצי למחקר במדעי ההתנהגות

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## Introduction:

To survive in a world with varying stimuli, animals have to learn which stimuli are safe and which are not safe and need to be avoided.
We used the contextual fear conditioning which associates a context with electrical shock and the odor conditioning paradigm which associates a more natural modality (odor) with malaise feeling.
The two paradigms share characteristics of robust, intense and one trial formation of the associative memory; they can undergo extinction upon repeated exposure with the stimulus without the reinforcement.
The medial prefrontal cortex has a role in extinction of aversive memories. Microinjection of protein synthesis inhibitor can disrupt the consolidation of extinction memory.

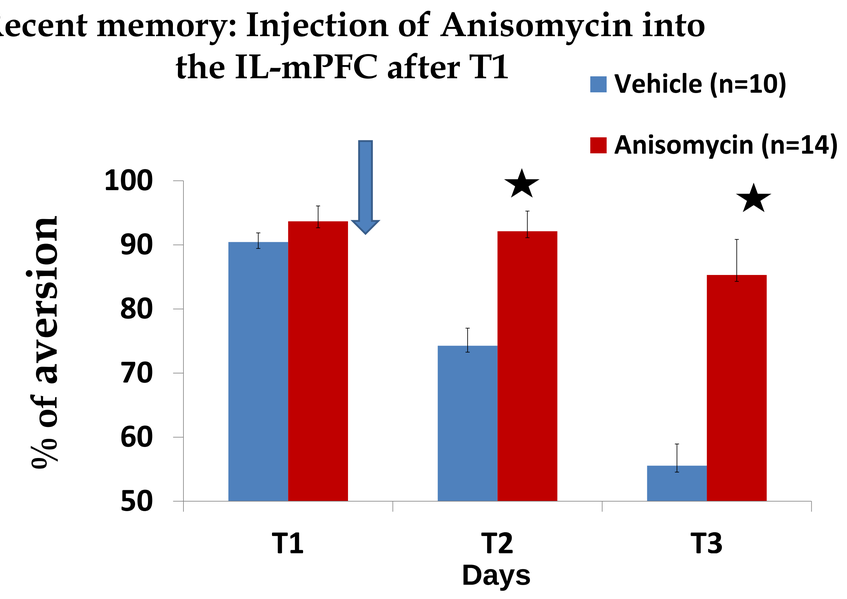
## In this study we wanted to examine:

The role of protein synthesis in the infralimbic (IL) subregion of the mPFC in the extinction of recent and remote extinction of conditioned odor aversion (COA) and contextual conditioning.
To that end we microinfused Anisomycin, the protein synthesis inhibitor into the IL immediately after the first retrieval test on either 2 days (recent memory) or 28 days (remote memory) after COA acquisition.

# Results

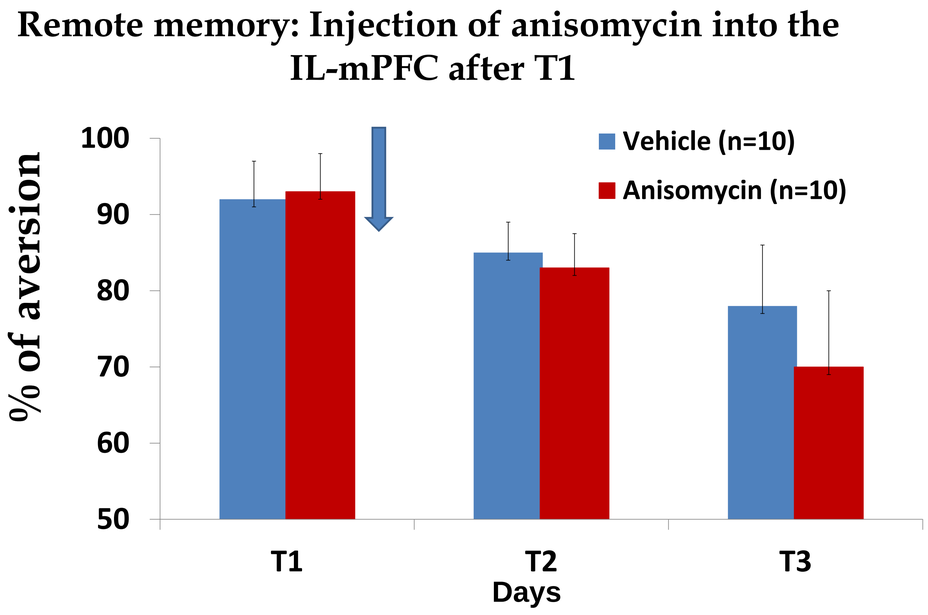
### Conditioned Odor Aversion

A




A: Animals were microinjected with Anisomycin or Vehicle into the IL of the mPFC immediately after T1 2 days after COA conditioning. The results indicate that the microinjection of Anisomycin significantly impaired extinction of COA. Arrow indicates time of microinfusion, star indicates significant differences.

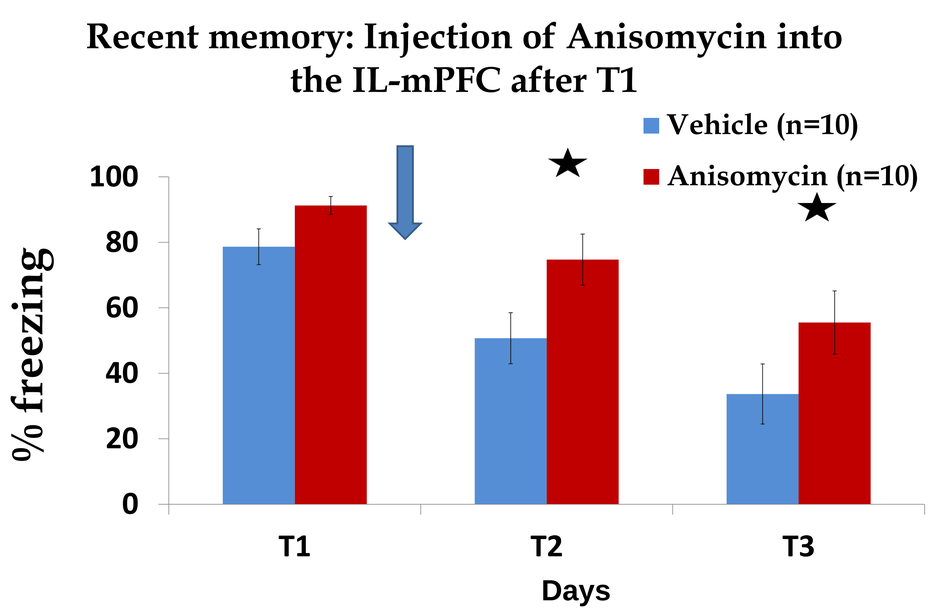
B




B: Animals were microinjected with either Anisomycin or Vehicle immediately after T1 28 days after COA conditioning. The results indicate that the microinjection of Anisomycin did not affect extinction of remote COA. Arrow indicates the time of microinfusion.

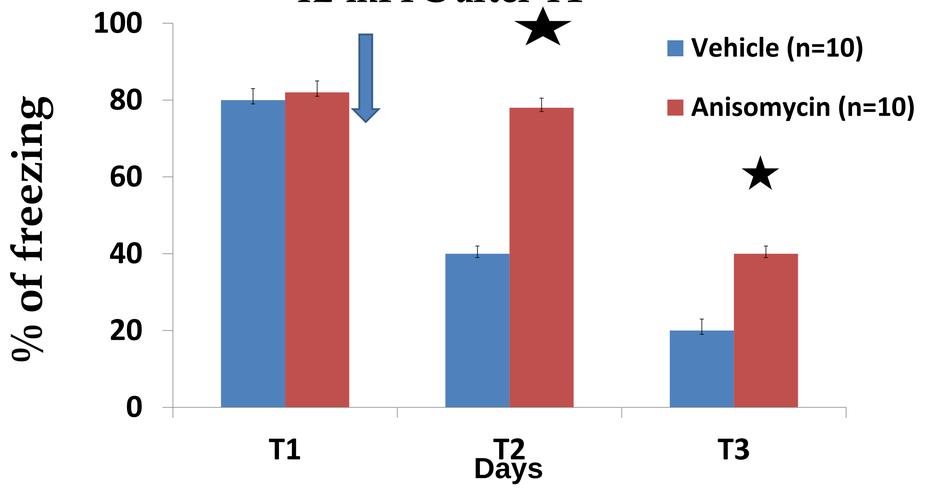
### Contextual Conditioning

C




C: Animals were microinjected with either Anisomycin or Vehicle into the IL immediately after T1 2 days after contextual conditioning. The results show that Anisomycin disrupted extinction. Arrow indicates time of microinfusion, star indicates significant differences.

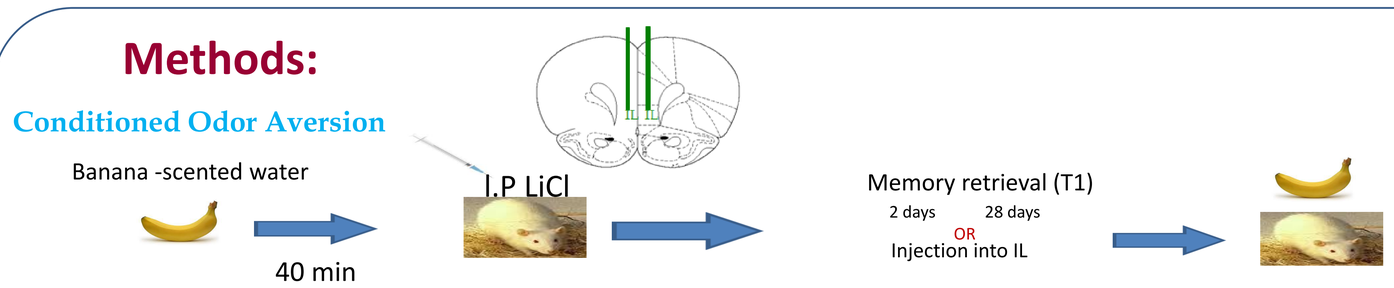
D



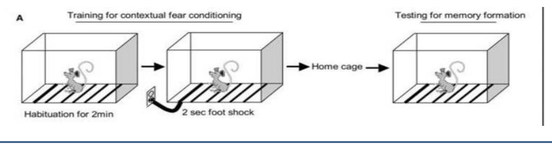

D: Animals were microinjected with either Anisomycin or Vehicle immediately after T1 28 days after contextual conditioning. The results show that the Anisomycin group was disrupted in extinction. Arrow indicates time of microinfusion, star indicates significant differences.

## Methods:

### Conditioned Odor Aversion




### Contextual Conditioning




## Summary and Conclusions

Our results show that the mPFC and mainly the IL has a role in the extinction of COA and contextual conditioning and that protein synthesis is required for intact extinction.
The IL does not seem to have a role in the extinction of remote memory of COA but it has a role in both recent and remote extinction of contextual fear.
These results suggest that the mPFC has a differential role in recent and remote extinction of COA and contextual conditioning.