The Role of the Primate Medial Temporal Lobe in Associative Memory Formation

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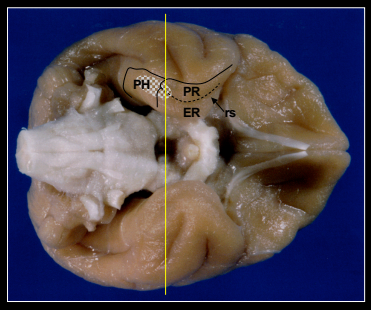
Ventral View of Macaque Monkey Brain



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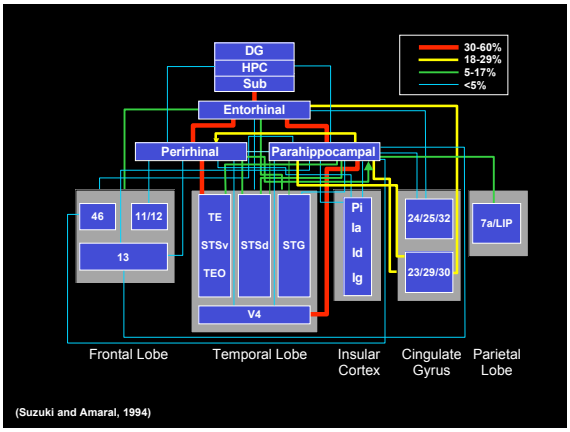

(Suzuki and Amaral, 1994)

Location-Scene Association Task

Gaffan (1994)

Murray and Wise (1996)

Murray et. al., (1998)

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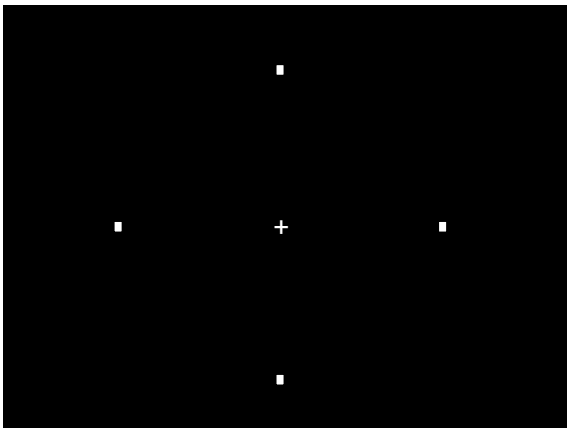
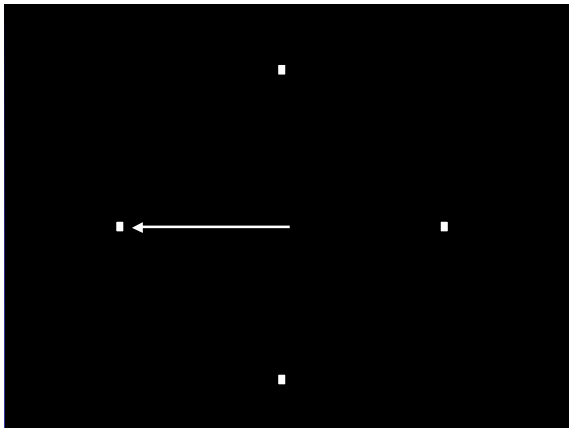
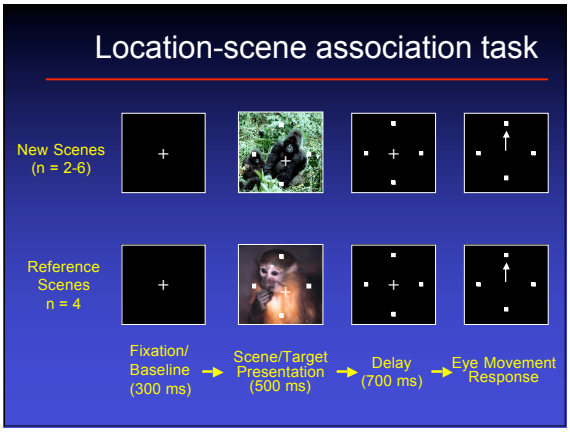


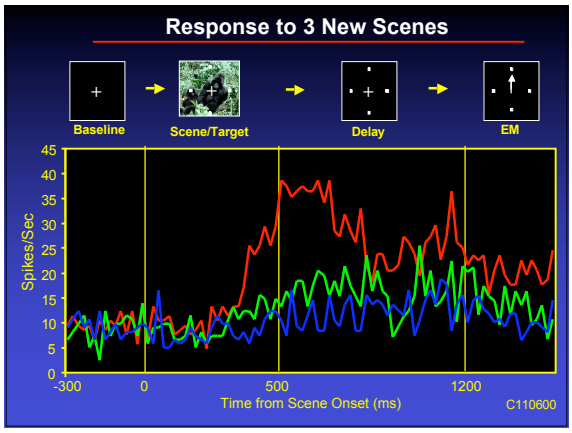


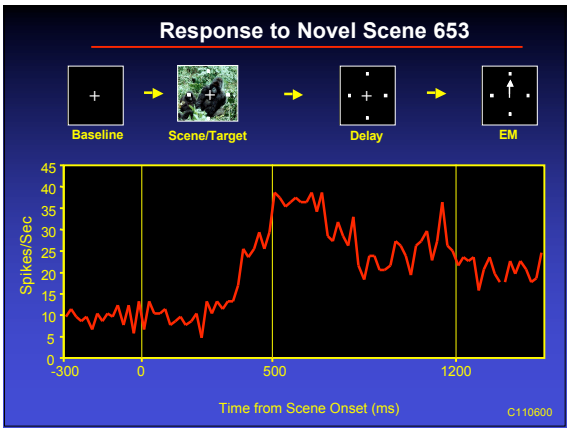


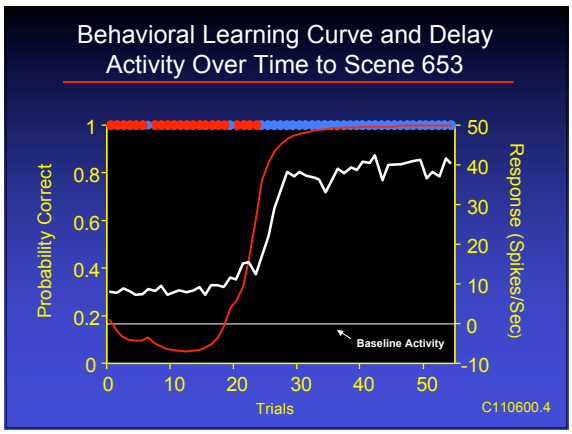
Working Hypothesis

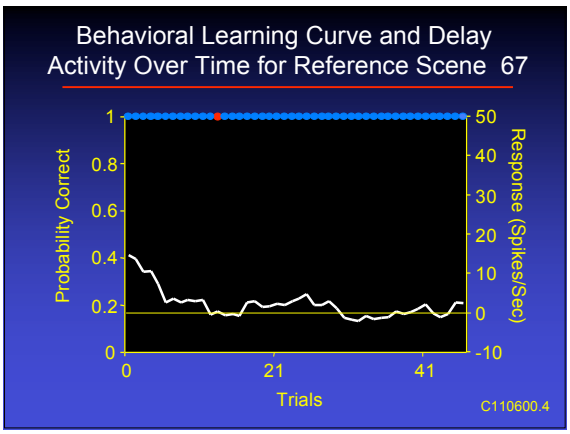
Selective changes in the patterns of activity in medial temporal lobe neurons underlie the formation of new location-scene associations.

Associative Learning Signals in the Hippocampus









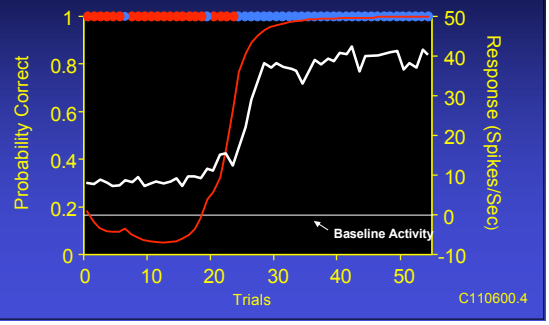
Are There Different Categories of Changing Cells?

2 Categories of Changing Cells

A. Sustained Changing cells:
56% of all changing cells

B. Baseline Sustained Changing cells:
44% of all changing cells

Behavioral Learning Curve and Delay Activity Over Time to Scene 653



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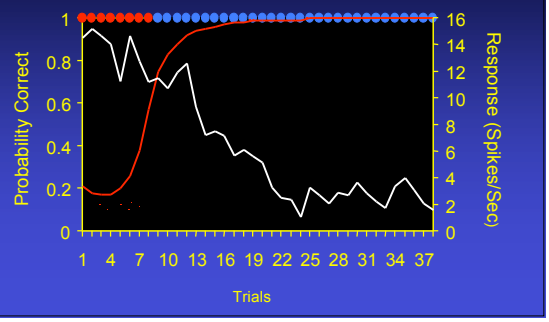
Behavioral Learning Curve and Delay Activity Over Time to Scene 386



Categories of Changing Cells

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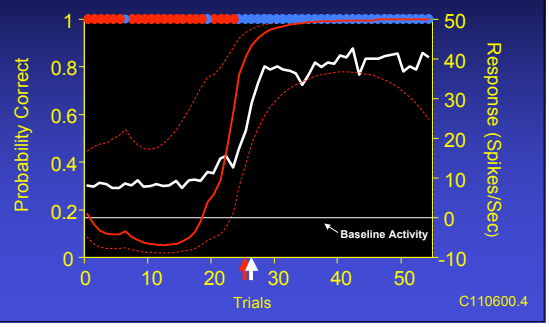
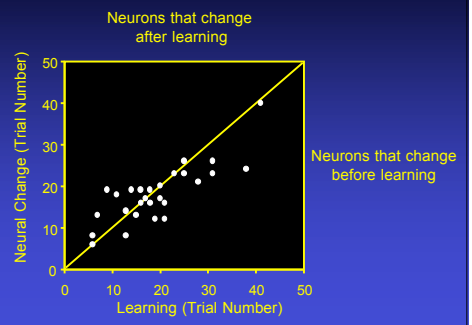
What is The Time Course of the Changing Cells relative to Learning?

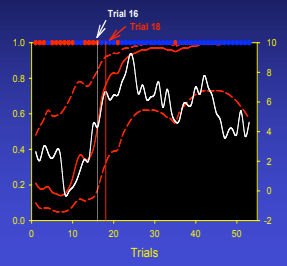
Behavioral Learning Curve and Delay Activity Over Time to Scene 653



Neural Change vs. Learning

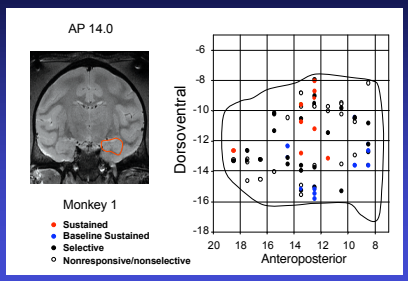


Neuron that changes BEFORE learning



Where are the changing cells located?

Hippocampal Recording Sites



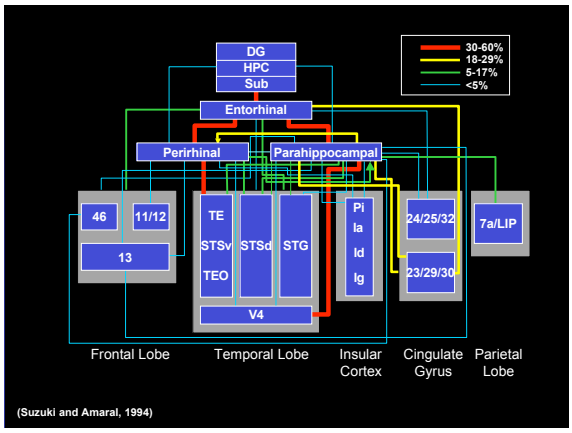
Summary

Changing cells in the hippocampus signal new association learning

Hippocampal neurons participate in both the formation and consolidation of new associations

Changing cells are observed throughout the hippocampus

What about the Perirhinal Cortex?



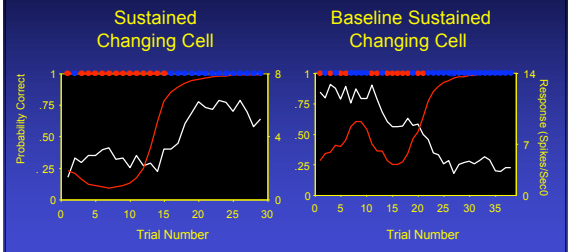
(Suzuki and Amaral, 1994)

	Hippocampus	Perirhinal Cortex
Selective	89/145 (61 %)	38/58 (66 %)

Are there changing cells in the perirhinal cortex?

	Hippocampus	Perirhinal Cortex
Changing Cells	25/89 (28%)	7/38 (18%)

Learning-related cells in the Perirhinal Cortex



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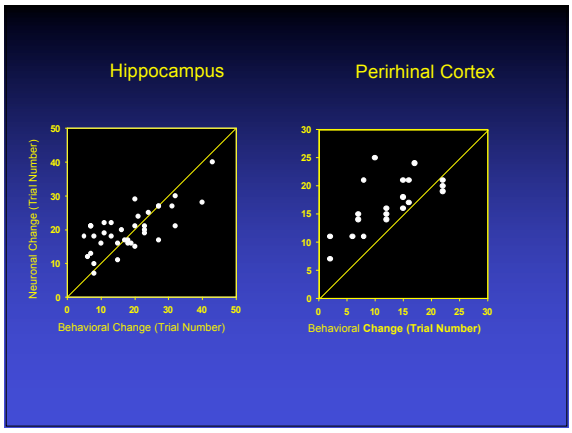

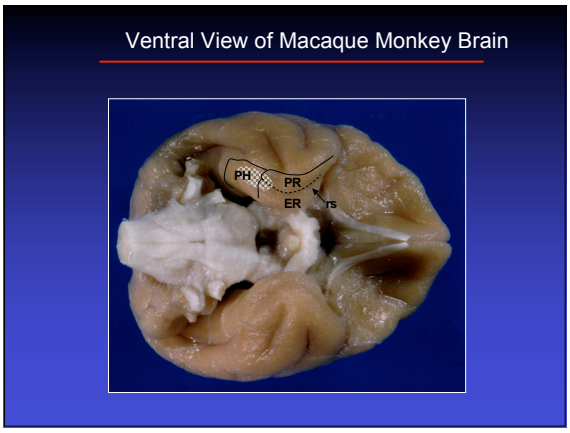

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