Abstract View

RESPONSES OF MONKEY INFEROTEMPORAL NEURONS DURING PAIRED-ASSOCIATE LEARNING.

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We recorded from area TE and perirhinal cortex during the learning of paired associates to determine the role of these areas in acquiring new associations. Each day we arbitrarily grouped four new visual stimuli (A-D) into two pairs (AB and CD), which monkeys learned by trial and error. Performance typically increased from 50% correct (chance) to 56 ± 1% correct. This improvement was highly significant across learning sessions (binomial test, $p = 0.004$, $n = 59$). Of 93 visually responsive neurons, 64 (69%) had significant changes in their response to at least one stimulus during a session. We compared the normalized absolute difference in firing rate in response to paired and unpaired stimuli at the start and end of each day of training. In the majority of cells (60%), the differences in firing rate for paired stimuli decreased during training relative to the differences for unpaired stimuli. That is, the responses to paired stimuli became more similar. This pair-selective change in firing rates was significant across the population (binomial test, $p = 0.031$, $n = 93$). When the improvement in performance between the first and last quartile was above the median, 70% of the cells exhibited the effect ($p = 0.006$, $n = 47$), as compared to only 51% of the cells ($p = 0.500$, $n = 46$) when the improvement in performance was below the median. The emergence of neural correlates of paired-associate learning in parallel with behavioral learning provides evidence that area TE and perirhinal cortex play a role in the encoding of visual associative memories.

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