

# Effect of Reversible Inactivation of Macaque Lateral Intraparietal Area on Saccades and Search

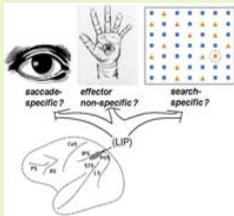
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## Question

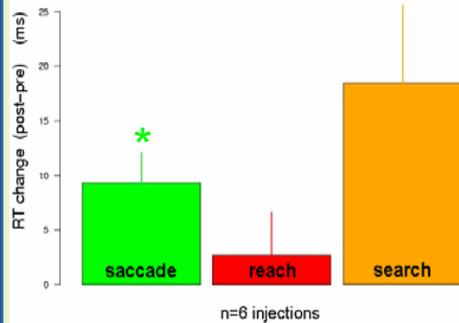
**The causal role of LIP in sensorimotor processing:**

Saccade effect (Li & Andersen 1999)      Search effect (Wardak et al. '02 & '04)

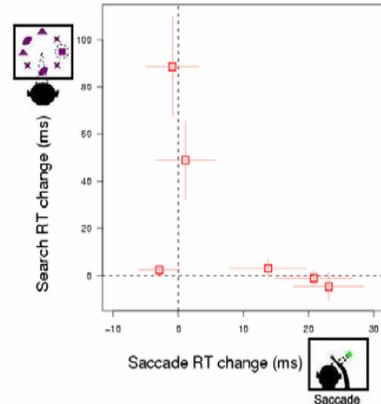


## LIP lesions affect both oculomotor and search tasks

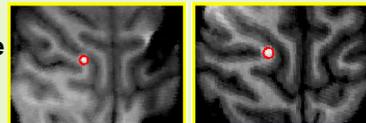
LIP lesions increase memory saccade & search RT



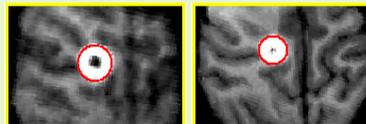
Site-by-site (n=6) comparison of memory saccade and search effects of LIP lesions



Saccade effect:

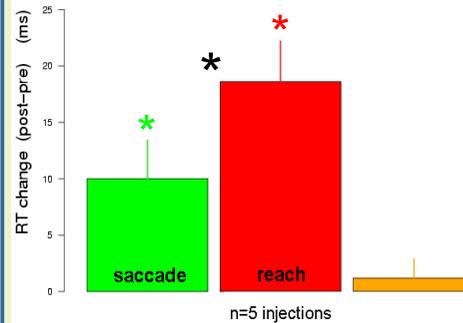


Search effect:

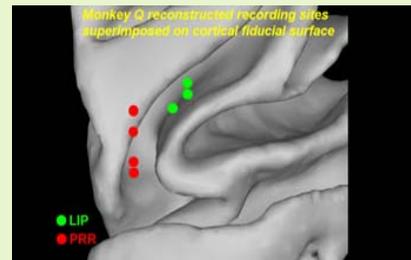


## PRR lesions affect reach tasks more than saccade tasks

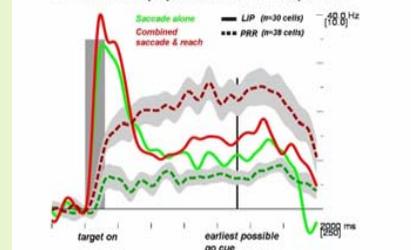
PRR lesions increase memory reach RT more than memory saccade RT



## Area localization



LIP and PRR population neural responses



## Summary

- LIP inactivation slows both saccades and visual search, but has little effect on reaches. In contrast, PRR inactivation has no effect on visual search, but slows both reaches and saccades. Reaches are slowed nearly twice as much as saccades.

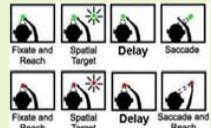
Thus LIP lesions show an effector-specific effect (on eye movements but not arm movements). Yet LIP lesions also affect visual search, a function more consistent with an effector non-specific role.

These two effects, effector-specific and non-specific, may be dissociable. Saccade effects were seen in conjunction with small localized Mn halos, while search effects were seen in conjunction with large halos. The number of observations is too small to draw any conclusions.

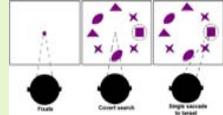
## Methods

### Tasks

Memory-guided saccades and reaches



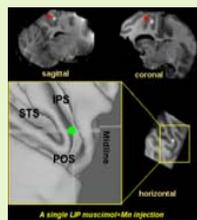
Visual search



### Muscimol + Mn-MRI

8 mg/ml muscimol and 0.1 M manganese (19.8 mg/ml MnCl<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub> (tetrahydrate)) in normal saline were co-injected into LIP or PRR. One or two injections of 1-2µL were made, ~4-8 mm below the cortex surface.

A T1-weighted image was acquired 6-8 hours after each injection using a standard MP-RAGE sequence. The radiuses of Mn injection halos varied between 0.5 - 3.5 mm.



Data are shown for contralateral targets/responses.

## References

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