Responses of Macaque PIT Neurons to Color and Luminance

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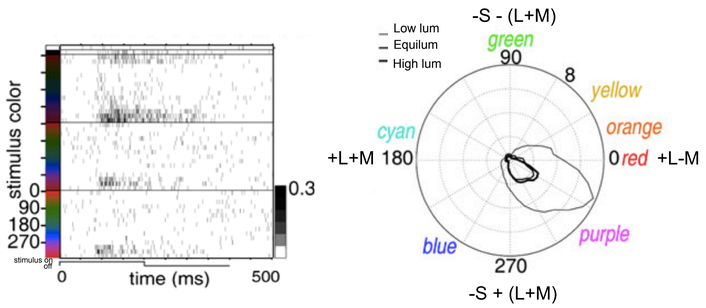
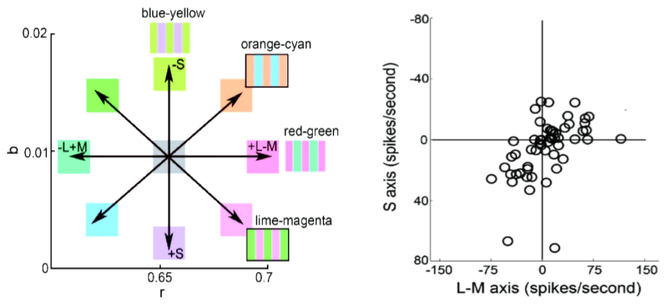
Introduction

Color vision in humans and monkeys relies on cone activity being passed through a hierarchy of incompletely understood neural circuits. One region thought to be important is V4/PIT, a mid-tier stage that contains color-selective “glob” cells. We used single-unit electrophysiology to record from these cells in fixating monkeys, testing the hypothesis that these neurons are correlated with color perception.

Methods

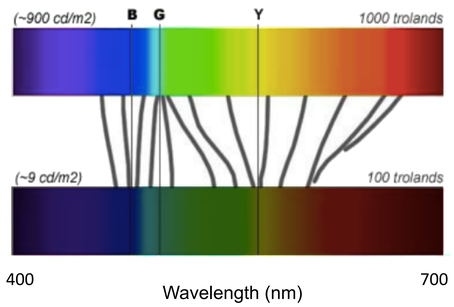


(Left) Post-Stimulus Time Histogram and (Right) Polar Plot from a Glob Cell. Figure from Ref. 1.

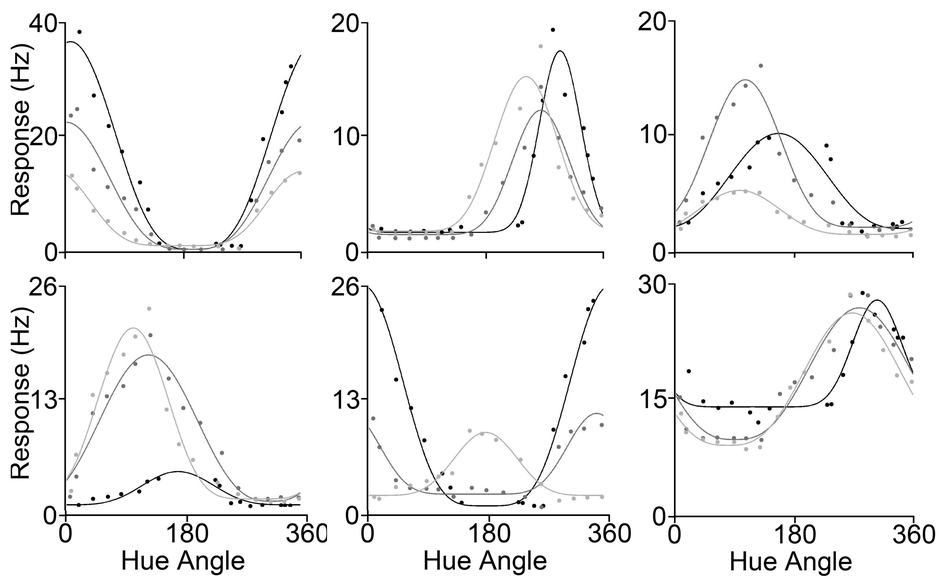


(Left) Color Space and (Right) Receptive Field Center V1 Reponses. Figures from Ref. 4.

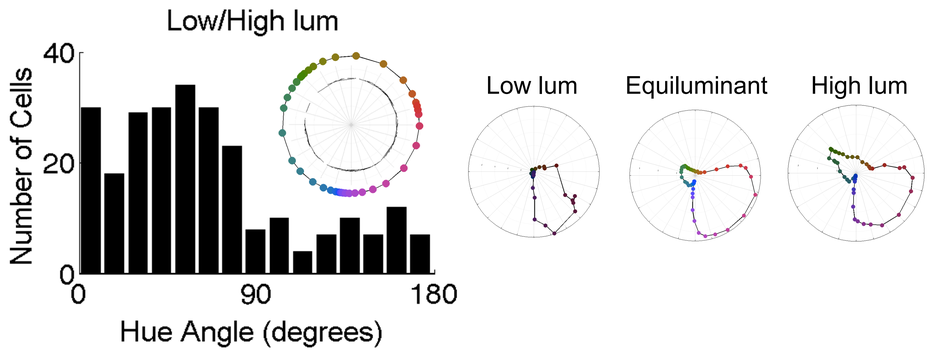
Bezold-Brucke Shift. Figure from Ref. 5, adapted from Refs. 3 and 6.



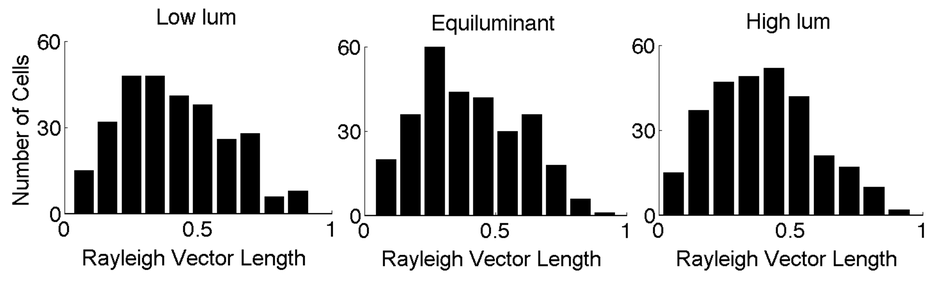
Results



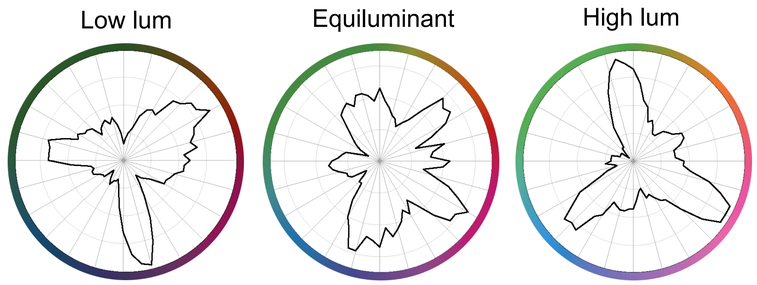
Six Example Cell Responses to Luminance Levels. Curves are fit to a sine exponential function. Curve peak determines hue preference.



(Left) Color Tuning Shifts (Right) Example of a Luminance-Invariant cell.

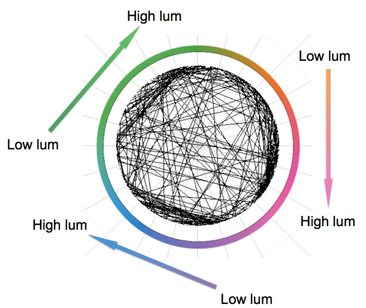


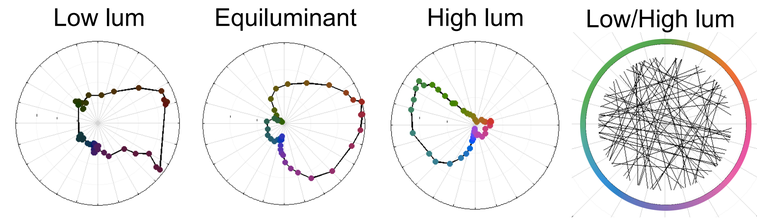
Color Selectivity for all Luminance Levels.



Polar Plot Histograms of Color Tuning.

Color Tuning Shifts. Each line is a cell; beginning of line shows hue preference at low lum; end of cell shows preference at high lum.





Color-Shifting Cells. (Left) Example cell. (Right) Color tuning shifts.

Discussion

We found that at different luminance levels, peak tuning was relatively constant: 73% of cells changed their hue preference by less than 90° in C.I.E. Luv color space across all luminance levels. Qualitatively the physiological properties of the glob cells are consistent with a role in color perception.

Acknowledgements

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References

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