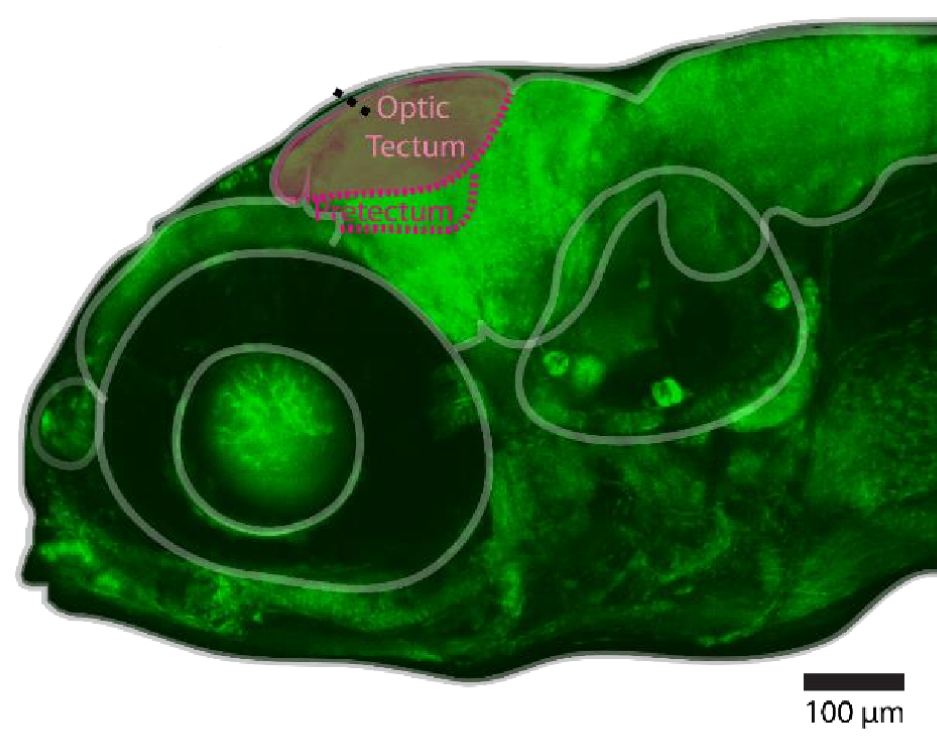


Color-blindness of direction-selective units in the zebrafish optic tectum

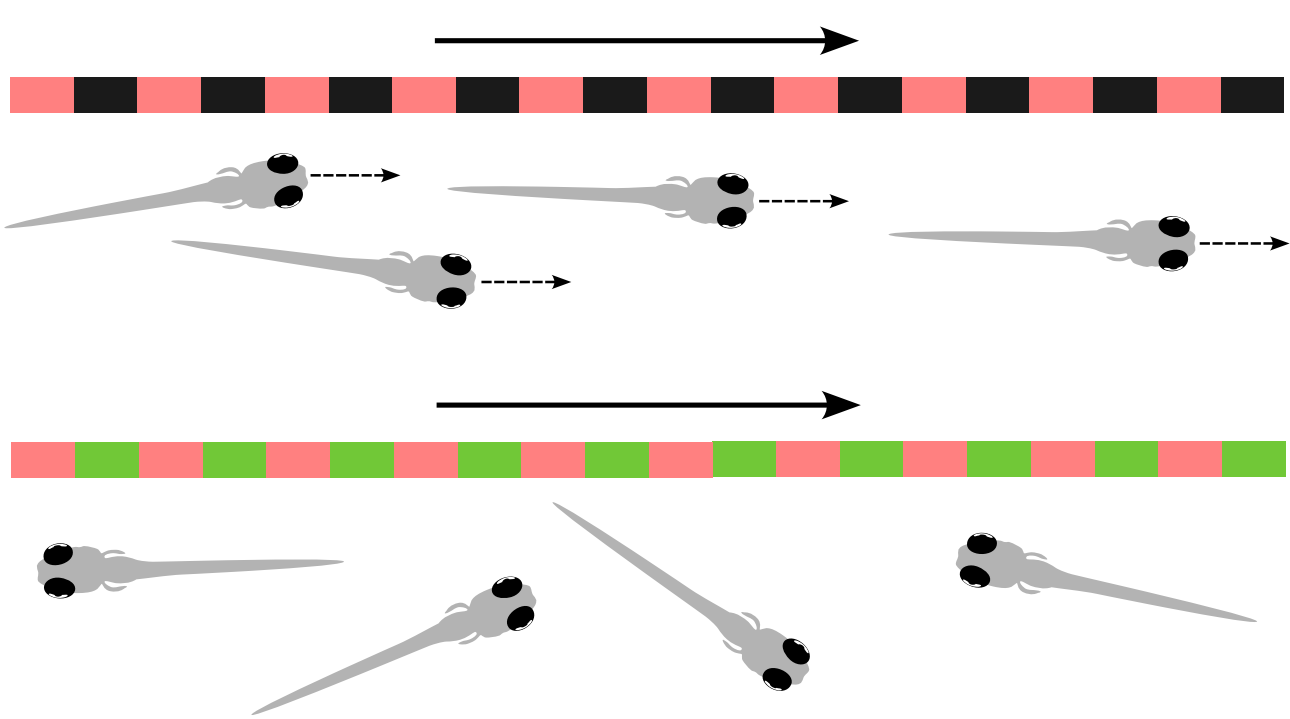
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Introduction

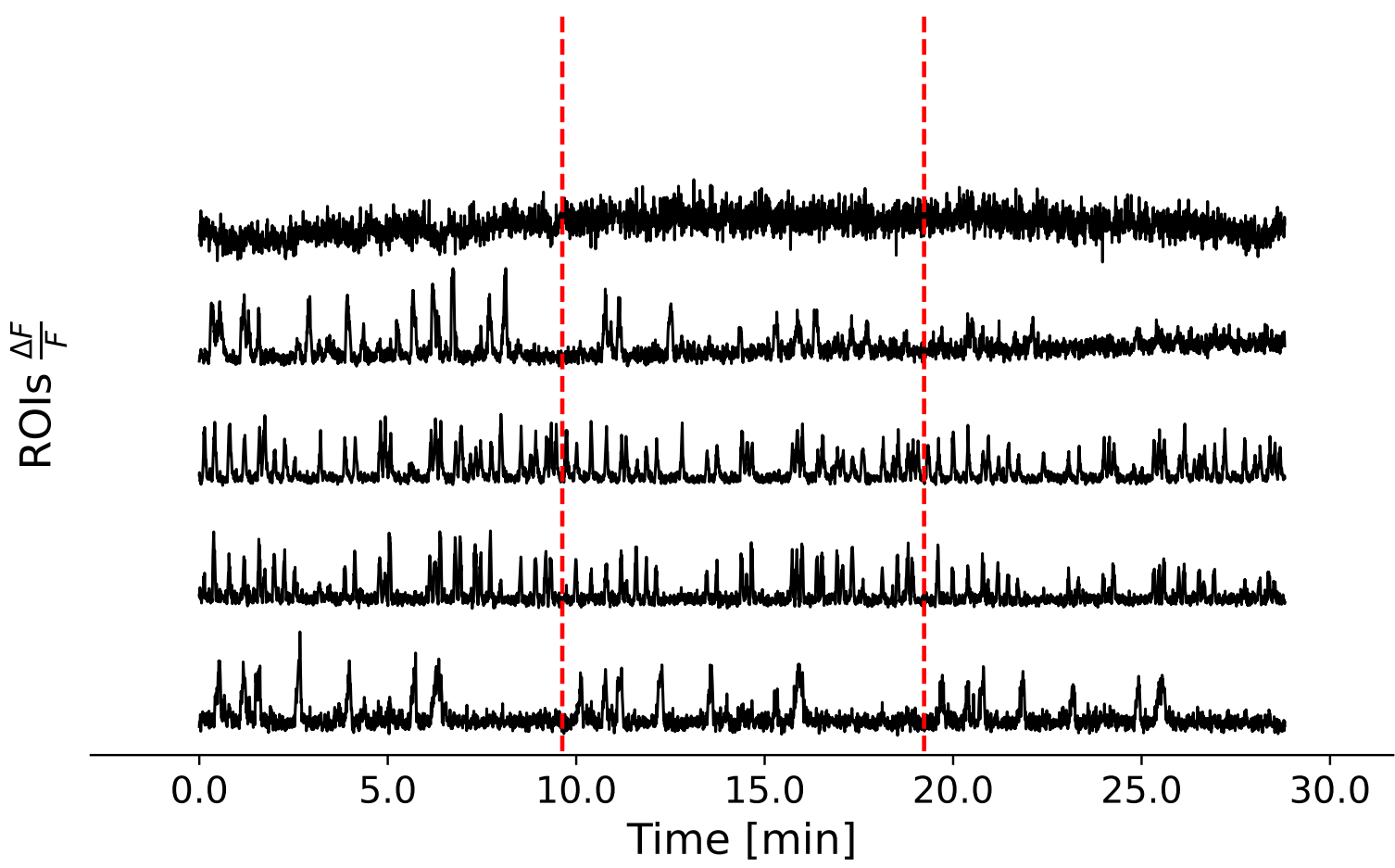
Color has a big influence on motion vision in zebrafish. Orger and Baier (2004) displayed with the optomotor response of zebrafish that motion blindness can be induced to a grating of different colors.



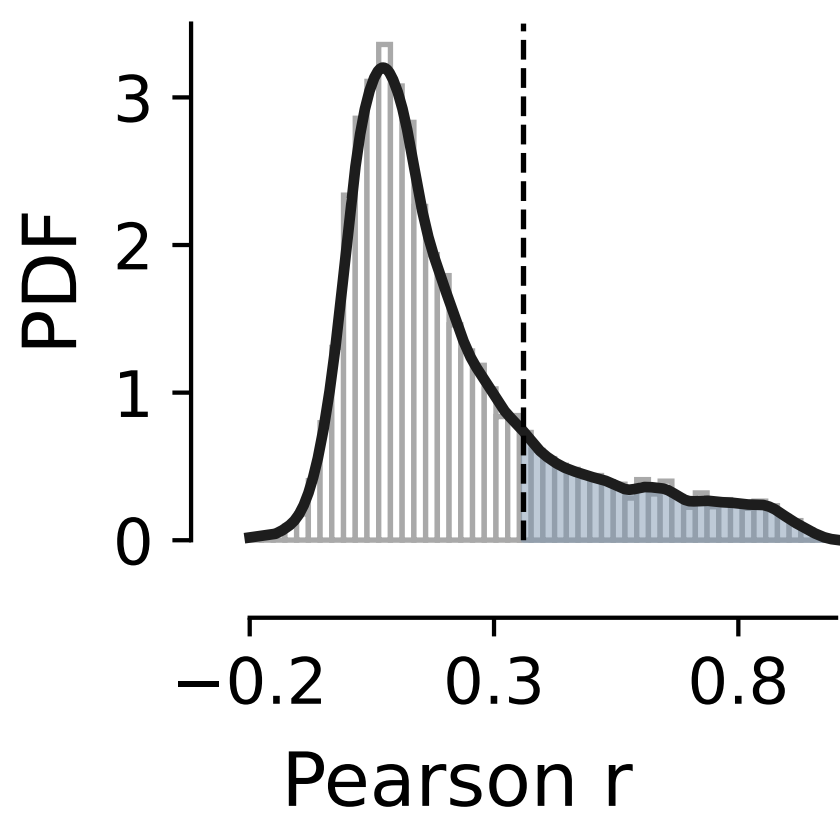
But little is known about the cortical structures conveying the „color-motion“ perception. We wanted to investigate the optic tectum of the zebrafish larvae with calcium imaging.

Preprocessing:

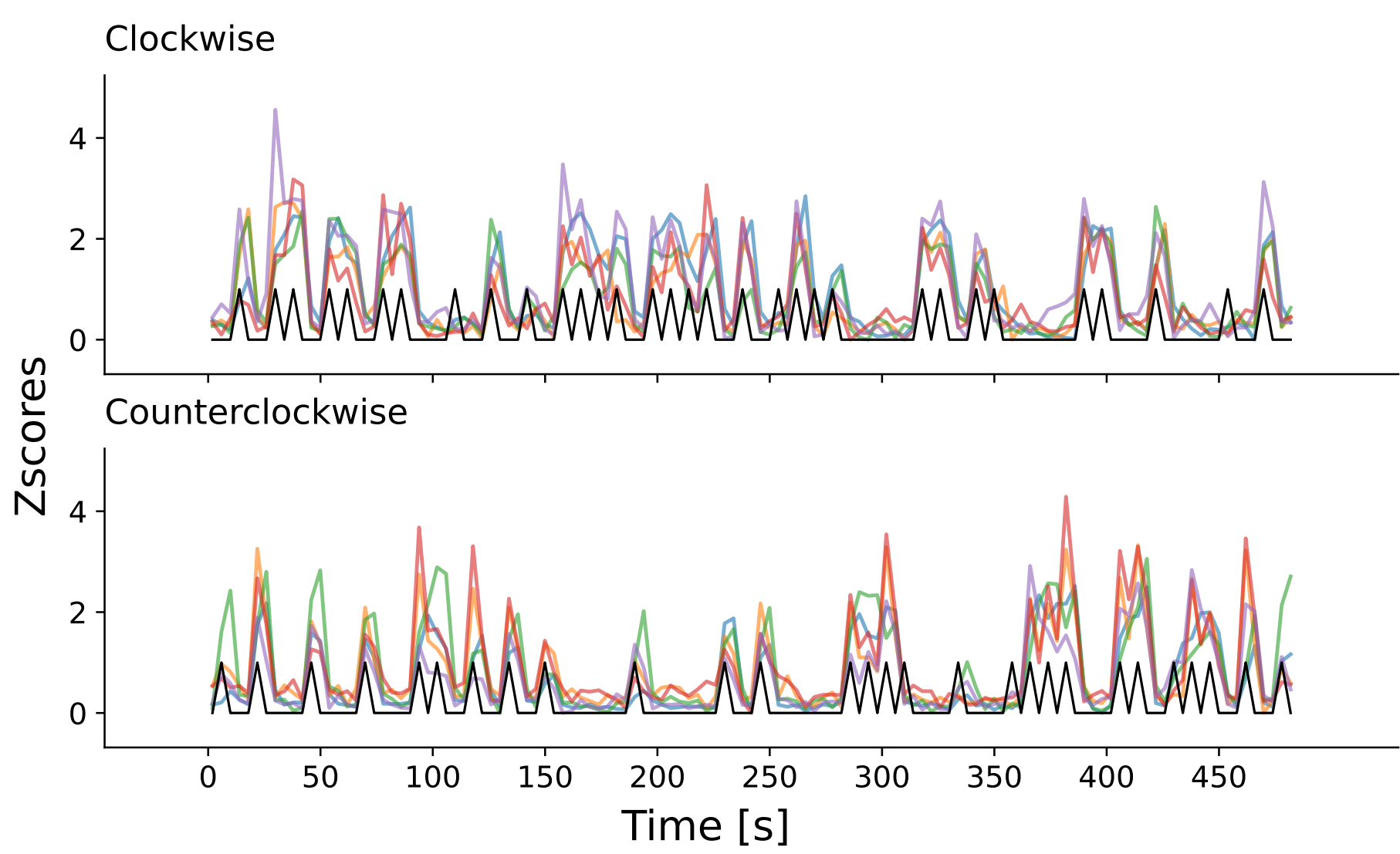
1. Region of Interests (ROI): corresponds to neurons with genetically induced calcium indicators. The lumiance F of the calcium imaging is calculated from the change of luminance normalized to the average luminance $F = \frac{\Delta F}{F}$.



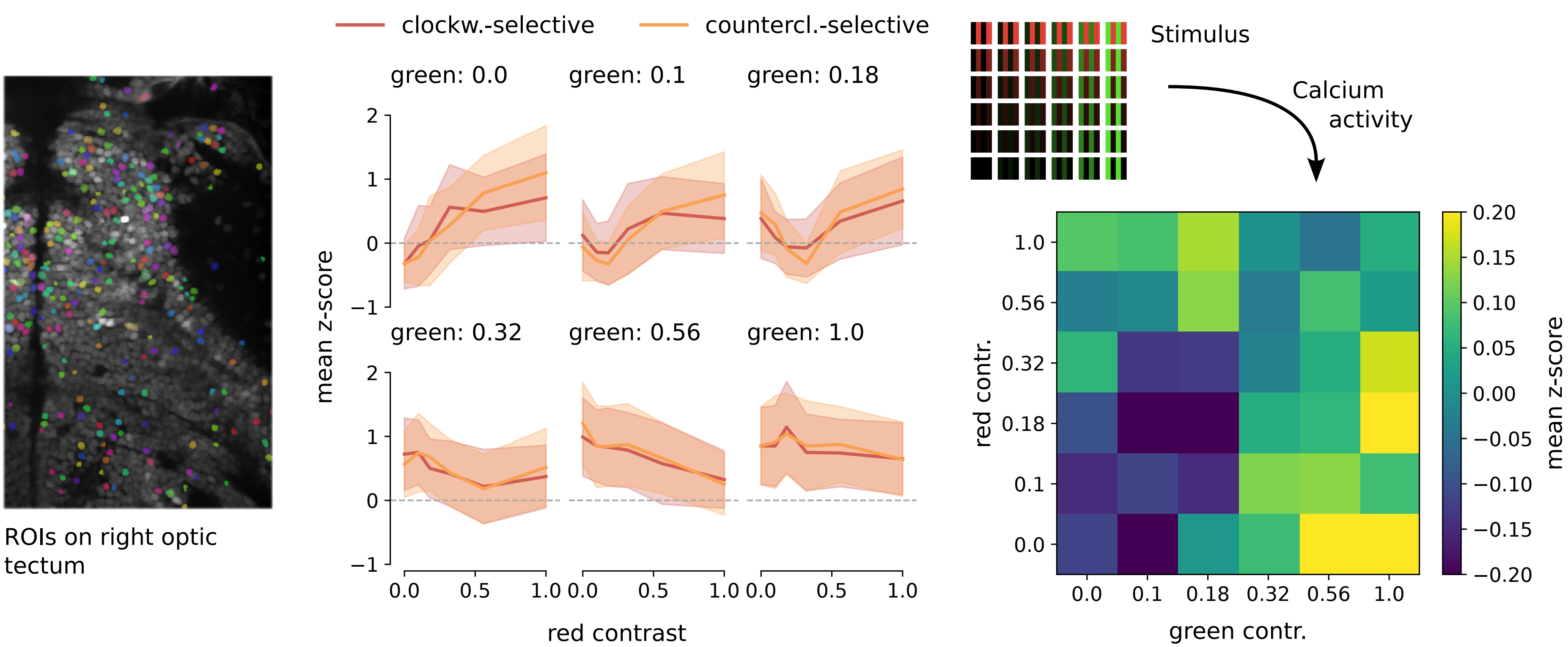
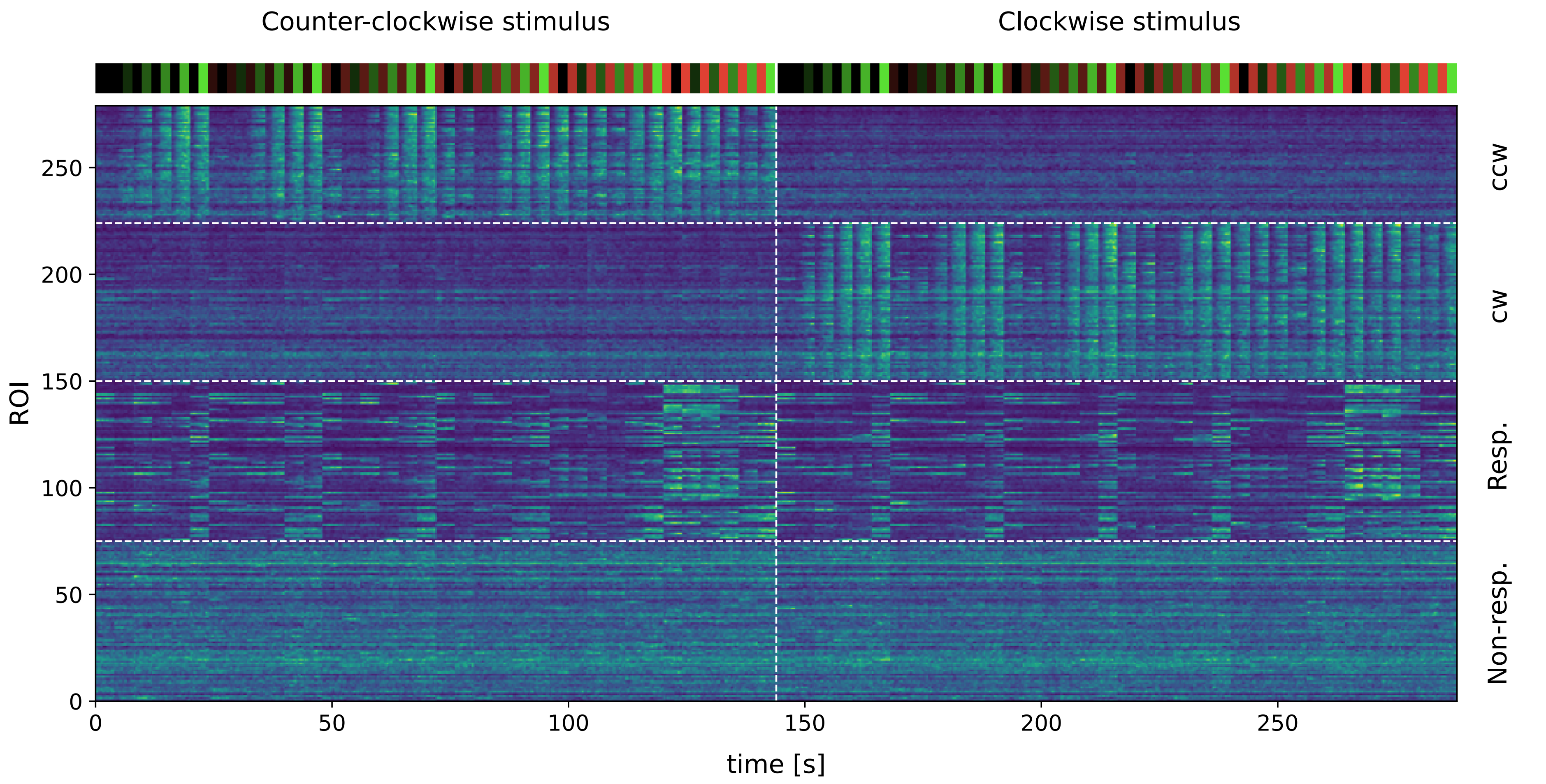
2. Active ROIs: To get the active ROIs we computed the correlation within 3 repeats of the same stimulus.



2. Direction selective ROIs: next Step was to search for ROIs that correlated with a direction selective regressor (1 for clockwise = CW or counter-clockwise = CCW, else is 0).

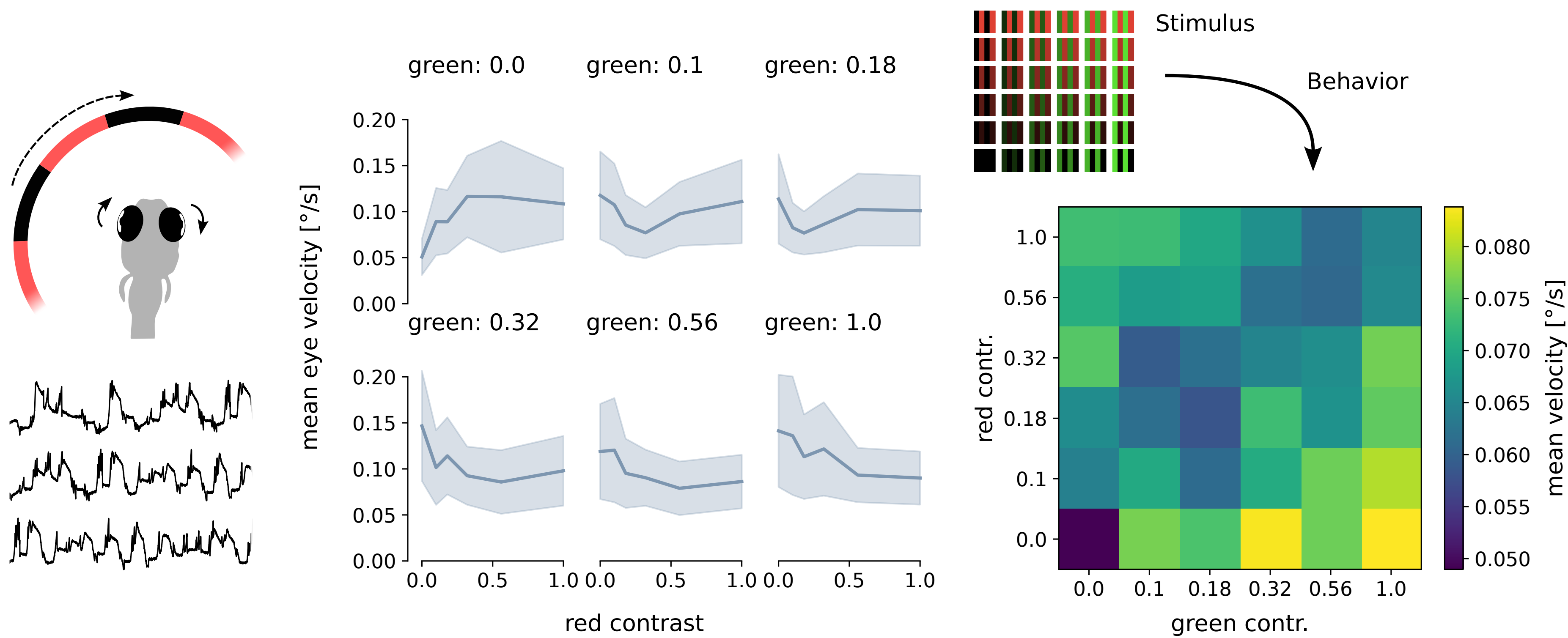


2-photon calcium imaging



- Calcium activity was lowest, when the achromatic contrast was zero.
- Both directions CW and CCW were responding equally

Behavior



- The Optokinetic response shows similar results as the calcium imaging.

Conclusion

We observed that the optic tectum of the zebrafish encodes for color directed motion stimuli. The optic tectum is motion blind for various contrast levels.