Adaptive Synchronization and Predictive Coding in the Retina
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Introduction
How can the neural system adapt to time-dependent input patterns and make predictions (Fig. 1)? We analyze the sophisticated neural computation in retina and investigate the underlying biophysical mechanisms of adaptive synchronization and predictive coding.

Methods
Bull frog retina were perfused in oxygenated Ringer’s solution, fixed on Multiple Electrode Array (MEA), and stimulated by LED (Fig. 2).

Results
1. Can Retina Detect and Predict Patterns? (Fig. 3)

2. How Long is the Adaptation Time Scale? (Fig. 4)

3. What are the Essential Circuits for Prediction? (Fig. 5)

Conclusions and Proposed Model
OSR is predictive in an adaptable range with time scale close to synaptic calcium dynamics. ON-OFF signals and spatial distribution may contribute to OSR. A plausible model is proposed:

References