VISUAL SYSTEM

V4 activity before saccades

In a complex visual image there are many locations that might be important to observe. We can only direct our foveas to one of them at a time, and efficient processing of the image requires us to move our eyes to such important locations as smoothly as possible. We can indeed target our saccadic eye movements to prominent sites within the image, and this targeting is thought to depend on a retinotopic salience map that represents the positions of such sites. Where in the visual system is this map located? Reporting in *Neuron*, Mazer and Gallant make a compelling case in favour of extrastriate area V4, and show that the map is more complex than previously envisioned.

To investigate the existence of the salience map, the authors trained monkeys in a free-viewing visual search task. The animals were shown a target stimulus (a circular image) on a screen and subsequently asked to identify the target in an array of possible matches. The experimenters recorded the eye movements of the monkeys and, simultaneously, the activity of neurons in the V4 area. They found that neurons showed enhanced visual activity, which preceded saccadic eye movements that were directed to the receptive field of the active neurons. In fact, this retinotopically organized, visually driven activity was predictive of the direction of subsequent saccades. Moreover, the authors found evidence that activity in V4 was not the reflection of an oculomotor signal, but was solely dependent on visual input.

A key finding from this study was that the activity of some V4 neurons could be modulated by the identity of the target. As the original proposal of a salience map did not include a role for top–down modulation of this kind, the results add an extra level of complexity to salience computation. The data also imply that there is no single region that performs this computation, but it depends on the interactions between several areas during natural visual search. Ultimately, the interplay between this network and regions that control target selection and oculomotor planning are responsible for the ability to explore complex visual images in an efficient way.

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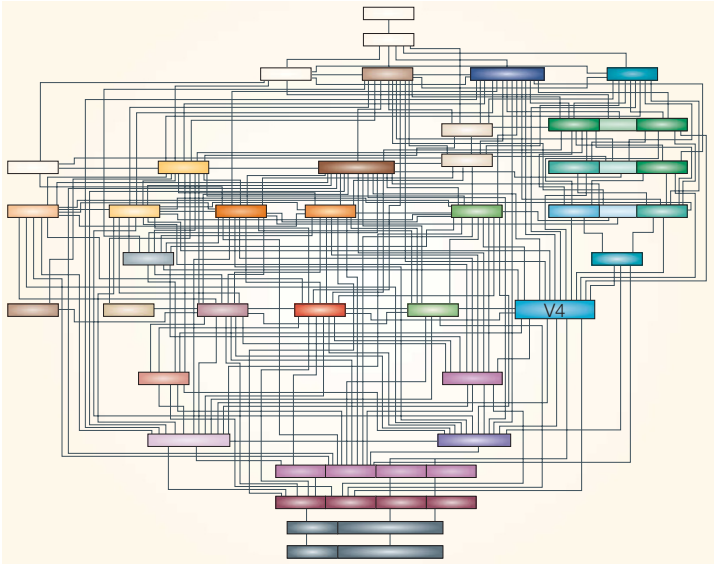
References and links

ORIGINAL RESEARCH PAPER Mazer, J. A. & Gallant, J. L. Goal-related activity in V4 during free viewing visual search: evidence for a ventral stream visual salience map. *Neuron* **40**, 1241–1250 (2003)

FURTHER READING Itti, L. & Koch, C. Computational modelling of visual attention. *Nature Rev. Neurosci.* **2**, 194–203 (2001)



IN BRIEF

PRIONS

A neuronal isoform of the *Aplysia* CPEB has prion-like properties.

Si, K. *et al. Cell* **115**, 879–891 (2003)

A neuronal isoform of CPEB regulates local protein synthesis and stabilizes synapse-specific long-term facilitation in *Aplysia*.

Si, K. *et al. Cell* **115**, 893–904 (2003)

Prions are notorious for their role in the pathogenesis of spongiform encephalopathies, but it is unclear whether they play a part in normal neuronal function. In these two papers, Si *et al.* identify a neuronal isoform of the *Aplysia* cytoplasmic polyadenylation element binding protein (CPEB) that has prion-like properties and is required for long-term facilitation at the synapse. They found that CPEB contains a structural motif that, when expressed in yeast, can induce other CPEB molecules to adopt a prion-like conformation and form aggregates. CPEB was previously shown to stimulate local protein translation by activating dormant mRNAs, and the authors propose that synaptic activity promotes its conversion to a prion-like state, which enables it to activate local protein synthesis and also stably mark the synapse for future long-term changes in efficacy.

NEURAL DEVELOPMENT

Foxg1 suppresses early cortical cell fate.

Hanashima, C. *et al. Science* **303**, 56–59 (2004)

During development, neuronal progenitors give rise to specific types of neuron in a particular order. At later time points, they are unable to produce cell types that are characteristic of earlier developmental points. Hanashima *et al.* find that a transcription factor called Foxg1 is responsible for suppressing an early cell fate in cortical progenitors. In *Foxg1*-null mice, there is an excess of the earliest-born neuron — the Cajal–Retzius cell. Conditional inactivation of Foxg1 in cortical progenitors also enables them to produce Cajal–Retzius cells.

BEHAVIOURAL NEUROSCIENCE

Selective deficits in appetitive conditioning as a consequence of ethanol withdrawal.

Ripley, T. L. *et al. Eur. J. Neurosci.* (in the press)

Chronic treatment with, and withdrawal from, ethanol is known to cause behavioural deficits that are similar in some respects to those produced by amygdala lesions. Ripley *et al.* investigated the effects of chronic ethanol treatment and withdrawal on behavioural tasks that are sensitive to lesions of specific nuclei within the amygdala. They found that conditioned reinforcement and reinforcer devaluation, which depend on the basolateral amygdala, were unaffected by ethanol withdrawal, but that Pavlovial-to-instrumental transfer, which depends on the central nucleus of the amygdala, was impaired. Chronic ethanol treatment and withdrawal therefore produces deficits that resemble those resulting from lesions of the central nucleus but not the basolateral amygdala.