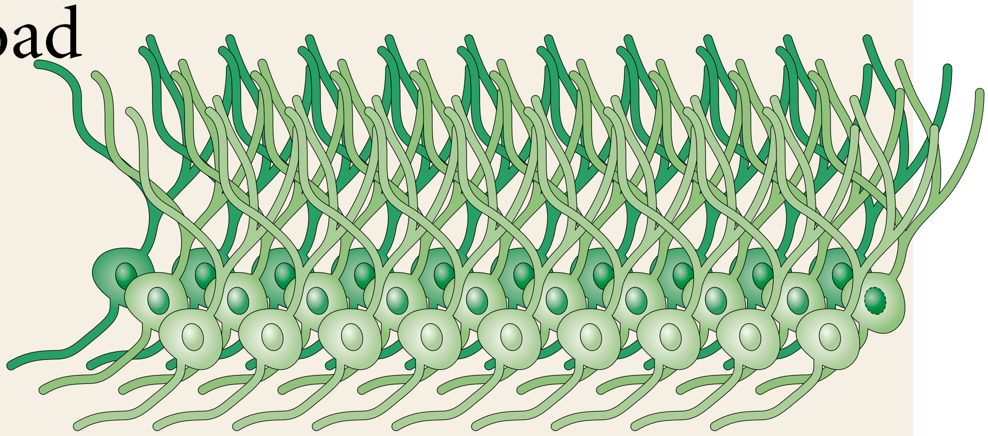
NEUROGENESIS

Take the low road



Until recently, a commonly held view in neuroscience was that neurogenesis does not occur in the adult brain. However, this idea was overturned by the discovery that new neurons are generated in the subventricular zone (SVZ). These neurons have been shown to colonize several structures, including the olfactory bulb and the hippocampus, and the list of possible destinations continues to grow, as a report in the *Proceedings of the National Academy of Sciences* illustrates.

Bernier *et al.* used 5-bromodeoxyuridine (BrdU), a thymidine analogue that is incorporated into the DNA of dividing cells, to identify sites of neurogenesis in adult monkey brains. They detected BrdU-labelled cells in the amygdala and piriform cortex, and they used immunostaining techniques to confirm that these cells were neurons. In addition, they identified a stream of BrdU-labelled cells that stretched from the temporal horn of the lateral ventricle (tLV) down to the dorsal amygdala. By labelling the SVZ with the lipophilic dye DiI, and tracking cell migration from the tLV, the authors provided further evidence for the existence of this migratory stream, which they termed the temporal stream.

The amygdala is probably best known for its role in mediating the fear response, but it also acts as a relay centre for olfactory information, as does the piriform cortex. Therefore, Bernier *et al.* speculate that new neurons might be generated in these regions to complement the turnover of olfactory bulb neurons that project to them. Of course, the real test will be to show that the new neurons integrate functionally into the neuronal circuitry, and the next step will be to find out whether this is the case.

Heather Wood

References and links

ORIGINAL RESEARCH PAPER Bernier, P. J. *et al.* Newly generated neurons in the amygdala and adjoining cortex of adult primates. *Proc. Natl Acad. Sci. USA* **99**, 11464–11469 (2002)

DECISION MAKING

A sensitive decision

When two sensory stimuli are presented sequentially, discriminating between them requires us to compare the second stimulus with stored information about the first one. A key problem is identifying the brain regions in which such an evaluation is made, and how they shape our subsequent behaviour. Focusing on the somatosensory system, Ranulfo Romo and his colleagues have obtained elegant evidence that a subset of neurons in the secondary somatosensory cortex (S2) participates in the comparison between past and present stimuli, implicating this brain region in the decision-making process.

The authors trained monkeys to discriminate which of two vibrating stimuli that were applied sequentially to their fingertips had the higher frequency, and to report their decision by pressing one of two buttons. Romo *et al.* recorded the activity of S2 neurons throughout the task, and found that, during the first stimulus, the cells merely encoded its frequency (f1). By contrast, during the second stimulus, the firing of some S2 neurons was not a simple function of f2, but depended on both the remembered and the current stimuli. So, for example, during the first few milliseconds of the second stimulus, the firing rates of some S2 neurons clearly depended on f1, despite the fact that the first stimulus had been presented as many as 3 seconds before. But during the final part of the second stimulus, firing depended on both f1 and f2. More precisely, the main determinant of firing was whether f2 was greater than f1, or f1 was greater than f2. Moreover, the behaviour of these S2 neurons during the final part of the second stimulus correlated with the monkey's choice, indicating that they might be involved in making a decision and reporting it to other parts of the brain for action.

Despite significant variability in the dynamics of the S2 responses during the second stimulus, the results of this study make a strong case for neurons in this area being involved in the comparison of the two stimuli and in the subsequent decision-making process. But as other brain areas, such as the prefrontal and the medial premotor cortices, also seem to have similar properties, it is likely that S2 is part of an extensive decision-related network. Future studies will allow us to disentangle more precisely the corresponding contributions of each of these structures to decision making.

Juan Carlos López

References and links

ORIGINAL RESEARCH PAPER Romo, R. *et al.* Neuronal correlates of decision-making in the secondary somatosensory cortex. *Nature Neurosci.* 30 September 2002 (doi:10.1038/nn950)

FURTHER READING Hernández, A. *et al.* Temporal evolution of a decision-making process in medial premotor cortex. *Neuron* **33**, 959–972 (2002) | Schall, J. D. Neural basis of deciding, choosing and acting. *Nature Rev. Neurosci.* **2**, 33–42 (2001)