AUDITORY SYSTEM-Senses working overtime

Heather Wood

The act of hearing involves not only identifying the nature of a sound, but also pinpointing the location of its source. To achieve this, the brain needs to compare the sounds received by the two ears, and this requires the development of ear-specific processing circuits. As in other sensory systems, peripheral neuronal activity is thought to play an instructive role in the patterning and refinement of these circuits. In the auditory system, it was previously thought that this activity was derived only from cells that were actively responding to sound. However, as reported in the *Journal of Neuroscience*, Jones *et al*. have now shown that during development, cochlear neurons can exhibit spontaneous activity in the absence of external sensory input.

The authors measured the activity of cochlear ganglion cells in chick embryos between embryonic days 13 and 17. They showed that a high proportion of the cells exhibited rhythmic bursting activity. Bursting cells were most prevalent in the embryos at the younger end of the age range, although the rate of bursting in individual cells increased as development progressed. The bursting patterns became less regular with time, indicating that spontaneous rhythmic bursting is a transient phenomenon. Of 18 cells that showed rhythmic bursting, only five were able to respond to sound.

Activity-dependent development has been extensively studied in the visual system, where it is likely that spontaneous neuronal activity plays a significant role in the patterning of cortical circuits. It is to be hoped that future studies will show whether the spontaneous bursting activity detected by Jones *et al*. in the cochlea has a similar influence on the development of auditory processing circuits.

References and links

ORIGINAL RESEARCH PAPER
Jones, T. A. *et al*. Primordial rhythmic bursting in embryonic cochlear ganglion cells. *J. Neurosci.* **21**, 8129-8135 (2001) | PubMed | ISI | ChemPort |

FURTHER READING
Katz, L. C. & Shatz, C. J. Synaptic activity and the construction of cortical circuits. *Science* **274**, 1133-1138 (1996) | Article | PubMed | ISI | ChemPort |