

Bone conducted responses in the neonatal rat auditory cortex

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Abstract

Rats are born deaf and start hearing at the end of the second postnatal week, when the ear canals open and low-intensity sounds start to evoke responses in the auditory cortex. Here, using μ ECoG electrode arrays and intracortical silicon probe recordings, we found that bone-conducted (BC) sounds evoked biphasic responses in the auditory cortex starting from postnatal day (P) 8. The initial phase of these responses, generated by thalamocortical input, was followed by intracortical propagation within supragranular layers. BC-evoked responses co-localized with the responses evoked by electrical stimulation of the cochlea and the deepest layers of the inferior colliculus prior to onset of low-threshold hearing (P13), as well as with the responses evoked by high-frequency (30 kHz) low-intensity (70 dB) air-conducted sounds after that. Thus, BC signals reach high-frequency processing regions of the auditory cortex well before the onset of low-threshold hearing, reflecting early integrity of the auditory system.

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