

Binaural Processing Of Interaural Level Differences In The Inferior Colliculus Of The Cat

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Cells in the mammalian inferior colliculus (IC) have been shown to be sensitive to interaural level differences (ILDs), the binaural cue formed by the difference in the level of a sound reaching the two ears due to the head shadowing effect. The IC receives converging inputs from many peripheral nuclei, including the lateral superior olive (LSO) and the dorsal nucleus of the lateral lemniscus (DNLL), both of which already show ILD sensitivity. It is not known, however, whether the converging inputs from the LSO and the DNLL are at matched frequencies.

To explore this further, we have investigated the effects of changing frequency and contralateral sound level on the ILD sensitivity of IC cells in barbiturate anesthetized cats. The ILD functions of all the cells were sensitive to both parameters. In general, when frequency was held constant and contralateral level was varied, the shape of the overall ILD function remained similar, though it could shift on either axis. However, when frequency was varied and contralateral level was held constant, the shape of the ILD function changed more dramatically, which may reflect differing ipsilateral and contralateral contributions at different frequencies. Using a computer model, we also explore the possibility that this effect is due to contributions from LSO and DNLL inputs that are not matched in frequency.

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