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BRAIN STEM AUDITORY AGNOSIA: AUDITORY CORTEX ACTIVATED TDCS

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fMRI was used to study fractionate auditory field activations in a young woman with auditory agnosia due to traumatic avulsion of the left inferior colliculus. She was unable to recognize speech or environmental sounds. Auditory temporal resolution was severely impaired, and she mislocalised sounds presented on her right to the left of midline. However, discrimination was greatly facilitated by context and lip reading.

Primary auditory cortex field hA1 was activated but hR was not. Auditory discrimination deficits were associated with bilateral unresponsiveness of the anterior STG and STS. Anodal tDCS over right auditory cortex increased activation of auditory cortex bilaterally; and for speech sounds, selectively increased activation in Broca's and Wernicke's areas.

The separation into ventral and dorsal streams occurs as early as the primary auditory cortex, with area hR projecting to the anterior STG, and hA1 to the middle-posterior STG. tDCS may be useful in the treatment of brain stem auditory agnosia.