The integrity of the auditory brainstem in autism
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The neurobiology of the language impairment in autism is not well understood. To date, sensory encoding at the level of the brainstem has been investigated only in terms of the auditory brainstem response (ABR) to stimuli such as clicks or tones. However, recent literature shows that the ABR to a click is not sufficient for evaluating the integrity of the auditory brainstem. The brainstem encodes stimulus features with remarkable precision in both the time and frequency domains. Thus, the objective of this study is to characterize the brainstem response to different speech syllables, presented in quiet and background noise, in children on the autism spectrum (AUT) and typically developing (TD) children.

Speech-evoked ABRs were recorded from AUT and TD children via scalp electrodes while participants watched a movie and received auditory input monaurally through an ear insert. Stimuli included a 40 ms /da/ stimulus, which has proven diagnostically useful in other populations, presented in quiet and background noise. Two 230 ms /ya/ stimuli (fully voiced, with either a rising or falling pitch contour) were presented to probe for brainstem origins for the pervasive behavioral deficit in prosody perception and production among autistics. The speech stimuli presented varied in timing and frequency content, and thus allow for a comprehensive analysis of the brainstem response to speech in autism.

Preliminary brainstem response data suggest that AUT children encode speech sounds differently from TD children and that their responses are deviant with respect to both the timing and frequency characteristics of the stimuli. Additionally, behavioral language indices are discussed with respect to the neurophysiology in order to better describe the impairment. These data may provide a measure to objectively sub-categorize children on the autism spectrum. Furthermore, because the auditory brainstem response is plastic, speech-evoked ABRs may provide a tool to monitor the progress of auditory training programs.