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Auditory brainstem responses in birds: How well do they compare to behavioral techniques for assessing hearing?

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Behavioral methods are the gold standard for assessing hearing sensitivity in birds. In many cases, however, behavioral techniques are simply impractical. The non-invasive auditory brainstem response (ABR) represents perhaps the next best approach, and researchers are increasingly turning to the ABR to obtain estimates of hearing sensitivity, auditory system function and development. Our lab has evaluated hearing sensitivity in over 11 species of birds using the ABR, and for six of these species, we have also obtained auditory thresholds by behavioral conditioning methods. These data, along with other results from the literature on bird hearing, now allow general conclusions about the use of ABR as a tool for measuring auditory sensitivity in birds. Waveform morphology is highly conserved across orders of birds. Regardless of how threshold is defined, the ABR audiogram reliably reflects the frequency range of hearing and the shape of the behavioral audiogram. However, ABR thresholds are higher than behavioral thresholds by 20-30 dB but with some variation across species. Aside from audiograms based on simple detection thresholds for tone bursts, ABR methods in birds have also been useful in assessing auditory development, hearing impairment, recovery of function with hair cell regeneration, masked thresholds and aspects of spectral and temporal processing.