# Brain lateralization of auditory processing in a songbird

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In 1970, Marler set the idea of a parallel between human speech and birdsong, emphasizing the many common properties in vocal development of both infants and songbirds. One of the best-known features of human speech is the hemispheric specialization of the brain for its perception and production. The lateralization for the production of song that has been observed in a number of passerine birds is reminiscent of this hemispheric asymmetry. However, although evidence exists for a lateralization of song production, very few studies have focused on the perceptual aspect of lateralization in songbirds. In the present study, we investigated the central processing of communicative and artificial signals at different level of the song system in male starlings. Neuronal responses to a variety of species-specific and artificial nonspecific stimuli were recorded in both hemispheres of awake and anesthetized birds. Recordings were made in the primary auditory area of the songbird brain, namely the Field L Complex, which is the main auditory input of the song system, and in the vocal control nucleus HVC, which is a highly integrative part of this system. In both cases, the right hemisphere exhibited significantly more responsive units than the left one when the birds were awake, and this difference was reduced or even suppressed under anesthesia. Most importantly, our results showed a complex and state-dependent hemispheric specialization towards behaviorally-relevant classes of stimuli. These results are in agreement with the suggestion that the two hemispheres exhibit different general functions in terms of attention or the nature of the cognitive task performed, and add to the many parallels between the avian and human systems that have become paradigmatic of vocal communication. Hemispheric specialization may therefore have been a general feature in the evolution of vocal communication.