

Acoustic radiation

The acoustic radiations or auditory radiations are structures found in the brain, in the ventral cochlear pathway, a part of the [auditory system](#).

Acoustic radiation arising in the [medial geniculate nucleus](#) and end in primary [auditory cortex](#) (transverse temporal gyri). Lesions to the auditory radiations could be a cause of cortical deafness.

Topographical knowledge of this bundle in primates is scarce and in vivo diffusion-based [tractography](#) reconstructions in humans remains challenging, especially with the most widely used MRI acquisition protocols. Therefore, the AR represents a notable anatomical omission in the neurobiological investigation of acoustic and linguistic functional mechanisms in humans.

In a study, Maffei et al. combine blunt micro-dissections and advanced diffusion tractography methods to provide novel insights into the topographical anatomy of this bundle in humans. Evidences from ex vivo blunt micro-dissection in three human (two right) hemispheres are compared to the 3D profile of this bundle as reconstructed by tractography techniques in four healthy adult data sets provided by the [Human Connectome Project](#). Both techniques show the unique trajectory of the AR, a transversal course from the midline to the lateral convexity of the posterior [temporal lobe](#). Blunt dissections demonstrated three portions of this bundle that we defined as the genu, stem, and fan, revealing the intimate relationships that each of these components has with neighboring association and projection pathways. Probabilistic tractography and ultra-high b values provided results comparable to blunt micro-dissections and highlighted the main limitations in tracking the AR.

This is, the first ex vivo/in vivo integrated study providing novel and reliable information about the precise anatomy of the AR, which will be important for future investigations in the neuroscientific, clinical, and surgical field ¹⁾.

¹⁾

Maffei C, Jovicich J, De Benedictis A, Corsini F, Barbareschi M, Chioffi F, Sarubbo S. Topography of the human acoustic radiation as revealed by ex vivo fibers micro-dissection and in vivo diffusion-based tractography. Brain Struct Funct. 2017 Sep 2. doi: 10.1007/s00429-017-1471-6. [Epub ahead of print] PubMed PMID: 28866840.

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