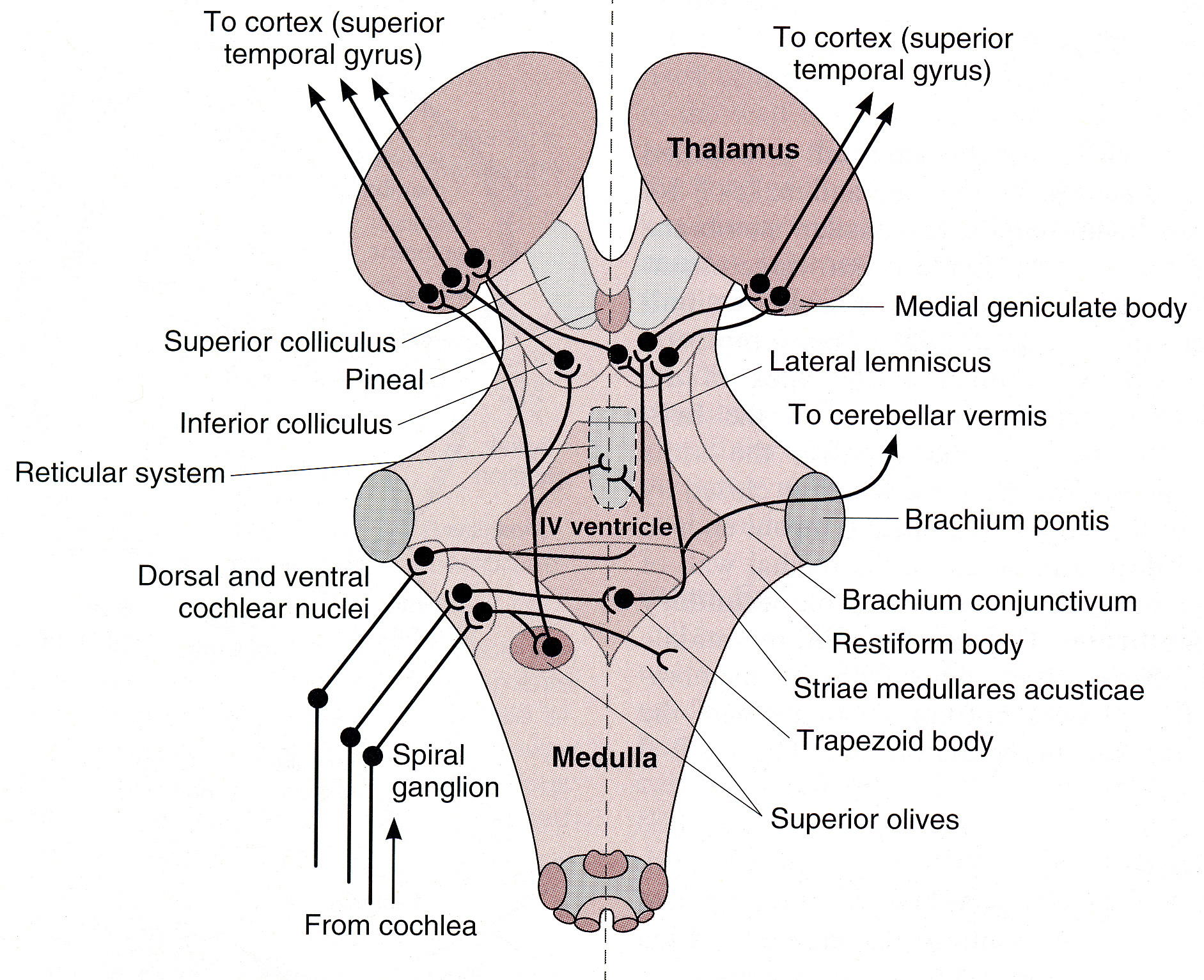
Auditory Pathways

Last updated: May 11, 2019



Source of picture: William F. Ganong “LANGE Review of Medical Physiology”, 21st ed. (2003); Publisher: McGraw-Hill / Appleton & Lange; ISBN-10: 0071402365; ISBN-13: 978-0071402361 [>>](http://www.amazon.com/gp/product/0071605673)

1. Organ of Corti - outer hair cells in organum spirale (cochlea)
2. Spiral (s. cochlear) ganglion in modiolus; cells use glutamate (+) and aspartate (+)
3. Cochlear part of CN8
   * blood supply – labyrinthine artery
4. Cochlear Nuclei (anterior, posterior)
   * blood supply – AICA
   * have input from hypothalamus (histamine-containing fibers), locus ceruleus (noradrenergic projections), olive (olivocochlear projection uses enkephalin)
5. Trapezoid body – crossing fibbers (acoustic striae); has also nuclei
6. Superior olive; cells use cholecystokinin
   * blood supply – BA (long circumferential branches)
   * stapedius reflex!!!, spatial sound localization!!!
   * olivocochlear fibers – modulate sensitivity of hair cells
7. Lateral lemniscus; has nuclei that contain dynorphin
   * blood supply – BA (long circumferential branches)
8. Inferior colliculus; major feedback to lower nuclei
   * blood supply – BA&SCA (long circumferential branches)
   * has input from locus ceruleus (noradrenergic projections)
9. Medial geniculate body - thalamic relay station; directs auditory attention
   * blood supply – PCA (thalamogeniculate branches)
10. Temporal auditory cortex:
11. primary auditory cortex (41-42)
12. secondary auditory cortex (22)

Three categories of deafness:

**Conductive hearing loss** – external ear, middle ear (otitis media, otosclerosis).

* Weber lateralizes to affected side
* Rinne is negative (abnormal)

**Sensorineural hearing loss** – cochlea, cochlear part of CN8.

* Weber lateralizes to normal side
* Rinne is positive in mild cases (in severe cases, 512 Hz tunning fork is not heard at either position)
* tinnitus

**Central deafness** – cochlear nuclei, central connections, auditory cortex

* system (central to dorsal and ventral cochlear nuclei) is bilateral and multisynaptic – synapse and crossing (or re-crossing) occurs at several levels – central lesions rarely result in unilateral or bilateral hearing losses that can be detected

exception - damage to trapezoid body

* cochlear nuclei-primary auditory cortex: diminished auditory acuity, decreased ability to hear certain tones, difficulty in precise space localization.
* secondary auditory cortex: difficulty in understanding / interpreting sounds (auditory agnosia).

Bibliography for ch. “Otology” → follow this [link >>](http://www.neurosurgeryresident.net/Ear.%20Otology\Ear.%20Bibliography.pdf)

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