

# Auditory pathway

**Auditory pathways** is a four-neuron pathway that transmits auditory information from the organ of Corti of the inner ear to the primary auditory cortex.

**The first neurons** of the auditory pathway are bipolar cells whose bodies lie in the ganglion spirale cochleae . The dendrites of these cells form synapses with the hair cells of the organ of Corti. The axons of the bipolar cells form the pars cochlearis nervi vestibulocochlearis and enter the brainstem, in the region of the pontocerebellar angle , where they end in the cochlear nuclei ( nucleus cochlearis ventralis and nucleus cochlearis dorsalis ) located at the interface between the medulla oblongata and the pons.

**The second neurons** arise from the cells of the cochlear nuclei and form three bundles:

- **Corpus trapezoideum** (from nucleus cochlearis ventralis);
- **Stria acustica intermedia** (from nucleus cochlearis ventralis);
- **Stria acustica dorsalis** (from nucleus cochlearis dorsalis).

These bundles cross the midline and proceed upward in the contralateral part of the brainstem, where they unite to form the massive bundle of **lemniscus lateralis** ending in the **colliculi inferiores** of the midbrain. Some fibers arising from the nucleus cochlearis ventralis make synapses in the **nucleus olivaris superior** and **nucleus corporis trapezoidei**. Some fibers of the lateral lemniscus connect in the **nucleus lemnisci lateralis**.

**Third neurons** arise from the colliculi inferiores and terminate in the **corpus geniculatum mediale** in the thalamu.

**The fourth neurons** begin in the corpus geniculatum mediale, form the **tractus geniculocorticalis (or radiatio acustica)** and end in the **primary auditory cortex** located in the upper part of the gyrus temporalis superior (area 41, 42).

At the level of the second and third neurons, some fibers of the auditory pathway cross, so that the cortical projection from each ear is bilateral.

## Links

## References

- ČIHÁK, Radomír – GRIM, Miloš. *Anatomie 3*. 2.. edition. Praha : Grada, 2004. 673 pp. vol. 3. ISBN 80-247-1132-X.
- KRÁLÍČEK, Petr. *Úvod do speciální neurofysiologie*. 1. edition. Praha : Karolinum, 1997. ISBN 8071840149.