

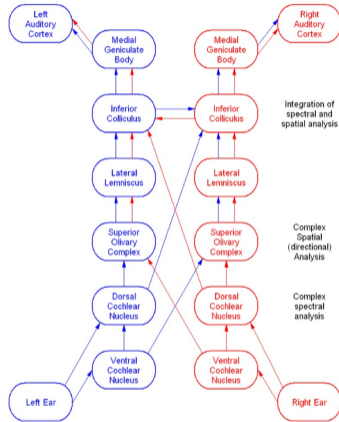
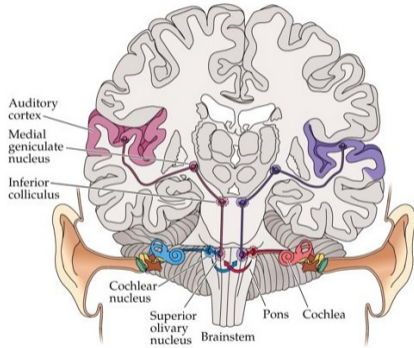
1. Introduction to Robot Hearing

1. Why do robots need to hear?
2. Human-robot interaction
3. Auditory scene analysis
4. Audio signal processing in brief
5. Audio processing in the ear
6. **Audio processing in the midbrain**
7. Audio processing in the brain

Auditory Processing in the Brain

- The brain has the difficult task of transforming the acoustic-wave input into auditory object perception.
- The data flow travels from the ear to the auditory cortex via the midbrain that is composed of several *nuclei*
- The auditory cortex is divided into several areas, both its anatomy and organization varies considerably between the species.

The Ascending Auditory Pathway



Sound Localization in the Midbrain

- The superior olivary complex (SOC) is the first *station* that receives input from both ears
- The SOC is subdivided into two nuclei, the lateral superior olive (LSO) and the medial superior olive (MSO)
- These nuclei seem to be well suited to represent and measure time differences (MSO) and intensity differences (LSO)

Session Summary

- The midbrain is composed of nuclei
- These nuclei preprocess the audio information before is passed to the cortex
- Several nuclei receive input from both ears.