＊平成 25 年度医学・生命科学セミナー／D1 “Medicine & Life Science Seminar, 2013”

Cortical processing of acoustic signals and speech observed by brain imaging.

Please note that Time has been changed.
時間が変更になりました。ご注意下さい。

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＊Date: December 11th (WED) , 2013 from 17:00. 平成 25 年 12 月 11 日（水）17:00

＊Place: Lecture Room 2, Medical Education & Library Building 3F.

医学教育図書棟３階第２講義室

ABSTRACT

Background: Functional brain imaging reveals the organization of cortical language networks and their reorganization due to sensory deficits.

Purpose: (1) To analyze the functional organization of the auditory cortex in normal hearing subjects. (2) To reveal its re-organization in profoundly deafened subjects.

Methods: (1) Our previous results of cortical activation studies using speech, and speech-related stimuli in normal hearing subjects are reviewed. (2) Cortical activation by speech in post-lingually deafened cochlear implant (CI: a device that electrically stimulate the auditory nerve and let deafened subject perceive sounds again) users, and that by speech reading in pre-lingually deafened children are analyzed.

Results: (1) Both speech and reversed speech activated mid-potion of the bilateral superior temporal gyri, which suggests phonological processing of speech are performed in these areas. (2) In post-lingually deafened CI users, increased activation was observed not only in the temporal cortices but also in Broca's area and its right hemisphere homologue, supplementary motor area (SMA) and anterior cingulate gyrus. These regions are thought to be establishing working memory for language decoding and encoding, enabling the brain to maintain an internal copy of the original auditory message. On the other hand, speech reading in pre-lingually deafened children significantly activated the pre-central gyrus, middle temporal gyrus in the right hemisphere, and superior temporal gyrus and superior parietal lobule, suggesting that some part of the temporal auditory cortices in deaf children develop to process visual aspects of language if they do not receive sufficient auditory signals and depends on visual cues.

Conclusion: Brain imaging with speech-related stimuli reveals various aspects of the plasticity in cortical language networks.

Keywords : brain plasticity, language, deafness

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