

SPEECH



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Speech

Ability to express one's ideas & thought symbolically in the form of language.

Types:

- Spoken speech
- Written speech

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Spoken speech

- Understanding of spoken words
- Expressing ideas in the form of speech

Written speech

- Understanding of written words
- Expressing ideas in the form of written words

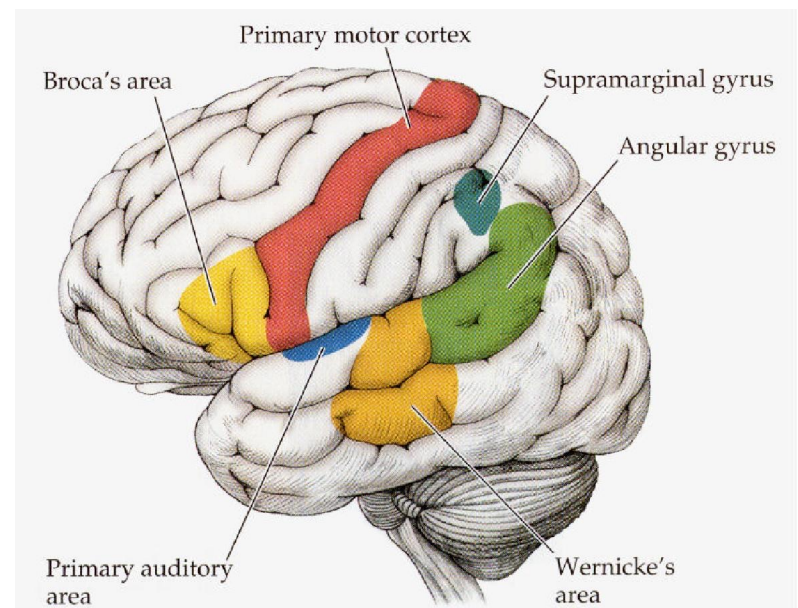
Complementary specialization of hemispheres

- Child's brain equipotential in the beginning
- Fixation of one side of brain as centre of speech occurs in early childhood
- CATEGORICAL/ DOMINANT HEMISPHERE-
Sequential-analytic process and language
- REPRESENTATIONAL/NON-DOMINANT-
Visuospatial relations

CENTRAL SPEECH APPARATUS

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Brain areas involved in Language



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LANGUAGE ZONE

RECEPTIVE AREAS

- Wernicke's area (22)
- Angular gyrus (39)
- Dejerine's area(38)
- Area 41,42

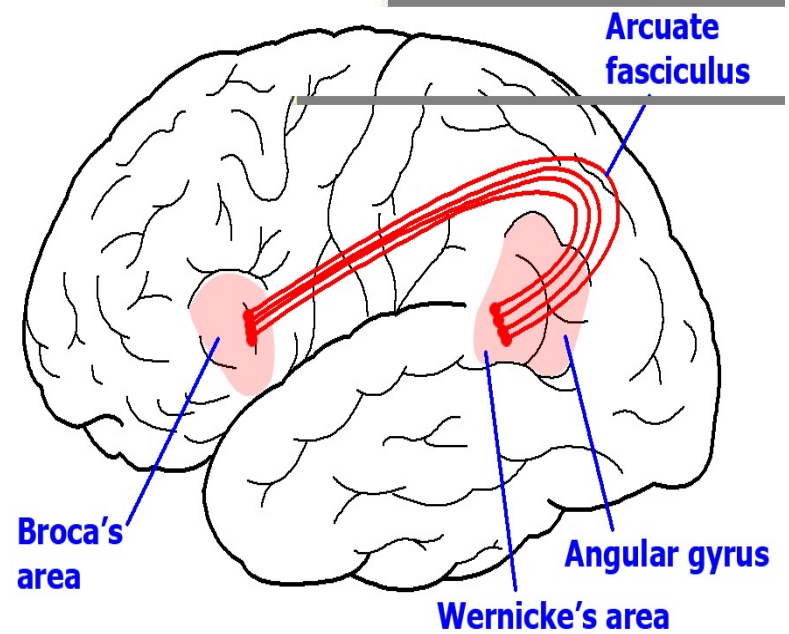
EXECUTIVE AREAS

- Exner writing area(6)
- Broca's area (44)

ARCUATE FASCICULUS

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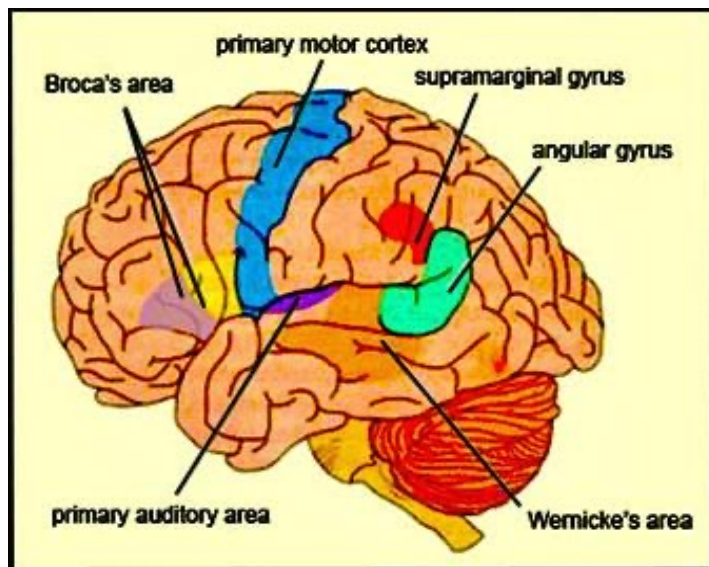
Wernicke's area

Carl Wernicke



Wernicke's area

- Carl Wernicke - German neurologist
- Wernicke's area : area 22 → sensory speech area
- Posterior part of superior temporal gyrus
- Concerned with comprehension of auditory and visual information



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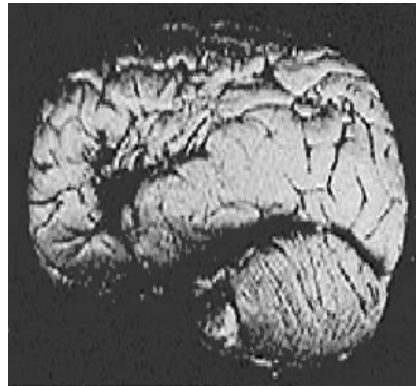
Dejerine's area

- Located in the angular gyrus behind the Wernicke's area
- Involved in the generation of thoughts /ideas in response to written speech
- Visual speech centre

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Broca's area

Peirre Paul Broca
French Sugeon



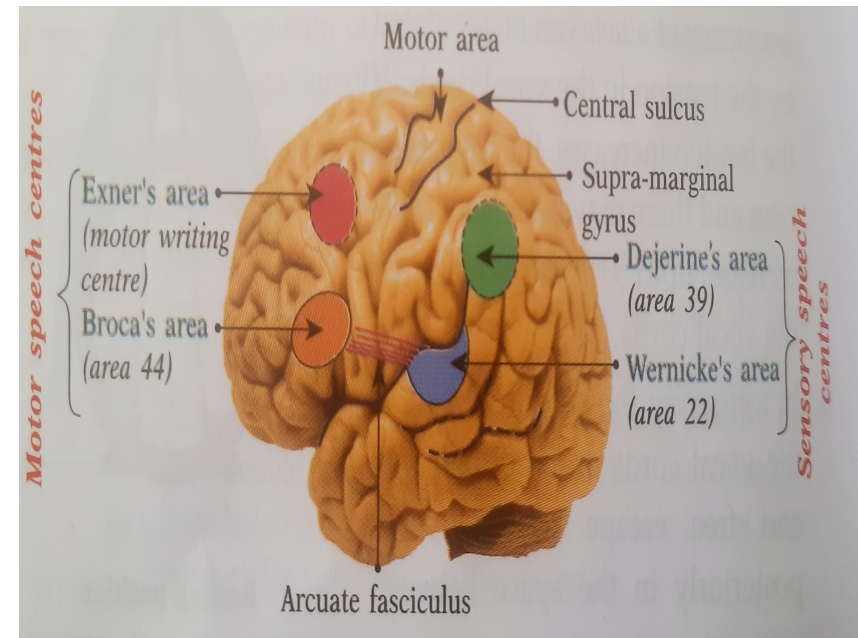
Broca's area- Motor speech area

- The motor area for spoken speech
- Situated in the posterior part of the inferior frontal gyrus
- Area 44
- Categorical hemisphere
- Processes information received from Wernicke's area and control muscles of speech

Exner's Area

- Middle frontal gyrus in dominant hemisphere anterior to the primary motor cortex.
- Area for writing close to area for hand movements
- Appropriate movement of hands & fingers – written speech
- Motor writing area
- Damage results in agraphia

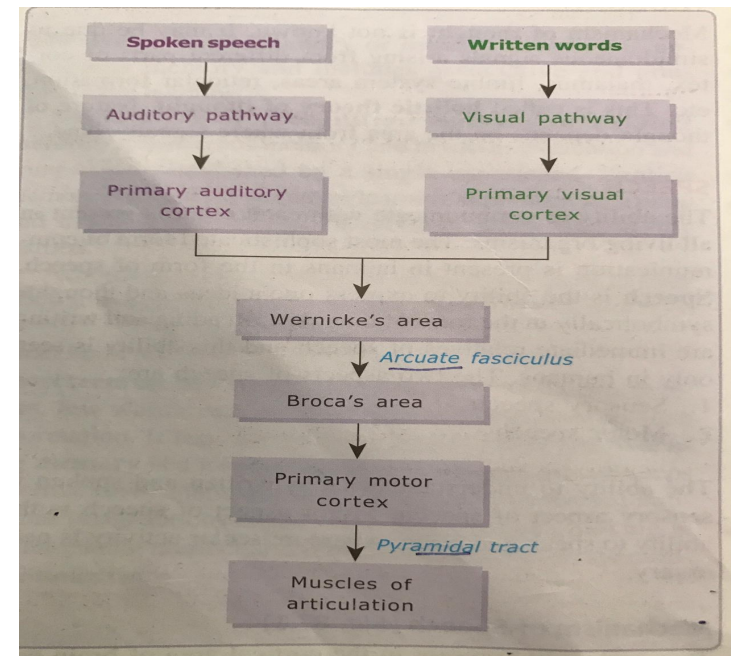
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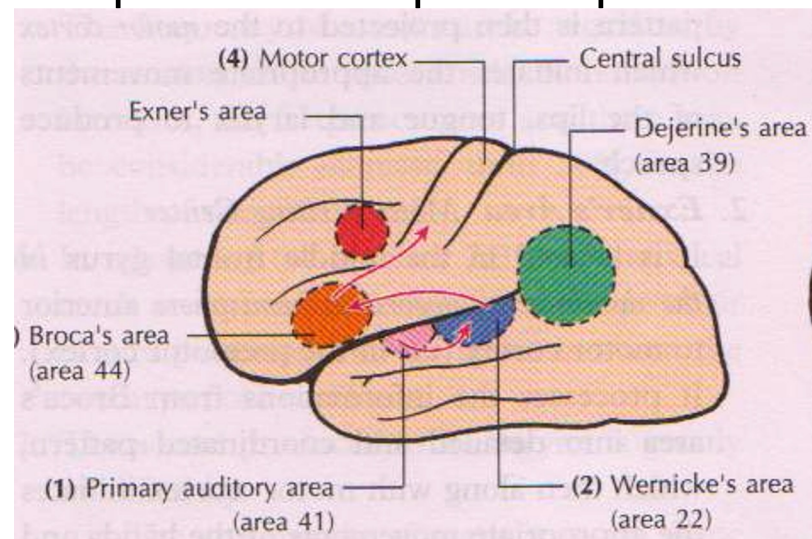
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Other language related areas

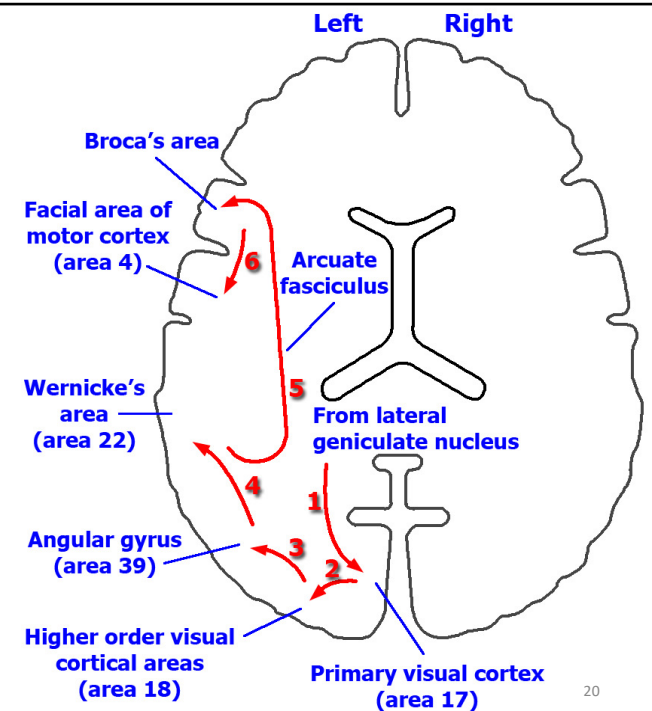
- Wernicke's area is connected to Broca's area : Arcuate fasciculus
- Motor area 4: concerned with movement of lips, tongue, pharynx, larynx etc
- Planum temporale : an area of the superior temporal gyrus that is involved in language-related auditory processing
- Hypothalamus, Spinal cord, Brain stem, Medulla and Cerebellum



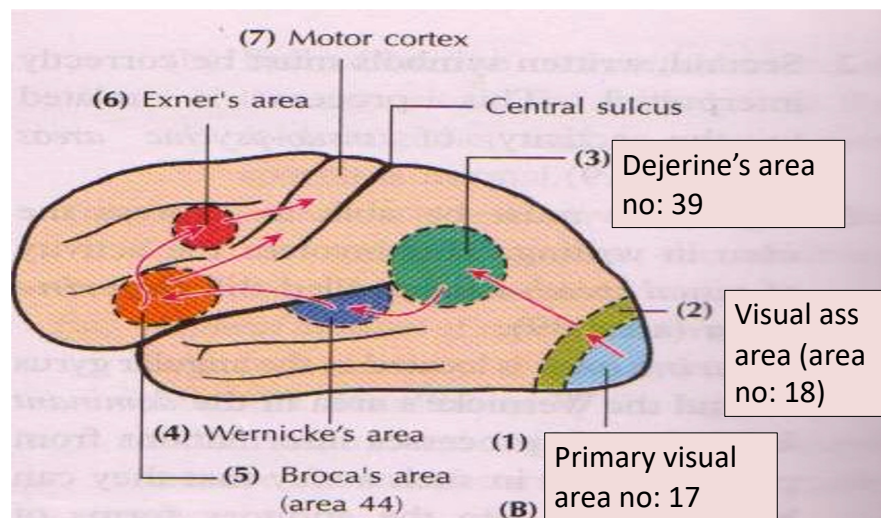
Expression of spoken speech



The probable sequence of events when a subject names a visual object (horizontal section of human brain)



Expression of spoken & written speech



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PERIPHERAL SPEECH APPARATUS

- Include descending tracts to control muscles of speech
- Work in coordination with respiratory system
- Influenced by motor impulses from motor cortex

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SPEECH AND LANGUAGE DISORDERS



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DISORDERS OF SPEECH

- Aphasias
- Dysarthrias
- Dysphonia
- Dyslexia
- Alexia
- Agraphias

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Aphasia

- Abnormalities of speech that are not due to defects of vision or hearing or motor paralysis.
- Lesion in speech centers of cerebral cortex

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Lesions in the categorical hemisphere

- Broca's area
- Wernicke's area
- Arcuate fasciculus
- Can be due to thrombosis or embolism

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Wernicke's aphasia

- Sensory/Fluent Aphasia
- Severely impaired comprehension
- Fluent speech with increased verbal content
- Jargon speech
- Neologisms (made up words)
- Speech make little sense
- MCA territory stroke – Left superior temporal lobe

Broca's Aphasia

- Non-fluent/motor aphasia
- Functional comprehension is present
- Loss of articulate speech or inability to write or both
- Reduced verbal content
- Phrase length – generally less than four words
- Agrammatical sentences (or frequent errors)
- MCA territory stroke – Left frontal lobe

Global aphasia

- Destruction of both Broca's & Wernicke's areas
- Severe impairment in all modalities
- Speaking, listening, reading and writing
- Very limited speech output
- Complete occlusion of MCA

Conduction aphasia

- Relatively uncommon
- Separation of auditory & motor languages areas
- Repetition severely affected
- Preserved auditory comprehension
- Spontaneous speech is fluent

Anomic aphasia

- Lesion in angular gyrus
- Difficulty in understanding written languages or pictures
- Visual information from primary visual area is not processed in angular gyrus

Head's Classification of Aphasia

- Verbal aphasia- Broca's area
- Nominal aphasia- angular gyrus
- Semantic aphasia- Wernicke's area
- Syntactic aphasia

DYSARTHRIA

- Due to paralysis or paresis of muscles involved in speech
- Articulation is involved
- Comprehension of spoken and written speech is not affected

TYPES

- Spastic- UMN lesion(pseudobulbar palsy)
- Flaccid- LMN lesion (Bulbar palsy)
- Ataxic- Scanning } Cerebellar disorders
Staccato }

- **Dysphonia:** Loss of voice due to dysfunction of the voice producing mechanism Eg: Vocal cord palsy , Acute Laryngitis
- **Alexia:** Loss of ability to read
- **Agraphia:** Loss of ability to write
- **DYSLEXIA:** Impaired ability to read
D/t brain damage in Lt hemisphere key language areas