Fusiform gyrus

- Activation Likelihood Estimation Meta-Analysis of the Effects of Cognitive Behavioral Therapy on Brain Activation in the Treatment of Depression and Anxiety Disorders
- Temporal specialization of the neural memory system: common and distinct neural correlates of recent and remote memory retrieval
- Intracranial High-Frequency Oscillations and Epileptogenic Zone: Incorporating Neuroanatomic Variation
- Hybrid Therapy for Newly Diagnosed and Recurrent Glioblastoma: Staged Procedure Integrating Open Surgical Resection With Laser Interstitial Thermal Therapy
- Facial emotion recognition in focal epilepsy: localization is not the main factor
- Transient Inhibition of the Posterior Parietal Cortex Affects Action-related But Not Action-unrelated Visual Processing during Path Integration
- Moyamoya disease in a 10-year-old male patient in the Middle East with the outcome of the surgery: A case report and literature review
- From Correlation to Causation: Understanding Episodic Memory Networks

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The fusiform gyrus is part of the temporal lobe and occipital lobe in Brodmann area 37. It is also known as the (discontinuous) occipitotemporal gyrus.

The fusiform gyrus is located between the inferior temporal gyrus and the parahippocampal gyrus.

The lateral and medial portions are separated by the shallow mid-fusiform sulcus.

The paramedian supracerebellar transtentorial approach (PST) provides the surgeon precise anatomical orientation when exposing the entire length of the mediobasal temporal region (MTR), as well as the fusiform gyrus, for removing any lesion [1)].

Areas

The fusiform face area (FFA) is a part of the human visual system that, it is speculated, is specialized for facial recognition, although there is some evidence that it also processes categorical information about other objects, in particular familiar ones. It is located in the fusiform gyrus (Brodmann area 37).

The FFA is located in the ventral stream on the ventral surface of the temporal lobe on the lateral side of the fusiform gyrus. It is lateral to the parahippocampal place area. It displays some lateralization, usually being larger in the right hemisphere.

Functionality

The specific brain area usually associated with prosopagnosia is the fusiform gyrus, which activates specifically in response to faces. The functionality of the fusiform gyrus allows most people to recognize faces in more detail than they do similarly complex inanimate objects. For those with

prosopagnosia, the new method for recognizing faces depends on the less-sensitive object recognition system. The right hemisphere fusiform gyrus is more often involved in familiar face recognition than the left. It remains unclear whether the fusiform gyrus is only specific for the recognition of human faces or if it is also involved in highly trained visual stimuli.

There is still some dispute over the functionalities of this area, but there is relative consensus on the following:

processing of color information

face and body recognition (see Fusiform face area)

word recognition (see Visual word form area)

within-category identification

Some researchers think that the fusiform gyrus may be related to the disorder known as prosopagnosia, or face blindness. Research has also shown that the fusiform face area, the area within the fusiform gyrus, is heavily involved in face perception but only to any generic within-category identification that is shown to be one of the functions of the fusiform gyrus.

Abnormalities of the fusiform gyrus have also been linked to Williams syndrome.

Fusiform gyrus has also been involved in the perception of emotions in facial stimuli.

However, individuals with autism show little to no activation in the fusiform gyrus in response to seeing a human face

Increased neurophysiological activity in the fusiform face area may produce hallucinations of faces, whether realistic or cartoonesque, as seen in Charles Bonnet syndrome, hypnagogic hallucinations, peduncular hallucinations, or drug-induced hallucinations.

Recent research has seen activation of the fusiform gyrus during subjective grapheme-color perception in people with synaesthesia.

After further research by scientists at MIT, it was concluded that both the left and right fusiform gyrus played different roles from one another, but were subsequently interlinked. The left fusiform gyrus plays the role of recognizing “face-like” features in objects that may or may not be actual faces. Whereas the right fusiform gyrus plays the role in determining whether or not the recognized “face-like” feature is, in fact, an actual face.

Fusiform gyrus tumor

- Hybrid Therapy for Newly Diagnosed and Recurrent Glioblastoma: Staged Procedure Integrating Open Surgical Resection With Laser Interstitial Thermal Therapy
- Dissecting the endothelial cell landscape in meningioma: single-cell insights into PLVAP+ subpopulations and their role in tumor angiogenesis
- A unique case of extra-cerebral diffuse glioneuronal tumor with oligodendroglioma-like features and nuclear clusters
- Visual hallucinations in neurosurgery: A systematic review and two case insights into Charles Bonnet Syndrome

- A Rare Case of Brain Metastasis of Gastric Neuroendocrine Carcinoma
- Gliomagenesis following chronic subdural hematoma: A case report
- Clinicopathological features of EBV-positive polymorphic B-cell lymphoproliferative disorders involving central nervous system in people living with HIV
- Potential Risk of Cognitive Impairment Due to Irradiation of Neural Structures in Locally Advanced Nasopharyngeal Cancer Treated by Curative Radiotherapy

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A tumor in the fusiform gyrus can have specific implications depending on its nature, size, and location. Here are some general considerations:

Clinical Implications:

Visual Processing and Recognition:

The fusiform gyrus is involved in the recognition of faces and objects. Tumors in this region can potentially impact visual processing and recognition abilities, leading to visual disturbances or difficulties in identifying faces.

Seizures:

Tumors in the brain, including the fusiform gyrus, may irritate surrounding neural tissue and increase the risk of seizures. Seizures can manifest with various symptoms, depending on the area affected.

Neurological Deficits:

Depending on the size and location of the tumor, neurological deficits may occur. These deficits can include sensory disturbances, motor impairments, or language difficulties, depending on the areas of the brain affected by the tumor.

Behavioral and Cognitive Changes:

Tumors can sometimes cause changes in behavior and cognition. This may include alterations in mood, personality, or cognitive functions such as memory and attention.

Diagnosis and Treatment:

Imaging Studies:

Magnetic Resonance Imaging (MRI) is typically used to visualize and locate brain tumors, including those in the fusiform gyrus. It provides detailed images of the brain structures and helps in planning treatment. Biopsy:

A biopsy may be performed to determine the type of tumor and its characteristics. This information is crucial for planning an appropriate treatment strategy.

Treatment Options:

Treatment options for fusiform gyrus tumors may include surgery, radiation therapy, and chemotherapy, depending on the type of tumor, its size, and its location. The goal is often to remove or reduce the tumor while preserving neurological function.

Monitoring and Follow-Up:

Regular monitoring is essential to assess the tumor's response to treatment and to manage potential complications. Follow-up imaging studies and clinical evaluations help track the patient's progress. It's important to note that the specific impact of a tumor in the fusiform gyrus can vary widely from person to person. The prognosis and outcomes depend on factors such as the type of tumor, its stage, and the individual patient's overall health.

A patient with paroxysmal aphasia evoked by ictal epileptiform discharges localized to the left fusiform gyrus, where a small brain tumor existed. The intracranial EEG recordings during other seizures demonstrated a close functional link between the left fusiform gyrus and Wernicke's area. The patient also showed transient aphasia with electrical stimulation of the left fusiform gyrus [2].

Operations on tumors of the posteromedial temporal region, that is, on those arising from the fusiform gyrus, are challenging to perform because of the deep-seated location of these tumors between critical cisternal neurovascular structures and the adjacent temporal and occipital cortexes.

Tumors of the fusiform gyrus generated a superior (and lateral) shift; consequently, a subtemporal approach is recommended to avoid white matter injury [3].

1)
Türe U, Harput MV, Kaya AH, Baimedi P, Firat Z, Türe H, Bingöl CA. The paramedian supracerebellar-transtentorial approach to the entire length of the mediobasal temporal region: an anatomical and clinical study. Laboratory investigation. J Neurosurg. 2012 Apr;116(4):773-91. doi: 10.3171/2011.12.JNS11791. Epub 2012 Jan 20. PubMed PMID: 22264179.
2)
Suzuki I, Shimizu H, Ishijima B, Tani K, Sugishita M, Adachi N. Aphasic seizure caused by focal epilepsy in the left fusiform gyrus. Neurology. 1992 Nov;42(11):2207-10. PubMed PMID: 1436539.
3)
Faust K, Vajkoczy P. Distinct displacements of the optic radiation based on tumor location revealed using preoperative diffusion tensor imaging. J Neurosurg. 2015 Oct 2:1-10. [Epub ahead of print] PubMed PMID: 26430843.