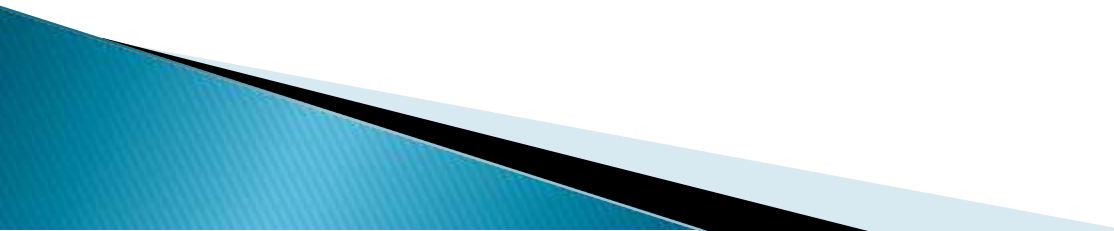


**PATNA UNIVERSITY
M.A(PSYCHOLOGY)
SEMESTER-2
NEUROPSYCHOLOGY (CC6)
TOPIC: BRAIN TUMOR**

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- ▶ A brain tumor, or **Neoplasm**, is a growth of abnormal cells inside the skull cavity. Most tumors of the Central Nervous System (>90%) originate from glial cells (e.g., astrocytes, oligodendrocytes, microglia, and ependymal cells), and only rarely develop from neurons.
- ▶ The original site of the tumor is usually the lungs or breast, but may also be in the kidneys, immune cells, prostate, or skin. Brain tumors are either benign (noncancerous) or malignant (cancerous).
- ▶ Primary brain tumors arise within the brain, whereas metastatic (also called secondary) brain tumors spread from other parts of the body through the bloodstream.
- ▶ To expand, gliomas, typically malignant brain tumors, release the neurotransmitter glutamate at toxic concentrations. This kills off neurons in their vicinity, making room for the tumor's expansion. The released glutamate explains seizures originating from tissue surrounding the tumor. An expanding tumor can increase pressure within the skull, causing headache, vomiting, visual disturbances, and impaired mental functioning.

Types of Brain Tumor

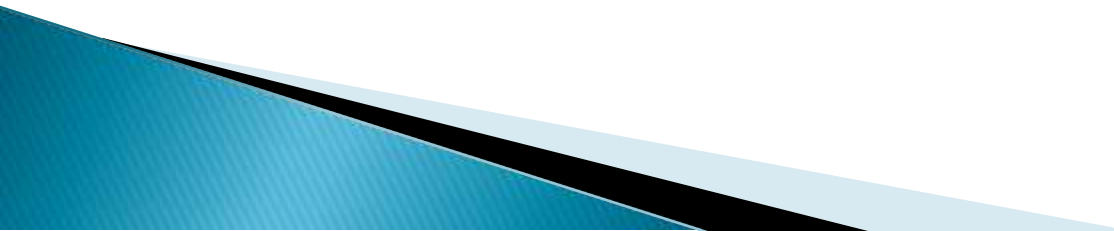
- 1. Metastatic-** Metastatic tumors originate elsewhere in the body and spread to the brain via blood cells and lymph channels. Metastatic cancers are twice as common as primary brain tumors in adults.
 - 2. Primary-** Primary brain tumors arise within the brain. Primary brain tumors are twice as common in children. Most primary brain tumors in adults develop above the tentorium in the hemispheres Whereas in children, these are found in the posterior fossa.
 - 3. Benign-** The term benign, is an unfortunate misnomer, as benign tumors are not harmless. Benign tumors include meningiomas, epidermoid tumors, dermoid tumors, hemangioblastomas, colloid cysts, pleomorphic xanthoastrocytomas, craniopharyngiomas, and schwannomas.
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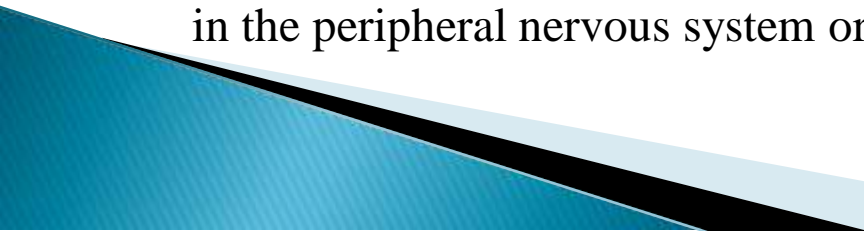
4. Malignant tumors- These vary in shape, size, and overall pattern; and usually proliferate rapidly. Malignant tumors are caused by multiple changes in gene expression, which lead to uncontrolled cell proliferation and cell death. Malignant tumors include anaplastic astrocytoma, glioblastoma multiforme, anaplastic oligodendroglioma, medulloblastomas, ependymoma, Gliomas and pineoblastomas.

5. Meningiomas- A meningiomas is a tumor that arises from the membranes that surround the brain and spinal cord.

6. Epidermoid tumors- An epidermoid tumor is a benign, slow-growing tumor that arises from skin cells that get trapped in the brain and spinal cord during development.

7. Dermoid tumors- A type of tumor that contains a cyst filled with tissues that are normally found in the outer layers of the skin, including sweat and oil glands.




- 8. Hemangioblastomas-** A hemangioblastoma is a noncancerous tumor that forms in the lower part of the brain, spinal cord, or retina. The tumor develops in the lining of a blood vessel.
 - 9. colloid cysts-** Colloid cysts are benign, congenital epithelium-lined cysts that most commonly occur in the third ventricle near the Monro foramen.
 - 10. Pleomorphic xanthoastrocytomas-** This is a kind of tumor arises from astrocytes, the supportive cells in the nervous system. These tumors also belong to the broader category of gliomas– tumors that arise from glial cells.
 - 11. Craniopharyngiomas-** Craniopharyngiomas are rare intracranial tumors that mainly arise in the sellar or parasellar region and are frequent in children and adults.
 - 12. Schwannomas-** A schwannoma is a tumor that develops from the Schwann cells in the peripheral nervous system or cranial nerves.
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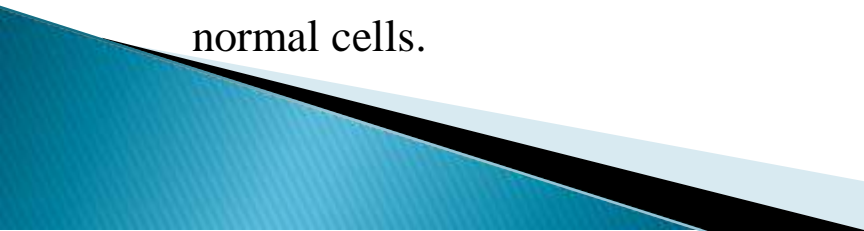
13. Anaplastic Astrocytoma- **Anaplastic astrocytoma** is a rare, cancerous (malignant) type of brain tumor that arises from star-shaped brain cells called astrocytes. These cells surround and protect nerve cells in the brain and spinal cord. An anaplastic astrocytoma usually develops slowly over time, but may develop rapidly.

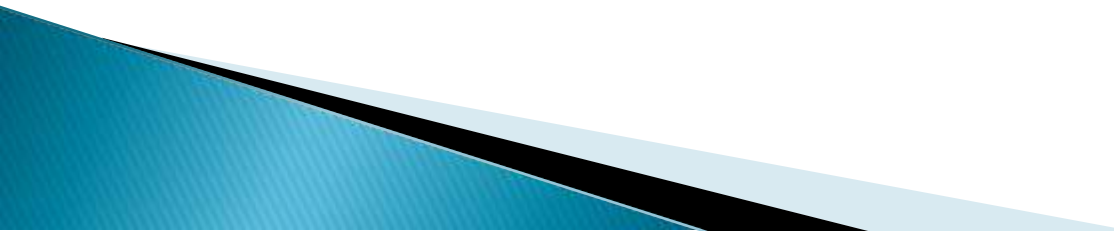
14. Glioblastoma multiforme- Glioblastoma multiforme is a type of very aggressive brain tumor. It is also known as Glioblastoma. This type of tumor grows very fast inside the brain. Its cells copy themselves quickly, and it has a lot of blood vessels to feed it.

15. Anaplastic oligodendroglioma- Anaplastic oligodendroglial tumors account for approximately 7% of all intracranial gliomas in adults and generally have a better prognosis than other types of high-grade gliomas.

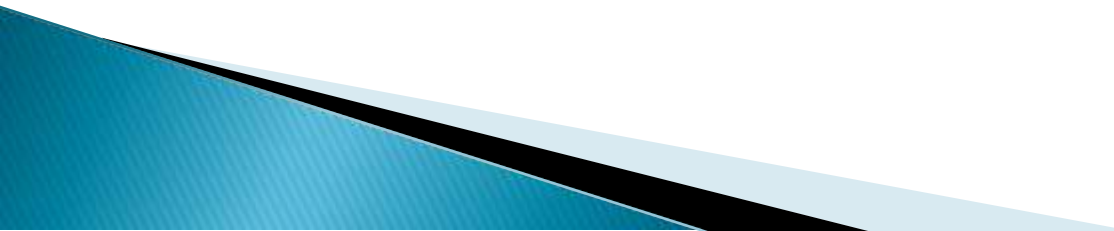
16. Medulloblastomas- Medulloblastoma is a primary central nervous system (CNS) tumor. It begins in the brain or spinal cord.

- 17. Ependymoma-** Ependymomas start when certain types of glial cell called ependymal cells start to grow out of control. These cells line the ventricles of the brain.
- 18. Gliomas-** A tumor composed of tissue representing neuroglia; the term glioma is often used to describe all primary, intrinsic neoplasms of the brain and the spinal cord.
- 19. Pineoblastomas-** Pineoblastoma is more aggressive than other types of pineal gland tumors. Its fast growth usually causes cerebrospinal fluid (CSF) to build up in the brain. This condition is called hydrocephalus. While pineoblastoma may spread through the CSF in 10% to 20% of cases, most of the time the tumors do not spread to other parts of the body.
- 20. Pituitary adenoma-** A tumor of the pituitary gland; pituitary adenomas are often classified as functioning (changing the secretion of the pituitary gland) and nonfunctioning (benign).
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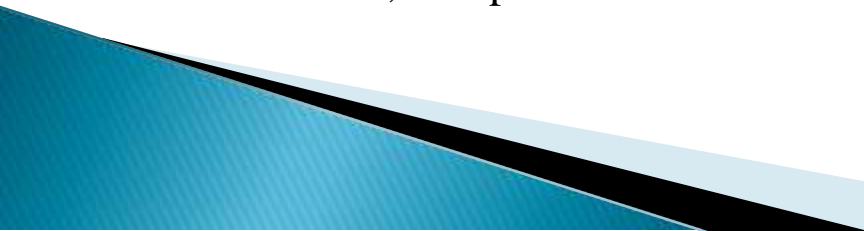
- ▶ WHO classified brain tumors on the basis of their histologic or cellular characteristics, ranging from Grades I through IV.
 - ▶ **Grade I tumors** (e.g., pilocytic astrocytoma and meningioma) are benign, grow slowly, and have low proliferation potential.
 - ▶ **Grade II tumors** (e.g., oligoastrocytoma and pineocytomas) also have low proliferation potential, however, unlike Grade I tumors, often recur and are infiltrative in nature. Thus, Grades II and higher suggest malignancy.
 - ▶ **Grade III tumors** (e.g., anaplastic astrocytoma and anaplastic oligodendroglioma) are generally malignant, with high proliferation potential, and usually grow again after being removed. Patients with Grade III (and higher) tumors typically receive radiotherapy and/or chemotherapy, in addition to undergoing neurosurgery.
 - ▶ **Grade IV tumors** (e.g., glioblastoma multiforme and medulloblastoma) are the most aggressive, and, as such, the most difficult to treat. They also appear very different from normal cells.
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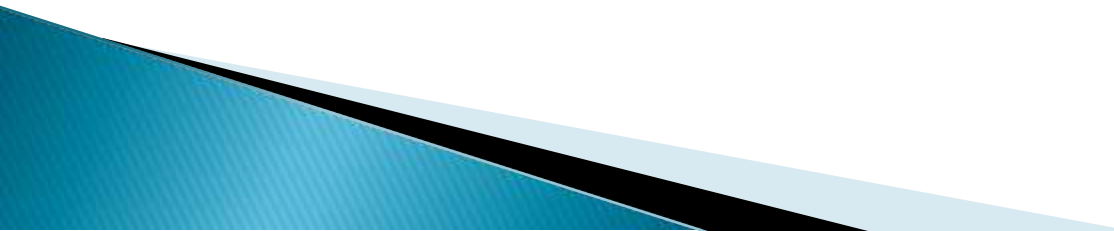
- ▶ The symptoms of brain tumors are often directly related to the cell type comprising the tumor, the rate of tumor growth, and the size and location of the tumor.
 - ▶ Symptoms can include headaches (in more than half of all individuals with brain tumors)
 - ▶ Seizures (sometimes a warning sign of a brain tumor if seizure onset is in adulthood)
 - ▶ Nausea
 - ▶ vision problems including blurred or double vision or partial vision loss
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Diagnosis of Tumor

- ▶ A variety of different conditions are needed to diagnose brain tumors including subdural hematomas, hydrocephalus, brain abscesses, cerebral infarctions, multiple sclerosis, and Alzheimer's disease.
 - ▶ CT and MRI scans are essential in screening for brain tumors.
 - ▶ MR imaging, using gadolinium infusion or not, is considered the best method of determining the mass characteristics, which includes location, size, and extent of the tumor.
 - ▶ A brain biopsy establishes histopathologic features needed to classify or grade brain tumors.
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Treatment of Tumor

- ▶ **Surgery-** Surgery is generally the first step if the tumor is accessible and vital structures will not be disturbed. The goal of surgery is to resect as much of the tumor as possible without causing too much permanent damage. Surgical armamentarium includes traditional scalpel, laser microsurgery, and ultrasonic aspiration. The laser vaporizes tumor cells. Ultrasonic aspiration employs ultrasonic waves, causing vibrations, which break up cancer cells. Surgical resection and debulking are common surgical techniques. Resection is the removal of the tumor for curative purposes. Debulking can improve survival and/or reduce neurologic symptoms by reducing intracranial pressure.
 - ▶ **Radiation Therapy-** Radiation is used to stop a tumor's growth or cause it to shrink. Many tumors die upon exposure to X- and gamma rays, due to radio sensitivity. Unilateral and/or bilateral radiation therapy is thus the mainstay treatment for brain tumors. Whole-brain radiation therapy (WBRT) is typically employed for brain metastases, irrespective of the number of lesions or location of the tumor.
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- ▶ **Chemotherapy-** It destroys tumor cells that may remain after surgery and radiation but is not very effective for gliomas. Chemotherapy has immediate and delayed side effects. Nausea and vomiting are common within 24 hours of treatment. Leukopenia (reduction in white blood cells) and stomatitis (inflammation of the mucous lining in the mouth) can occur within days to weeks. Chemotherapy may cause deficits of attention, processing speed, verbal memory, visual-spatial functioning, executive functioning, and motor functioning.
 - ▶ **Drugs-** Steroid drugs relieve brain swelling, and antiepileptic drugs control seizures.
 - ▶ **Gamma Knife/Stereotactic Radiosurgery-** Gamma-knife neurosurgery has been recommended for targeting smaller tumors. This directs focused gamma radiation to a highly circumscribed area.
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- ▶ **Therapies-** New therapies for brain tumors are developed in organized studies called clinical trials. Many of these trials focus on targeted therapy-treatment aimed at biologic characteristics of tumors.
 - ▶ **Targeted therapies** include vaccines created from the patient's own tumor combined with substances that boost the immune system or kill tumor cells; monoclonal antibodies, which home in on receptors on the surface of the tumor cells.
 - ▶ **Anti-angiogenic therapy**, in which the tumor's blood supply is restricted; immunotherapy, which uses the body's own immune system against the tumor.
 - ▶ **Gene therapy**, in which bioengineered genes are delivered to the cancer cells to kill them and several approaches for a targeted delivery of antibodies, toxins, or growth-inhibiting molecules that attach specifically to the tumor cells and interfere with their growth.
 - ▶ **A scorpion-derived toxin** called chlorotoxin that interferes with tumor spread has shown promise in clinical studies where it extended life expectancy significantly.
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- ▶ Researchers are exploring the role of stem cells in the origin of brain tumors. Epidemiologists are studying disease in human populations, also are looking into tumor genetics and patients' lifestyle, environment, occupation, and medical history for clues as to the causes of these tumors. International efforts are underway to increase awareness of brain tumors, encourage research collaboration, and explore new and innovative therapies.

