

# **Glioma Breakout Session: Glioma 101**

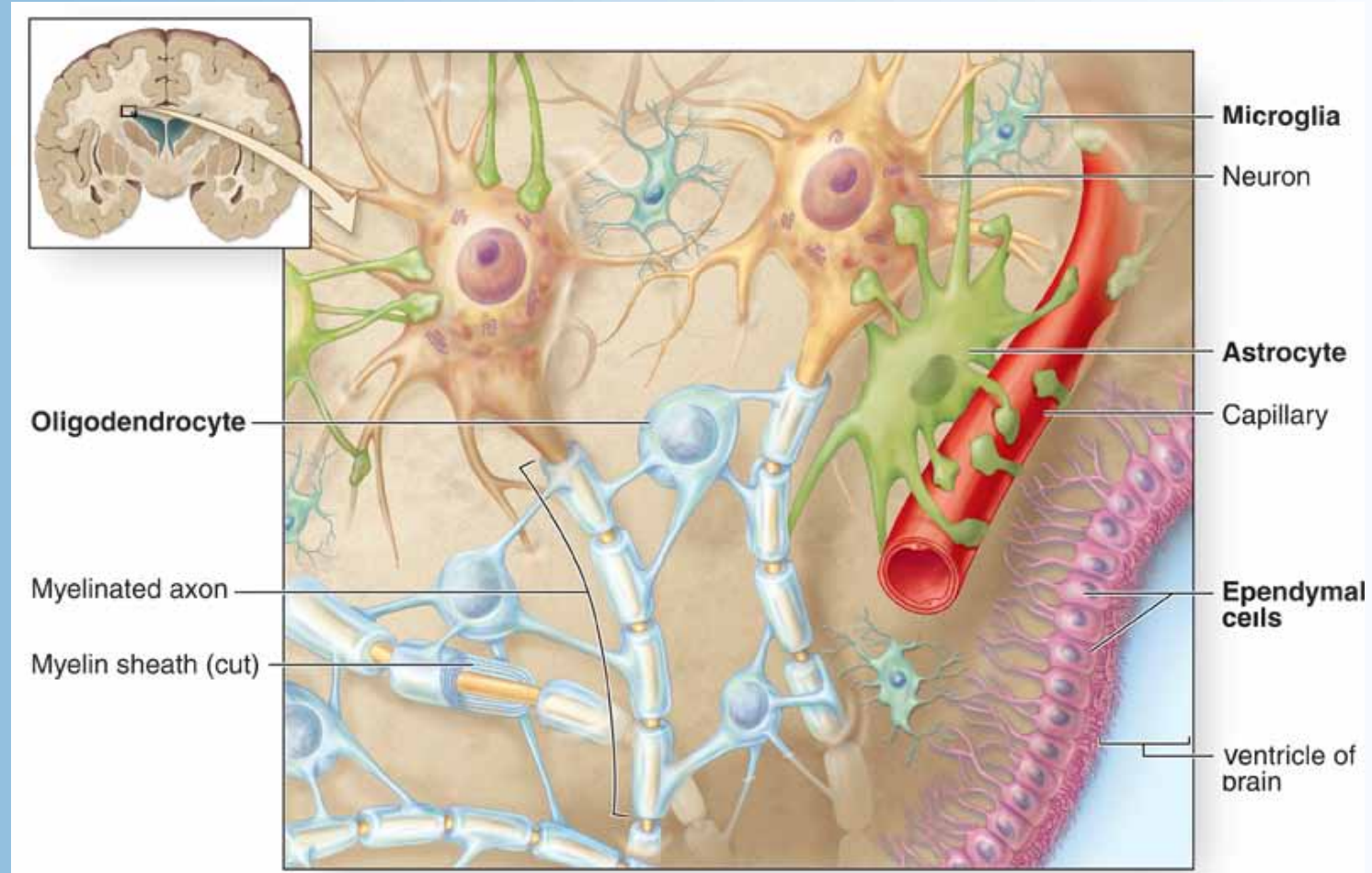
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# WHAT IS A GLIOMA?

# Glial Cells

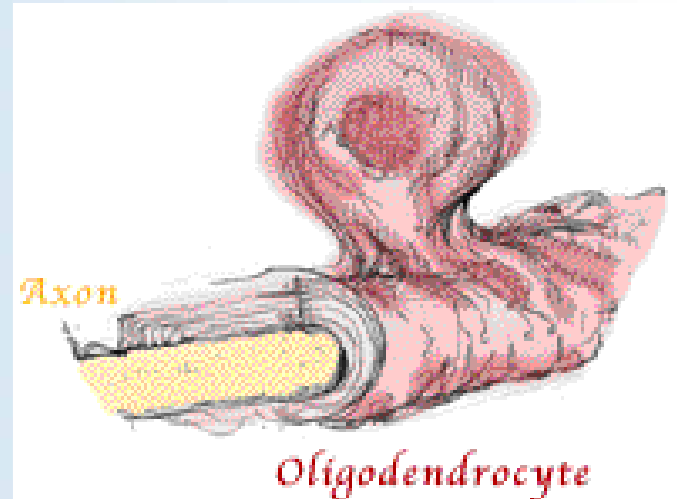
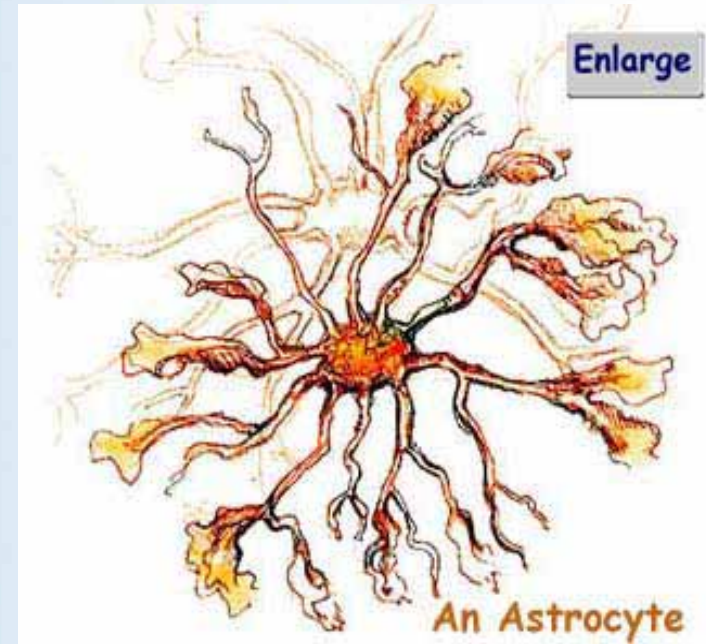
§ Glia = Glue (Greek)

§ Glia = Support cells



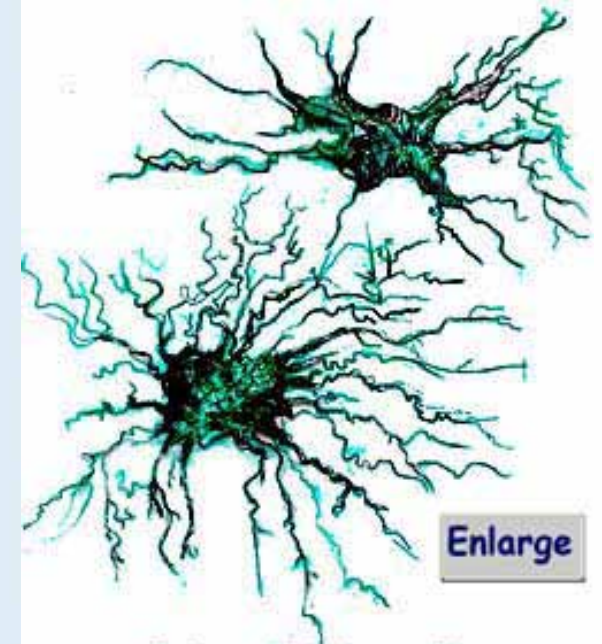
# Glial Cell Types

- §Astrocyte - transport nutrients and hold neurons in place
- §Oligodendrocyte - provide insulation (myelin) to neurons



# Glial Cell Types

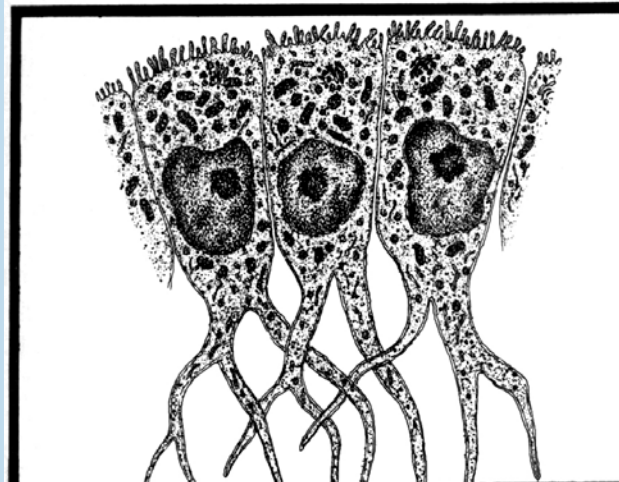
- Microglia - digest dead neurons and pathogens
- Ependymal cells - line ventricles and secrete cerebrospinal fluid



Enlarge

Pair of Microglia

Ependymal cell



# WHAT DOES GLIOMA GRADE MEAN?

## § **WHO = World Health Organization**

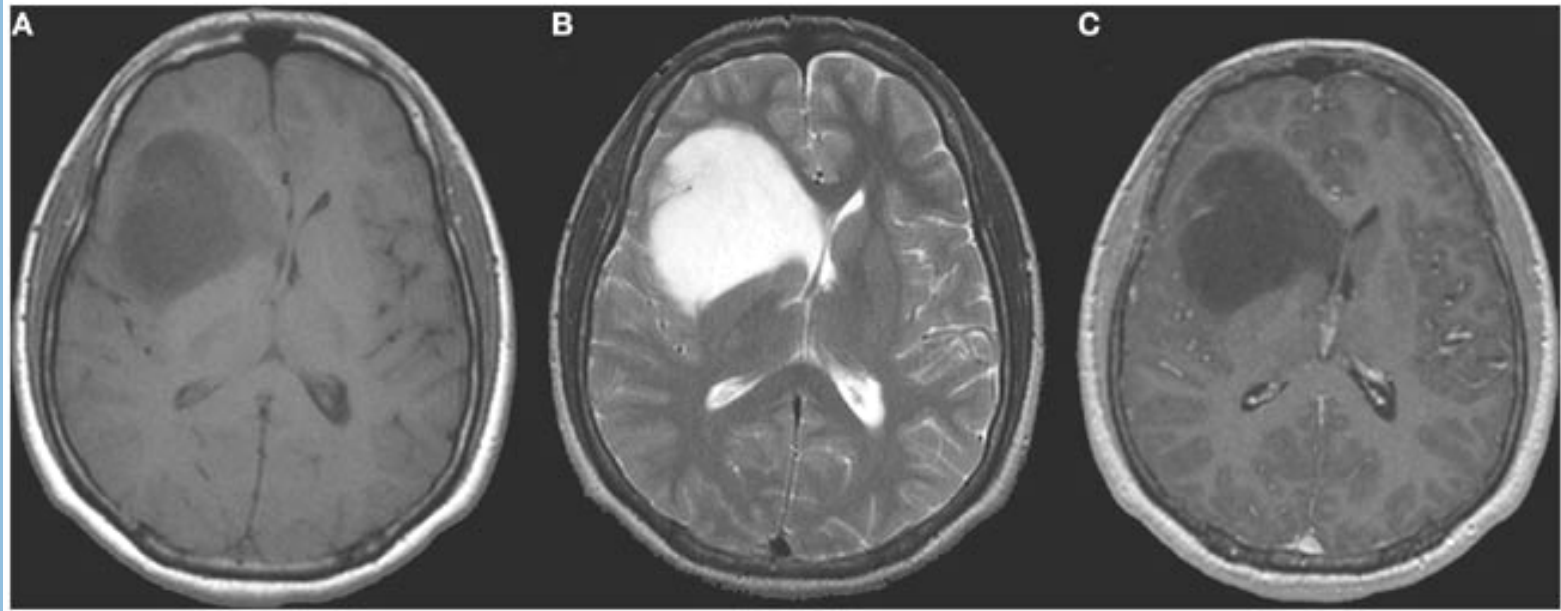
- Grades tumors on a scale based on degree of malignancy
- Grade 1 = Most Benign
- Grade 4 = Most Malignant

# Grading of brain tumors

Grade	Characteristics
I	<ul style="list-style-type: none"><li>Slow growing cells</li><li>Almost normal appearance</li><li>Least malignant</li><li>Usually associated with long-term survival</li></ul>
II	<ul style="list-style-type: none"><li>Relatively slow growing cells</li><li>Slightly abnormal appearance</li><li>Can invade nearby tissue</li><li>Sometimes recur as a higher grade</li></ul>
III	<ul style="list-style-type: none"><li>Actively reproducing abnormal cells</li><li>Abnormal appearance</li><li>Infiltrate normal tissue</li><li>Tend to recur, often as a higher grade</li></ul>
IV	<ul style="list-style-type: none"><li>Rapidly reproducing abnormal cells</li><li>Very abnormal appearance</li><li>Area of dead cells (necrosis) in center</li><li>Form new blood vessels to maintain growth</li></ul>

- § **WHO Grade 1 = Pilocytic astrocytoma**
  - DNET, Ganglioglioma
- § **WHO Grade 2 = Low Grade Glioma**
  - Astrocytoma
  - Oligodendroglioma
  - Mixed Oligoastrocytoma
- § **WHO Grade 3 = Malignant Glioma**
  - Anaplastic Astrocytoma
  - Anaplastic Oligodendroglioma
  - Anaplastic Oligoastrocytoma
- § **WHO Grade 4 = Glioblastoma Multiforme**

# WHO Grade 2 Glioma - Astrocytoma



# WHO Grade 4 Glioma Glioblastoma



# WHAT SYMPTOMS DO GLIOMAS CAUSE?

# Seizures

§ **Seizures common for all glioma patients**

§ **When to use anti-seizure medicine?**

- Any one having seizures
- Around the time of surgery
- Patients felt at higher risk for seizures

§ **Medications**

- Certain medications affect chemotherapy – Dilantin, not Keppra
- Weigh side effect risk vs. benefit

# Headache

- § **Headache common for glioma patients**
  - Steroids can be beneficial, but side effects are important consideration
  - Pain medications as needed
  - Relaxation techniques, alternative therapies can play a role

# Other symptoms

## § Other symptoms depend on specific location of tumor

- Frontal lobe – difficulty with speech, concentration, memory, weakness.
- Temporal lobe – difficulty with speech, memory
- Parietal lobe – weakness/numbness
- Occipital lobe – vision
- Cerebellum – balance, coordination, ambulation

# WHAT CAUSES GLIOMAS?

§ **Radiation increases risk**

§ **Rare syndromes increase risk**

- Lei Fraumani syndrome
- Neurofibromatosis

§ **Bottom line is, in most cases:**

- We don't know!
- Ohio Brain Tumor Study
  - Consortium of 4 major centers in Ohio
    - § University of Cincinnati
    - § Case Western Reserve – Cleveland, Ohio
    - § Cleveland Clinic – Cleveland, Ohio
    - § James Cancer Center – Columbus, Ohio

# ARE FAMILY MEMBERS WITH GLIOMA AT INCREASED RISK?

§ **In the majority of cases – No**

§ **British Journal of Cancer 2001**

- Familial analysis of 432 patients with astrocytoma from Sweden
- 24 pts (5%) had 2 or more members of family with glioma, felt to be a familial tendency
  - Compare to 10% of breast cancer/20% of colon cancer are familial

§ **A few familial syndromes known to increase risk**

- Neurofibromatosis
- Lei Fraumeni syndrome

§ **In most cases, not familial**

# WHAT IS STANDARD TREATMENT FOR GLIOMAS?

# Low Grade Glioma

## § Standard treatment

- Biopsy for diagnosis if able
- Observation is an option for some tumors
- Surgical resection if possible,
  - **Functional preservation most important**
- Role of radiation is controversial
  - Delays time to progression
- Role of chemotherapy is controversial

# Malignant Glioma/GBM

## § Standard Treatment – Stupp protocol

- Maximal surgical resection
- Radiation, 6 weeks of fractionated radiation
- Chemotherapy with Temozolomide during radiation and for 6-12 months after radiation

# Treatment of Recurrence

## § All options are available

- Surgery with or without implants (wafers, seeds)
- Radiation / Radiosurgery
- Chemotherapy