BRAIN TUMORS-2
Summary
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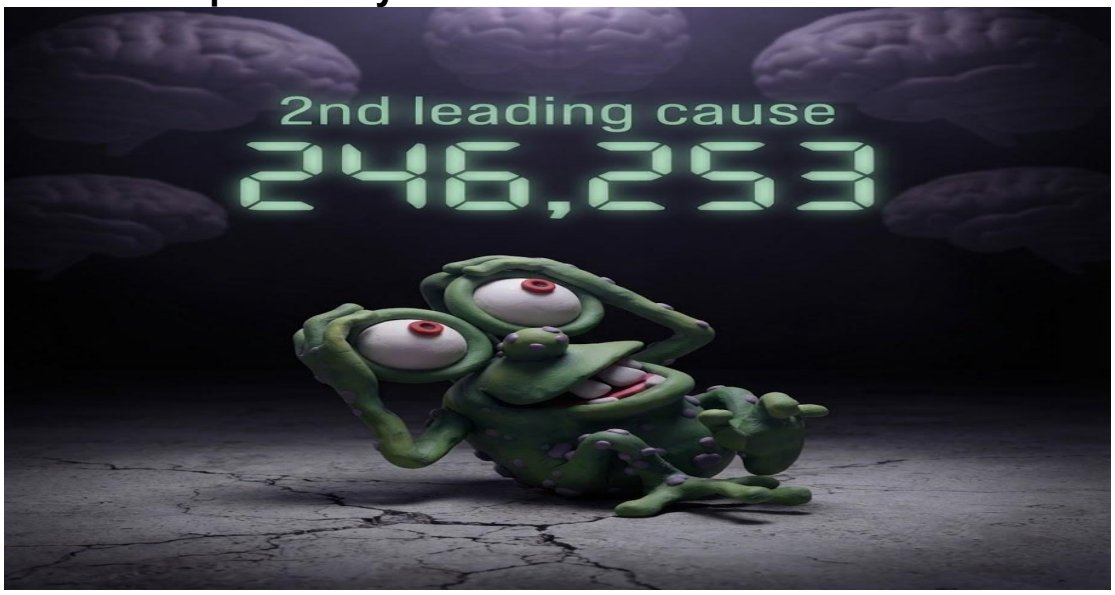
*** Ooga booga! Listen up, puny humans! Brain tumors are either primary (they start right there in the squishy command center) or secondary (Metastases—invaders from elsewhere!).**

*** They are a mixed bag of both benign and malignant nasties, making them a top-tier villain! They are the 2nd leading cause of cancer death in kids and the 3rd in adults!**

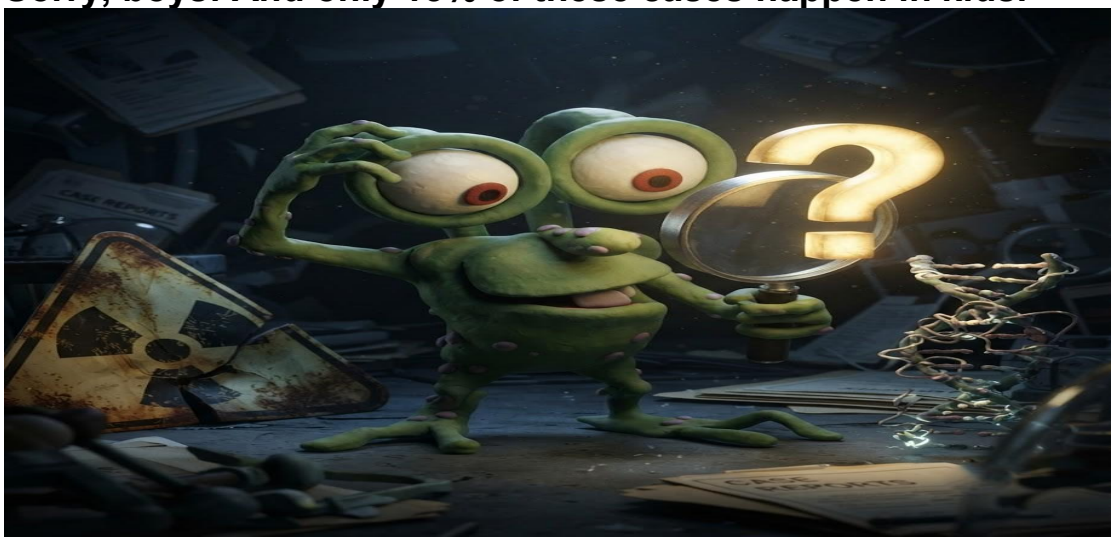
*** They account for 1.9% of all cancers, wiping out a terrifying 246,253 people globally in 2019 alone. Even a monster under the bed is spooked by those numbers!**



*** The Western Pacific Region gets hit the absolute hardest with new cases and deaths.**

*** Weird brain fact: In kids, malignant tumors are more common, but in grown-ups, non-malignant tumors win the numbers game!**

*** Males are taking a harder beating than females (Ratio 1.8:1). Sorry, boys! And only 15% of these cases happen in kids.**



*** Here's the really freaky part: we don't know what causes most of them! Decades of searching and—ZIP!**

*** The only sure-fire known risk factors are ionizing radiation and some single-gene inherited disorders (which cause about 4% of childhood cases).**

*** Scientists are also snooping around things like birth weight, structural birth defects, and immune stuff (viruses, allergies, HLA) to find more clues.**

*** 5 to 10% of cases run in the family. It's like passing down a cursed sock! Watch out for big-name syndromes like Neurofibromatosis (types I and II), Tuberous Sclerosis, and Li Fraumeni.**

*** The big brainiacs at the WHO updated their rulebook in 2021! Now they mix what the tumors look like (histopathology) with their *deep-down genetic secrets (molecular genetics) to figure out how to fight them!**

*** They divided the monster zoo into 13 huge groups—everything from Gliomas and Embryonal tumors to Meningiomas and Metastases.**

*** For adults, the main diffuse glioma thugs are IDH-mutant Astrocytomas, Oligodendrogliomas, and the big bad IDH-wildtype Glioblastoma.**

*** Kids have their own separate creepy categories, like H3 K27-altered midline gliomas and infant-type hemispheric gliomas.**

*** Don't forget the circumscribed astrocytic tumors (like Pilocytic astrocytoma), the wild mixed-up Glioneuronal tumors, and those sneaky Ependymomas hiding near the ventricles!**

*** Meningioma Madness: These tumors are like the weird, bumpy creatures of the brain world! Most are Grade 1 (the "good" guys, relatively speaking), including types like Meningothelial, Fibrous, Transitional, and Psammomatous. But watch out! Atypical (Grade 2) and Anaplastic/Malignant (Grade 3) meningiomas are the real troublemakers—extra sneaky and aggressive! Brain invasion (even if otherwise looking benign) also kicks them up to Grade 2.**

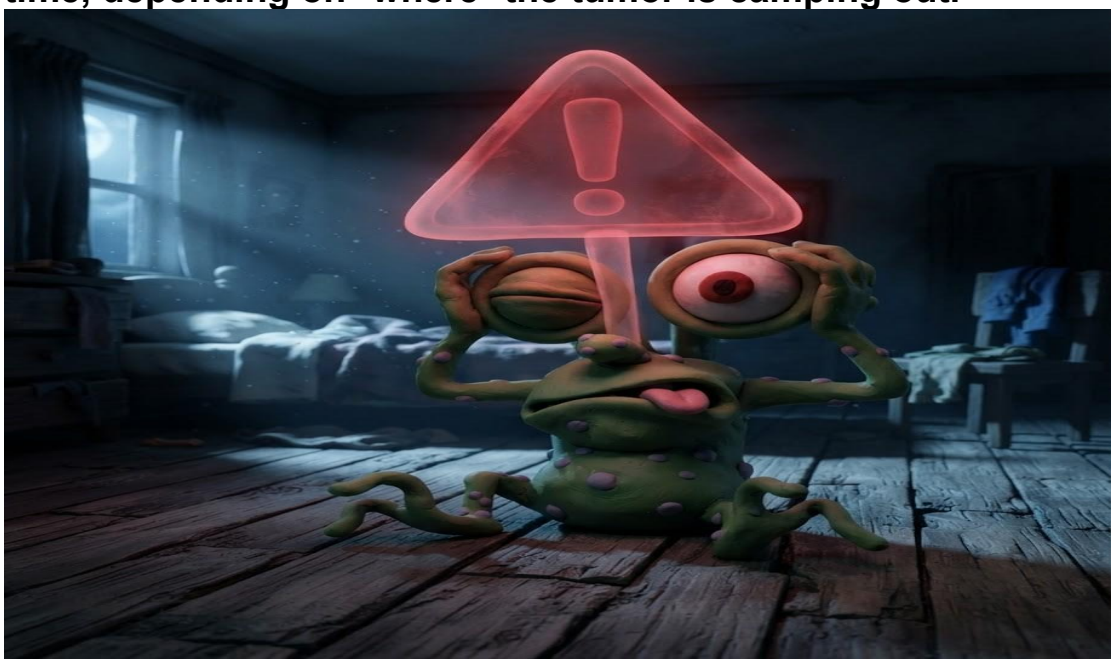
*** The "Layered" Look: Modern diagnosis isn't just one thing anymore—it's a monster with layers! Think of it like a creepy cake: Layer 1 (Integrated Diagnosis):** The big picture combining everything (e.g., "Diffuse astrocytoma, IDH-mutant, CNS WHO grade 2"). Layer 2 (Histopathology): What the tumor cells *look* like under the microscope (e.g., "Diffuse astrocytoma"). Layer 3 (WHO Grade): The official "aggressiveness score" (e.g., "CNS WHO grade 2"). Note: Arabic numerals (1, 2, 3, 4) are now used instead of Roman numerals. Layer 4 (Molecular Genetics): The secret genetic code that drives the tumor (e.g., "IDH1 R132H-mutant"). This layer is super powerful and can even override the others!**

*** Headache Hullabaloo: The most common monster-in-the-closet symptom! It's not just any headache—it's caused by:**

Rising Pressure: Increased intracranial pressure (ICP) from the tumor growing or blocking fluid flow. Nasty Nibbling: The tumor invading or squishing pain-sensitive structures like meninges and blood vessels. Vision Vexation: Secondary problems like blurry vision from pressure on the optic nerve. Herniation Horror: If the pressure gets too high, the brain can get pushed out of its normal spot (herniation)—super dangerous!

*** Seizure Surprise: New-onset epilepsy, especially in adults over 20, is a major red flag ! It happens in about 30% of brain tumor patients and can be the very first clue. The tumor irritates the normal brain tissue, causing electrical storms.**

*** Subtle Shifts: Keep your peepers peeled for sneaky changes like: Personality/Behavior Boo-boos: Becoming forgetful, confused, or acting strange. Progressive Problems: Weakness, numbness, or speech troubles that get worse over time, depending on *where* the tumor is camping out.**



***Skull X-Ray: The old-school detective! It can spot clues like: Calcifications: Little mineral deposits common in Oligodendroglioma, Meningioma, Craniopharyngioma, and Ependymoma. Hyperostosis: Bone thickening near a Meningioma. Bone Destruction: A sign of aggressive tumors like metastases, Chordoma, or Craniopharyngioma. Sella Turcica Erosion: A pituitary tumor might be eating away at this bony saddle. Signs of Pressure: Like a calcified pineal gland shifted off the midline.**

*** CT Scan (Computed Tomography): The quick-action scanner! Great for finding: Where & What: Tumor location, size, and mass effect (how much it's squishing things). Bone Business: Detail of bone destruction or hyperostosis. Enhancement: After contrast dye, certain tumors light up like a Christmas tree! This includes high-grade gliomas, meningiomas, metastases, acoustic neuromas, and large pituitary tumors. Multiplicity: Scanning for multiple tumors (like metastases).**

*** MRI (Magnetic Resonance Imaging): The gold standard! It's way better than CT for seeing: Posterior Fossa & Skull Base: Tumors hiding near the cerebellum or base of the skull. Brain Tissue: Superb detail of the brain itself and tumor extent. Advanced Views: With contrast, it spots even more lesions.**

*** Angiography/MRA: For mapping blood vessels, especially if surgery is planned.**

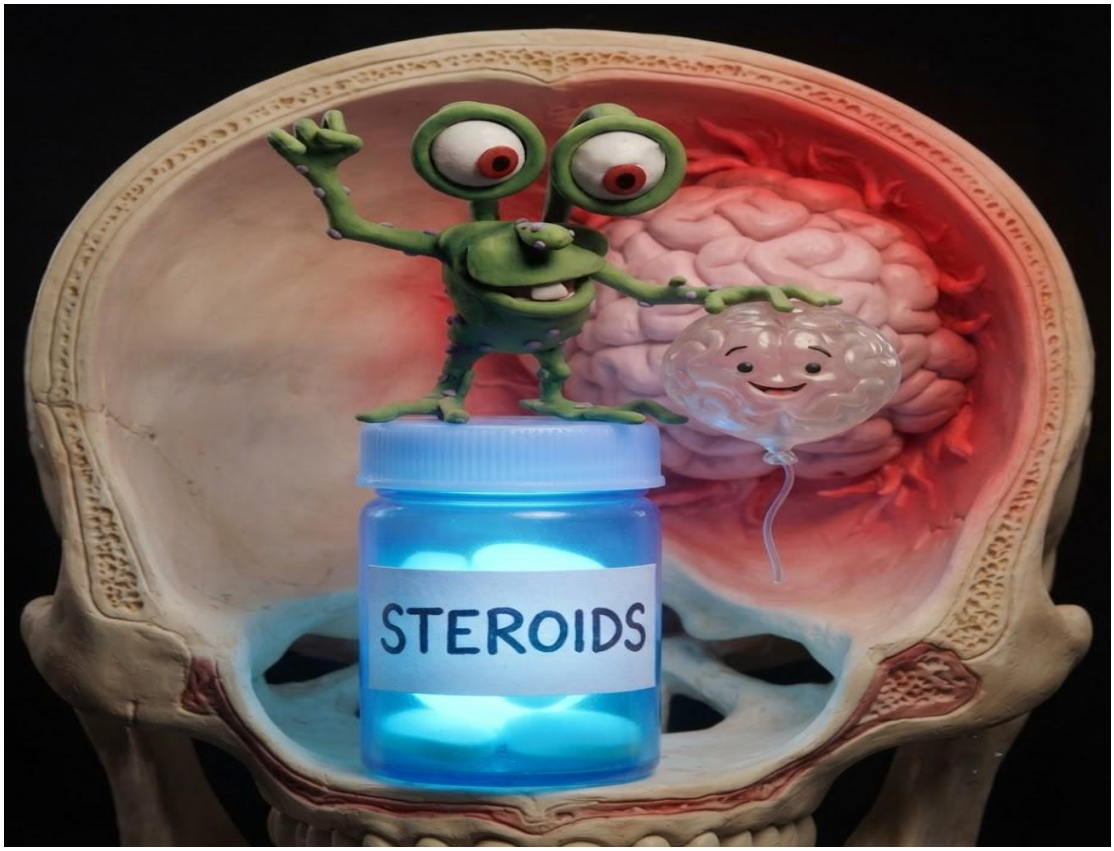
*** PET Scan: To see how active the tumor is metabolically.**

*** CSF Cytology Checking the spinal fluid for tumor cells (but be careful—don't do a lumbar puncture if there's high ICP!).**

*** Biopsy: The only way to be 100% sure! It can be done through a small hole (burr hole), with image guidance (stereotactic), or during surgery.**

*** Tumor Markers: Blood or fluid tests that might hint at certain tumor types.**

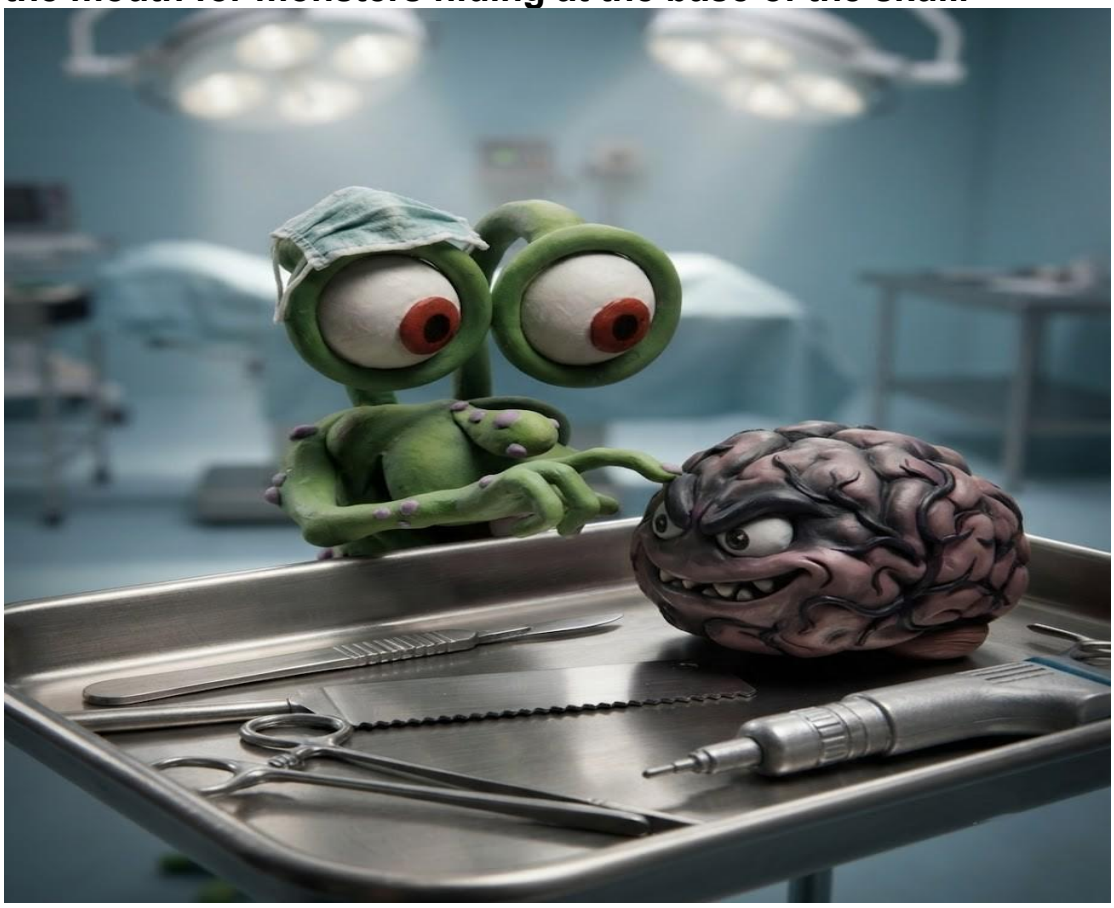
***Medical Magic (Sort Of!): Listen up, my puny human friends! Medical therapy is like putting a band-aid on a Godzilla-sized problem! Steroids (like dexamethasone) are the real heroes here, not because they shrink the tumor, but because they magically melt away the swelling and edema surrounding it! This is super important for pesky tumors like metastases, meningiomas, and the big bad GBM (Glioblastoma). They don't kill the monster, but they sure make it less uncomfortable to live with!**



*** Surgical Safari: When medicine isn't enough, it's time to call in the monster hunters! Surgery is the main event! The Goals: It's not just about a free tour of the brain! The main missions are to: 1. Snatch a Sample: Biopsy to find out exactly what kind of monster we're dealing with. 2. Evict the Intruder: Remove that tumor completely (gross total resection) or at least shrink it down (partial resection/cytoreduction). 3.Fix the Plumbing: Treat complications like hydrocephalus (water on the brain) by putting in a drain (shunt).**

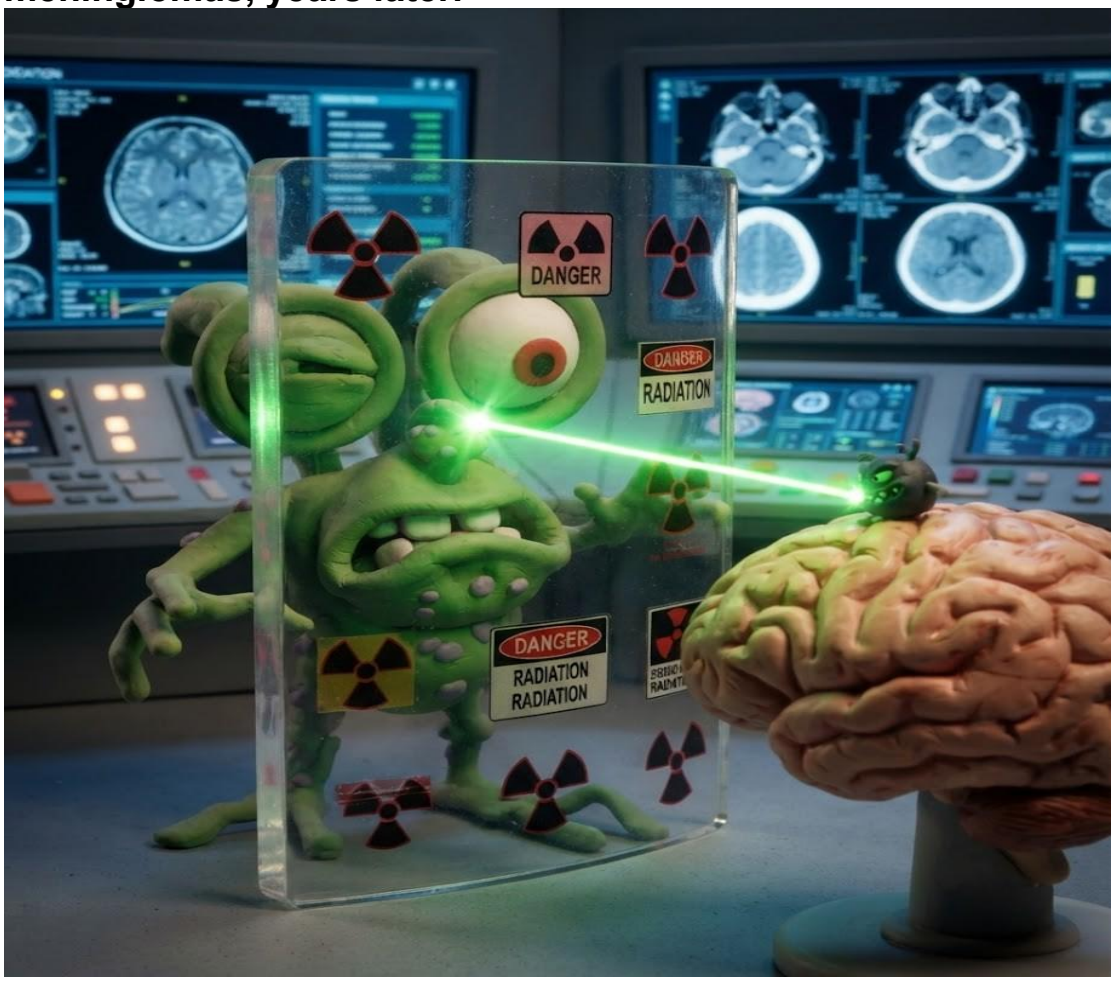
*** The Tools of the Trade: The surgeons have different keys for different doors: Craniotomy: The classic "open the skull" approach. The bone flap is put back like a puzzle piec. Craniectomy: Sometimes they leave the bone off for a while to let the swollen brain relax. It's like taking the lid off a pressure**

cooker!. Trans-sphenoidal: Sneaky surgery through the nose and sinus to reach pituitary monsters! Trans-oral: Through the mouth for monsters hiding at the base of the skull.



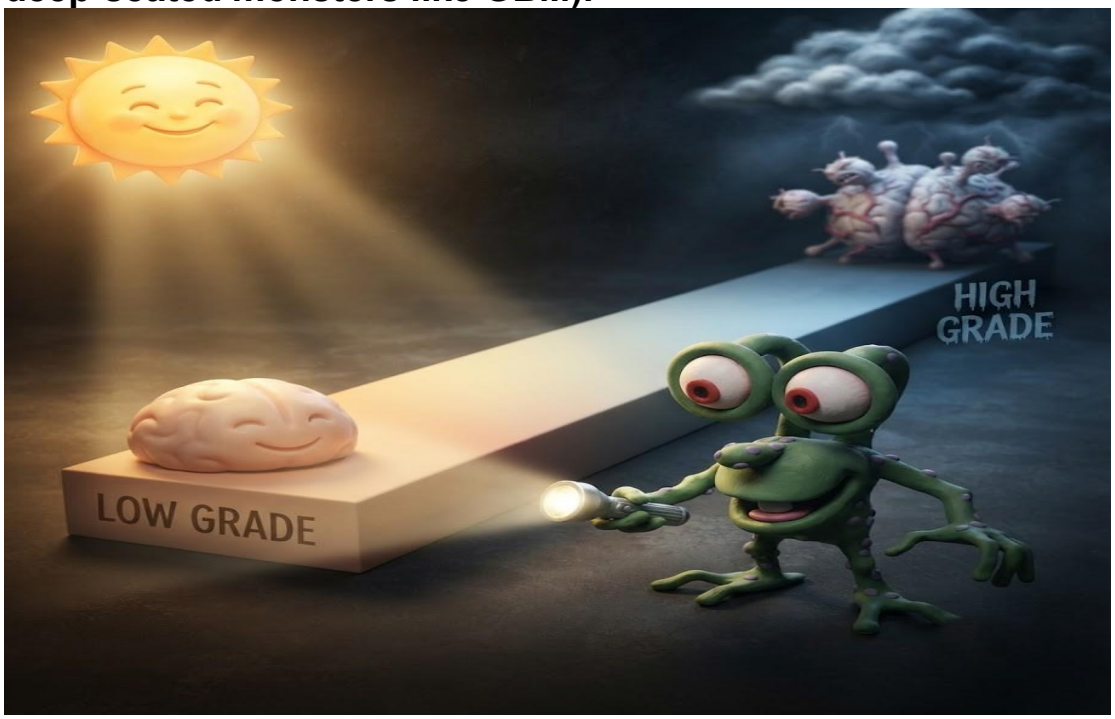
*** Radiation Rockets & Gamma Knife Precision!**
The Difference: Not all radiation is created equal!
Conventional Radiotherapy: The "wide-area bug bomb." It's used after surgery (adjuvant) to zap any remaining invisible monster cells. It's less precise but covers a larger area.
Radiosurgery (like Gamma Knife Icon): The "sniper rifle" of radiation! It delivers a super-focused, high-dose blast in one or a few sessions, perfectly targeting the tumor while sparing the good brain stuff. The Leksell Gamma Knife® Icon™ at Jordan University Hospital is a prime example of this non-invasive tech!
The Sensitive Monsters Germinomas and medulloblastomas are total wimps when it comes to radiation—they're extremely radiosensitive.
The Oops Factor (Complications): Radiation isn't all sunshine and rainbows. It can cause:
More Swelling: Increased edema (hence the steroids!).
White Matter Woes: Demyelination (damaging the insulation on nerves).

Tissue Death: Radionecrosis (killed brain tissue).
Brain Fog: Problems with memory, thinking, and cognitive functions.
New Monsters: Very rarely, it can induce new tumors, like meningiomas, years later.



*** Chemical Chaos (Chemotherapy): This is where the fun gets really frustrating! The Big Barrier: The Blood-Brain Barrier (BBB) is the brain's bouncer! It keeps most chemicals, including chemo drugs, out. This is a huge problem! The Workarounds: The Mannitol Trick Doctors sometimes give mannitol first to artificially "pop" the BBB open temporarily, letting chemo sneak in. Lipid-Loving Drugs They use drugs that are fat-soluble (lipophilic), which helps them sneak through the bouncer more easily. The MVP Drug Temozolomide (TMZ)** is the most common single-agent chemo drug for nasty tumors like high-grade gliomas and oligodendrogliomas. It's an oral pill (take that, needles!) and can cross the BBB to some extent, especially when the barrier is already disrupted by the tumor.**

*** The Prognosis Picture: What's the future look like? It's a spectrum as wide as the gap between my teeth! Survival It's all about the type of tumor (a low-grade meningioma is a much nicer neighbor than a GBM) and the treatment received. We talk about 5-year survival and median survival times. Quality of Life It's not just about living longer, but living better! The goal is to keep the patient's brain functions and happiness as intact as possible for as long as possible. The Spectrum It ranges from excellent (for completely removable, benign tumors) to extremely challenging (for aggressive, deep-seated monsters like GBM).**



*** Mr. Bumpy's Brainy Bonus: The Leksell Gamma Knife mentioned in the slides is a real, state-of-the-art non-invasive tool used right at the Jordan University Hospital! It's like having a super-precise, monster-zapping laser cannon without having to cut open the skull at all!**

Your brain is not a museum of your past; it is a living network that rewires itself with every thought you choose to repeat. Guard your attention carefully, because today's focus becomes tomorrow's identity.