

Brain Tumor: New Diagnosis Techniques & Treatments

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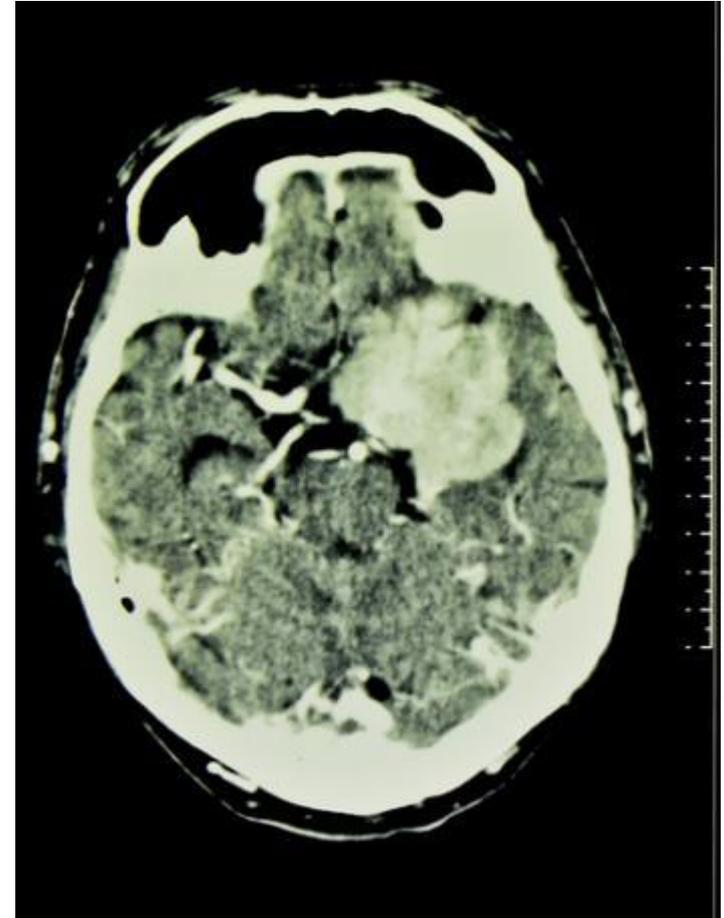
Brain Tumor



A BRAIN TUMOR IS A MASS OR GROWTH OF ABNORMAL CELLS WITHIN THE BRAIN OR SPINAL CORD.

A brain tumor can be dangerous as it can disrupt the proper function of the brain.

Brain tumors are often referred to as cancerous (malignant) or noncancerous (benign). Tumors can also be primary or secondary.



Symptoms of brain tumors



- ❖ Persistent headaches
- ❖ Problems with vision
- ❖ Nausea, vomiting, and general drowsiness
- ❖ Seizures
- ❖ Issues with short-term memory
- ❖ Speech problems
- ❖ Coordination issues
- ❖ Personality changes

Diagnosis



- ❖ Limb strength
- ❖ Hand strength
- ❖ Reflexes
- ❖ Hearing
- ❖ Vision
- ❖ Skin sensitivity
- ❖ Balance
- ❖ Coordination
- ❖ Memory
- ❖ Mental agility



➤ CT SCAN

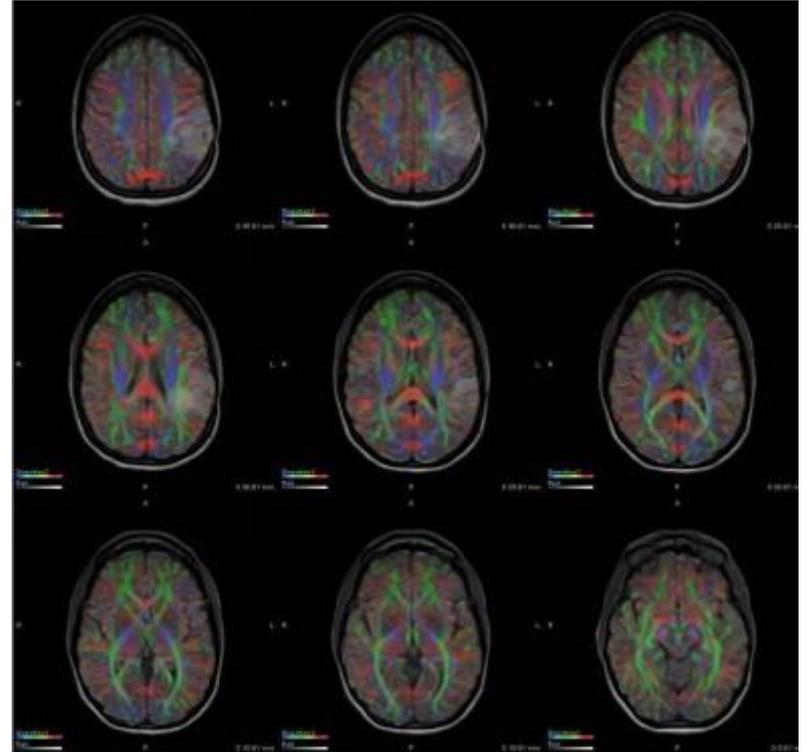
➤ MRI

➤ EEG

Diffusion Tensor Imaging (DTI)

DTIs measure the flow of water through the white matter tracts of the brain. This provides a snapshot of the brain's structure and can be used to compare changes over time.

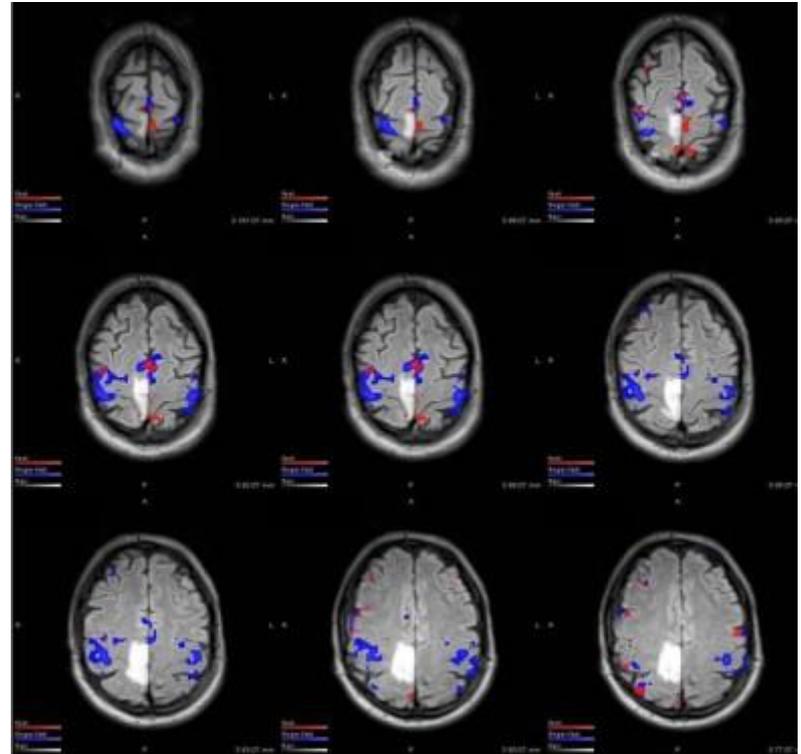
Patients can receive a scan called Diffusion Tensor Imaging (DTI). This scan allows the surgeon and treating team to visualize the circuitry (or wiring) of the brain to guide the surgery. In the image below, the green demonstrates wires that connect the front and back of the brain; the red delineates the wires that connect the right and left side of the brain; and finally, the blue shows the wires that connect the brain to the rest of the body. These images can then be loaded into navigation systems that are used in the operating room as a GPS and map for the surgeon.



Functional Magnetic Resonance Imaging (fMRI) scans

fMRI is used to determine the specific location of the brain where a certain function, such as speech or motor function, occurs. During functional resonance imaging of the brain, the patient is asked to perform a specific task, such as recite the Pledge of Allegiance, while the scan is being done. By pinpointing the exact location of the functional center in the brain, physicians can plan surgery or other treatments for a particular disorder of the brain.

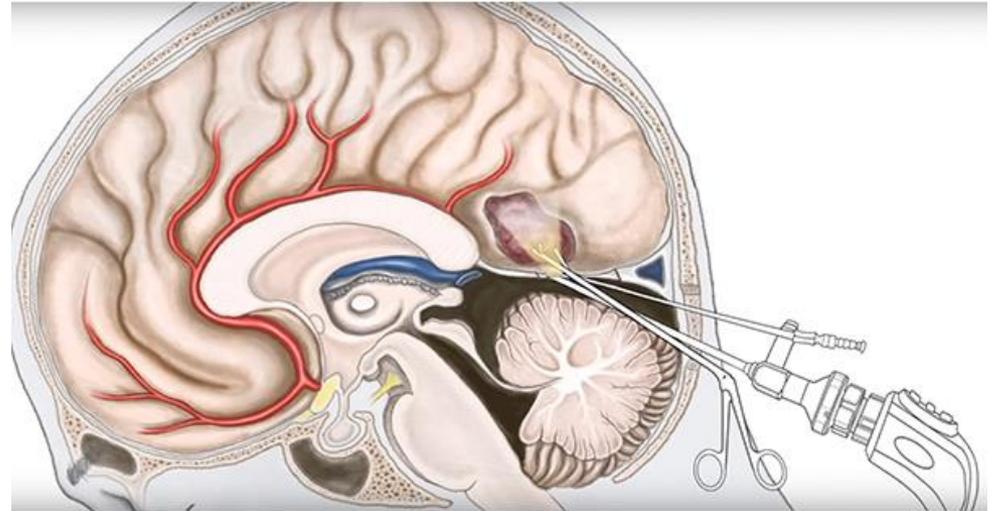
The example shown demonstrates a tumor near the area for extremity movement. The blue and red areas specify the part of the brain that moves the arms and legs.



Treatment options



- ❖ Age
- ❖ General health
- ❖ Medical history
- ❖ Type of tumor
- ❖ Location of the tumor
- ❖ Size of the tumor
- ❖ Likelihood of the tumor spreading
- ❖ Tolerance for certain treatments



- SURGERY
- STEROIDS
- RADIOTHERAPY
- RADIOSURGERY
- CHEMOTHERAPY

Newer Brain Tumor Treatments



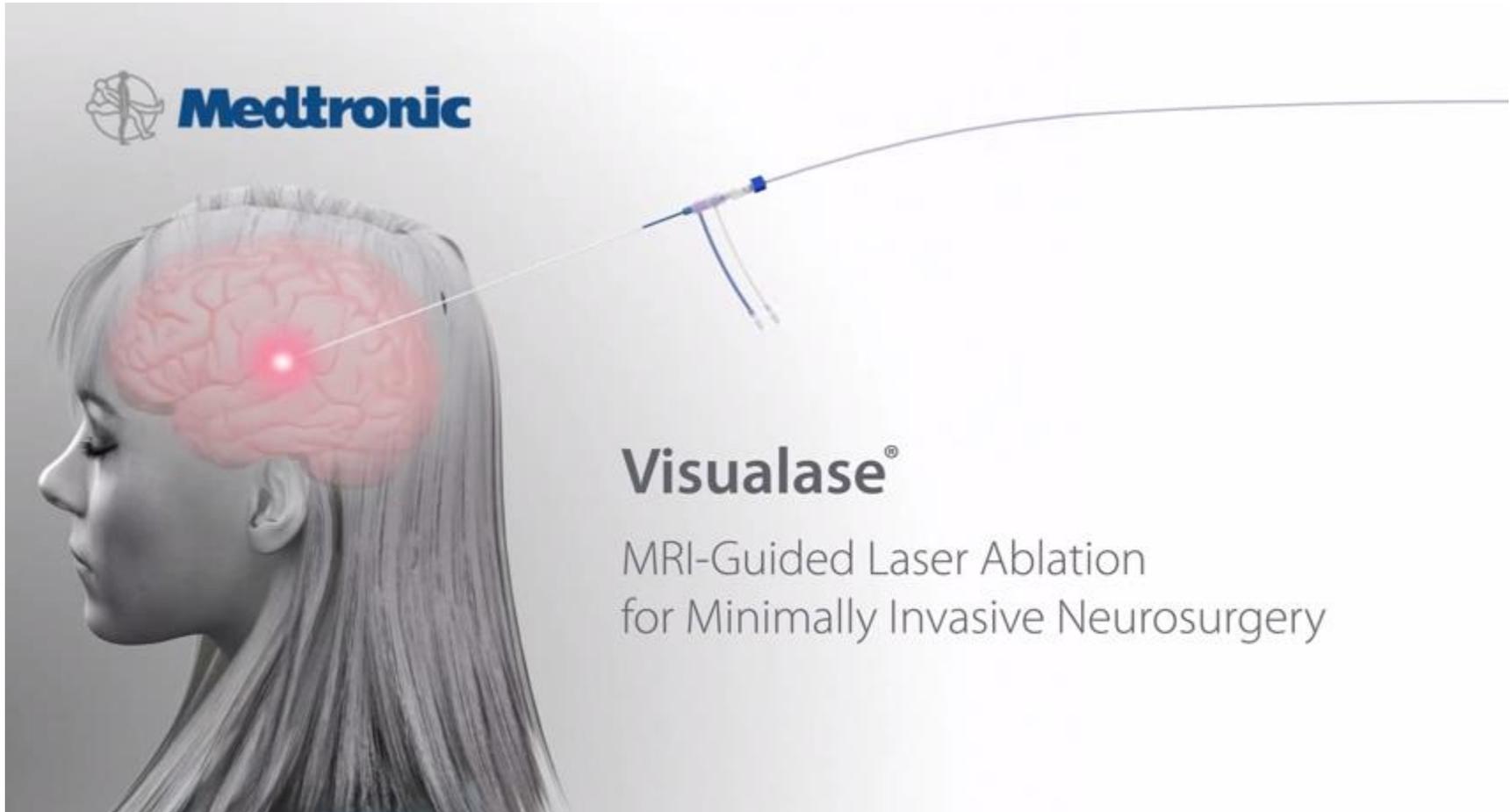
TT Fields (Tumor-Treating Fields)



Newer Brain Tumor Treatments



MRI-Guided Laser Ablation



Visualase[®]
MRI-Guided Laser Ablation
for Minimally Invasive Neurosurgery

Newer Brain Tumor Treatments



Tubular Retractor System for Neurosurgery





LARGE-SCALE STUDY FINDS GENETIC ERRORS ASSOCIATED WITH BRAIN CANCER



Published Tuesday 28 March 2017

By Ana Sandoiu

- ❖ The scientists identified 13 new genetic variants that raised the risk of glioma: five new loci were identified for GBM, and eight for non-GBM tumors. The study shows that these genetic errors impact various cell functions, including the genesis and division of neurons, cell cycle regulation, DNA repair, and the production of some proteins.



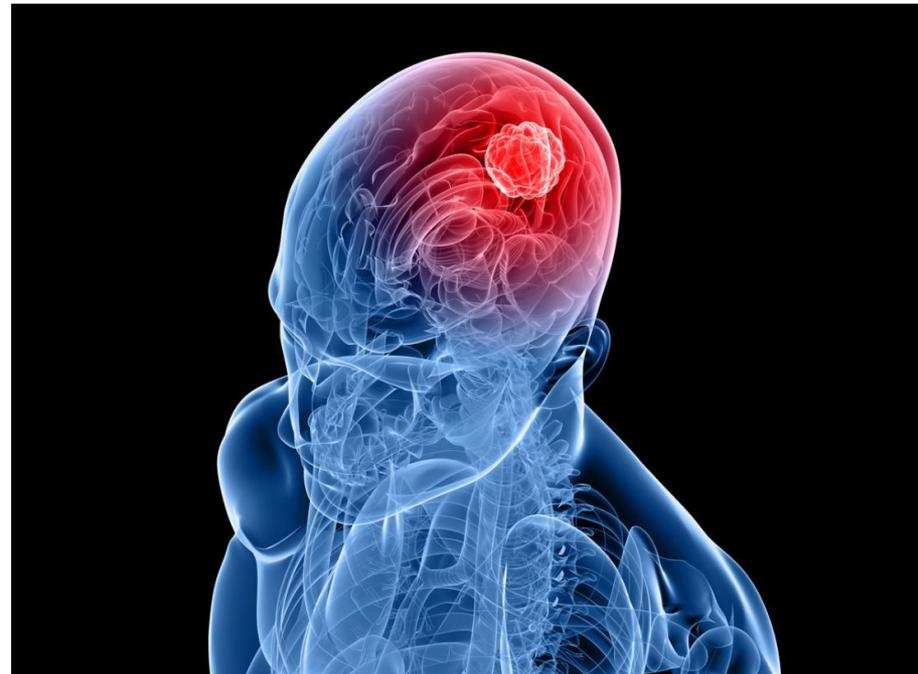
SCIENTISTS DISCOVER ENZYME THAT SUPPORTS BRAIN TUMOR GROWTH



Published Friday 26 May 2017

By Hannah Nichols

- ❖ An enzyme known as acetyl-CoA synthetase 2 (ACSS2) is at the center of providing tumors with a route to survive.
- ❖ ACSS2 enhances the tumor's ability to use acetate, a cellular salt, as a carbon-based source of food, instead of glucose.



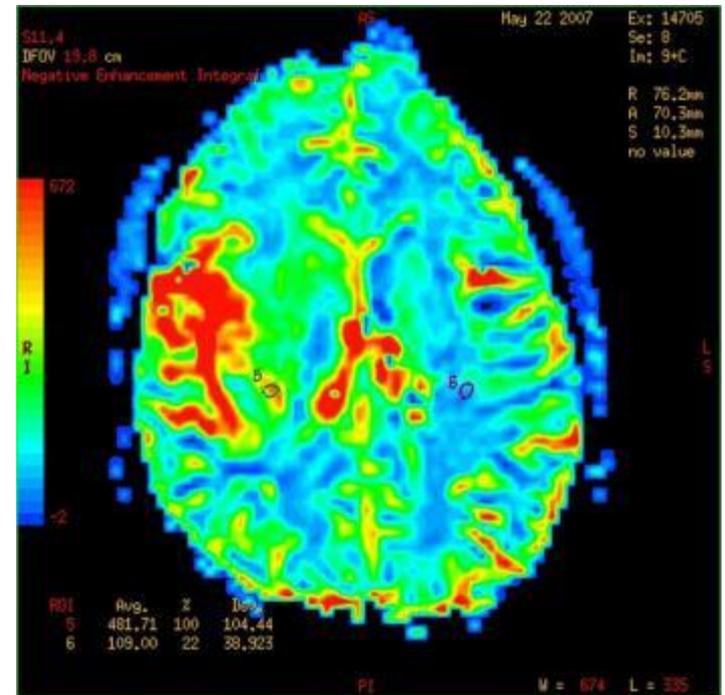
SCIENTISTS INHIBIT BRAIN TUMOR CELL GROWTH, PAVING WAY FOR NEW TREATMENT

Published Sunday 29 January 2017

By Ana Sandoiu



- ❖ Mithramycin inhibits glioblastoma-driving transcription factors
- ❖ Instead of the RTK genes, the new study found three transcription factors to be responsible for glioblastoma: Sox2, Olig2, and Zeb1.



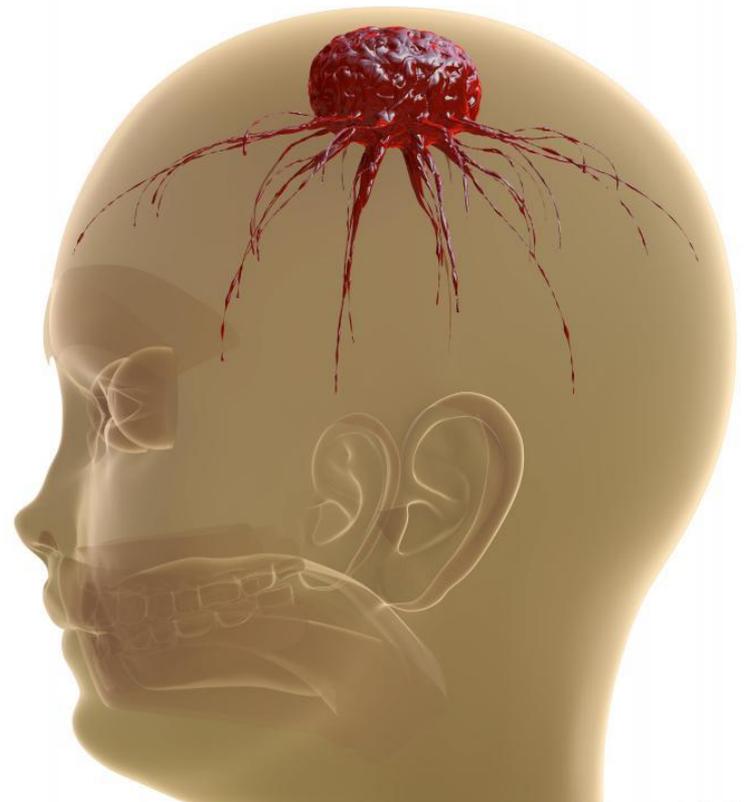
RARE BUT FATAL PEDIATRIC BRAIN TUMOR MAY BE STOPPED WITH NEW MOLECULE

Published Tuesday 28 February 2017

By Ana Sandoiu



- ❖ Researchers may have found a molecule that inhibits the growth of a rare but fatal tumor that occurs in children, called diffuse intrinsic pontine glioma.



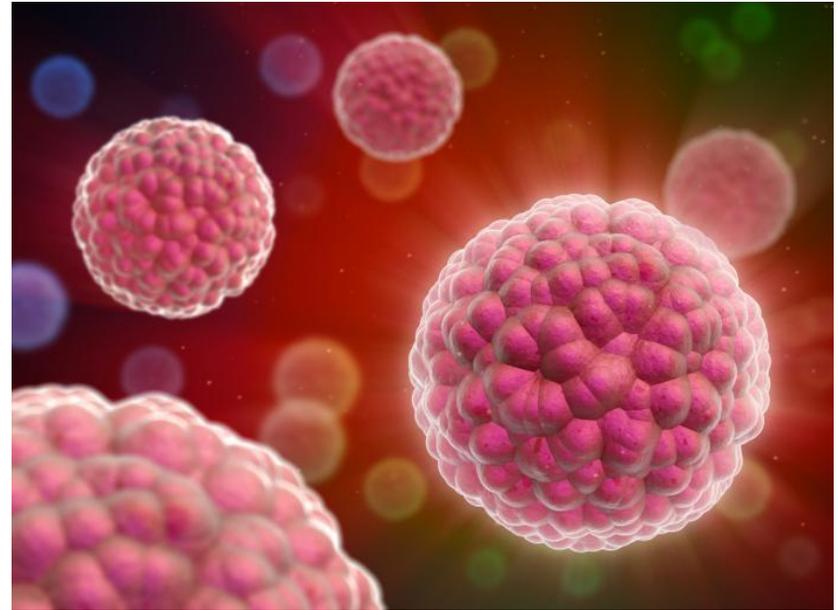
OXYGEN-STARVED CANCER CELLS PROGRAMMED TO EVADE THERAPY AFTER SPREADING



Published Friday 27 January 2017

By Catharine Paddock PhD

- ❖ By manipulating the environment surrounding cells in primary tumors, scientists have discovered for the first time the conditions that program migrating cancer cells to become dormant and hide from chemotherapy after spreading.



BRAIN CANCER COULD BE TREATED WITH ZIKA VIRUS

Published Tuesday 5 September 2017

By Maria Cohut



- ❖ A new study looks into the potential of the Zika virus to target and kill brain cancer cells. The results, so far, are encouraging, but researchers suggest that there is a long way to go until a safe and effective treatment is reached.

