

GLOSSARY:

Anesthesia: General or local insensibility, as to pain and other sensation, induced by certain interventions or drugs to permit the performance of surgery or other painful procedures.

Axon: The long portion of a neuron that conducts impulses away from the body of the cell. Also called nerve fiber.

Cerebral cortex: The surface layer of gray tissue of the cerebrum, frequently called the gray matter. Specific parts of the cortex control specific functions, including sensation, voluntary muscle movement, thought, reasoning, and memory.

Chemotherapy: Treatment of cancer using chemical agents or drugs that are selectively destructive to malignant cells and tissues.

Glial cells: The delicate web of connective tissue that surrounds and supports nerve cells.

Glioblastoma: A fast-growing malignant brain tumor composed of spongioblasts; commonly a fatal disease.

Metastasis: A cancerous tumor formed by transmission of malignant cells from a primary cancer located elsewhere in the body.

Neurons: A specialized, impulse-conducting cell that is the functional unit of the nervous system, consisting of the cell body and its processes, the axon and dendrites.

Oncology: The branch of medical science dealing with tumors, including the origin, development, diagnosis, and treatment of cancer.

Radiation: Streams of photons, electrons, small nuclei, or other particles. Radiation is given off by a wide variety of processes, such as thermal activity, nuclear reactions, and by radioactive decay. In cancer treatment, radiation therapy uses high-energy radiation to kill cancer cells by damaging their DNA.

Synapses: The points at which nerve impulses are relayed from the terminal portion of an axon to the dendrites of an adjacent neuron.

Wernicke's Area: Part of the temporal lobe that surrounds the auditory cortex and is thought to be essential for understanding and formulating speech. Damage in Wernicke's area causes deficits in understanding spoken language.



TMW MEDIA GROUP

2321 Abbot Kinney Blvd., Venice, CA 90291

(310) 577-8581 Fax: (310) 574-0886

Email: sale@tmwmedia.com Web: www.tmwmedia.com

"Producers & Distributors of Quality Educational Media"

© 2013 TMW MEDIA GROUP, Inc.

© 2013 Allegro Productions, Inc. and TMW Media Group, Inc.

Show Me Science Advanced

Medicine

Revolutionary Brain Surgery

K4608DVD

Advanced Teachers Guide

SYNOPSIS:

Medical professionals all over the world are constantly looking for better ways to treat patients and diseases. In this program, doctors at the University of Miami Miller School of Medicine and the Sylvester Comprehensive Cancer Center treat a patient with a type of cancer that affects the area of the brain that controls function.

Because this type of cancer is often resistant to conventional therapies, doctors were required to perform an awake craniotomy. In another groundbreaking procedure, doctors create a vaccine from the patient's extracted tumor to help fight future occurrences.

CURRICULUM UNITS:

- Anatomy
- Biology

CAREER OPPORTUNITIES:

- Anesthesiologist
- Doctor
- Neurologist
- Neurosurgeon
- Nurse
- Spinal surgeon

PROGRAM OVERVIEW:

Glioblastomas are aggressive and often fatal malignant brain tumors. To combat the disease, revolutionary medical treatments are beginning to save lives all over the world. Doctors found that when the procedure called an awake craniotomy was used, they are able to remove the tumor from the brain without damage to the language areas. During an awake craniotomy, surgeons can converse with the patient to hear if the language areas of the brain are being affected before removing the tumor, thus preserving very important parts of the brain as much as possible.

In addition, the medical staff is able to create a vaccine from the extracted tumor. After the tumor is harvested during surgery, certain proteins from the cells are purified. These proteins are then concentrated and given back to the patient in simple injections. The purpose of this tumor vaccine is to spark the patient's immune systems to fight the tumor and attack it to keep it from coming back.

This issue also goes in depth about how the human brain works, the different regions, and specifically the Wernicke's area, which is one of the two parts that is linked to speech.

ISSUES & CRITICAL THINKING:

1. Ask students to map the human brain. Identify different sections and their associated functions.
2. Discuss the traits often associated with right brain and left brain. Assign particular activities, such as: which is used when operating a microscope? Which foot is used when first stepping onto an escalator? Which hand to write their name? Which ear when listening for sounds through a wall or talking a phone?
3. Discuss brain injuries and rehabilitation. The greatest factor in functional recovery after a brain injury comes from the brain's ability to re-learn, called neuroplasticity. Explain that neurons near damaged brain areas can reconnect pathways between other neurons, forming new circuits with the ability to resume some of the functions lost to injury.