Brain Tumors
Psychology 372
Physiological Psychology
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Background
• More than 120 types
• Can occur in any part of the brain or SC
• Only 31% survive five years after diagnosis.
• Often requires treating the entire brain rather than just some parts.

The Brain
• Contains both Neurons and glial cells
• Is covered by the meninges
• Also contains blood vessels
• Also contains cavities.

Tumors
• Many types
• Are classified according to the type of cell which causes the tumor.
• Can be fast or slow growing
• Are often different in children
• Can arise from several places

Tumors in the Brain
• Start in the brain itself
• Called Primary Tumors
• Often involve many types of tumor cells
  • Makes it difficult to kill
  • Each type of cell is resistant do different drugs.
• Many types
  • Astrocytoma
  • Glioblastoma
  • Oligodendroglioma
  • Ependymoma

Location
• Most tumors come from Astrocytes 65%
• When come from glial cells called gliomas
  • Astrocytoma
  • Anaplastic Astrocytoma
  • Glioblastoma
Tumors in the Meninges

- Meningiomas

Tumors in Nerves at the Base of the Brain

- Come from Schwann Cells
- Acoustic neuromas
- Schwannomas

Tumors that Come from Outside the Brain

- Called Secondary Tumors
- Metastatic brain tumors
- Come from other body areas
  - Liver
  - Breast
  - Lung
- Resemble the cells where the tumor started.

Symptoms of Brain Tumors

- Symptoms depend on where the tumor is located
- Frontal lobe – muscle weakness, confusion, etc.
- Temporal Lobe – Seizures, types of aphasia, etc
- Occipital Lobe – Visual problems
- Parietal Lobe – Loss of sensation

Enlargement

- As becomes larger, more tissue is destroyed
- Tumors can also infiltrate between tissue
  - Makes it harder to remove

Other Issues

- Some tumor cells live in low oxygen environments
- Cells tend to be radio-resistant and away from blood supplies
- Decrease probability for success
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Treatment

• Many types of treatment (Over 400 Protocols)
• Standard treatment
• Use a combination of
  • Surgery
  • Radiotherapy
  • Chemotherapy

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Other Procedures and Technologies

• Lasers
• Stereotactic computers
• Radiosurgery
• Gamma Knife
• X-Knife
• Boron Neutron Capture
• Others

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Treatment Issue for Physicians

• 1 gram of tumor contains approximately one billion cells (1,000,000,000)
• Remove 99% (990,000,000) of the tumor by some sort of surgery
  • Ultrasonic Aspiration
  • Computer Assisted Stereotactic surgery
  • Others
• Regardless of best technique,
  • Still have 10,000,000 cells

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Soooo

• Use other techniques
  1. Radiation at the site
     • If 99% effective = 9,900,000 gone
     • Remaining cells left 100,000
  2. Use Chemotherapy at the site
     • If 99% effective = 99,000 gone
     • Remaining cells left 1,000

Problem, rarely do you get 99% removal rate

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Consequence

• Cells grow in other locations
• Result, must treat the entire brain

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Newer Models

• To increase success must treat the whole brain.
  • How?
  • Surgery first (Depending on the type of Tumor)
    1. Radiotherapy for the whole brain
    2. Chemotherapy for the while brain
       • Usually need other substances to help the molecules cross the blood brain barrier.
    3. Immunotherapy way of the future
       • Use the immune system
Conclusion

- Lots of work being done.
- Much better success rates than even 10 years ago.
  - Better techniques, better technology, better drugs