

Cancer Treatments and Possible Side Effects



BODY SCANS
SURGERY
CHEMOTHERAPY
TARGETED THERAPY
RADIATION THERAPY
PART 1



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Cancer Treatment – An Overview



- Treatment for cancer involves trying to eliminate every cancerous cell in the body by surgery, chemotherapy, targeted therapy, and/or radiation.
- Many of these treatments, particularly chemotherapy and radiation, can be damaging to normal cells leading to side effects.
- Many side effects like nausea are temporary but some of them like infertility are permanent.

Treatment and Survival of Different Types of Cancer

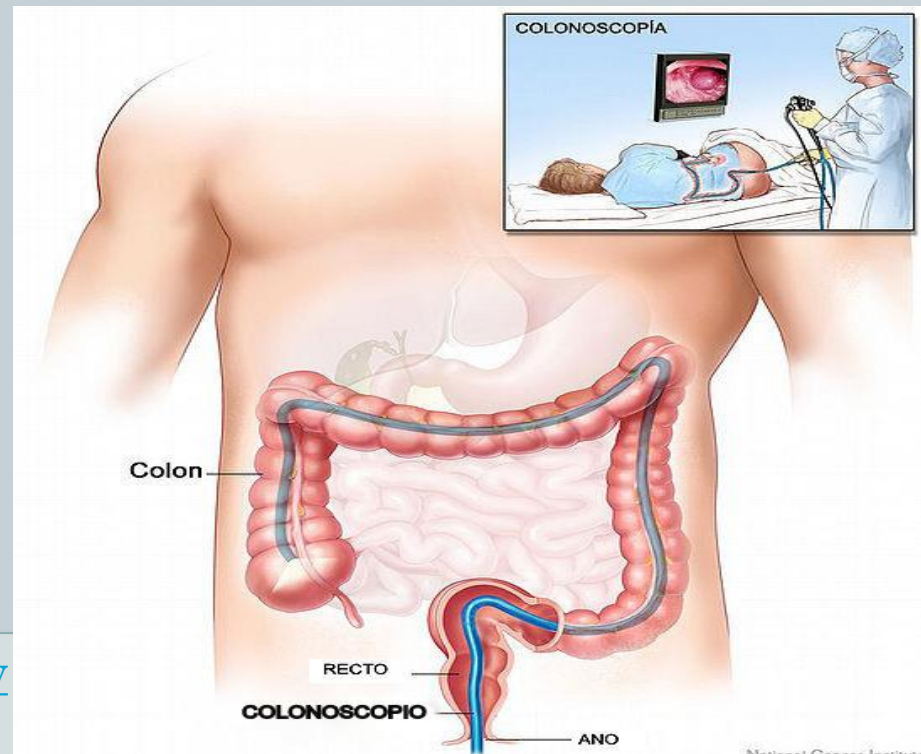


- Cancer is thought by many people to be one disease but actually each type of cancer is very different in its cell type, mode of growth and metastasis, and treatment.
- The particular treatment protocol for any individual cancer patient would depend on:
 - a) the type of cancer
 - b) the stage and grade of the tumor
 - c) the age of the patient and general health
 - d) data from study results of treatment in other patients with the same cancer.

Early Diagnosis Increases The Chance of Survival

- Cancer can be detected by early screening such as through a Pap smear, mammogram, or colonoscopy, or by self-screening.
- Early detection of breast and colon cancers considerably increases the chance of survival since the cancer cells grow more quickly and metastasize and spread to other organs more readily.

Early Detection for Colon Cancer Through a Colonoscopy



<http://en.wikipedia.org/wiki/Colonoscopy>

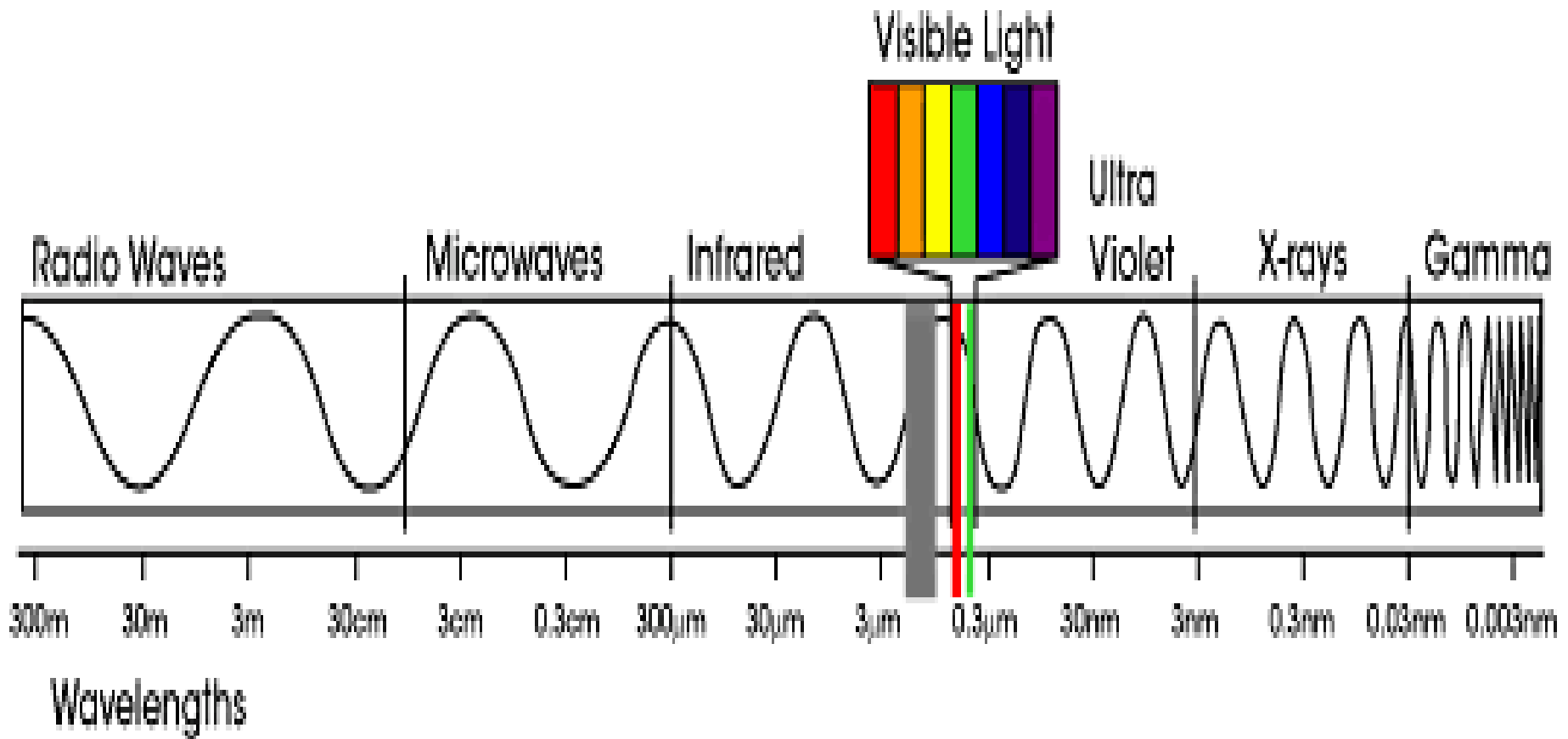
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Types of Scans to Determine the Extent of Metastasis



- Once cancer has been detected, the entire body can be scanned to determine the location of the tumor(s) in preparation for surgery.
- There are different types of scans used to detect cancer:
 1. CT (computerized tomography)
 2. PET (positron emission tomography)
 3. MRI (magnetic resonance imaging)

The Electromagnetic Spectrum



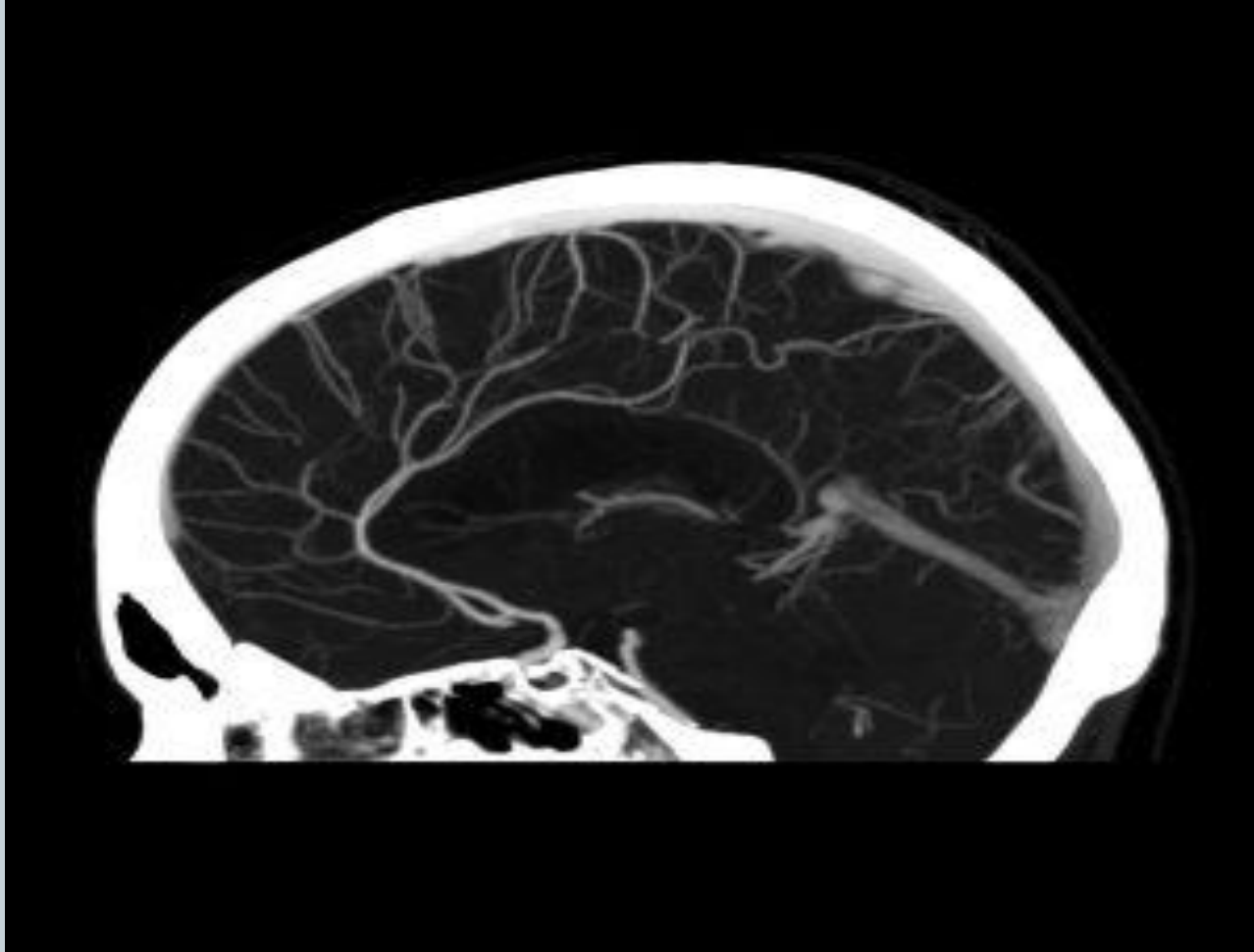
CT (Computed Tomography) Scanning Machine



GE's "Veo" scanner technology helps lower patients' radiation exposure. Courtesy of GE Health.

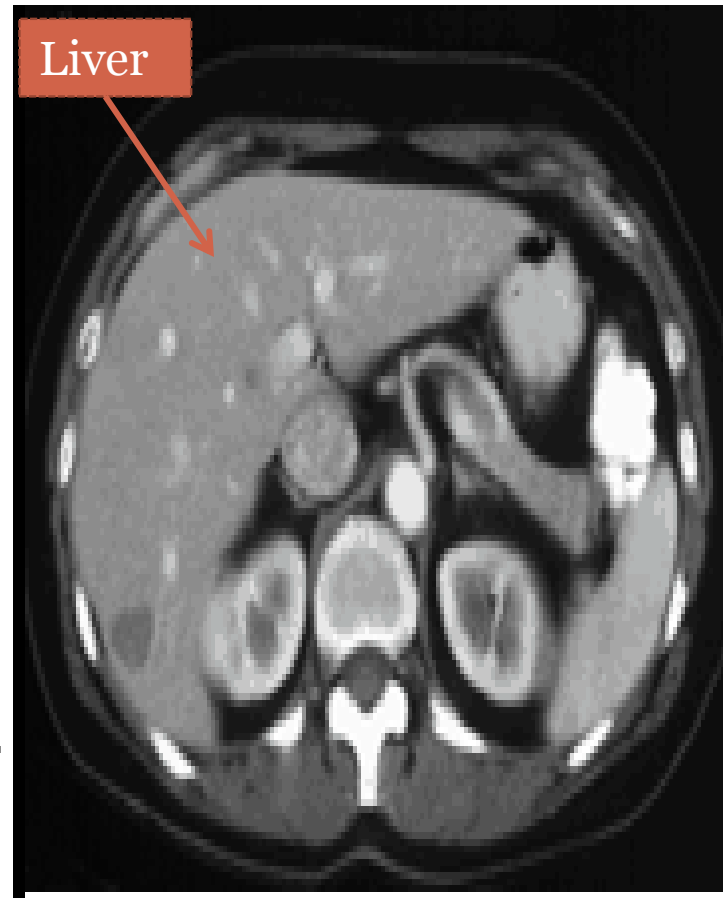
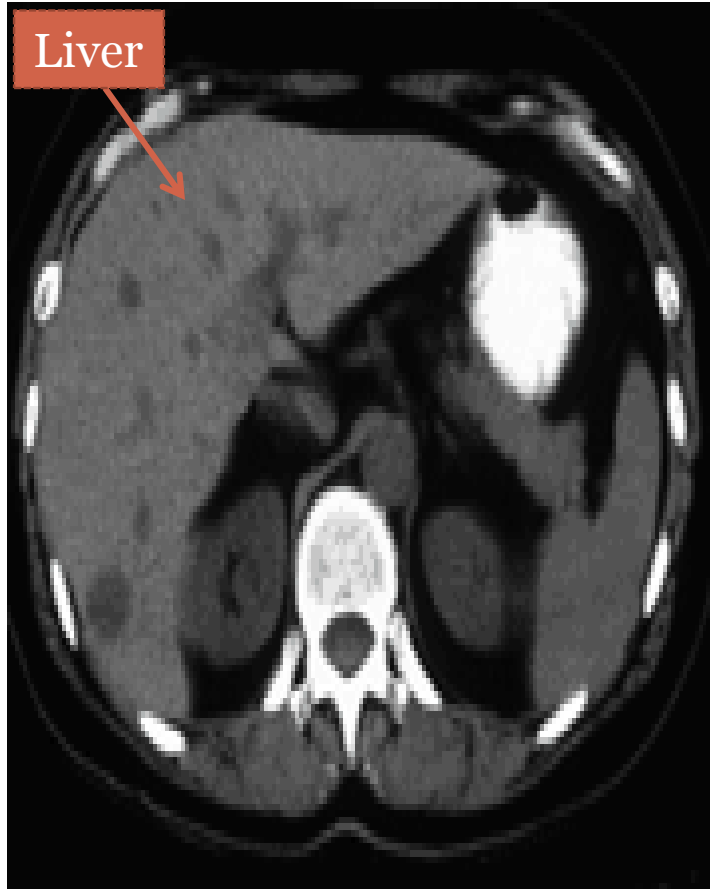
<http://www.intelfreepress.com/news/computing-power-speeds-safer-ct-scans/186>

CT Scan Image of the Brain



A human brain viewed with GE “Vevo” scanner technology. Courtesy of GE Health.
<http://www.intelfreepress.com/news/computing-power-speeds-safer-ct-scans/186>

CT Scan Images of the Liver



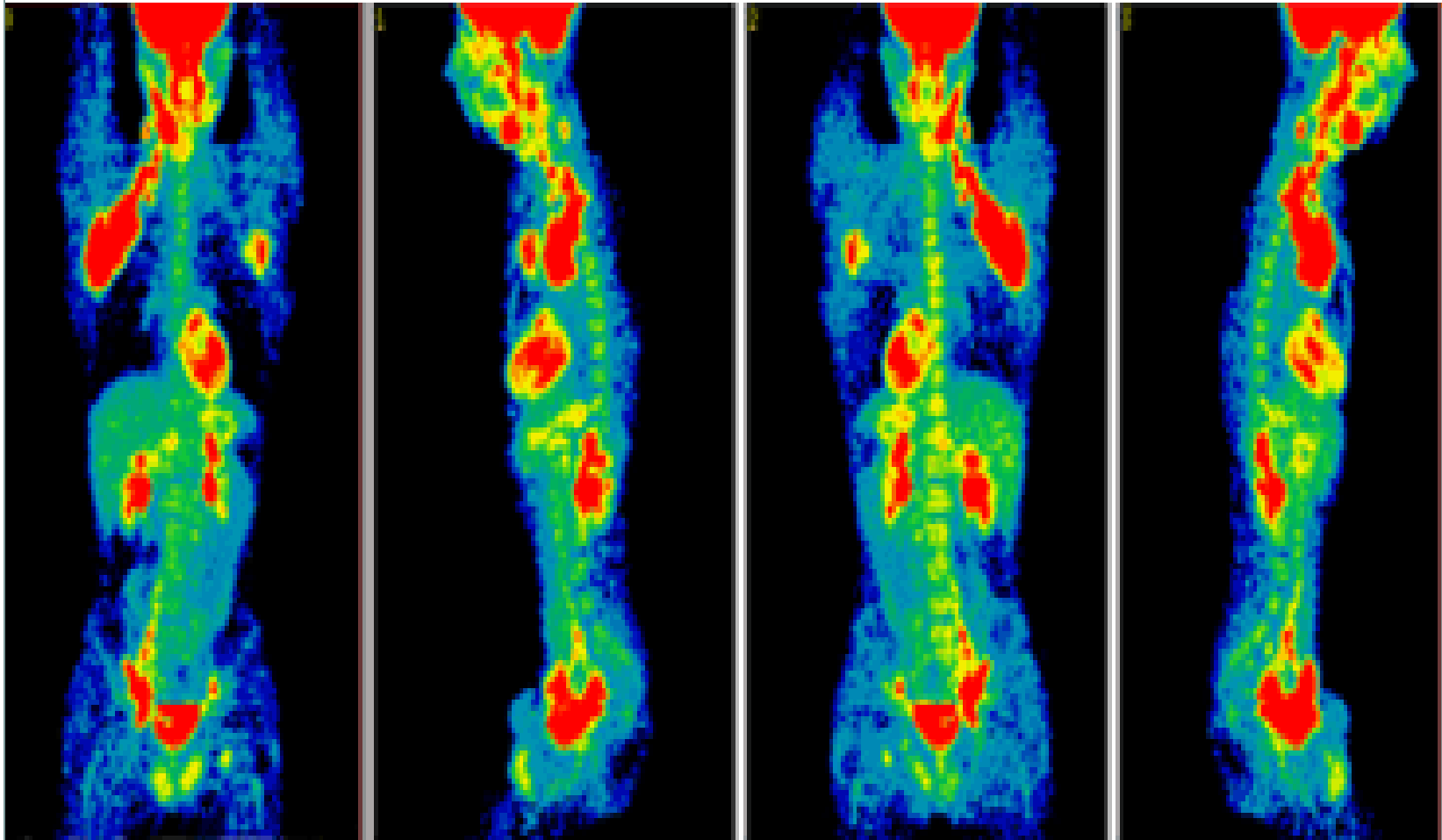
<http://imaging.cancer.gov/patientsandproviders/cancerimaging/ctscans> Image are courtesy of Dr. Peter Choyke, Department of Radiology, Clinical Center, National Institutes of Health

PET (Positron Emission Tomography) Scanning Machine



<http://ftp.nimh.nih.gov/health/publications/neuroimaging-and-mental-illness-a-window-into-the-brain/index.shtml>

PET Scans of Lymph Nodes



54 K

PET scans. Uptake of tracer in the lymph nodes involved with lymphoma in the groin, both axilla, and neck (red areas). Image courtesy of Dr. Jorge Carrasquillo, Nuclear Medicine Department, Clinical Center, National Institutes of Health.

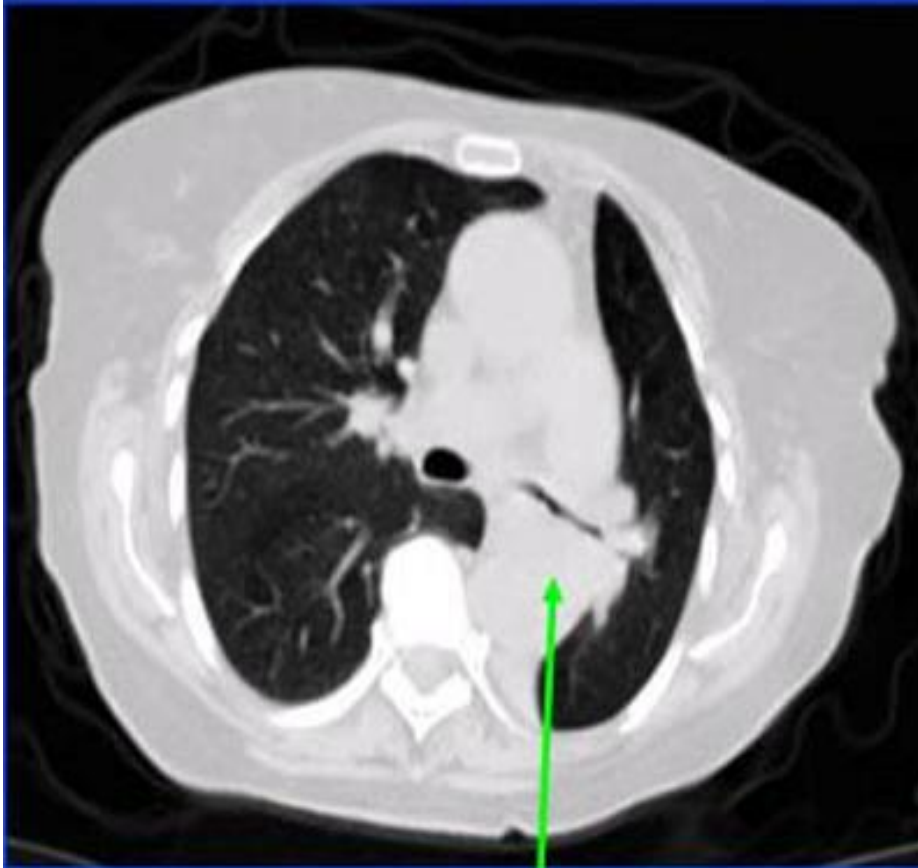
Combining PET and CT Scans



- PET Scans tend to show activity in a general area but do not provide clarity about the precise location of the tumor(s). When combined with a CT scan, much more information is available.
- In some cases, the tumor(s) are not clearly shown by a CT scan so a PET scan is done and the two are combined to identify the location of the tumor(s).

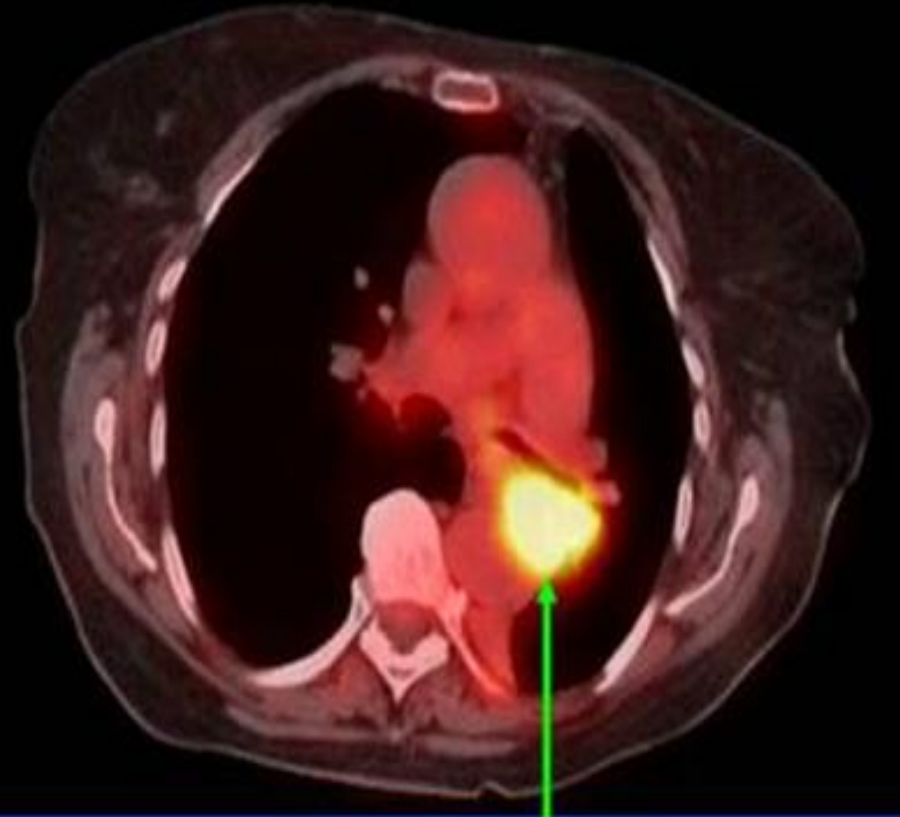
CT/PET Scan of Cancer Tumors

CT Image



Poorly Defined Tumor Margins

Fused CT-PET Image



FDG Avid Tumor

MRI (Magnetic Resonance Imaging) Scanning Machine

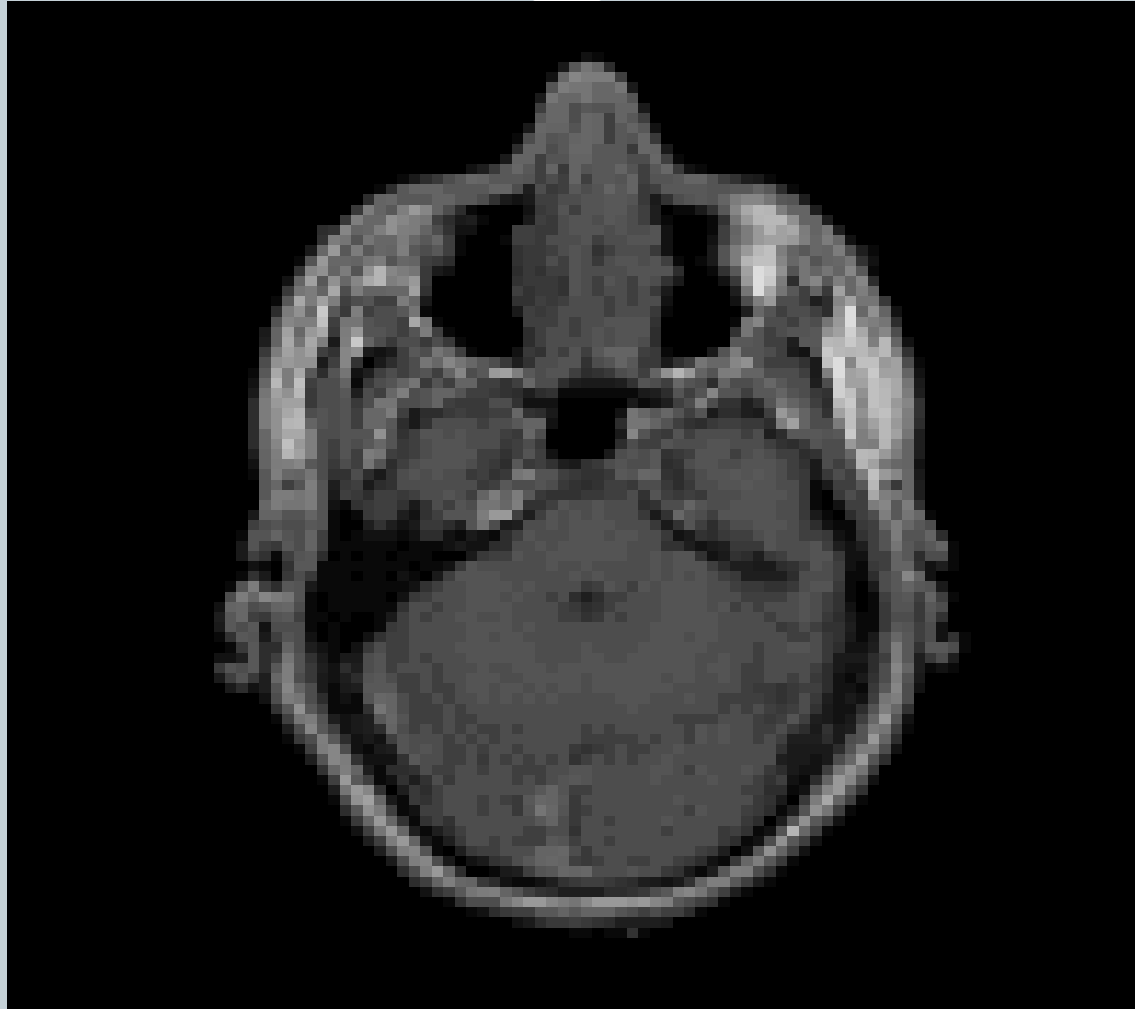


<http://ftp.nimh.nih.gov/health/publications/neuroimaging-and-mental-illness-a-window-into-the-brain/index.shtml>

MRI of Thoracic Cavity



MRI Image of the Head



Next Steps After Detection and Scans

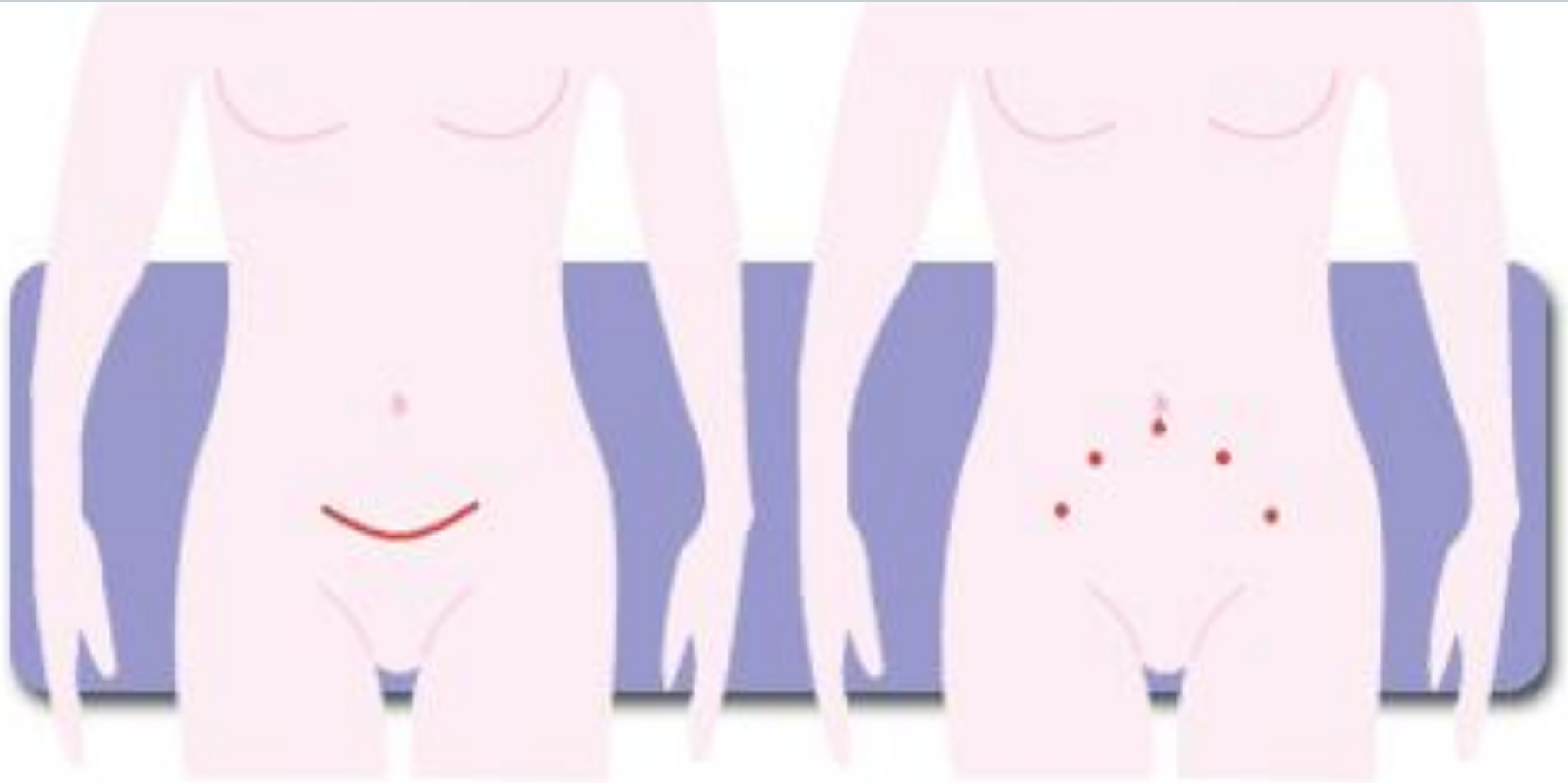


- Surgery to remove the primary source of the cancer and as much of the secondary tumors as possible would be scheduled. If fertility preservation surgery is necessary to remove ovarian or testicular tissue, it could be completed at the same time as the cancer surgery.
- However, if the scans show an enlarged stage III tumor and lymph node involvement, stage IV widely spread metastasized tumors, or a tumor in a location where removal would lead to critical loss of function, then surgery would be postponed. Chemotherapy, targeted therapy, and/or radiation therapy would be planned to shrink the size of the tumors before scheduling the surgery.
- Fertility surgery would proceed prior to any chemotherapy or radiation therapy for those under 40 years old who wish to preserve their fertility.

Laparoscopic Surgery



Laparoscopic vs Traditional Surgery



Open Hysterectomy Incision

***da Vinci* Hysterectomy Incisions**

Determining the Stage and Grade of Cancer



- After the surgery, the pathologist would send a report indicating whether or not cancer cells were found in each of the tissues removed during surgery to help the oncologist determine the stage and grade of the cancer.
- There are 4 stages of cancer – stage I, II, III, IV. Stage I can be divided into IA, IB, IC.
- There are 3 grades of cancer – grade I, II, III.
- The stage and grade determine the treatment.