

# Breast Cancer 101

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# Commonly Asked Questions

- What is Cancer?
- Why are there different ways to treat cancer?
- How does chemotherapy work?
- What side effects can I expect from chemotherapy and radiation therapy?

# What is Cancer?

- The abnormal growth of cells
- Cells multiple without control or order
- 100 different types of cancer
- The cells affected determine the type of cancer

# How Does Cancer Spread?

- Grows into surrounding tissue
- Small cells break off and travel to other parts of the body
  - blood stream
  - lymphatic system

# Breast Cancer

- 2008, approximately 187,000 women in the United States will be diagnosed invasive breast cancer (Stages I-IV)
- 58,490 women will be diagnosed with in situ breast cancer
- Incidence 1 in 7 (13.4%) women
- 1,490 cases will be diagnosed in men in 2005.
- 38,410 women and 460 men will die from breast cancer

<http://www.imaginis.com/breasthealth/statistics.asp#1>

# Incidence and Mortality

|             | <u>1973</u> | 2008    |
|-------------|-------------|---------|
| ● Incidence | 73,000      | 187,000 |
| ● Mortality | 32,400      | 38,000  |

## **Risk Factors**

### **PRIMARY**

**Female gender**

**>50 years of age**

**North American or North European heritage**

**Prior BC, atypical hyperplasia, carcinoma in situ**

**1<sup>st</sup> degree relative(s) with BC**

**BRCA1 or BRCA2 mutation**

### **SECONDARY**

**Postmenopausal obesity**

**Early menarche, late menopause**

**1<sup>st</sup> full term pregnancy >30 yrs old**

**Oral contraceptives <20 yrs old, persisting  $\geq$ 6 yrs**

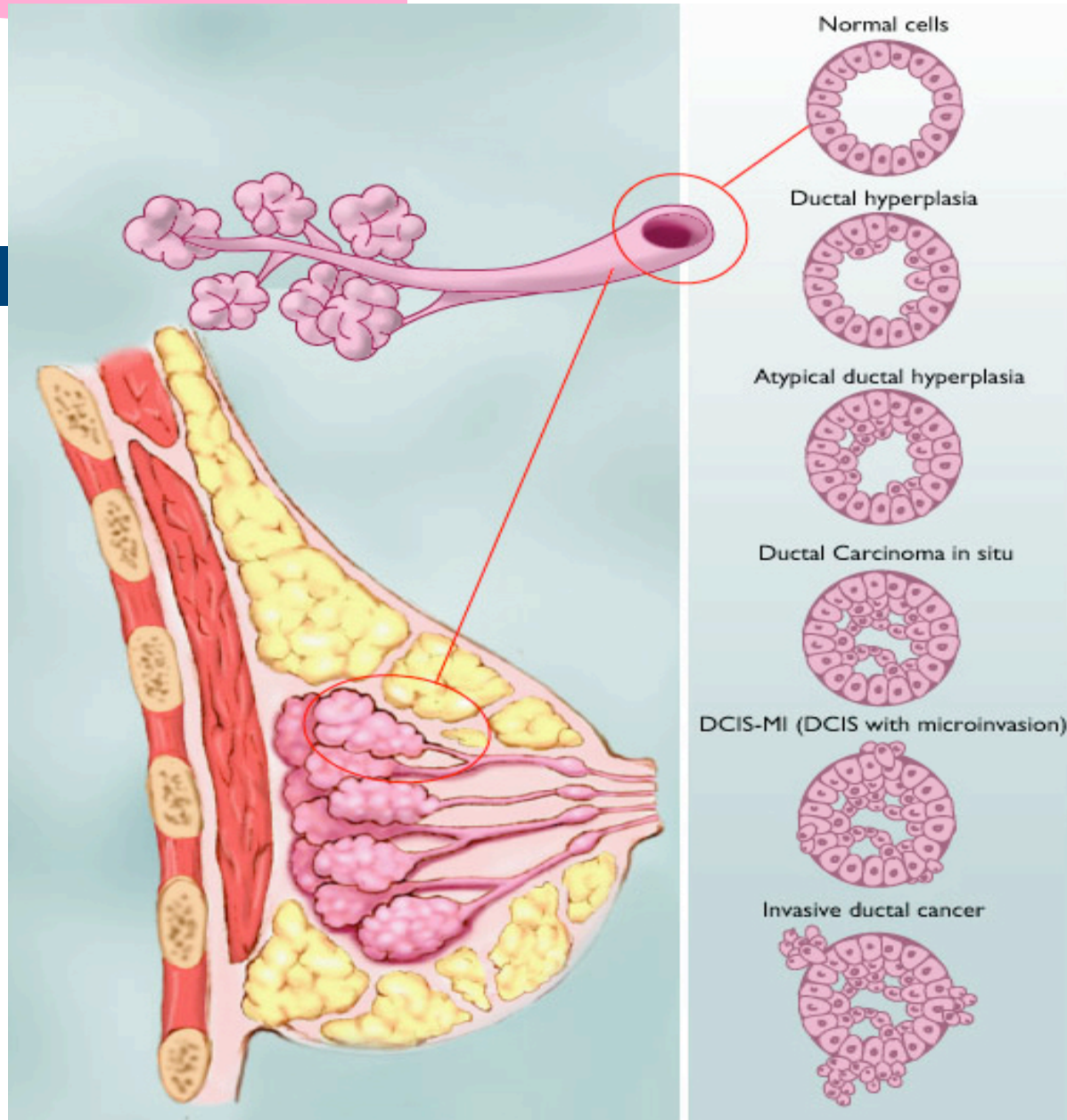
**Chest radiation <35 yrs old**

**Benign breast disease**

# Types of Breast Cancer

- Carcinoma in situ
  - Lobular carcinoma in situ (LCIS)
    - treatment= observation- bilateral mastectomy
  - Ductal carcinoma in situ (DCIS) =(12-15%)
    - Comedo, micropapillary, cribriform, solid, papillary
    - treatment= lumpectomy-mastectomy +radiation+Tamoxifen
- Infiltrating (or invasive) Ductal carcinoma (IDS) = 80%

# Range of Ductal Carcinoma in situ (DCIS)



## Invasive Ductal Carcinoma (IDC)

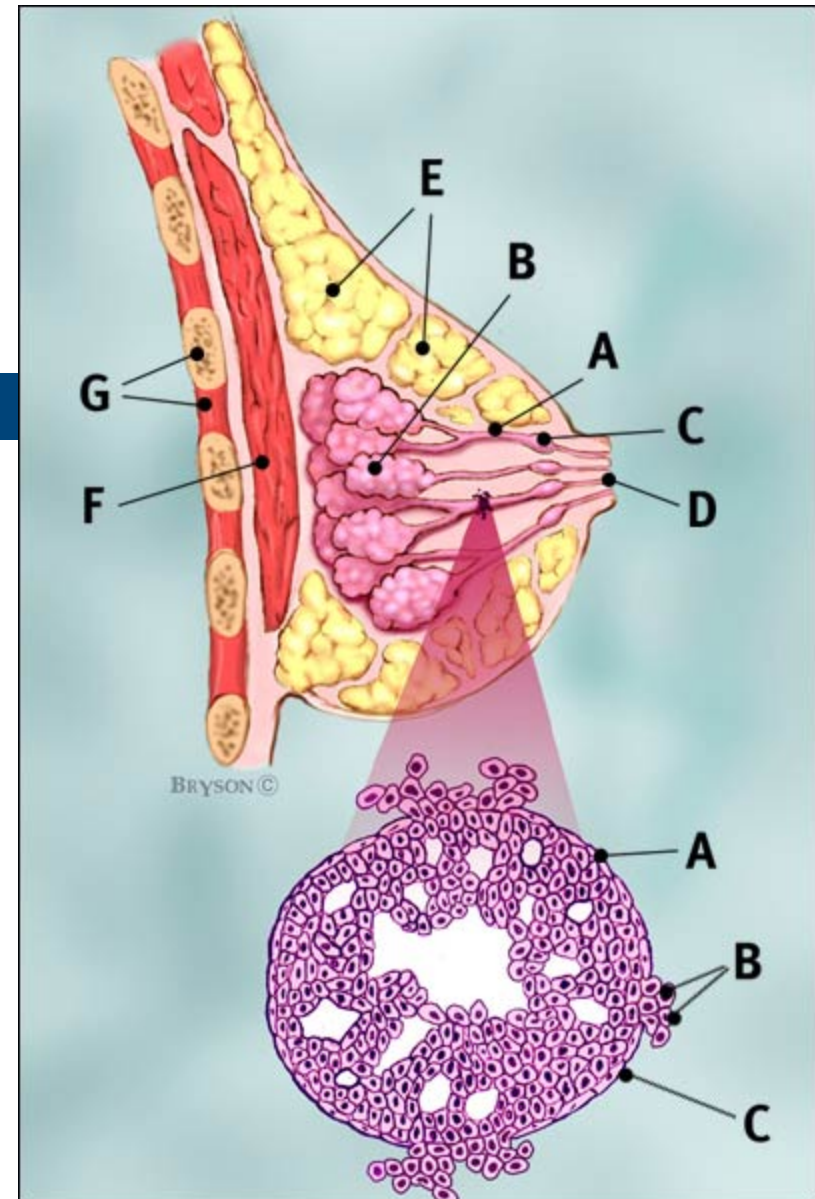
Normal breast with invasive ductal carcinoma (IDC) in an enlarged cross-section of the duct.

### Breast profile:

- A ducts
- B lobules
- C dilated section of duct to hold milk
- D nipple
- E fat
- F pectoralis major muscle
- G chest wall/rib cage

### Enlargement:

- A normal duct cells
- B ductal cancer cells breaking through the basement membrane
- C basement membrane



## Invasive Lobular Carcinoma (ILC)

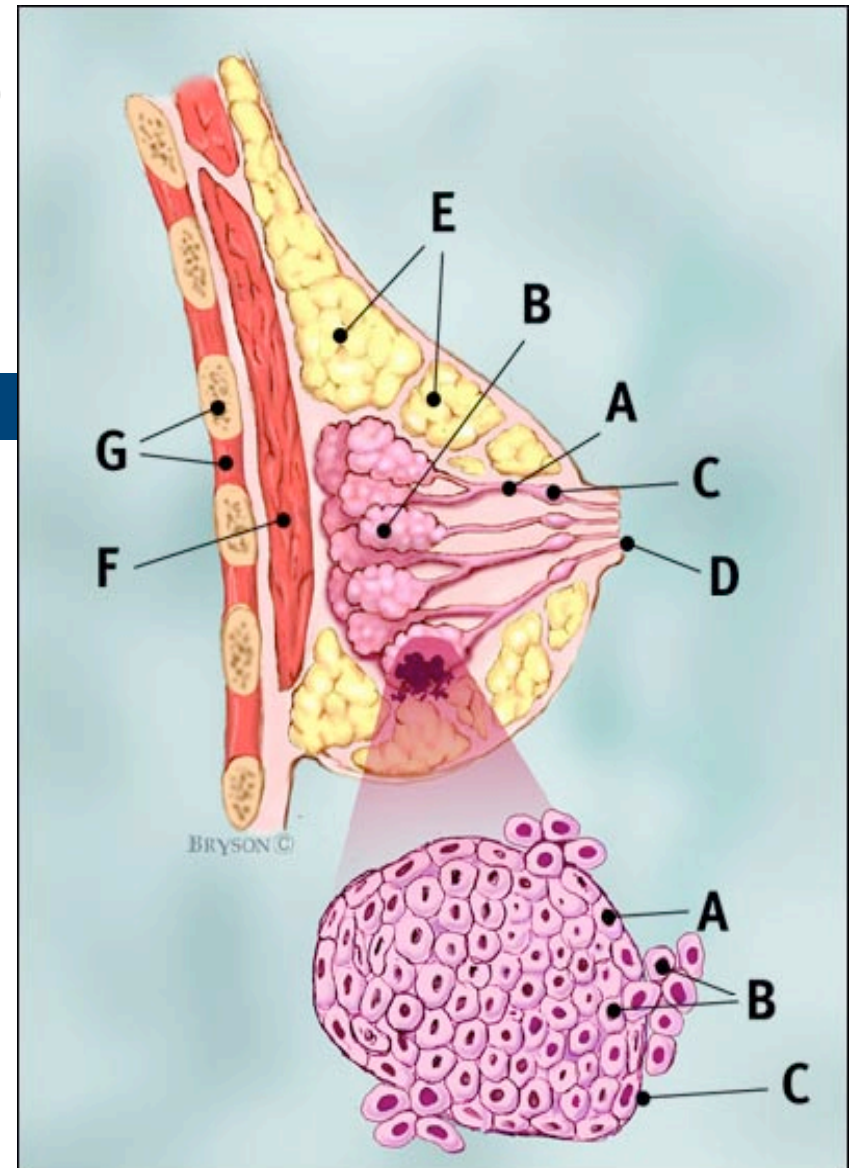
Normal breast with invasive lobular carcinoma (ILC) in an enlarged cross-section of the lobule.

### Breast profile:

- A ducts
- B lobules
- C dilated section of duct to hold milk
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### Enlargement:

- A normal cells
- B lobular cancer cells breaking through the basement membrane
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<http://www.breastcancer.org>

## Types of Breast Cancer (cont.)

- Infiltrating (or invasive) Lobular carcinoma (ILC) = 10-15%
- Medullary carcinoma = 5%
- Tubular carcinoma = 2%
- Inflammatory breast cancer = 1%
- Adenoid cystic carcinoma = rare
- Colloid = rare

# Genetic Considerations

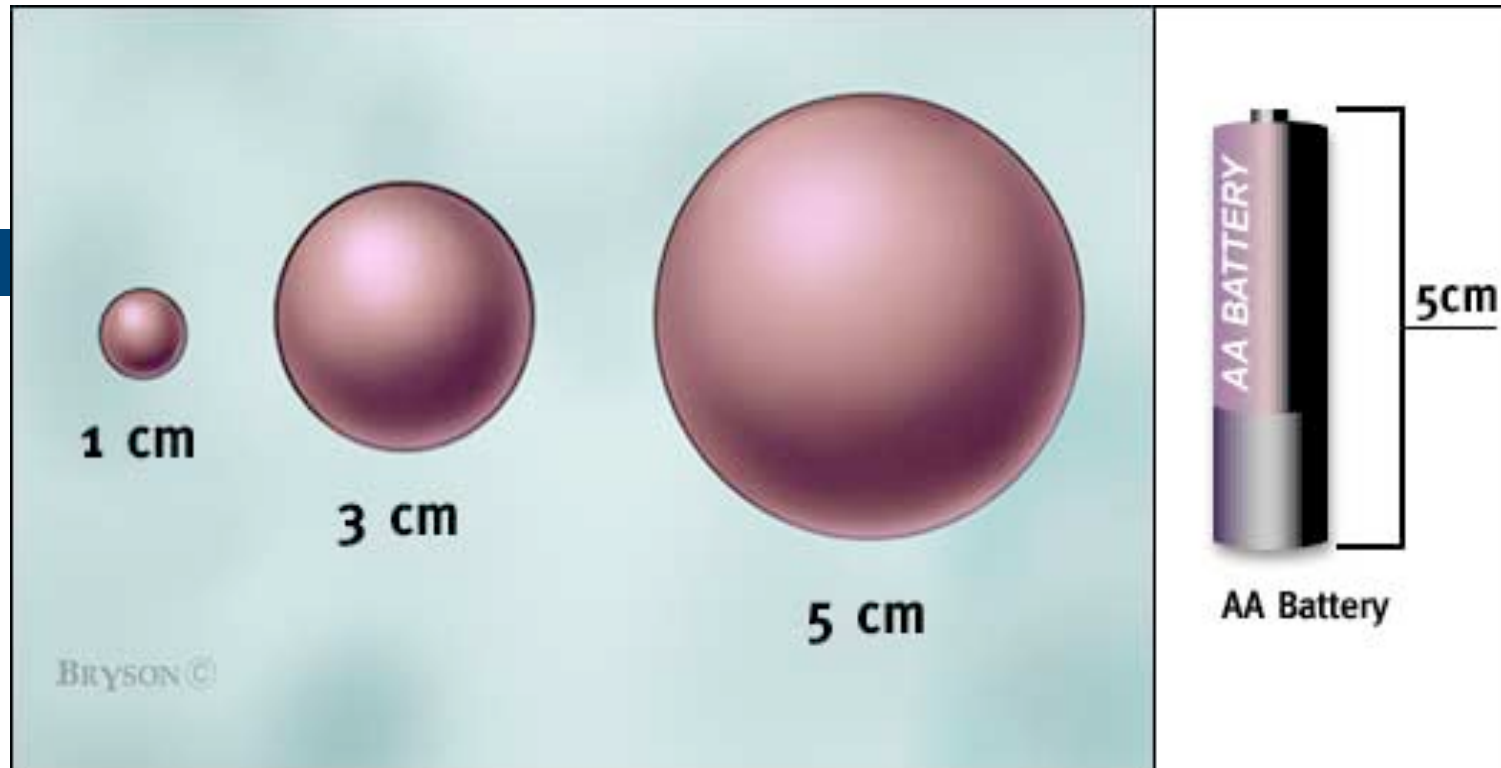
## Inherited Risk Factors

- BRCA 1 and BRCA 2

Gene mutation occurs 1 in 200 women

- breast cancer genes found in 3-5% of breast cancers.
- The gene plays a part in DNA repair

# Tumor Sizes



3 spheres measuring  
1 cm, 3cm, 5cm.

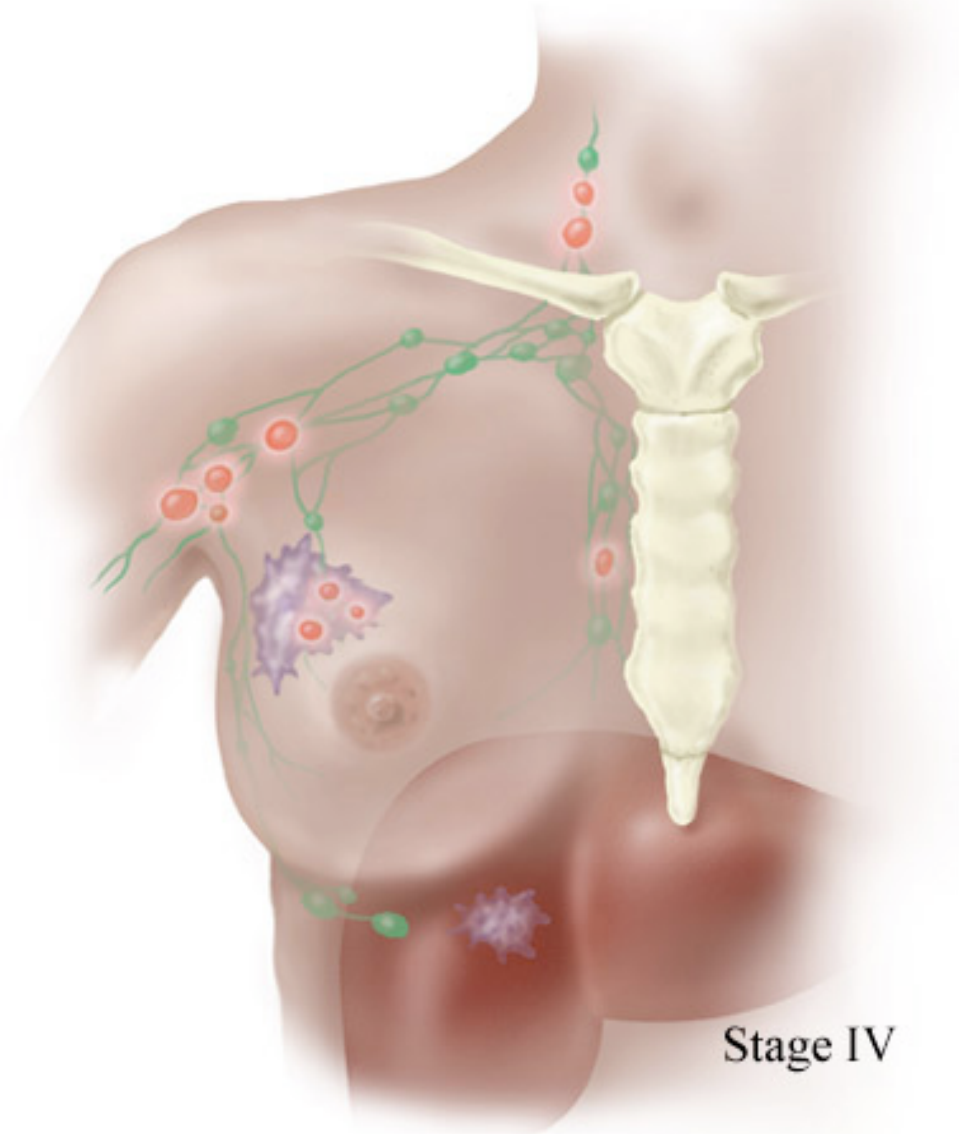
<http://www.breastcancer.org>

# TNM Staging System

## *Tumor, Nodes, Metastasis*

### Stages I-IV

- **Stage I**
  - Small tumor, – nodes
- **Stage IIA, IIB**
  - Small tumor, + nodes
  - Larger tumor, – nodes
- **Stage IIIA, IIIB**
  - Advanced locoregional
- **Stage IV**
  - Distant metastasis



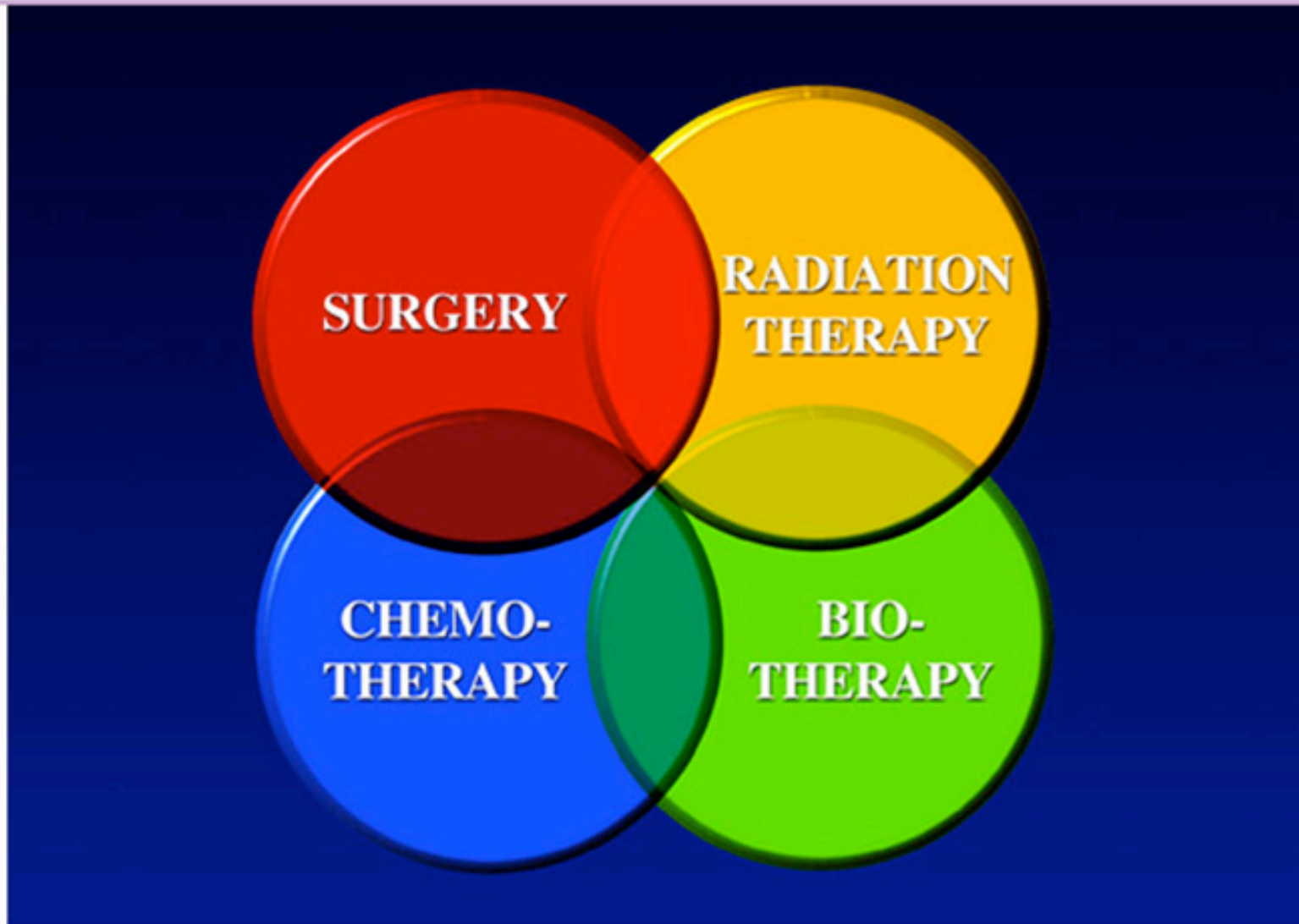
# Test on Tumors

- Estrogen/ progesterone receptors (ER+PR)
- HER-2/nue
- S-phase
- Chemo sensitivity test

# Imaging Work Up/ Monitoring

- Breast exam
- Mammography
- Breast ultrasound
- Chest x-ray
- Bone scan
- CT scans
- MRI
- PET Scans
- Ultrasounds
- Breast MRI

# Treatment Modalities in Oncology



# Chemotherapy

- Kills cancer cells that may remain in the body, or slows or stops their growth
- Chemotherapy
  - pills
  - intravenous
  - schedule, cycle

# Chemotherapy for Breast Cancer

- AC = Adriamycin & Cytoxan Q3w
- AT = Adriamycin & Taxol or Taxotere Q3w
- ATC = Adriamycin , Taxotere & Cytoxan 112d
- CAF = Cytoxan, Adriamycin & 5FU Q3w
- CAF = Cytoxan, Adriamycin & 5FU Q4w
- CEF = Cytoxan, Epirubicin & 5FU Q4w

# Chemotherapy Continued

- CMF = CTX, MTX & 5FU Q4w d 1&8
- CMF = CTX, MTX & 5FU Q3w
- CMF ADJ <60 Oral Ctx, MTX & 5FU D1&8 >60 lower dose
- CMFP, CMFVP, Cooper regimen, DOX-PCT, FAC, FAC(MD Anderson),
- FAC-RTX, FEC, FOAM, Ifex - Vinorelbine, Mitoxantrone+CTX+5FU, MV, NFL,
- PCT + Carboplatin, PCT+ CTX, STAMP, TAC, VATH, VD

# Hormone Receptors

- Most breast cancer cells are hormone-dependent, which means that estrogen and progesterone stimulate their growth by turning on hormone receptors in the cancer cells.
- Without these hormones, the cancer cells are not stimulated to grow.

## Hormone status

- About 75% of breast cancers are ER+
- About 65% are ER+ are also PR+
- About 25% are ER- and PR-
- About 10% are ER+ and PR-
- About 5% are ER- and PR+

# Hormone Therapy

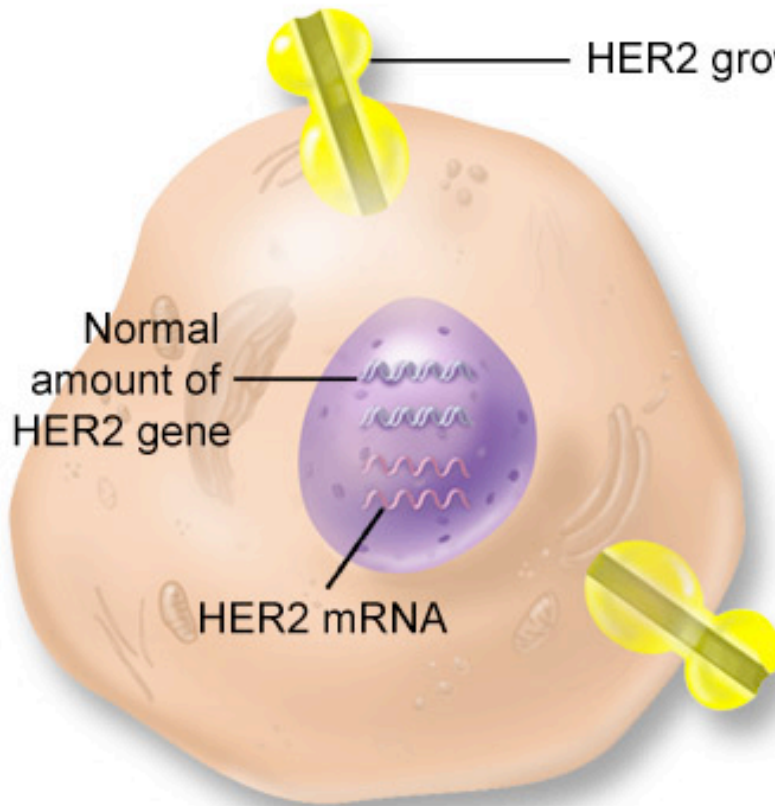
- Used to inhibit the effect of hormones on the growth of cancer cells that may remain in the body.
- For tumors that are estrogen dependent (ER positive)
  - Tamoxifen
  - Raloxifene (Evista)
  - Letrozole (Femara)
  - Exemestane (Aromasin)
  - Anastrozole (Arimidex)
  - Faslodex
  - Fareston

# Monoclonal Antibodies

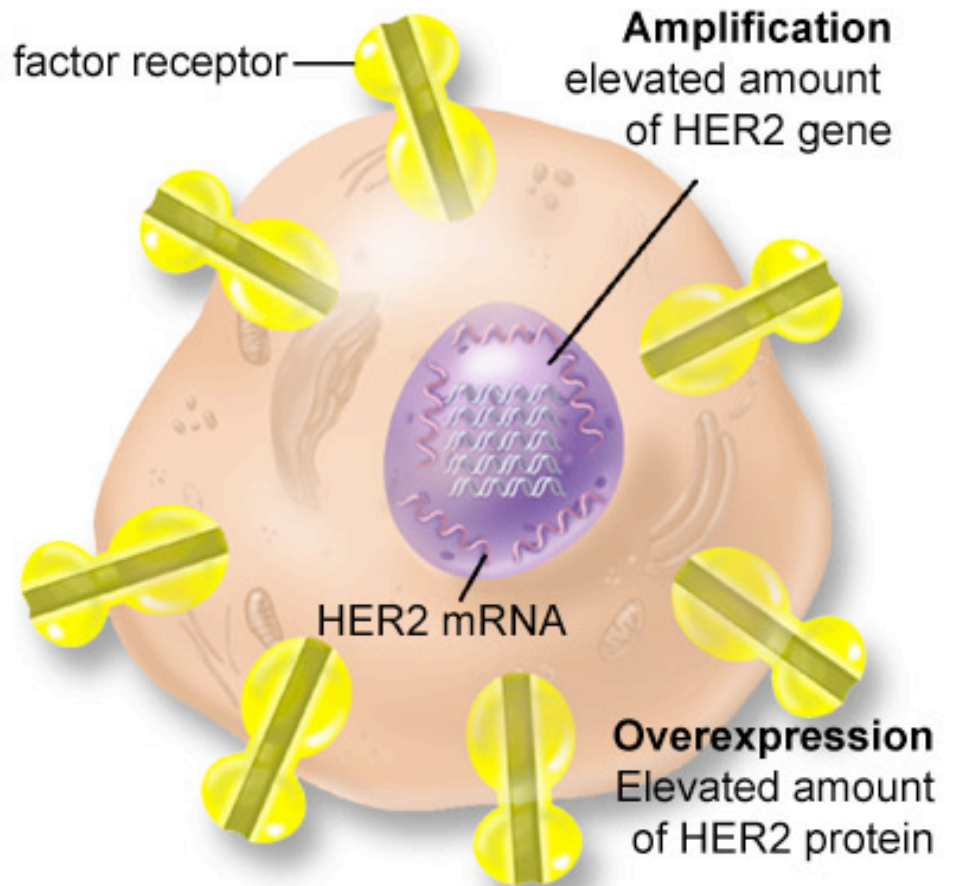
- Herceptin
  - Used treat breast cancer that is positive for HER2 protein
  - Targets treatment only to HER2 positive cells = 25-30% are positive
    - chills are the most common infusion related side effect

# HER2-Positive Disease

## Normal

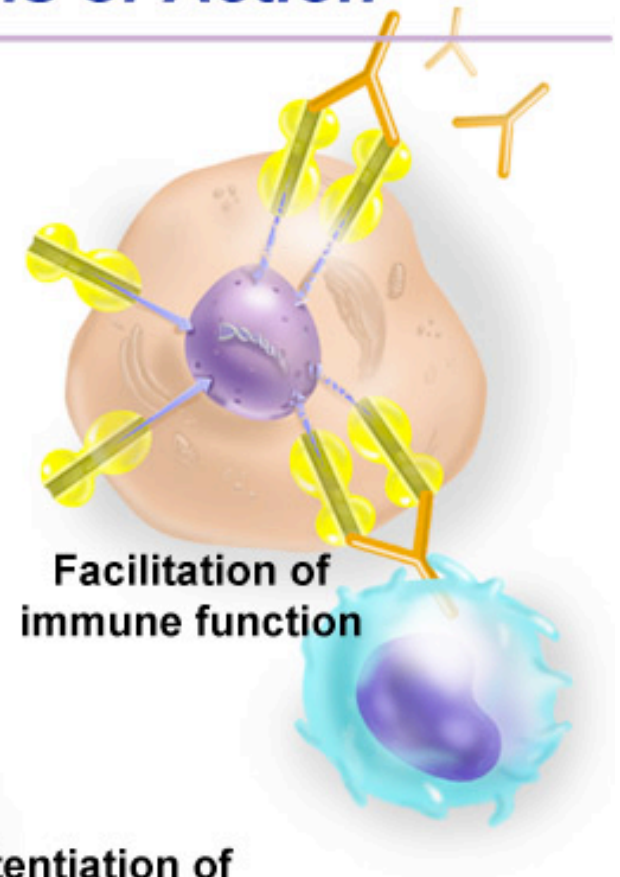
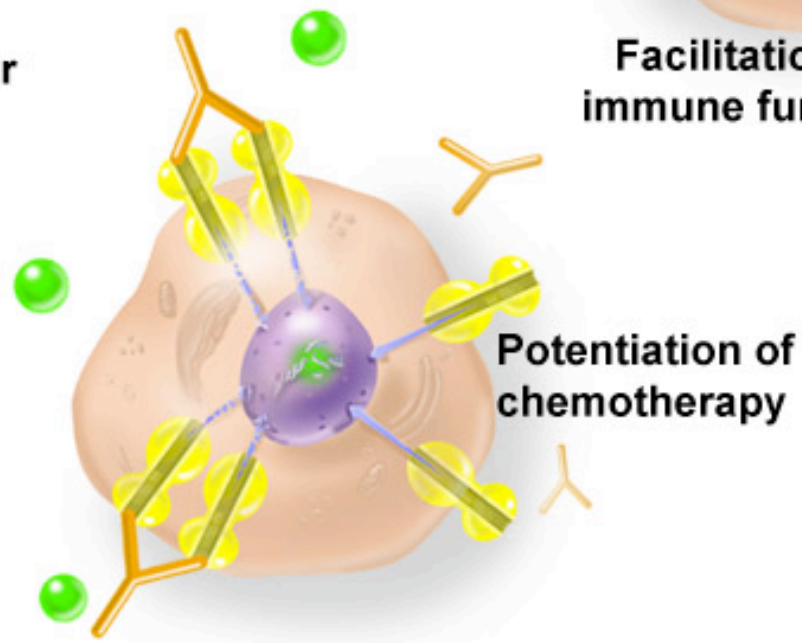
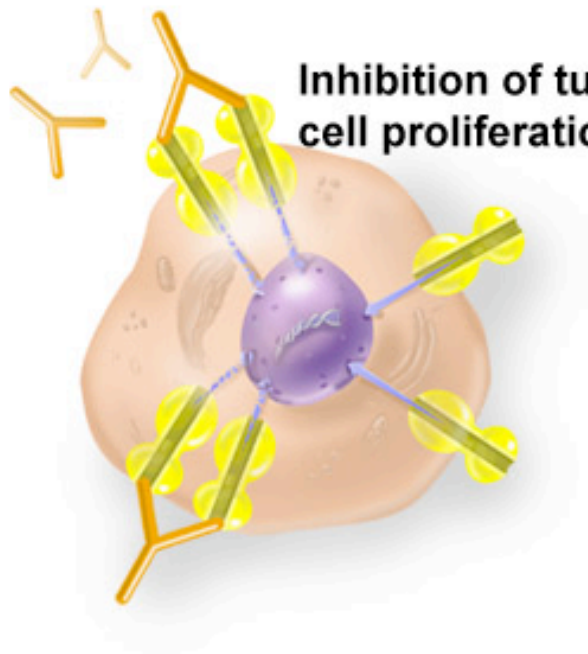


## Overexpression/ Amplification



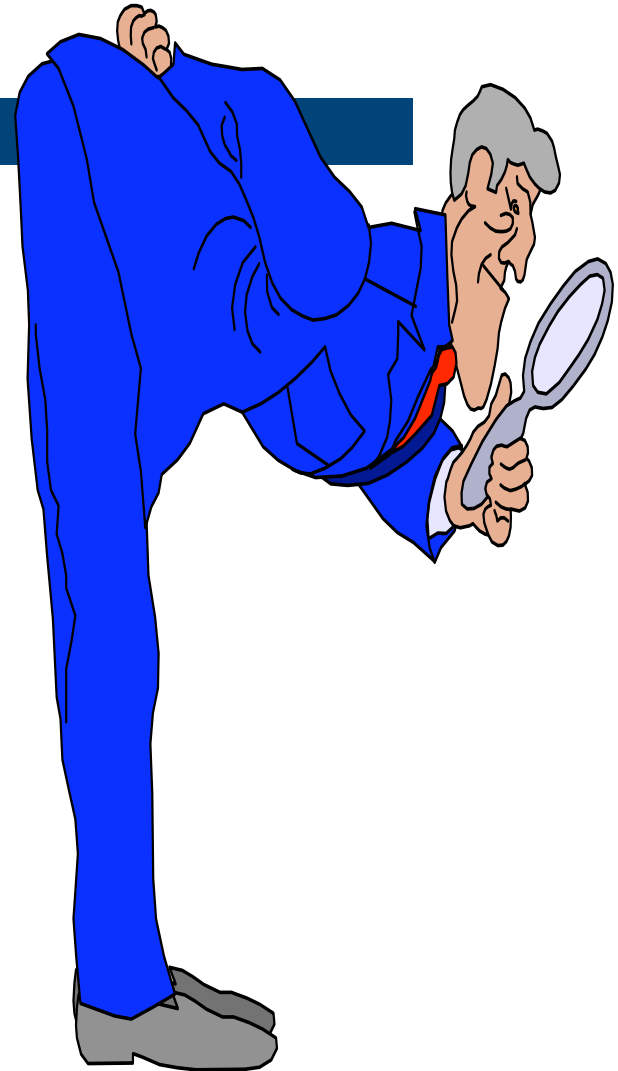
## Trastuzumab: *Potential Mechanisms of Action*

- **Binds to HER2 receptor**
- **Potential mechanisms of action**
  - Inhibits proliferation of tumor cells
  - Sensitizes cells to chemotherapy
  - Kills cells by recruiting other immune cells



# • Intravenous Access

- Peripheral Access
- External Catheters
  - Central Venous Catheters
  - PICC Lines
- Implanted Ports



# Port for Chemotherapy

Port inserted in vein for chemotherapy.

**A** port

**B** catheter [tubing]

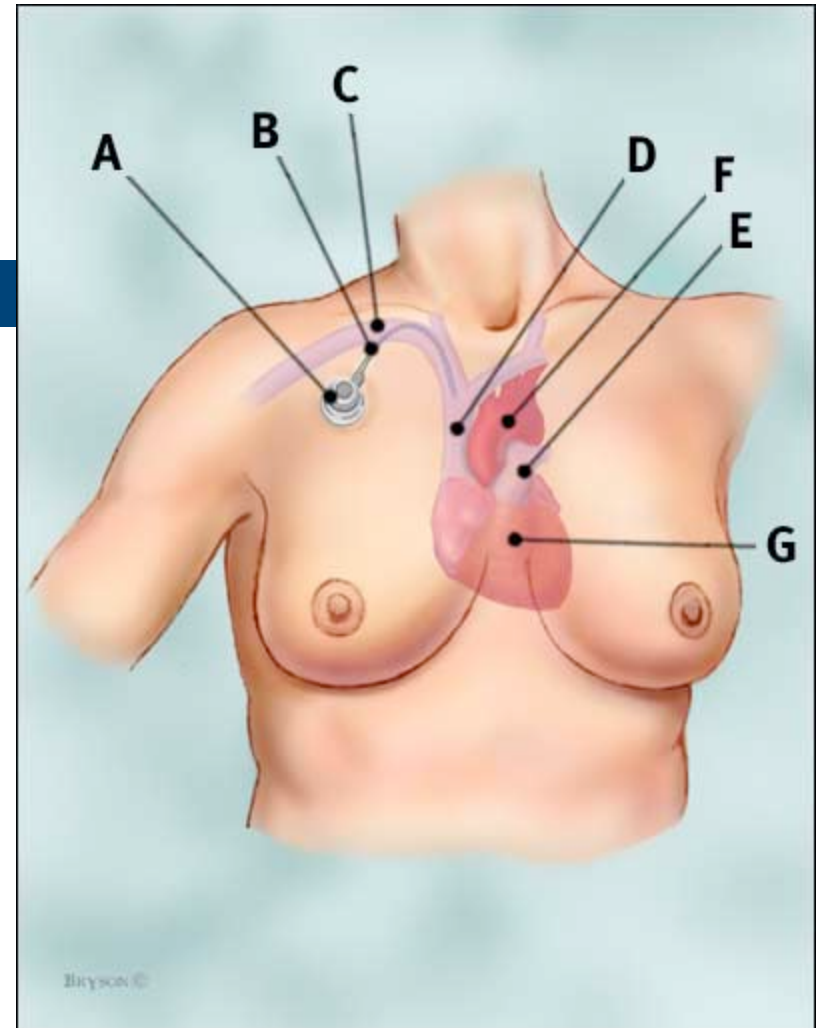
**C** subclavian vein

**D** superior Vena cava

**E** pulmonary vein

**F** aorta

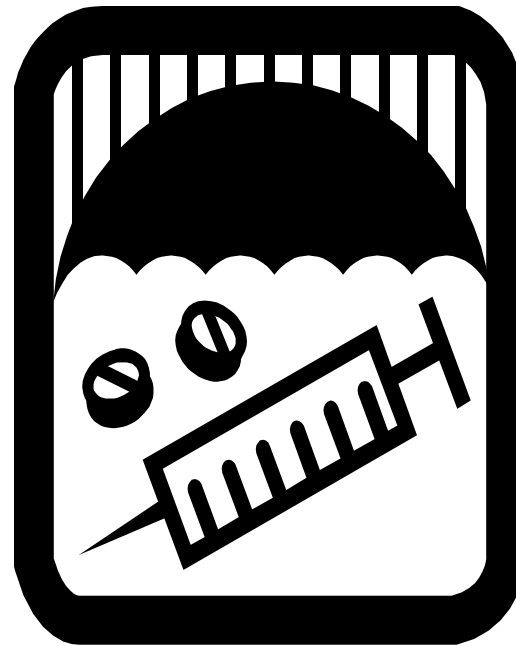
**G** heart



<http://www.breastcancer.org>

# Blood Test

- Cbc - complete blood count
  - white cells
  - red cells
  - platelets
- Chemistries
- Tumor markers
  - CEA, CA125, Ca27/29, RPR



# Chemotherapy Side Effects

- Loss of appetite, nausea & vomiting
- Mouth sores
- Hair loss
- Changes in the menstrual cycle
- Effect on the bone marrow
  - wbc = infection
  - red blood cells = anemia and fatigue
  - platelets = bleeding

# Gastrointestinal side effects

- Loss of appetite
- Food aversions
- Taste alterations
- Nausea/Vomiting
- Constipation
- Diarrhea



Loss of Appetite  
Food Aversions  
Taste Alterations

WEIGHT LOSS

# Other effects

- Skin
  - Rash
  - Itching
  - Redness
  - Changes in skin color
  - Sensitivity to light
  - Ulceration
  - Nail changes



# Rash Itching and Color Changes

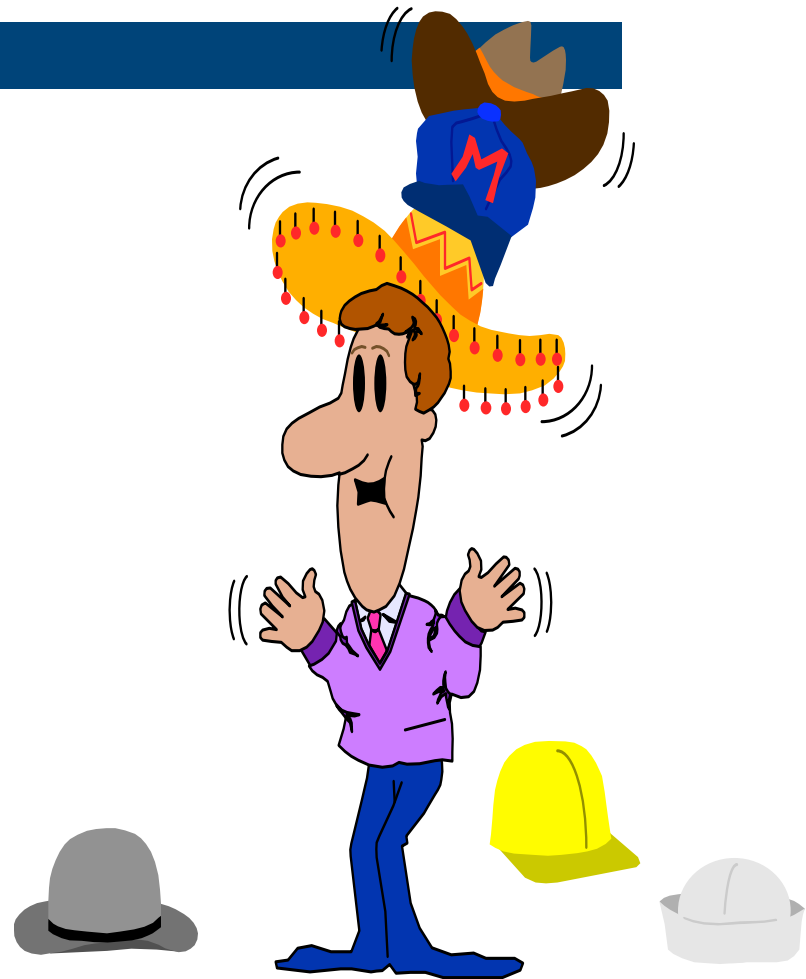
- May be localized or generalized
  - ? allergic reaction during infusion
- Caused by
  - Adriamycin, Cytosin, Cisplatin

# Skin ulceration, Nail changes Photosensitivity

- Exposure to sun can cause acute sunburn
- Ulceration and nail changes
  - Adriamycin, Cytosin, and Taxol

# Hair Loss

- Slight thinning
- Partial
- Complete



# Hypersensitivity Reactions

- Immediate or delayed
  - feeling of agitation
  - shortness of breath
  - chest tightness
  - itching or rash

# Bone Marrow Suppression

- Fatigue
- Anemia
- Bleeding
- Infection

# Fatigue

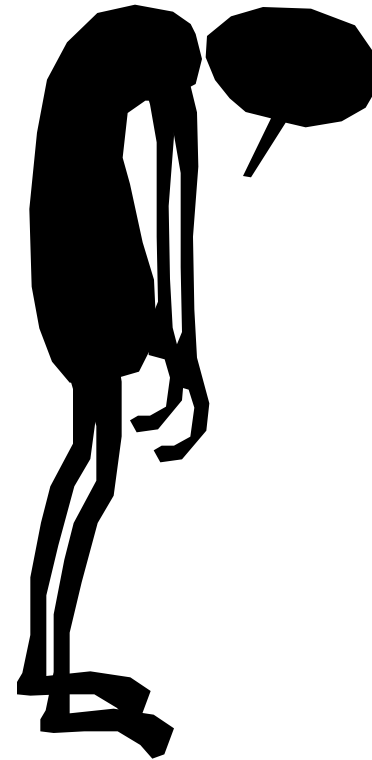
## Treatment

rest

mild exercise

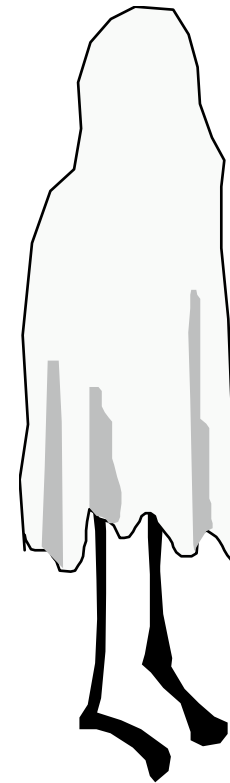
medications

Epogen, Procrit



# Anemia

- Caused by the effects on the red cells in the bone marrow
- Treatment
  - medications-Epogen, Procrit
  - blood transfusion



# Infection

- Due to the effects on the white cells in the bone marrow
- Interventions
  - take your temperature
  - hand washing
  - avoid exposure to infections
  - medications- Neupogen, Leukine



# Radiation therapy side effects

- Fatigue
- Hair loss
- Skin burns
- Nausea, vomiting, mouth sores
- Effect on the bone marrow

# Reminder

- Cure rates/survival from breast cancer have increased over time
- Great advances are being made in breast cancer treatment
- Treatments are more effective and better tolerated

# Contact Information

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