

# **Surgical Oncology**

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*Professor of Surgical Oncology*

## Learning Objectives

*After completing this module, attendees should be able to*

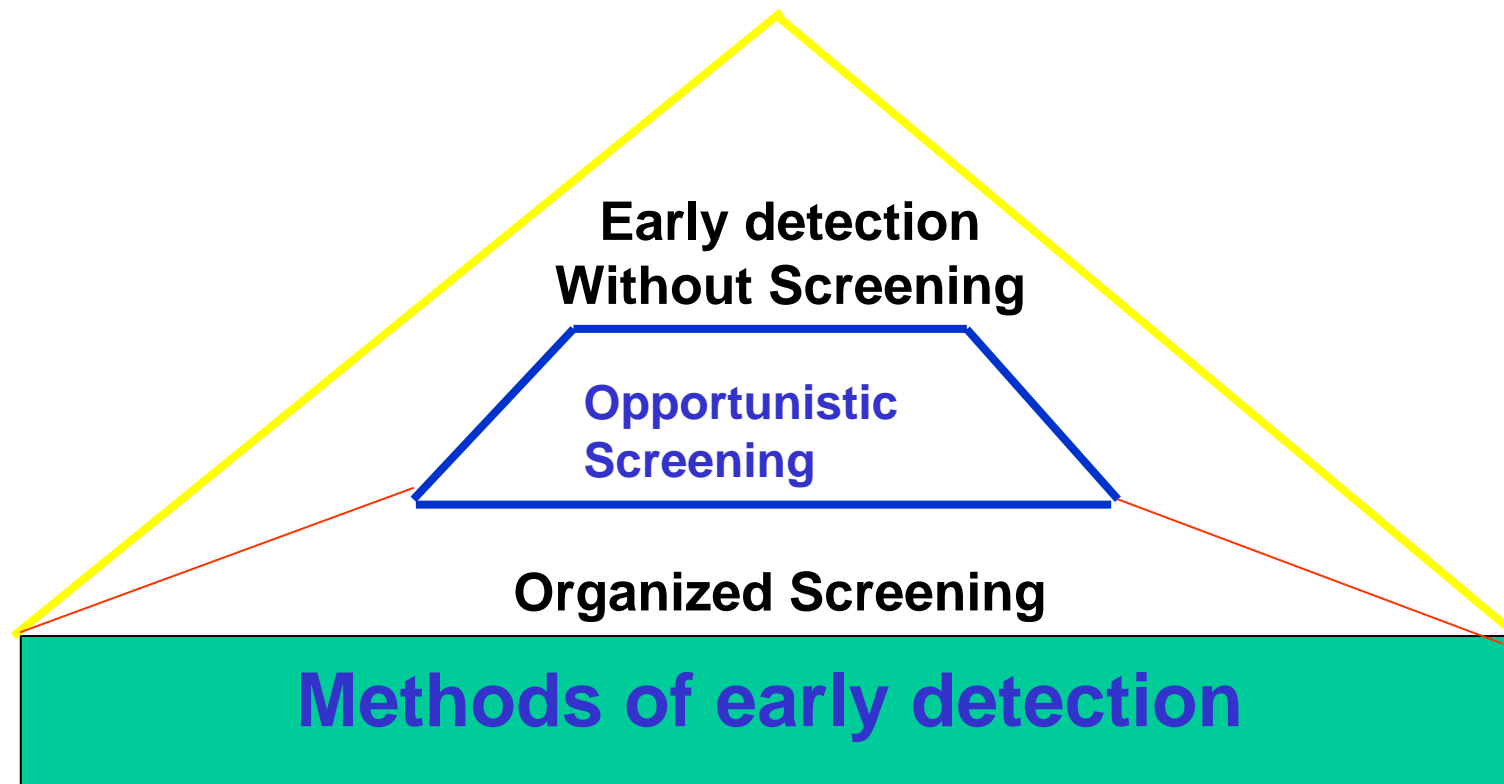
- Describe the various considerations related to biopsy
- Summarize the use of surgery with “*curative intent*”
- Discuss surgery for “*palliation*”
- Explain the role of surgery for treatment-related complications
- Identify the oncologic emergencies requiring surgery
- Describe the various prophylactic surgeries for cancer prevention
- Discuss the future of surgical oncology

# Multidisciplinary Cancer Management Course

- Prevention
- Screening and early diagnosis
- Diagnosis :
  - Imaging
  - Tissue procurement
  - Pathology
- Staging
- Treatment : **Medical Surgical Radiation**
- Rehabilitation
- Follow-up

# Multidisciplinary Cancer Management Course

Implementation of screening and early detection programs.



**Early detection of breast cancer in countries with limited resources**

# Multidisciplinary Cancer Management Course

**BIRTH**

Latent period

Screening

Diagnosis and Staging

Treatment

Recurrence

**DEATH**

## Role of Surgery in Cancer Care

**“Surgery makes its contribution to cancer treatment in concert with other modalities.**

**Advances in the treatment of cancer will derive from improved orchestration with the other modalities rather than from improved operative technique alone.”**

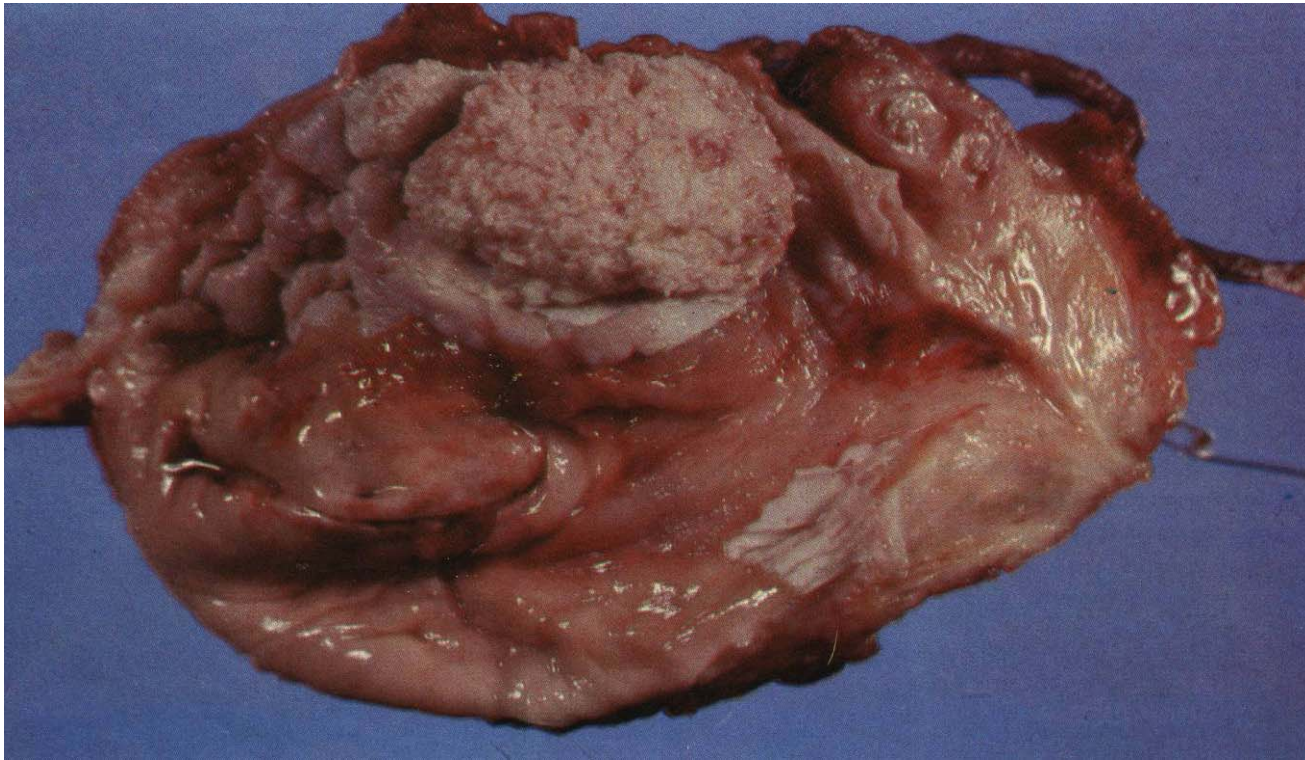
*Bernard Fisher, 1977*

# Multidisciplinary Cancer Management Course



## Clinical Breast Exam for IBC

# Multidisciplinary Cancer Management Course



**Bilharzial Bladder Cancer**

# Multidisciplinary Cancer Management Course

- **1ry liver cancer** (*advantages for HCC*)

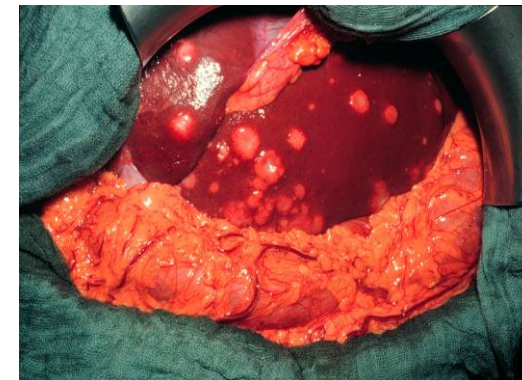
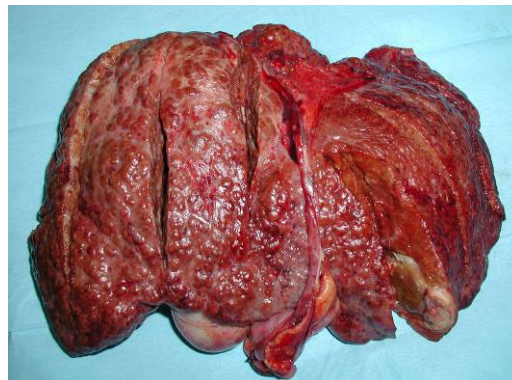
HCC (*Milan criteria*) (*1=5cm or 3 none more than 3cm + no vasc.inv.*)

Hepatoblastoma

Haemangioendothelioma

Cholangio carcinoma

Angiosarcoma



- **Liver metastases**

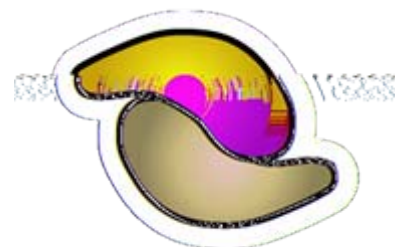
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*O.Sh.Omar, M..Malago, Essen, 2007*

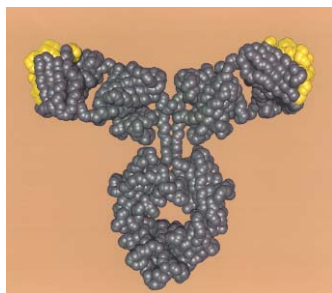
# Multidisciplinary Cancer Management Course



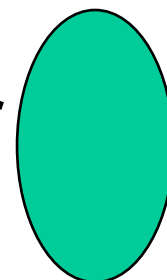
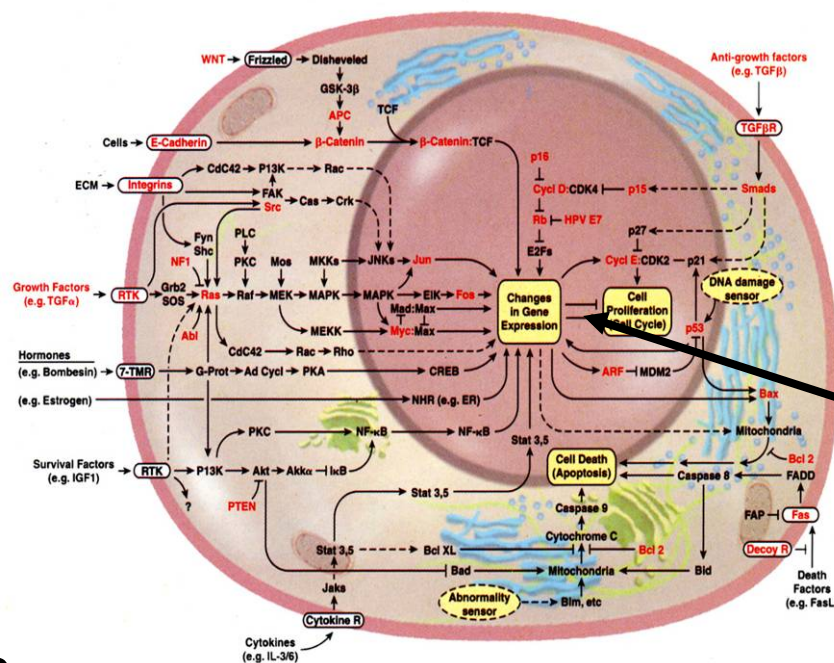
EGFR



Her-2 Neu



Anti-Angiogenesis  
VEGF



ER/PR

## Role of Surgery in Cancer Care

- **Surgery**

**Zero-order kinetics—100% of cells at risk are killed with a single treatment**

- **Radiotherapy/Chemotherapy**

**First-order kinetics—only a portion of cells at risk are killed during treatment, which is followed by regrowth**

# Multidisciplinary Cancer Management Course

## Surgical Oncologist

**“A surgical oncologist is a well-qualified surgeon who has obtained additional training and experience in the **multidisciplinary approach** to the prevention, diagnosis, treatment, and rehabilitation of cancer patients, and devotes a major portion of his or her professional practice to these activities and cancer research.”**

*Society of Surgical Oncology  
Training Program Guidelines, 2004*

# Multidisciplinary Cancer Management Course

## Fellowship Training in Surgical Oncology

**Provides basis for understanding the natural history of malignant disease and promotes broad knowledge of other treatment modalities (Multidisciplinary treatment)**

## Fellowship Training in Surgical Oncology

In addition, trainees learn

- Diagnoses and Staging
- Selection of patients for **multidisciplinary treatment**
- How to communicate “**bad news**”
- How to educate trainees and other surgeons and physicians
- How to create new knowledge through clinical and laboratory research

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## Ancient History of Surgery for Cancer Treatment

**1600 BC** First recorded description of the surgical treatment of cancer (in Egypt)

**400 BC** **Hippocrates** describes the stages of cancer and advises against surgery for terminal disease; he coins the terms “carcinoma” (crab-leg tumor) and “sarcoma” (fleshy tumor)

**200 AD** **Galen** identifies cancer as a systemic disease (primary and metastasis)

# Historical Eras of Surgery to Treat Cancer

<b>Before 1850</b>	<b>Early heroic attempts to resect cancer</b>
<b>1850-1950</b>	<b>Development of standard surgical resection techniques</b>
<b>1950-1960</b>	<b>Development of extended radical surgical procedures</b>

# **Historical Eras of Surgery to Treat Cancer**

<b>1960-1980</b>	<b>Exploration of combined-modality treatment</b>
<b>1980-2000</b>	<b>Multimodality therapy improves organ preservation and survival</b>
<b>2000-present</b>	<b>Surgical practice incorporates improved understanding of the molecular basis of tumor biology</b>

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## Landmark Advances in Surgical Oncology

- 1775 Etiologic basis of cancer  
*Percival Pott*
- 1809 Elective oophorectomy  
*Ephraim McDowell*
- 1829 Metastatic process  
*Joseph Recamier*
- 1846 Ether used as anesthesia  
*John Collins Warren*
- 1867 Carbolic acid used as antisepsis  
*Joseph Lister*
- 1873 Laryngectomy  
*Albert Theodore Billroth*

Holland J et al. *Cancer Medicine*, 6th ed. 2003.

# Multidisciplinary Cancer Management Course

## Landmark Advances in Surgical Oncology

- 1878** Resection of rectal tumor  
*Richard von Volkman*
- 1880** Esophagectomy  
*Albert Theodore Billroth*
- 1881** Gastrectomy  
*Albert Theodore Billroth*
- 1890** Radical mastectomy  
*William Stewart Halstead*
- 1896** {Oophorectomy for breast cancer}  
*G. T. Beatson*

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## Landmark Advances in Surgical Oncology

- 1904**    **Radical prostatectomy**  
*Hugh H. Young*
- 1906**    **Radical hysterectomy**  
*Ernest Wertheim*
- 1908**    **Abdominoperineal resection**  
*W. Ernest Miles*
- 1909**    **Nobel prize for thyroid surgery**  
*Theodore Emil Kocher*
- 1910**    **Craniotomy**  
*Harvey Cushing*

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## Landmark Advances in Surgical Oncology

**1912**    **Cordotomy for the treatment of pain**

***E. Martin***

**1913**    **Thoracic esophagectomy**

***Franz Torek***

**1927**    **Resection of pulmonary metastases**

***George Divis***

**1933**    **Pneumonectomy**

***Evarts Graham***

**1935**    **Pancreaticoduodenectomy**

***Allen O. Whipple***

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## Landmark Advances in Surgical Oncology

- 1945 Adrenalectomy for prostate cancer**  
*Charles B. Huggins*
- 1957 Isolated limb perfusion**  
*Oliver Creech*
- 1958 First multicenter clinical trial**  
*Bernard Fisher*
- 1965 Hormone therapy for cancer**  
*Charles Huggins*
- 1971 Microvascular free-tissue transfer**  
*Harry Buncke*

# **Surgery for Diagnosis and Staging**

## Biopsy

### Surgeon's responsibilities:

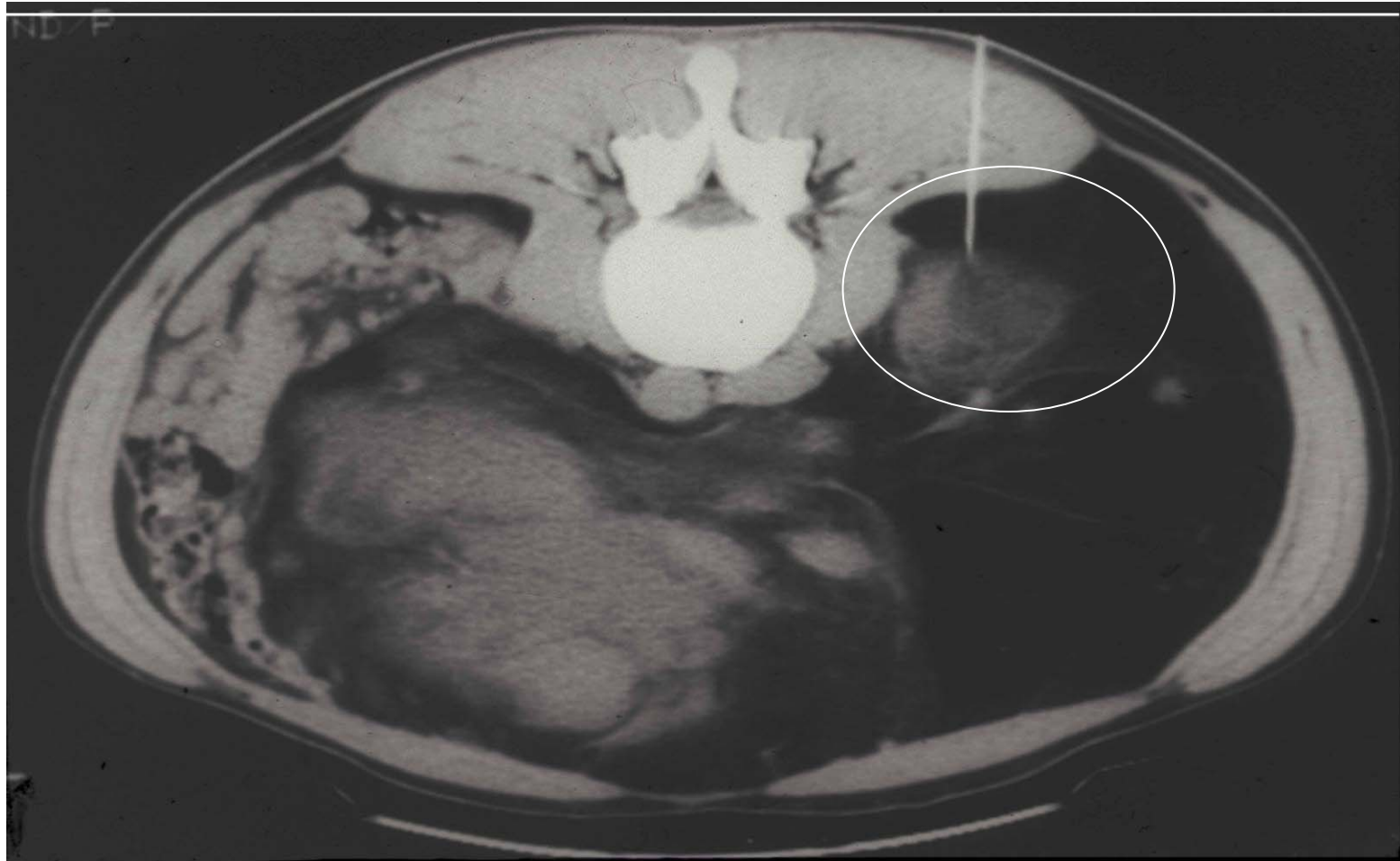
- **Selection of appropriate biopsy method and site**
- **Responsible that the tissue reach the pathologist timely and properly .**
- **Communicate the results to the patient, family, other physicians**
- **Provide initial prognosis and information on follow-up care**

## Types of Biopsy Methods

- **Transcutaneous**
- **Image-directed (with fine-needle aspiration or cutting needle)**
  - **Ultrasonography**
  - **Computerized tomography**
  - **Magnetic resonance imaging**
- **Open incisional (A portion of the tumor)**
- **Open excisional (All tumor mass removed)**

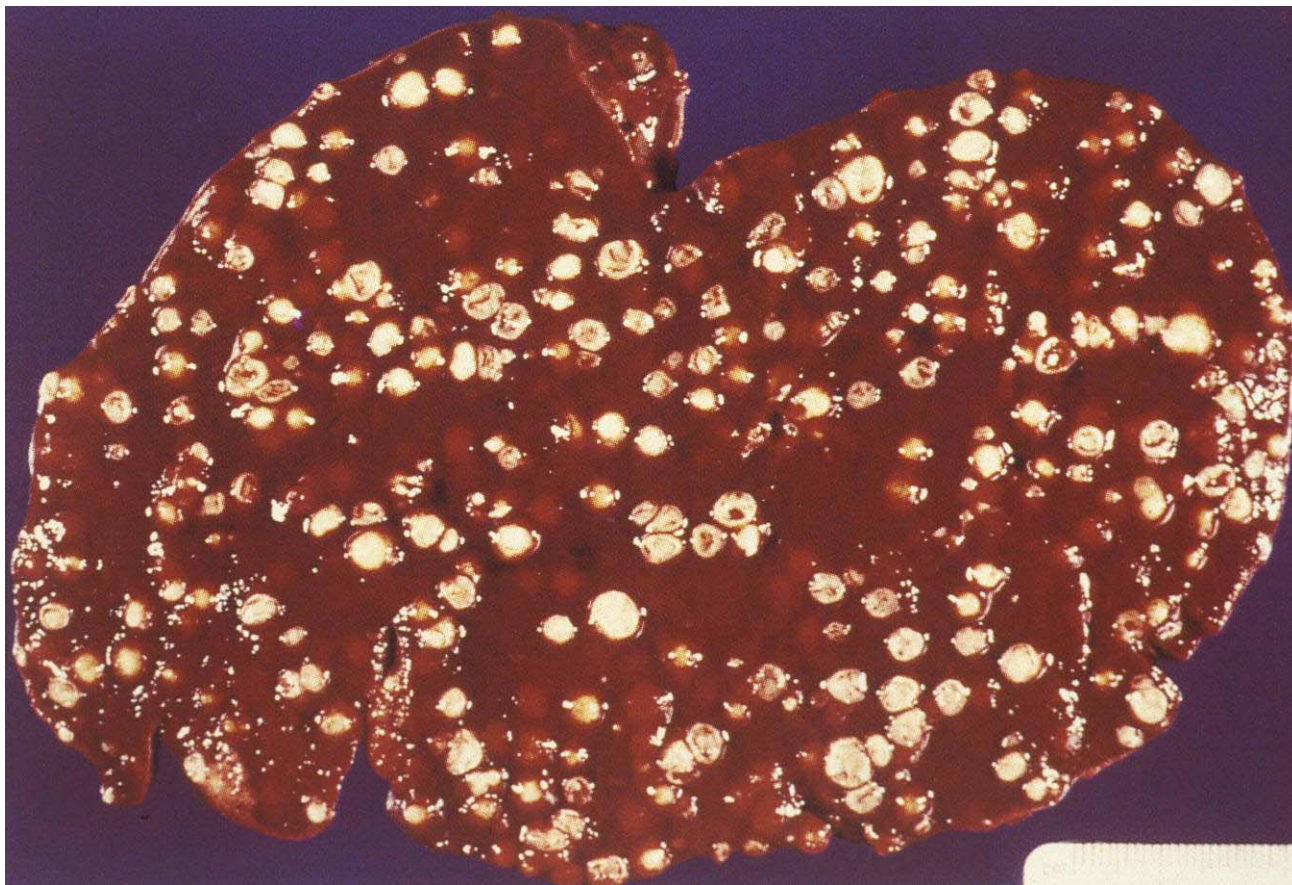
# Multidisciplinary Cancer Management Course

## Image-Directed Biopsy



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## Open Excisional Biopsy



## Surgeon's Tasks in Performing Biopsy

- **Orient the specimen**
- **Ensure the integrity of the tissue plane**
- **Ensure the adequacy of the tissue sample**
- **Be sure tissue reach the pathologist !**

## Appropriate Open Biopsy



- Scar is parallel to the long axis of the extremity
- Tissue planes and compartments are intact
- En bloc resection will be easy to accomplish
- Biopsy is only the first step

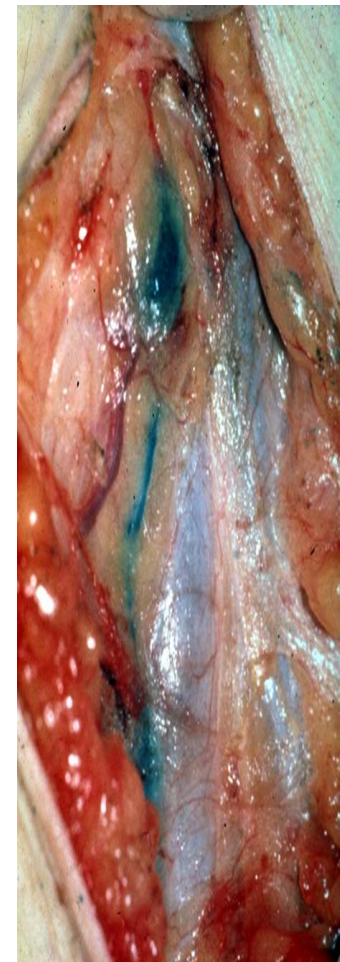
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## Surgical Staging: Concept of the Sentinel Lymph Node

- Lymphatic drainage is not random--for any given point in an organ (eg: skin),there is a single lymph node to which the lymphatic channels drain first, the **sentinel node**.
- Different regions of an organ site will drain to different sentinel nodes
- If melanoma or carcinomas were to metastasize to regional lymph nodes, the sentinel node is the first node to which the cancer would spread.
- If the **sentinel node is negative**, it is very likely that the other regional nodes will be negative as well

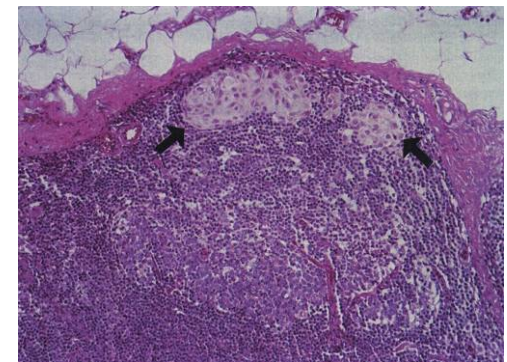
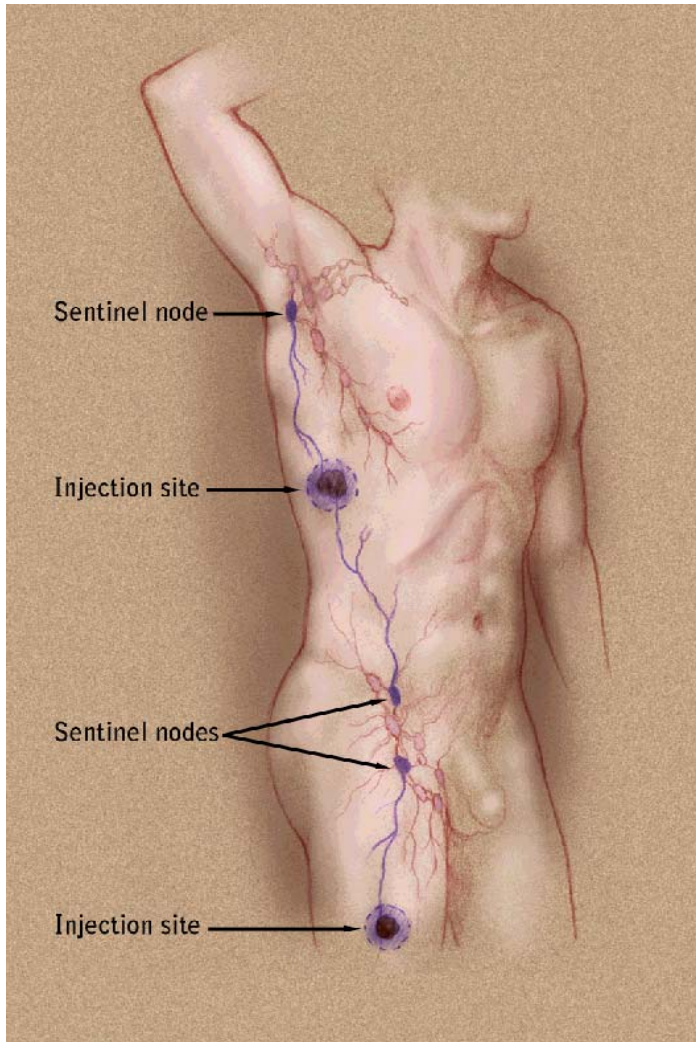
## SENTINEL LYMPH NODE (Breast Ca –Melanoma)

- Requires pre-operative injection of 5 ml lymphazurin or lymphoscintigraphy
- More precise staging of metastases to a threshold of  $10^5$  to  $10^6$  cells
- Reproducible technology with acceptable false negative rate of 5% with experienced team in surgery, pathology and nuclear medicine
- Gives pathologist more limited tissue to perform step sections and immunohistochemical stains

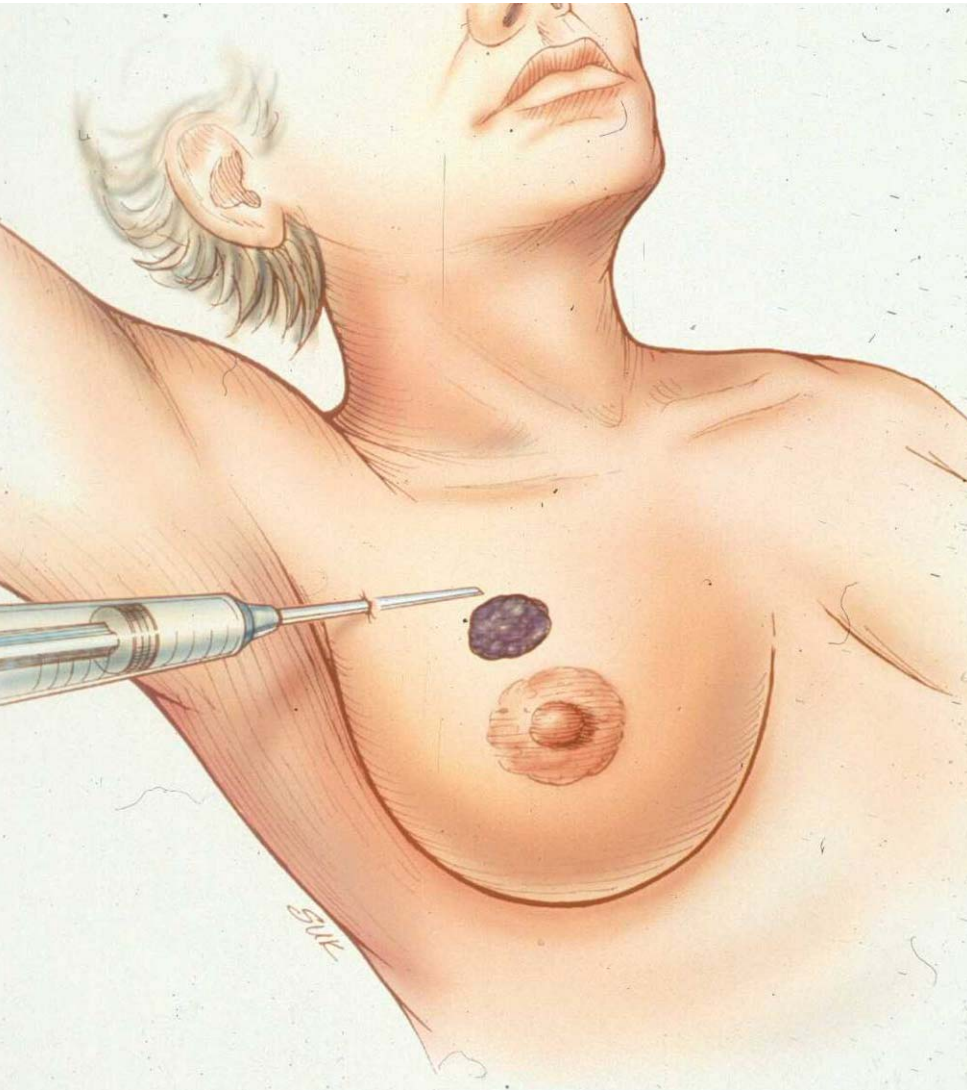


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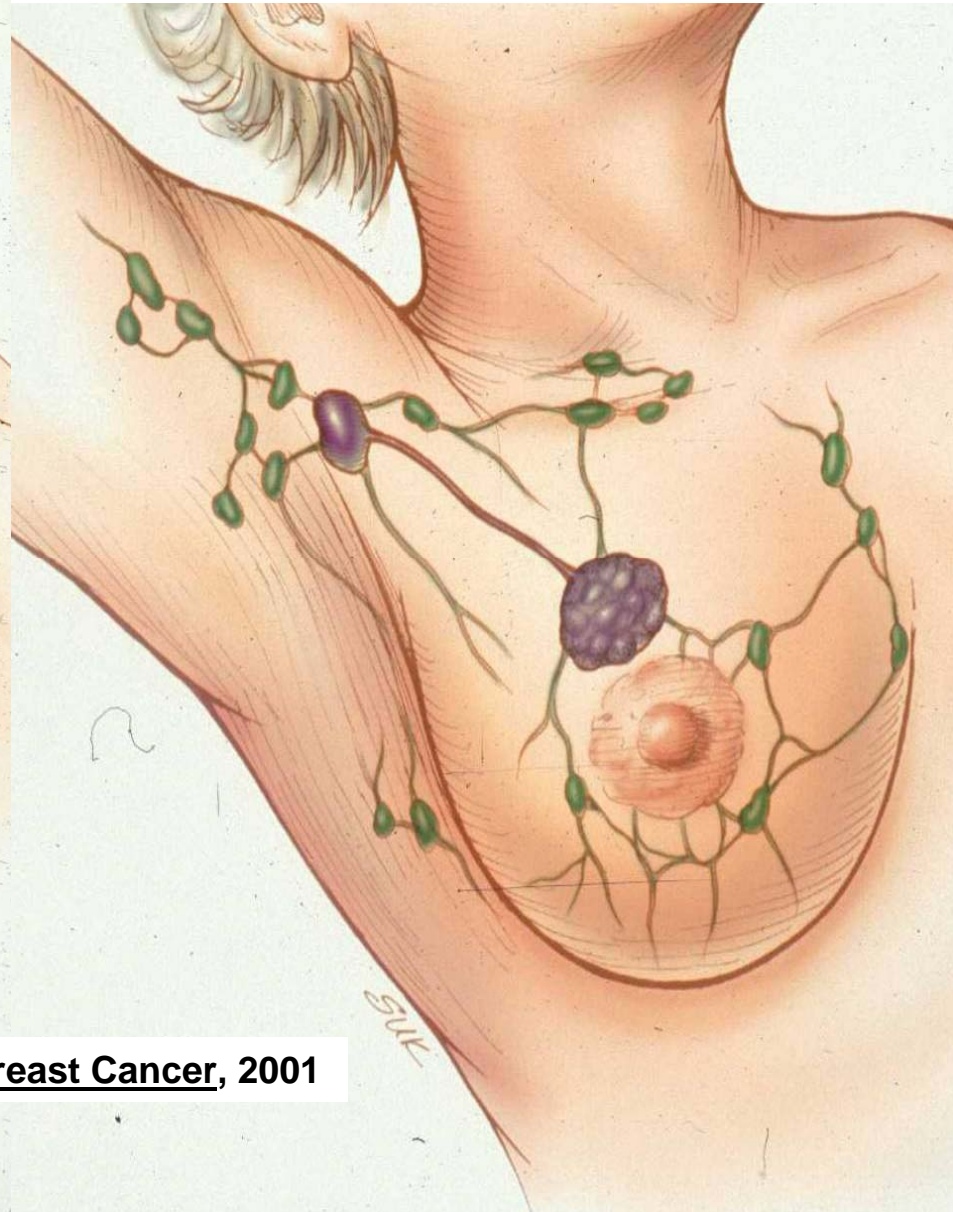
## Sentinel Lymph Node Biopsy



**Peritumoral injection of dye  
and/or radiolabelled colloid**

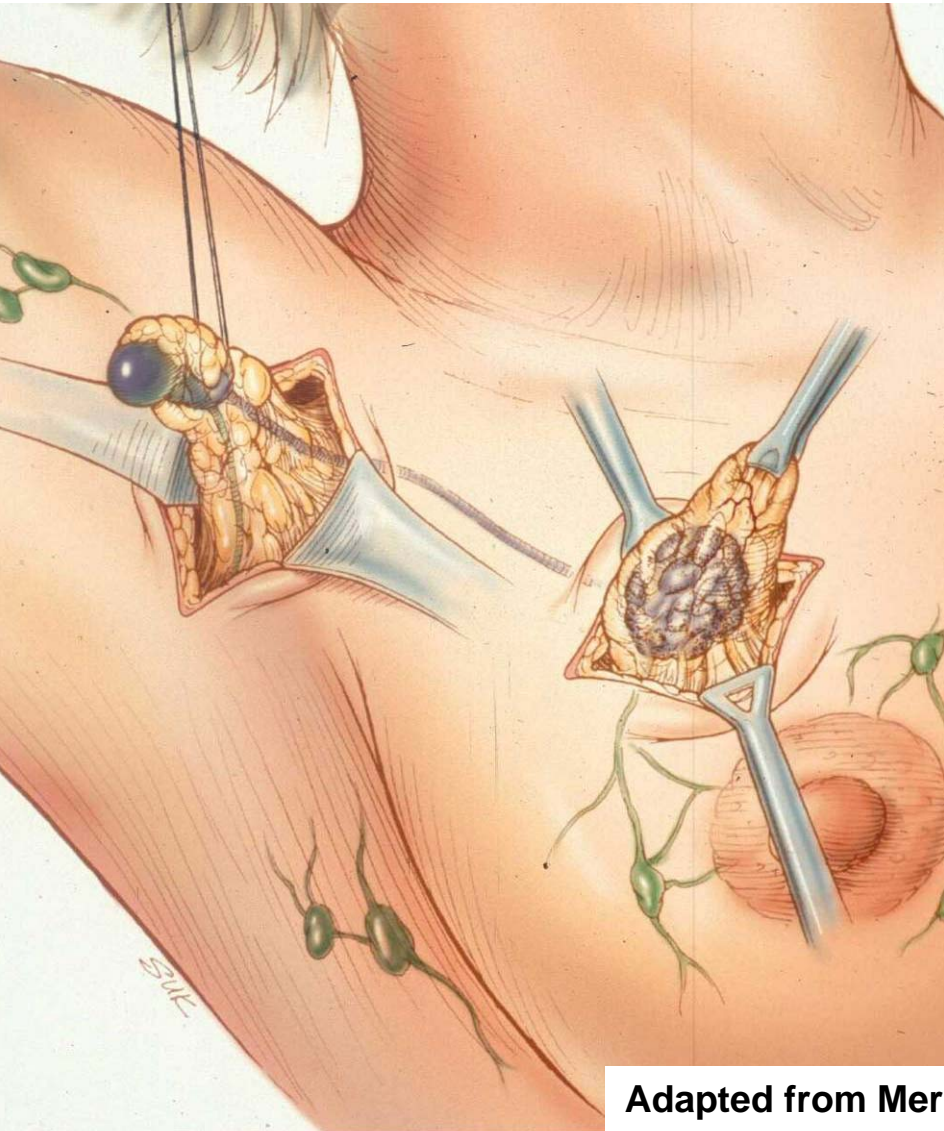


**Agent travels through lymphatic  
channels to the sentinel lymph  
node**

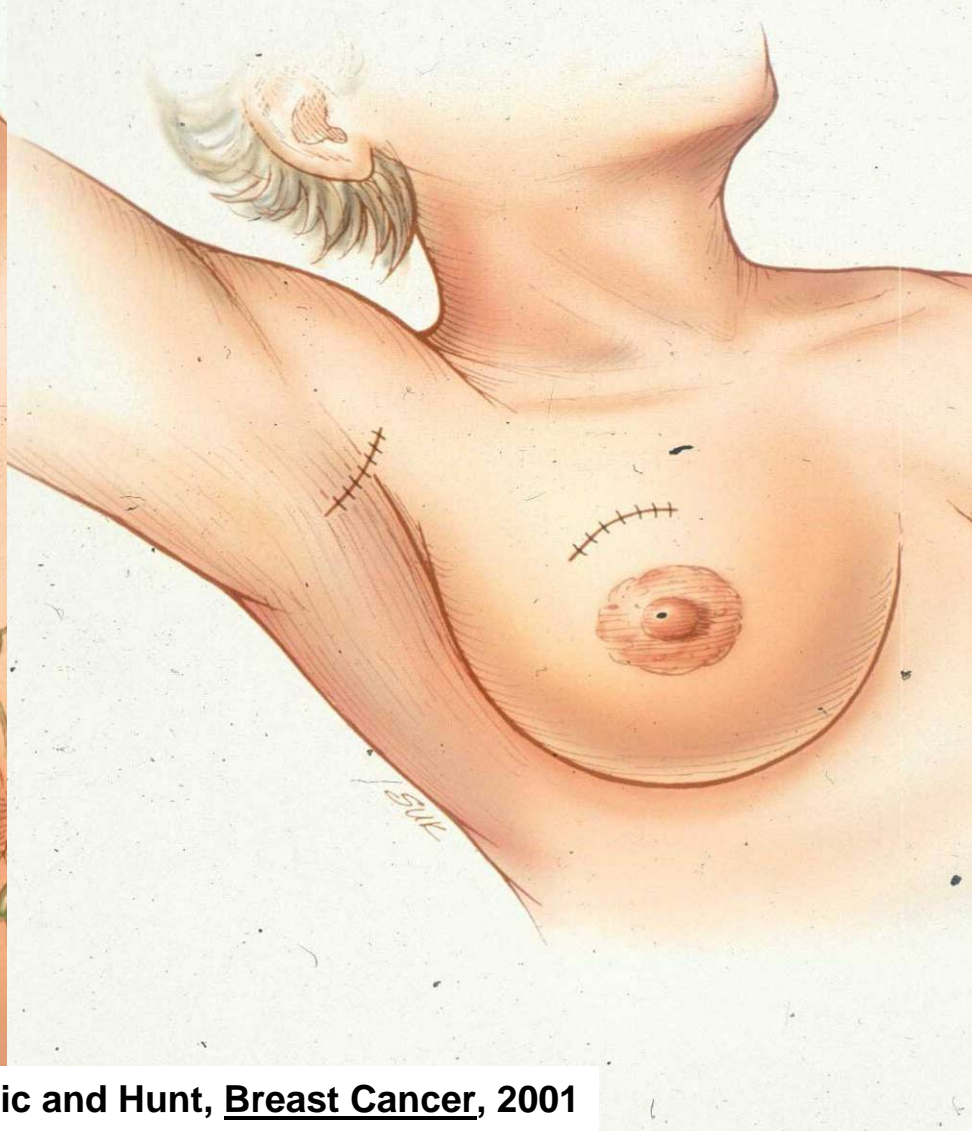


Adapted from Meric and Hunt, Breast Cancer, 2001

# Removal of axillary sentinel node and primary breast tumor



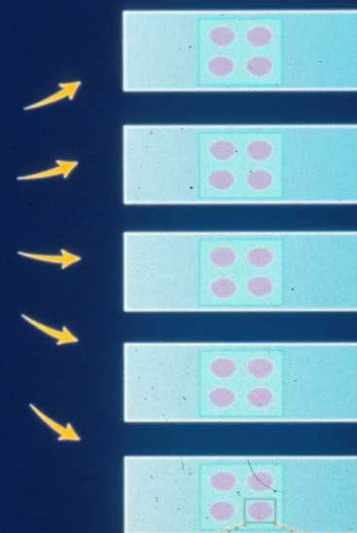
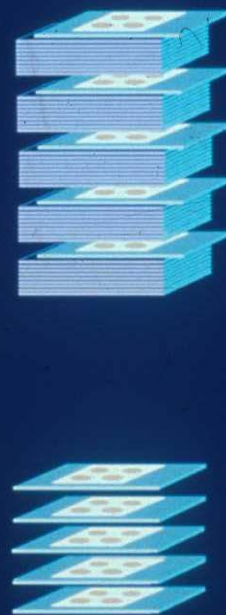
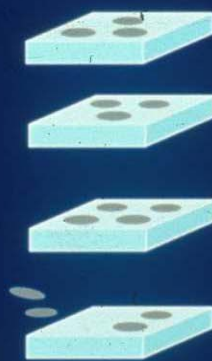
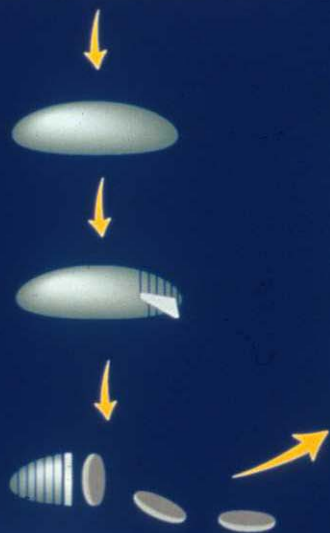
# Postoperative Incisions



Adapted from Meric and Hunt, Breast Cancer, 2001

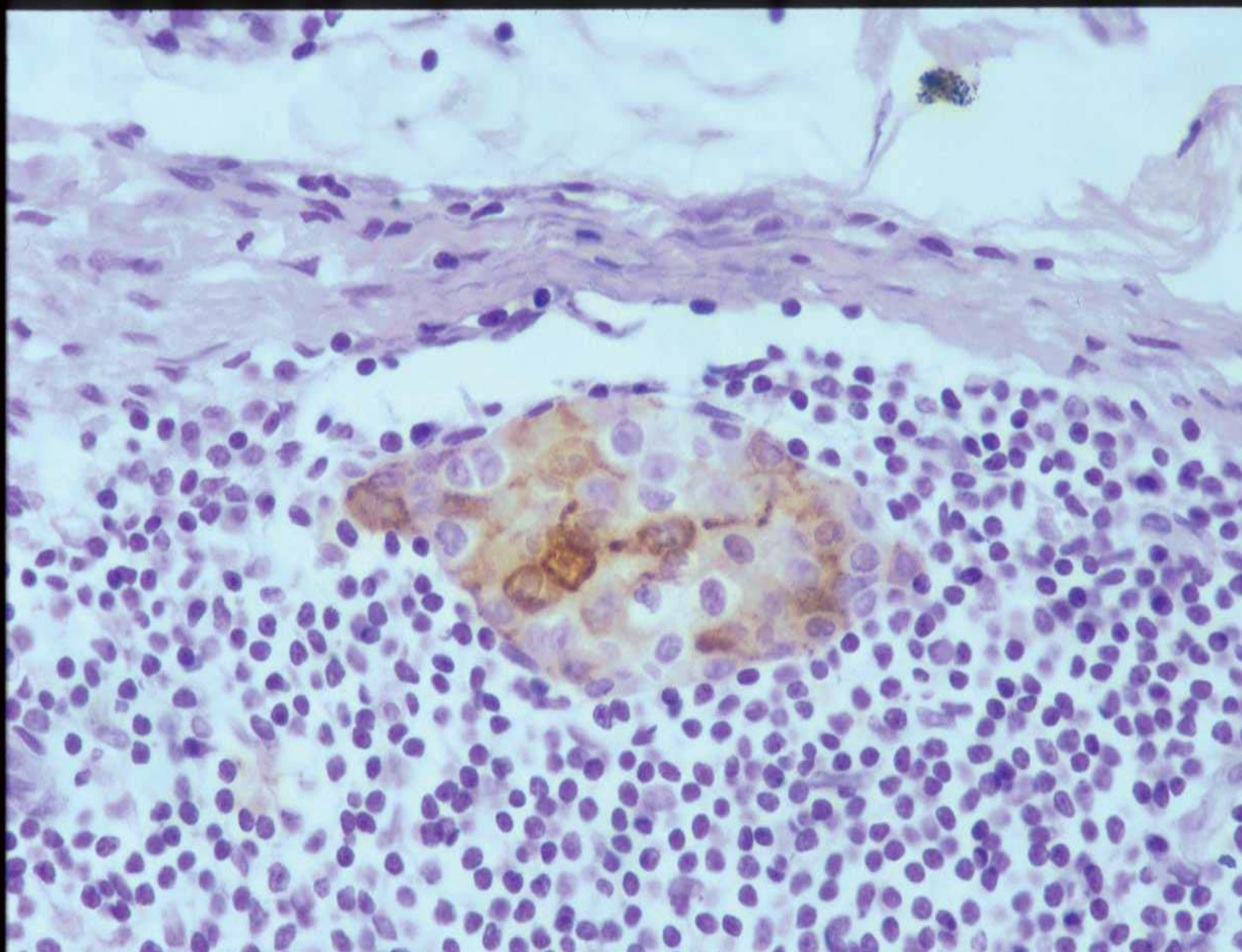
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## Pathologic Evaluation of Sentinel Lymph Nodes



THE UNIVERSITY OF TEXAS  
MD ANDERSON  
CANCER CENTER

Gershenwald - 1997



# Advantages of Sentinel Node Biopsy in “Early” Breast Cancer

- **reliable identification of patients with positive axillary nodes**
- **lower morbidity, including analgesics/drains**
  - full axillary dissection only for node-positive patients
  - spare node-negative patients the morbidity of a full dissection
- **improved staging**
  - identify patients with micrometastases (EG: < 1 mm)
  - identify sentinel nodes outside standard sampling dissection

## Preoperative Assessment and Preparation

- **Surgeon's responsibility to assess the risk-to-benefit ratio and identify and correct underlying, *relevant* health problems .**
  - **Nutritional status**
  - **Co-morbid medical conditions**
    - **Diabetes**
    - **COPD**
    - **Congestive heart failure**
    - **Liver or renal insufficiency**
    - **Immunosuppression**

## Goals of Palliative Surgery

- Relieve symptoms for patients beyond cure when non-surgical measures are not feasible, not effective, or not expedient
- Palliation means patient should be better at the completion of the procedure

“It is axiomatic that one cannot palliatively improve an **asymptomatic** patient using a scalpel.”

*R. G. Martin, 1982*

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## Palliative Improvement of Function and quality of life

- Adequate control of pain
- Relief gastrointestinal and biliary obstruction
- Stop hemorrhage
- Supplement poor nutrition
- Airway obstruction
- Renal failure
- Rectal or urinary incontinence

# **Surgery for Palliation - Metastasectomy**

**Complete resection of distant metastases  
improves five-year overall survival rates**

**40% for colorectal cancer with resection of liver  
metastases**

**30% for sarcoma with resection of lung  
metastases**

**16% for breast cancer with resection of brain  
metastases**

## Treatment-Related Complications

- **Gastrointestinal and genitourinary strictures**
- **Fistulae**
- **Tissue necrosis of bone (osteonecrosis) or skin**
- **Proctitis and cystitis**
- **Radiation-induced secondary cancer**

## Surgical Oncology in the Future

- Preemptive surgery in populations at genetic risk for the development of cancer
- Tissue and function-preserving improvements
  - Minimally invasive and robotic surgery
  - Implantable monitors
  - Treatment sensitizers
  - Tissue-engineered, implantable “spare parts”
- Refinements in surgical practice will be driven by the underlying **molecular basis of tumor biology**

# Multidisciplinary Cancer Management Course



# **Surgical Oncology**

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