

**Approach to Cut-Up;  
Macroscopic  
Examination as the  
Precursor to Accurate  
Microscopic  
Interpretation -  
Breast**

**PATHOLOGY REPORTING OF BREAST DISEASE**

A Joint Document Incorporating the Third Edition  
of the NHS Breast Screening Programme's  
*Guidelines for Pathology Reporting in Breast Cancer Screening*  
and the Second Edition of the Royal College of Pathologists'  
*Minimum Dataset for Breast Cancer*

NHSBSP Publication No 58  
January 2005

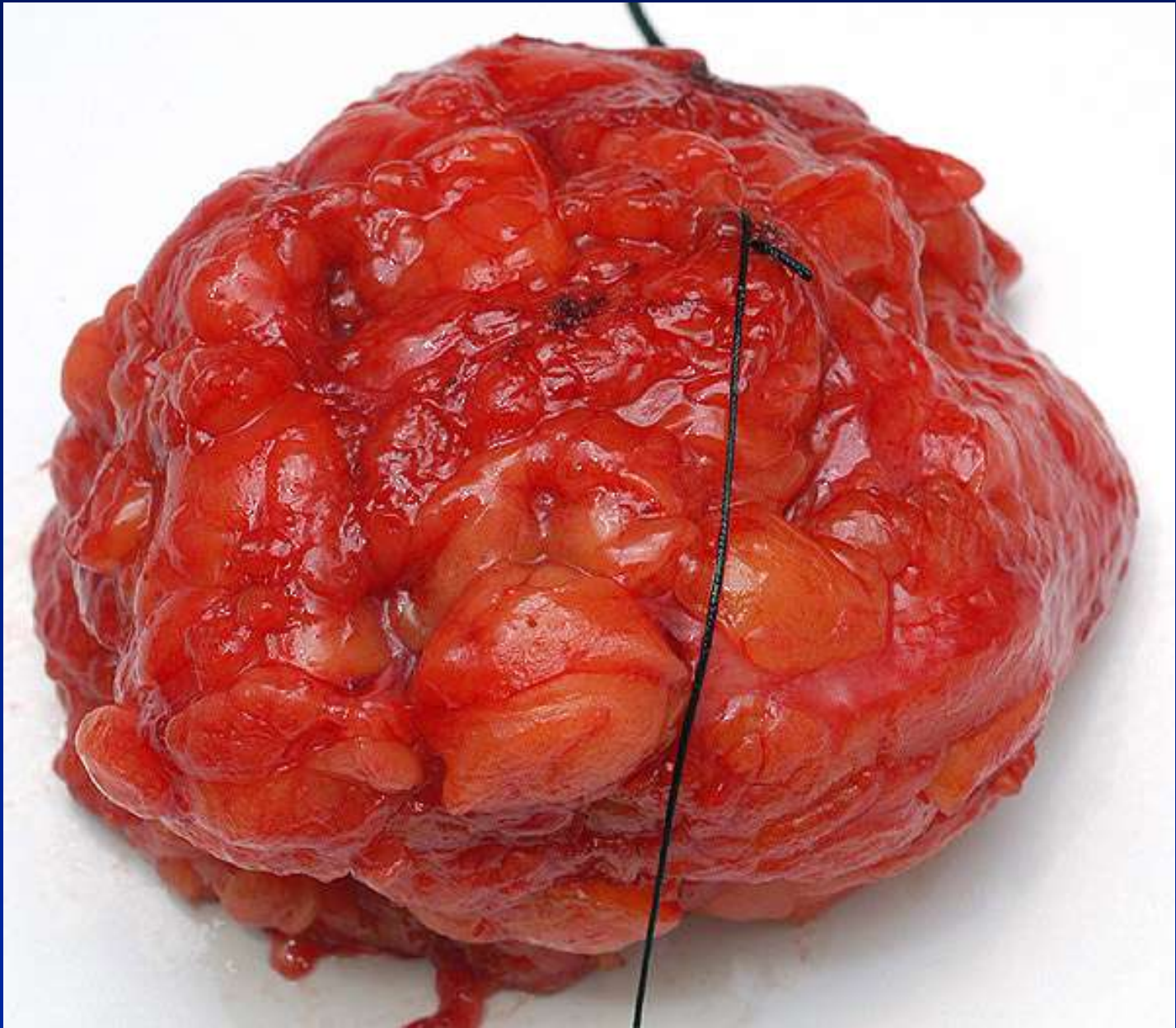
**Sarah E Pinder**

# Minimum Dataset

## Invasive Breast Carcinoma

- Tumour type and histological grade
  - Lympho-vascular invasion
  - Oestrogen receptor status
- 
- Fixation**

- Size
  - Axillary nodes
  - Excision margins
- 
- Operator**

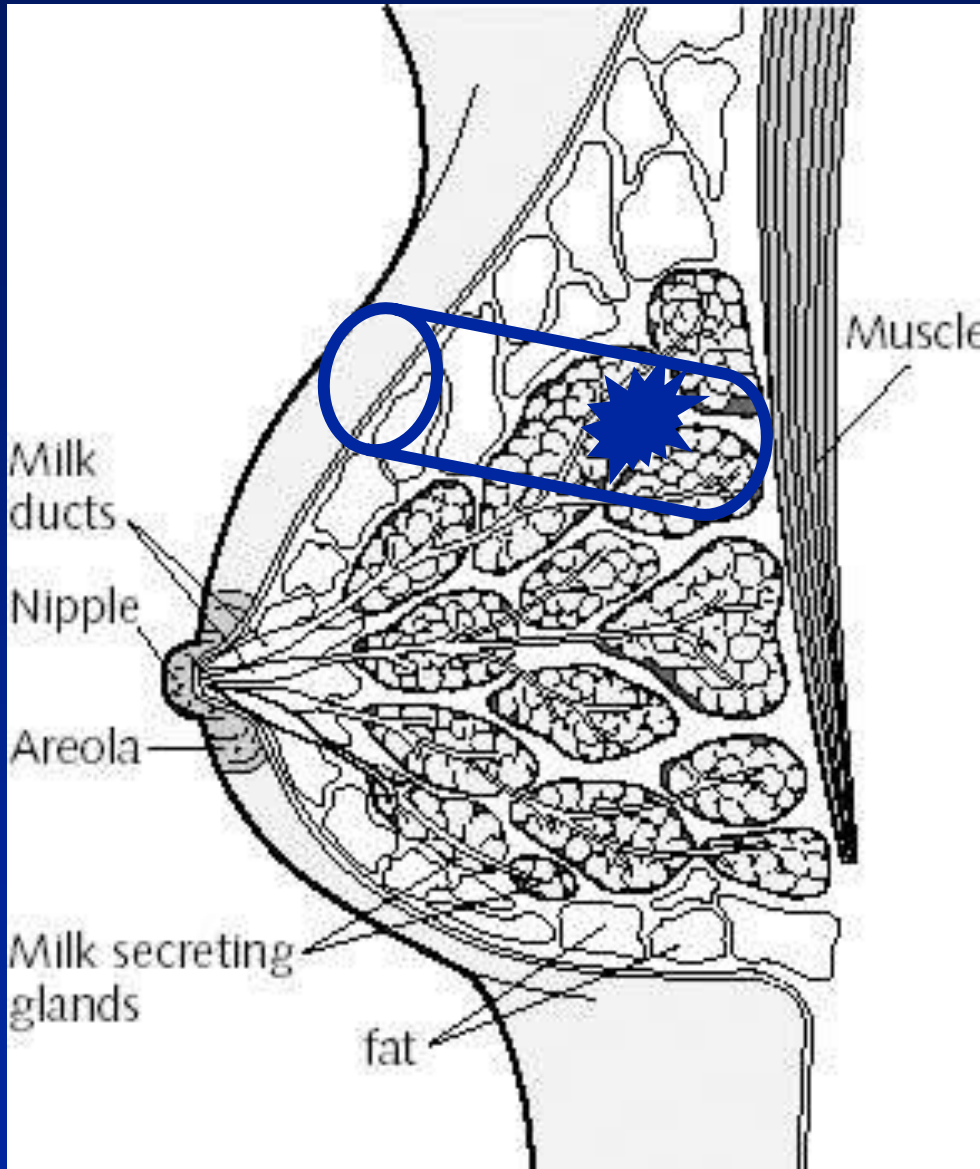


# **Breast Specimen Handling**

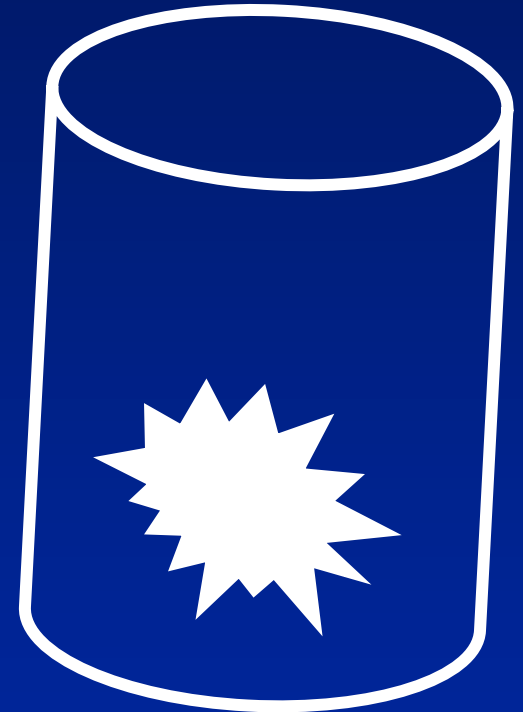
## **Principles 1 - Breast Unit Protocols**

- **Lesions should be surgically resected and orientated according to a defined protocol**
- **If the surgical resection differs, this should be discussed**

# Therapeutic Breast Surgery (1)

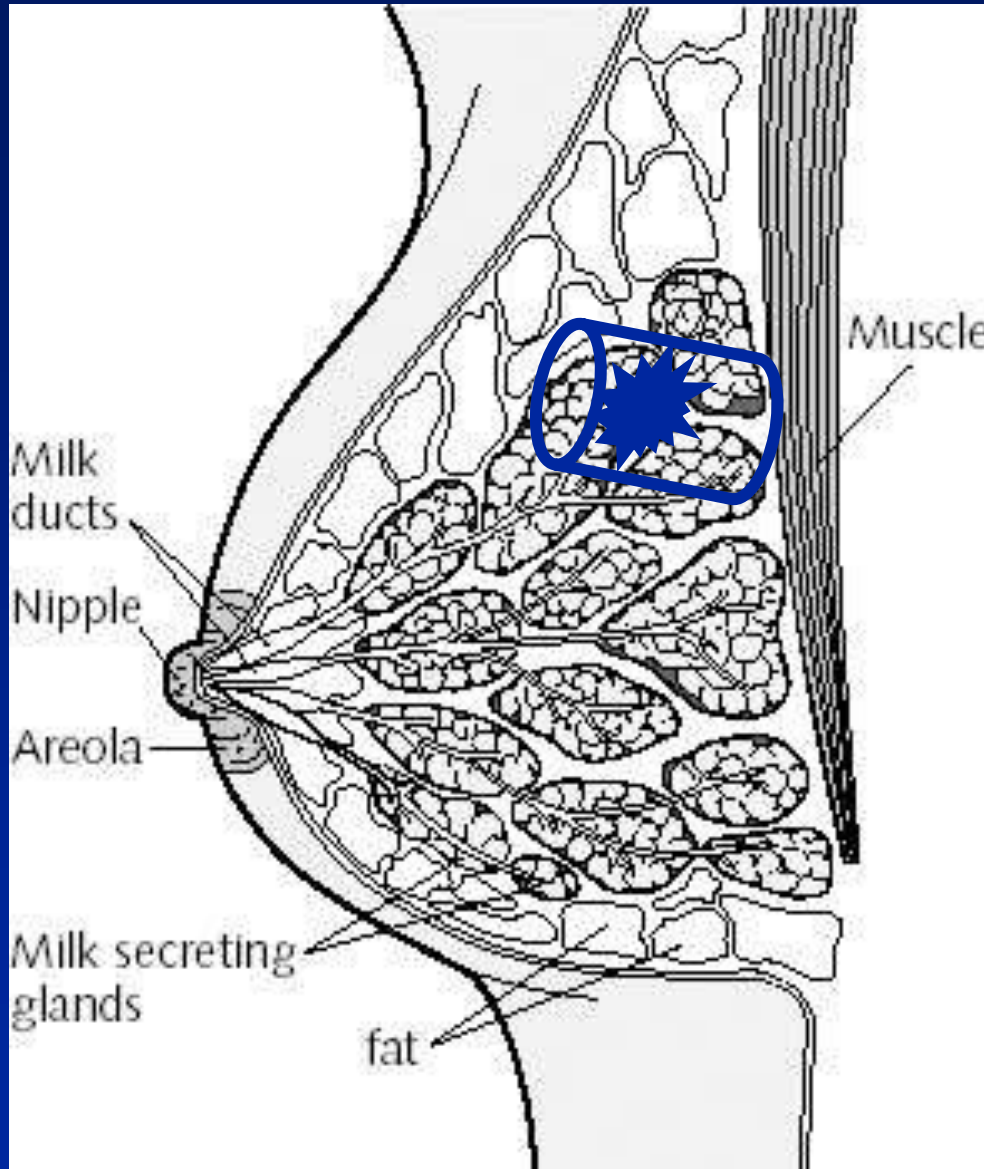


**Anterior = skin**

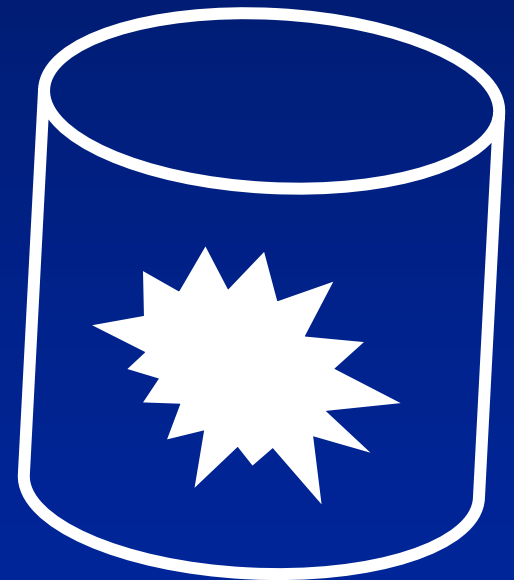


**Posterior = fascia**

# Therapeutic Breast Surgery (2)



**Anterior = breast**



**Posterior = fascia**

# **Breast Specimen Handling**

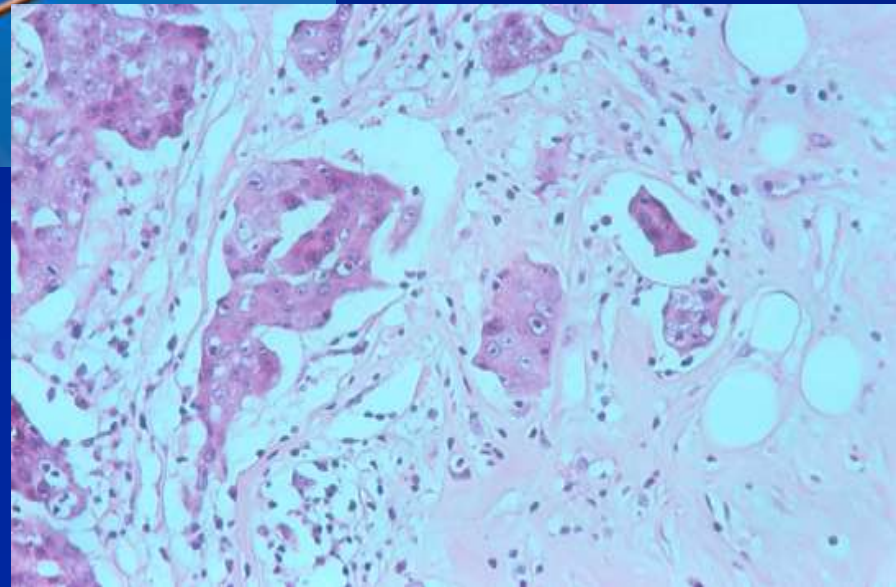
## **Principles 2 - Breast Unit Protocols**

**Request form with appropriate clinical information including:**

- (Name, date of birth, side, site etc)**
- Surgical procedure**
- Microcalcification, mass, deformity**
- Single or multiple foci, neo-adjuvant therapy etc**

**Specimen:**

- Appropriate orientation sutures and/or clips**
- X-ray**
- Ideally fresh to incise for optimal fixation**



**What is lesion?**

**Where is lesion?**

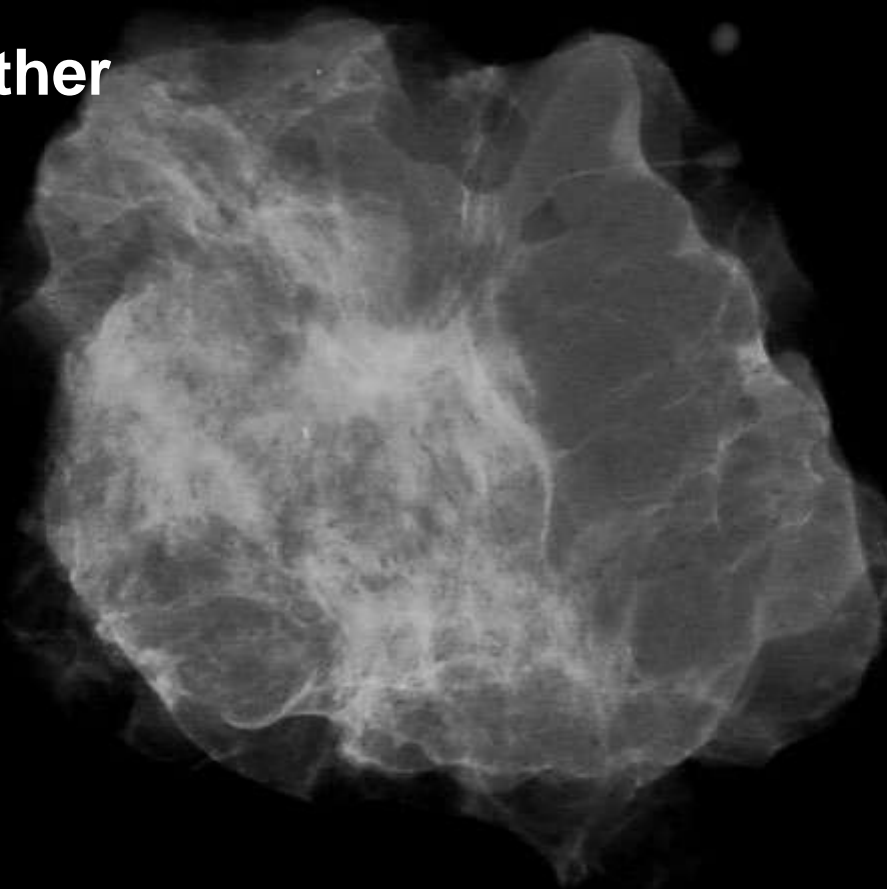
**Nearest margin?**

**Is there any other  
abnormality?**

**S**

**M**

**L**



# Specimen orientation

## Sutures or clips

According to local protocol

e.g.

Long – Lateral

Short – Superior

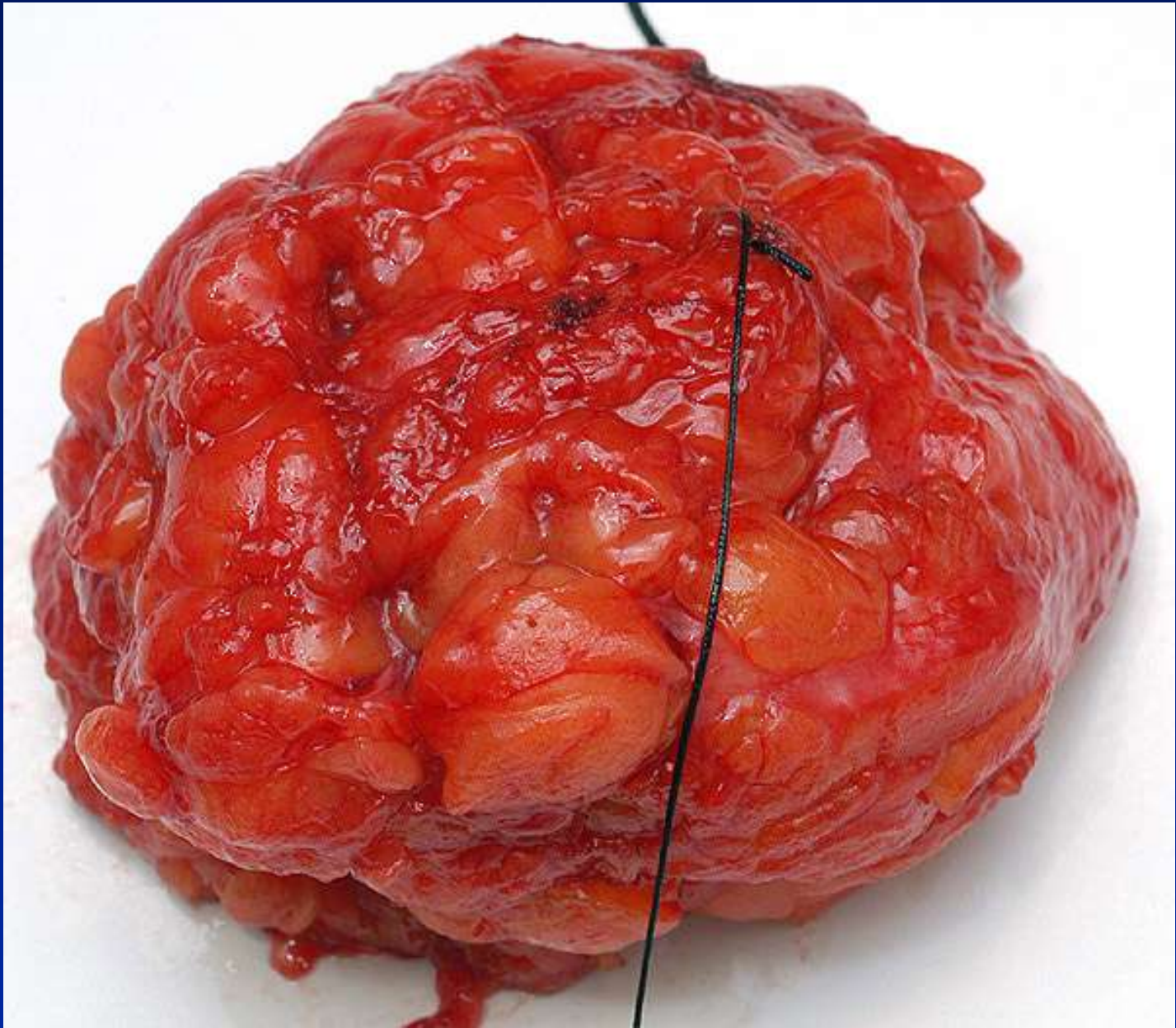
(Medium – Medial)

or

1 = Anterior

2 = Superior

3 = Nipple margin



# **Specimen Handling**

## **Laboratory Practice 1 - WLE**

- **Measure in 3 dimensions**
- **Weigh**
- **(Macroscopy proforma)**
- **Ink**
  - **Anterior, blue**
  - **Lateral, blue**
  - **Deep, yellow**
  - **Medial, green**
  - **Superior, red**
  - **Inferior, black**



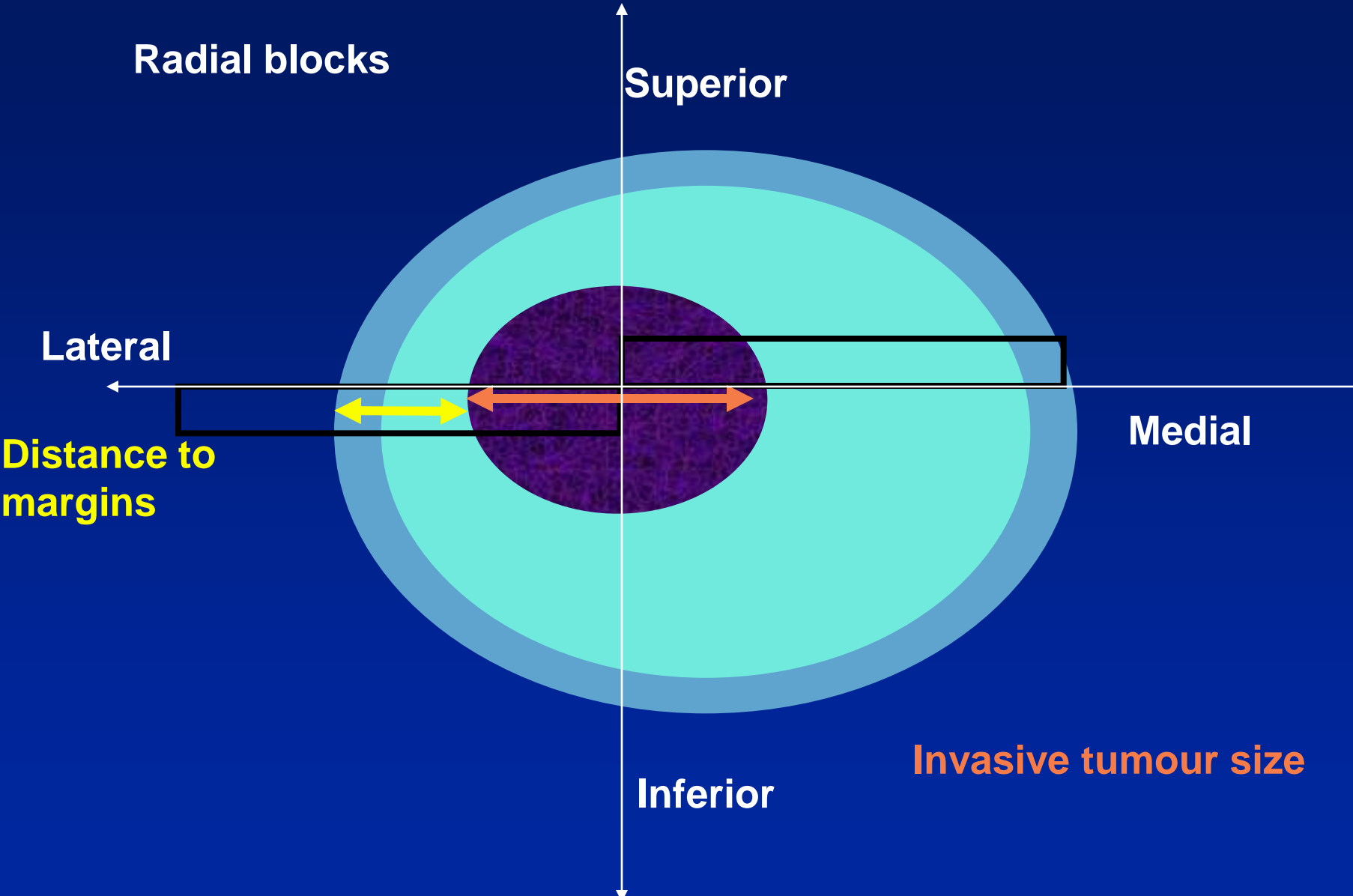




## How to Slice?

- **Incise ( & bank tissue ) and fix**
- **3 main approaches to WLE; depend on size & shape of specimen, lesion type & personal preference**
  - **Bread-slice - medial to lateral or superior to inferior**
  - **Bread-slice - anterior to posterior**
  - **Cruciate**

# Cruciate - mass lesion



Radial blocks

Superior

Lateral

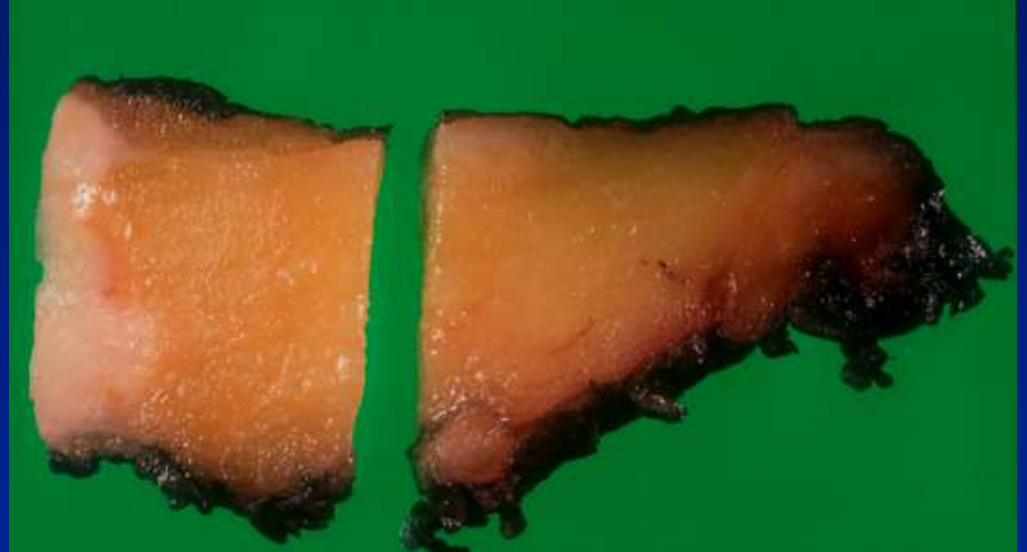
Distance to margins

Medial

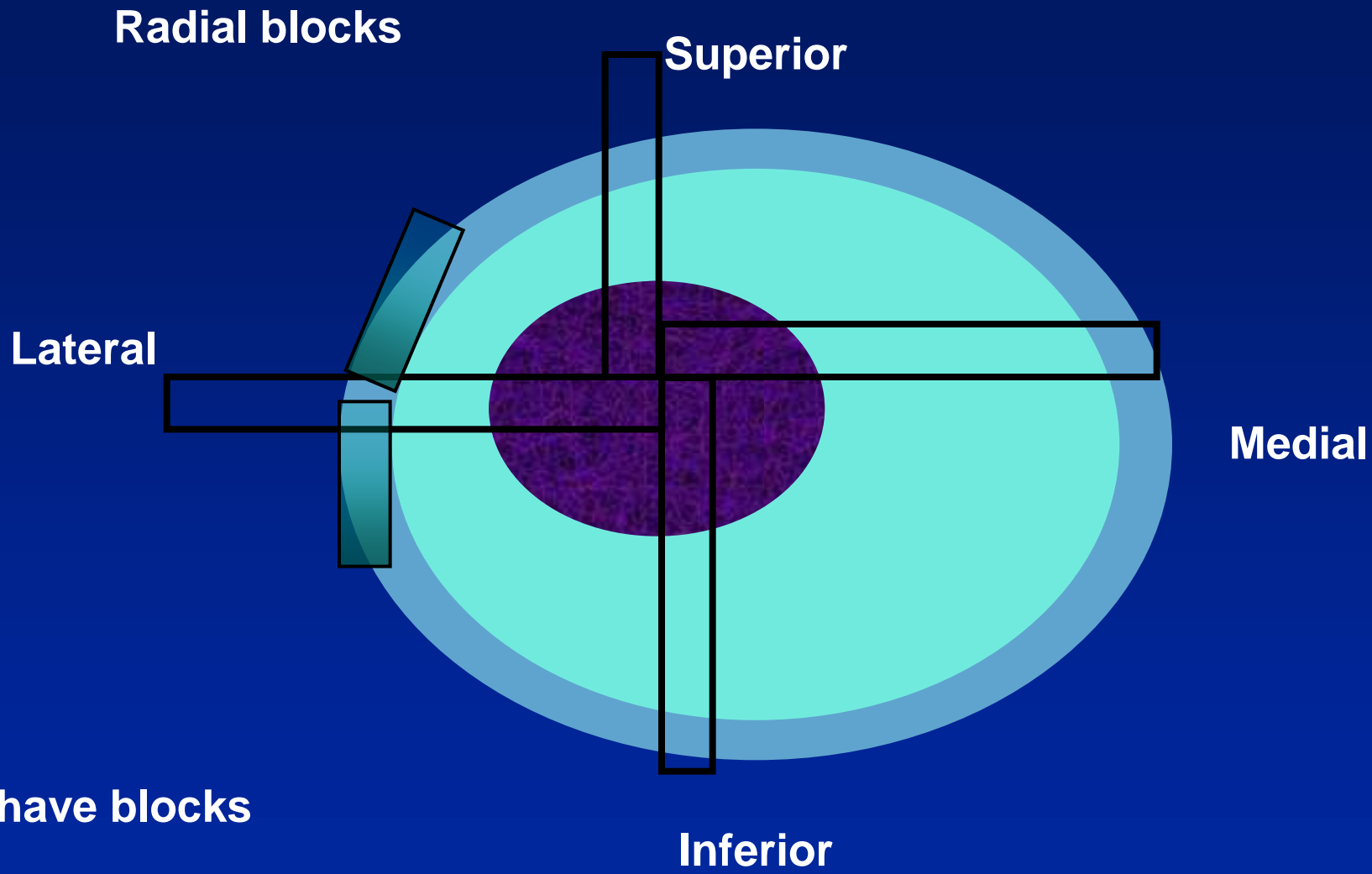
Invasive tumour size

Inferior



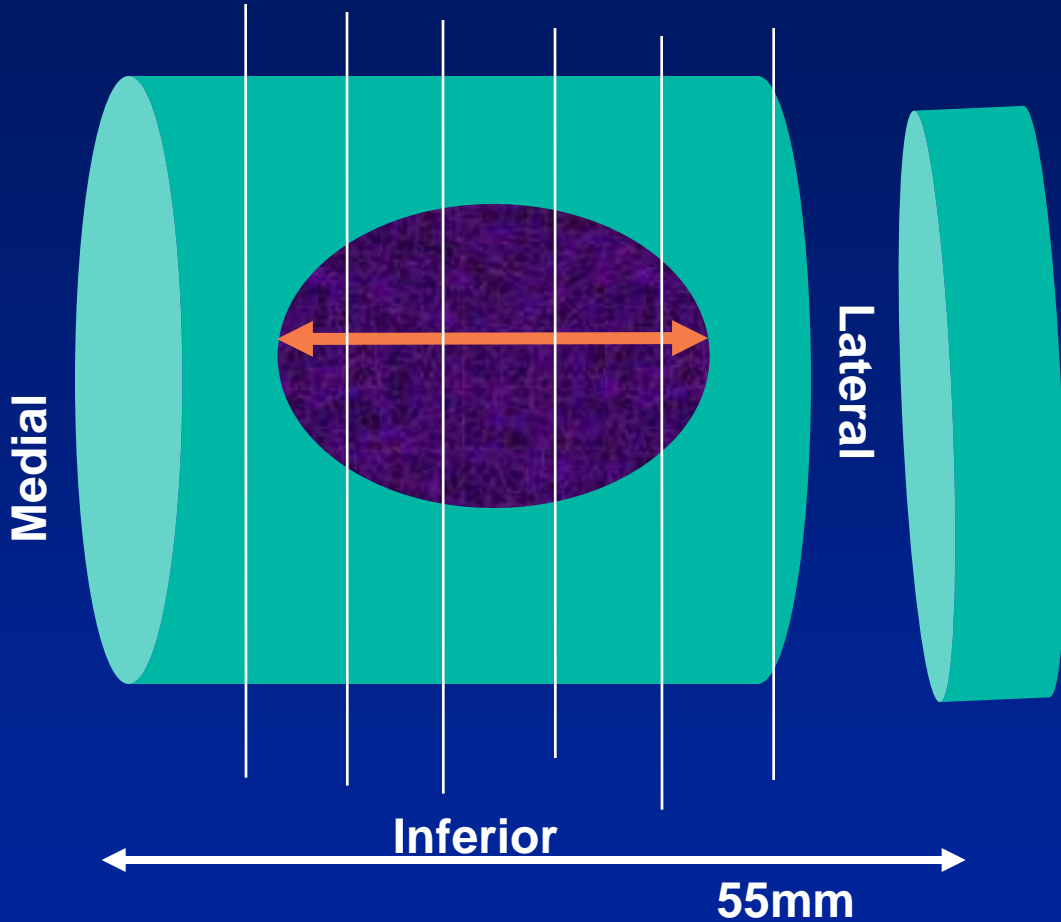


# Cruciate

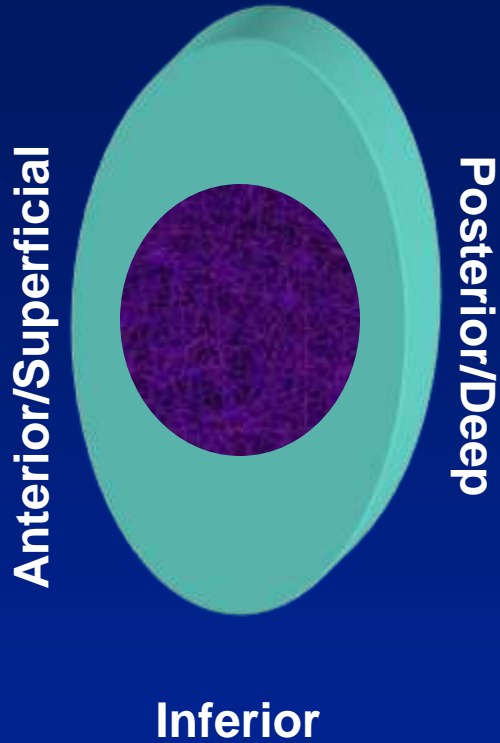


Method 1: serial slicing perpendicular to the medial-lateral plane (Figure 2)

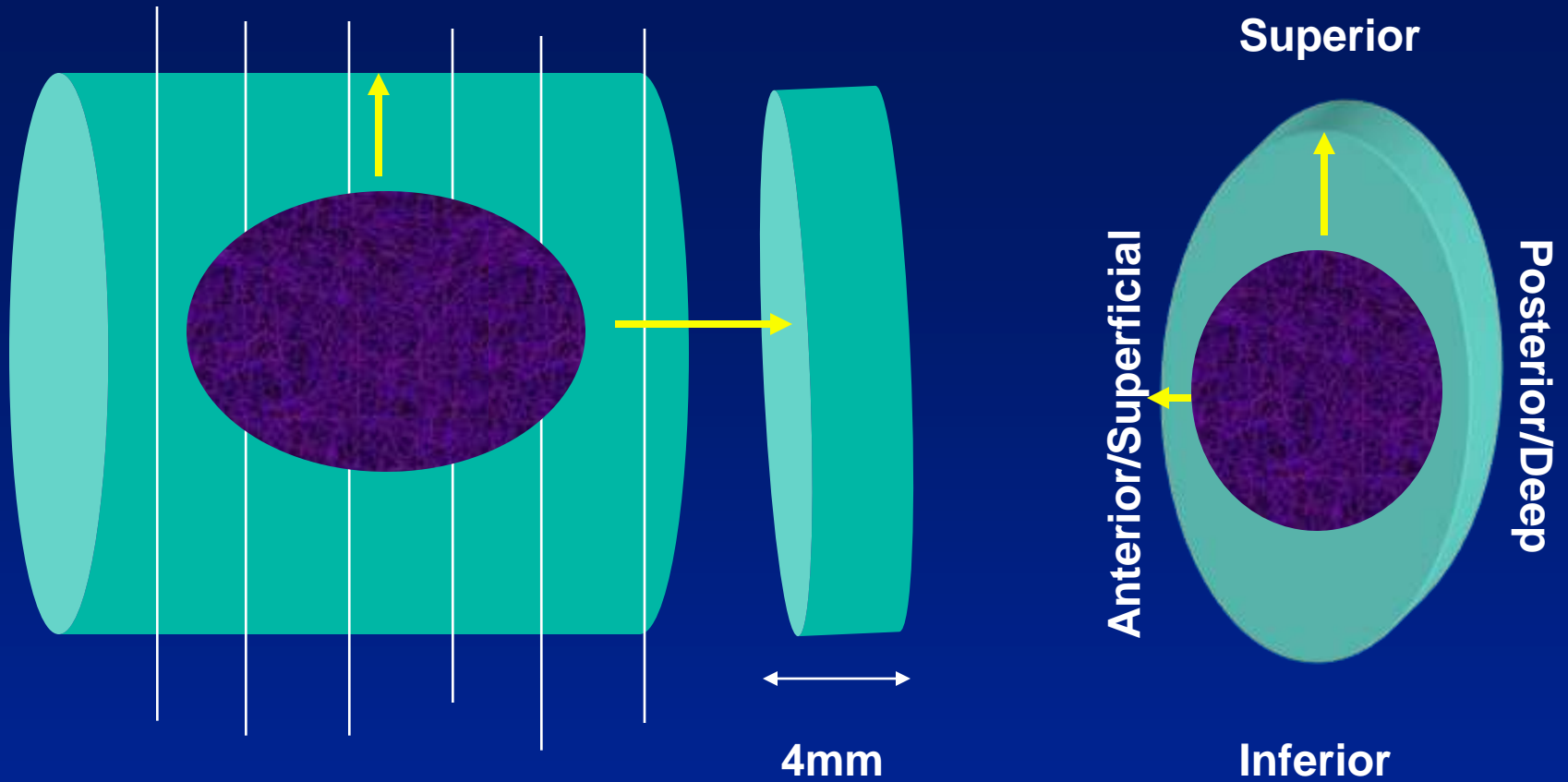
Superior



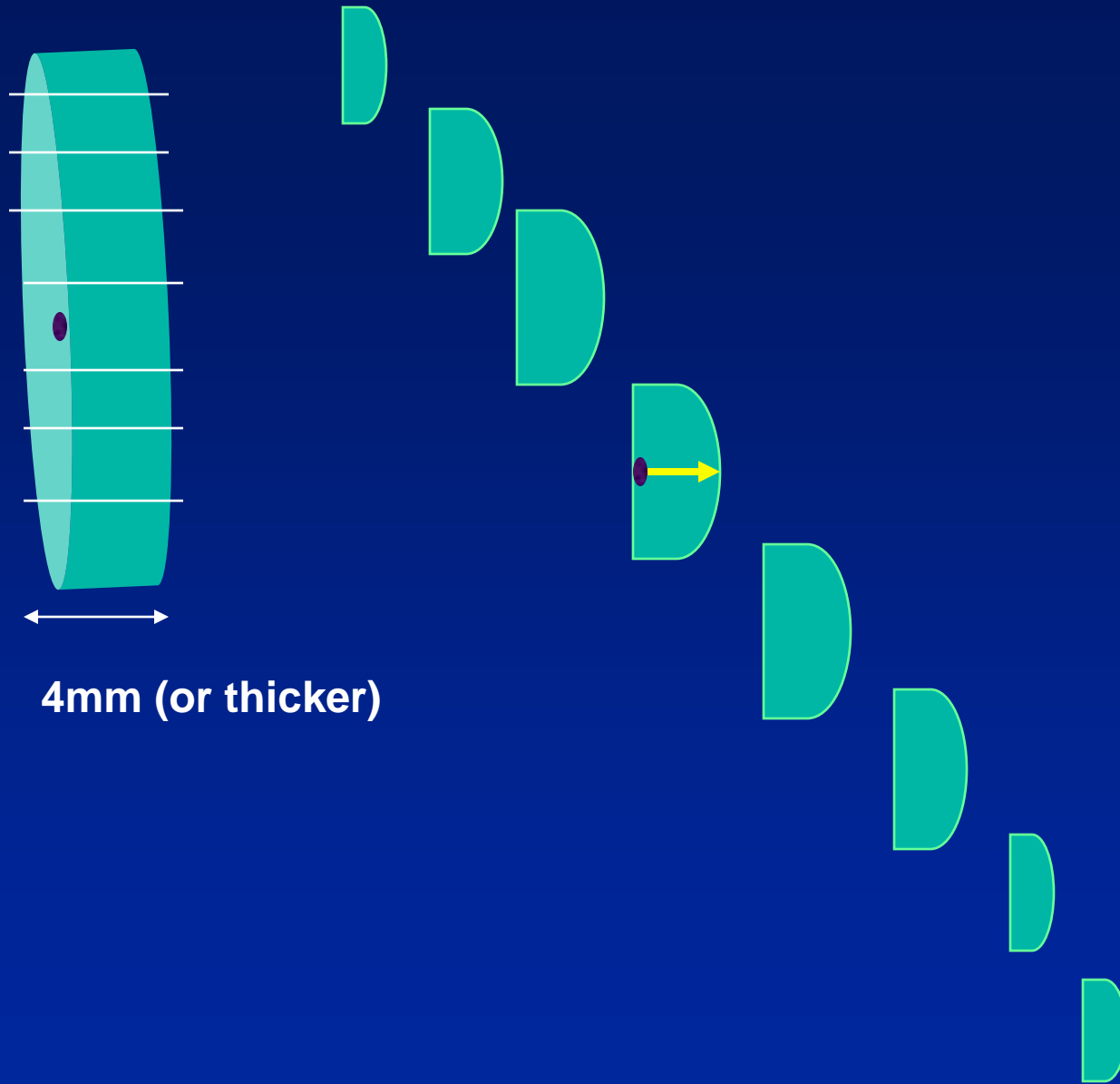
Superior



Tumour size =  
no. of slices with tumour / total number slices x size of specimen  
(e.g. above 5 of 8 slices x 55 = 34mm)

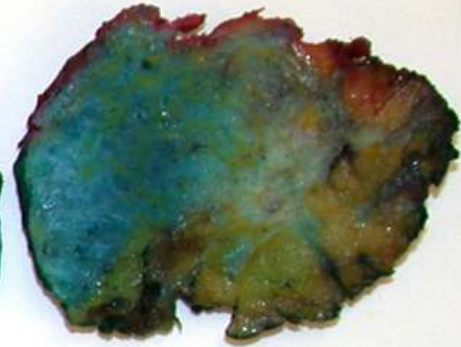
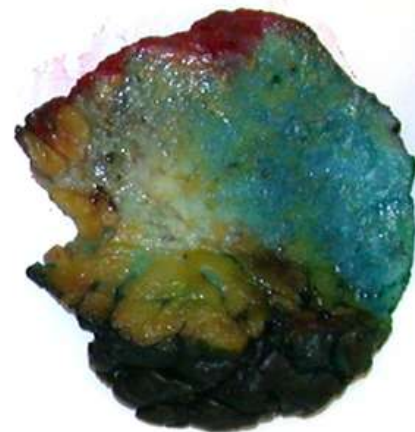
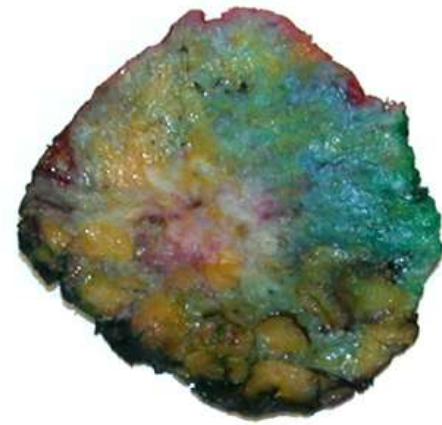


Handling of end slices depends on local clinical protocol definition of “complete excision”.



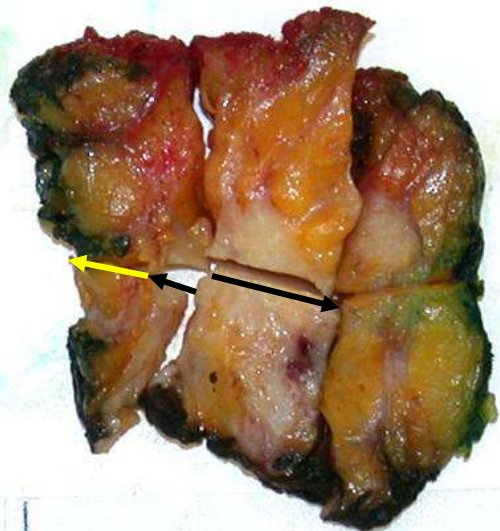
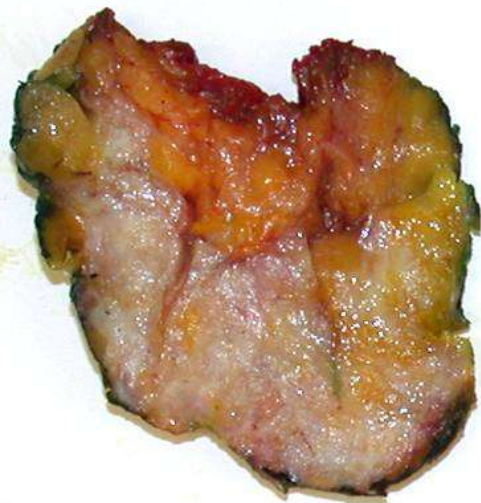
4mm (or thicker)

Method 2: serial  
slicing perpendicular  
to the superficial–deep  
plane (Figure 3)

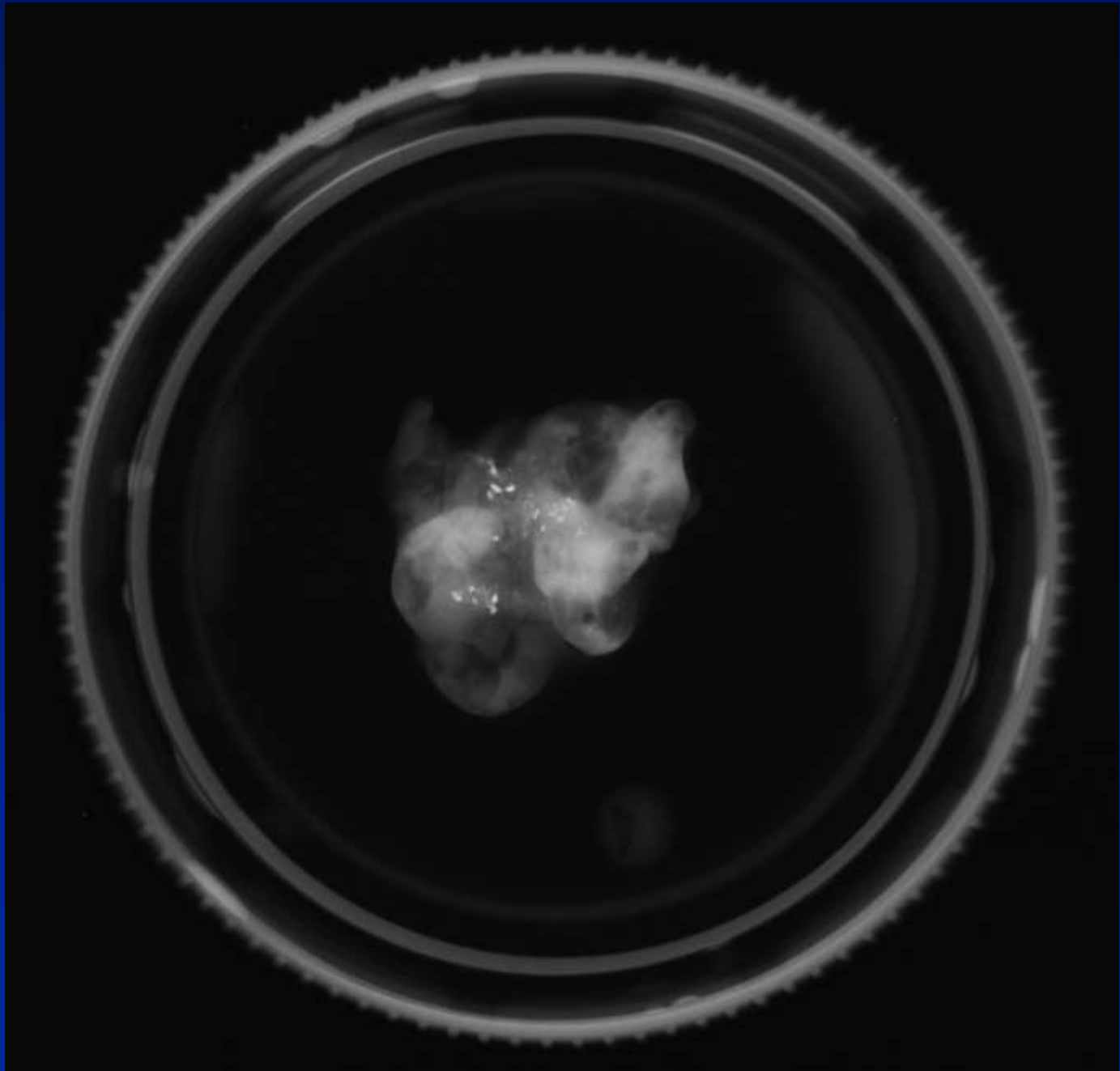


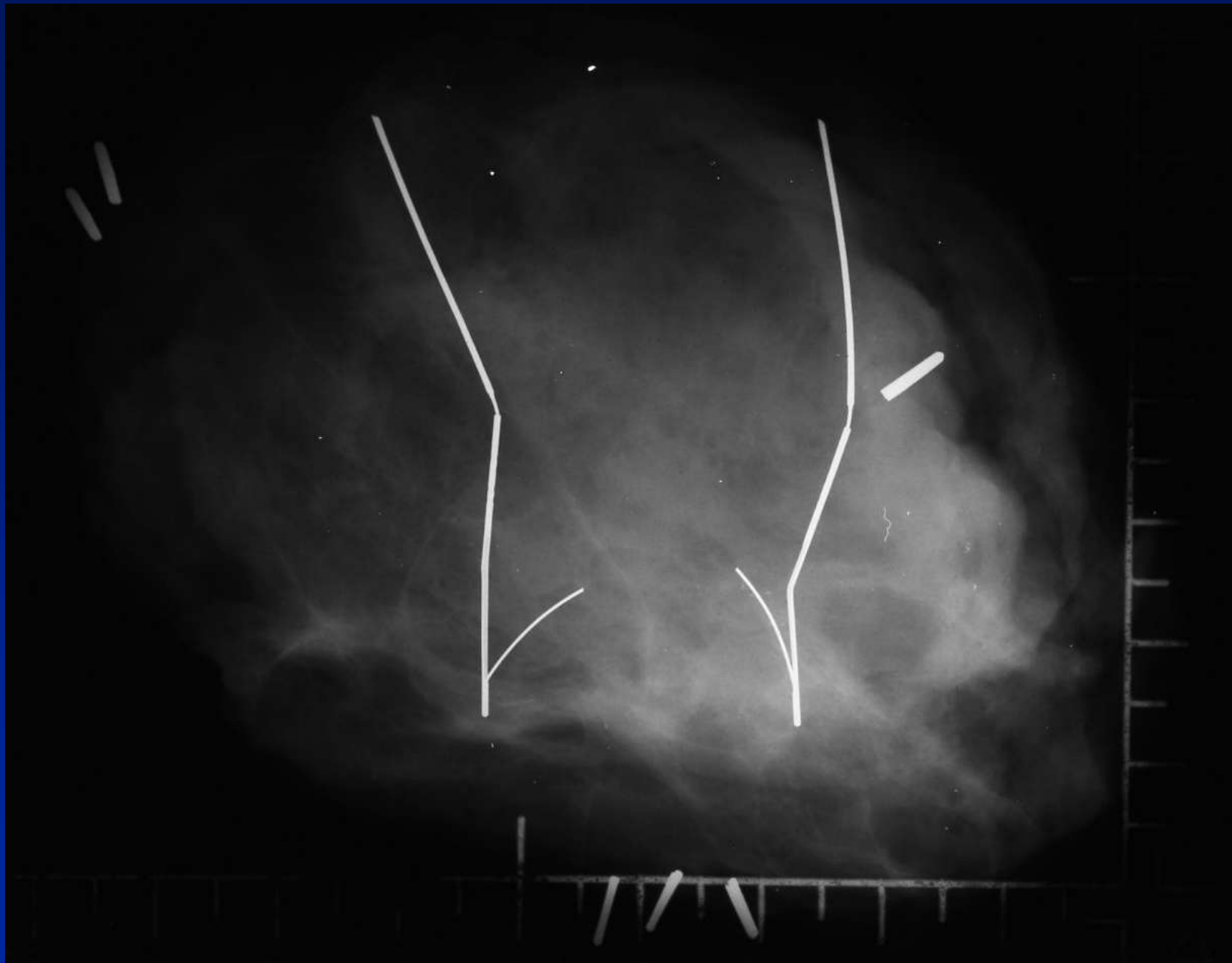
0cm 505  
3061

ANTERIOR

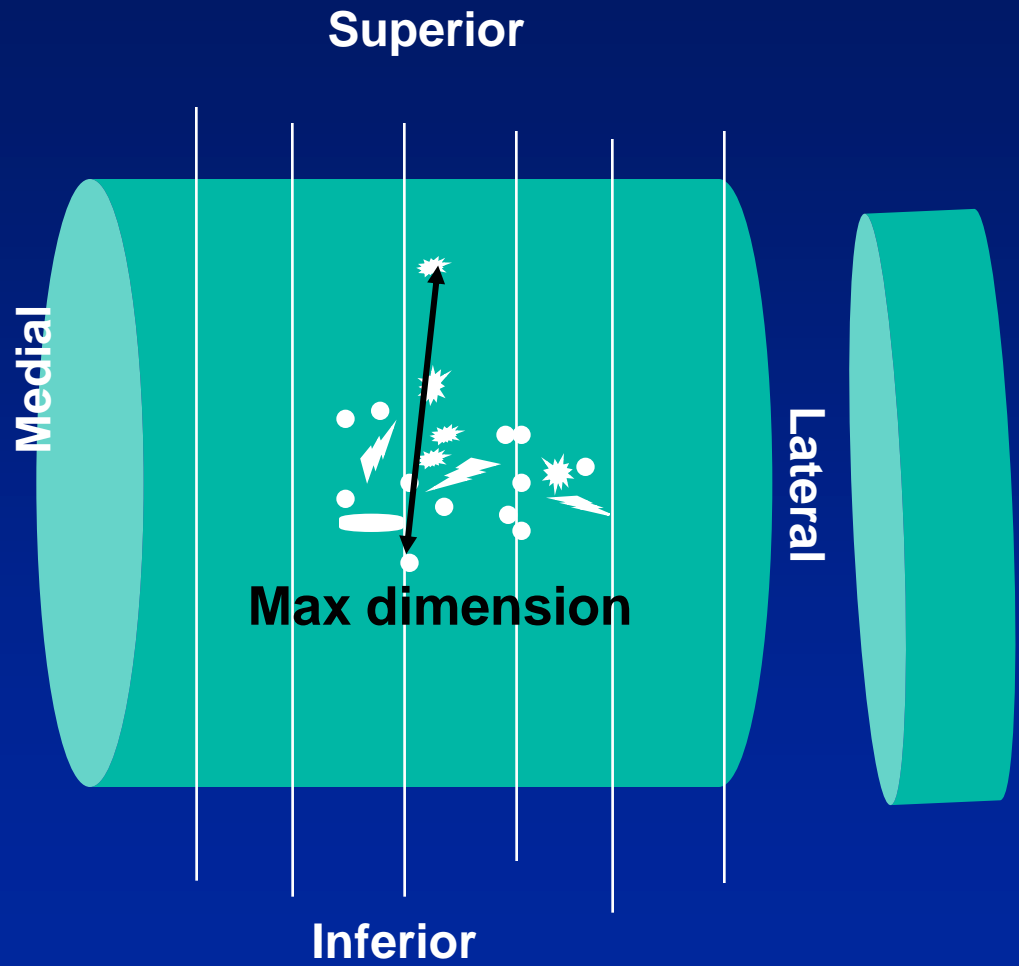


ANTERIOR





Method 1: serial slicing perpendicular to the medial-lateral plane (Figure 2)



Slice from mid specimen





# Excision of DCIS

## Prediction of Disease Extent by Radiology

**Comedo / Solid**

**85% of area visible  
mammographically**

**Micropapillary / Cribriform**

**50% of area visible  
mammographically**



**Calcification**

0cm

5cm

10cm

15cm

# Specimen Handling

## Practice 2

### Mastectomy

- Specimen arrives fresh
- Orientated
- *(Ink)*
- Slice
- Fix
- *(X-ray)*

LATERAL



0cm 5

INFERIOR



Courtesy of Colin Purdie, Ninewells.

MEDIAL



SLICE  
8



0cm

5

0177-1





E

F

G

H

I

J

K

L

M

Courtesy of Colin Purdie, Ninewells.

# Breast Specimen Handling

- **Sample for histology**
  - **Macroscopic lesions**
  - **(Radiographic lesions, X-ray, MRI)**
  - **Adjacent tissue for (extent of) DCIS**
  - **Surgical margins, as appropriate for specimen type and Breast Unit clinical protocol**

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

- **259 consecutive mastectomies**
- **New diagnosis of Paget's disease in 3 (1%)**
- **All 4 quadrants sampled in 230**
- **Unsuspected multifocality microscopically in quadrant sections in 14, in nipple in 3 and in both in 1 (total 8%)**
- **Such findings do NOT affect patient management**

# Axillary Clearances

## Minimum standard

- Every lymph node examined histologically
- Total number of nodes assessable - at least one slice per node
- Allows multiple nodes per block

## Ideal method

One node per cassette - multiple slices

<http://www.cancerscreening.nhs.uk/breastscreen/publications/nhsbsp58.html>

# Axillary Clearance



# Axillary Clearance



# Axillary Metastasis Reporting

|                                     |                          |   |                    |
|-------------------------------------|--------------------------|---|--------------------|
| <b>(Macro)metastasis</b>            | <b>&gt; or = 2mm</b>     | } | <b>LN Positive</b> |
| <b>Micrometastasis</b>              | <b>&lt;2mm &gt;0.2mm</b> |   |                    |
| <b>Isolated Tumour Cells (ITCs)</b> | <b>&lt;0.2mm</b>         |   | <b>LN Negative</b> |

- **UICC (International Union against Cancer) TMN Classification**
- **Singletary et al. J Clin Oncol 2002; 20;3628-3636**
- **Pathology Reporting in Breast Disease. NHS BSP Publication no 58.**

# **Lymph node sample specimens, including sentinel nodes**

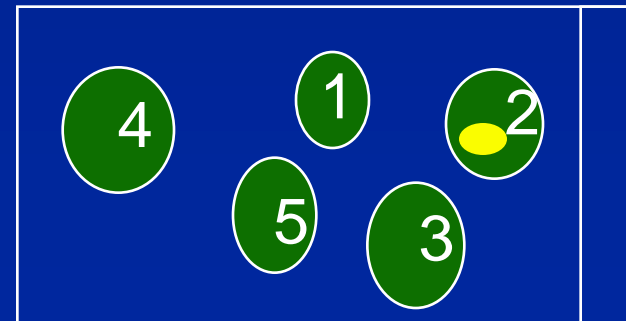
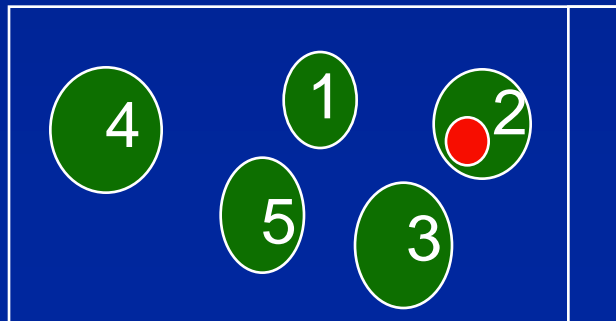
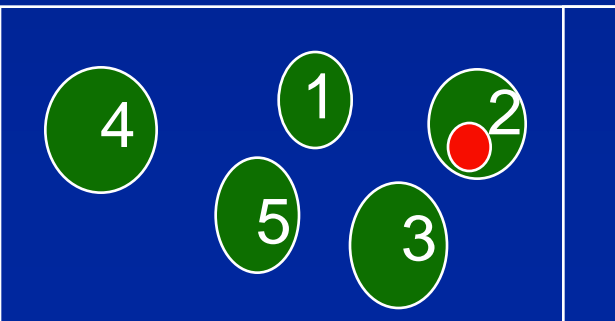
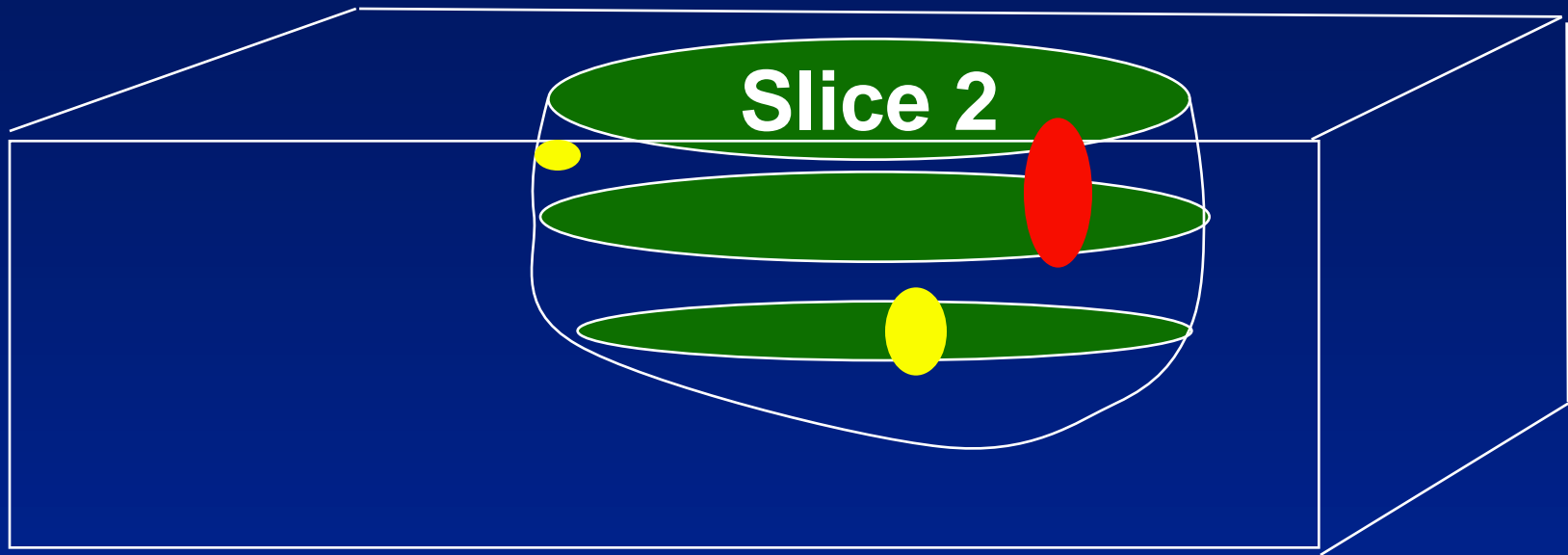
- **Methodology should provide highest chance of finding metastases by routine H&E microscopy**
- **Each node blocked separately**
- **Lymph nodes >5mm slice at approx 2-3mm, perpendicular to long axis**
- **Embed all**
- **Lymph nodes <5mm should, ideally, be bisected & blocked**

# SLN Handling Protocols

- Survey in Europe
- 123 different protocols for SLN
- 12% single H&E level of sliced SLN
- H&E levels (63%)
- IHC (71%) on H&E negative SLN - 12 different antibodies
- Molecular analysis (4%)
- 60% intra-operative assessment

Cserni. J Clin Pathol. 2004;57:695-701

# Levels of Lymph Nodes



# Levels?

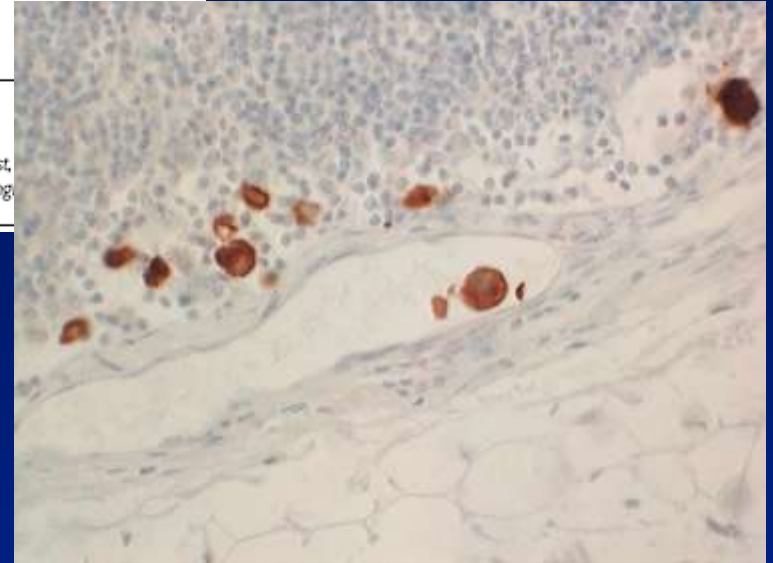
Calculated that

- Identification of an isolated tumour cell would require **312 sections of a 1cm LN**

# The value of immunohistochemistry in sentinel lymph node histopathology in breast cancer

MB Klevesath<sup>1</sup>, LG Bobrow<sup>2</sup>, SE Pinder<sup>\*2</sup> and AD Purushotham<sup>1</sup>

<sup>1</sup>Cambridge Breast Unit, Department of Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, UK; <sup>2</sup>Department of Pathology, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, Eng



- 476 SLNs, 216 patients
- 3 H&E levels
- 26% metastasis on H&E
- IHC (Cam 5.2+) metastases in further 9 (4%)
- 4 (2%) micrometastasis & 5 (2%) ITCs only
- On review all micrometastases visible on H&E

BJC 2005; 92;2201-5

**IHC identifies ITCs, if H&E carefully assessed**

# **Approach to Cut-Up - Breast**

## **Conclusions**

- 1. Be friends with the clinical team**
  - Know local clinical protocols
  - Appropriate radiological and clinical information with specimen, previous histological (pre-operative) reports
- 2. Be adaptable**
  - Benefit of different approaches to slicing specimens
  - Receive fresh if possible - good fixation
  - Make use of X-rays
- 3. Block selection is relatively straightforward**
  - Sample lesion, adjacent tissue & margins
  - Lymph nodes - multiple thin slices & good quality H&E
  - Report to minimum datasets - synoptic reports / proformas