Specimen Grossing

Lecture Objectives

- State steps involved in grossing.
- Discuss how grossing contributes to accurate diagnosis.
- Describe grossing/dissection plans for common resections.

Introduction

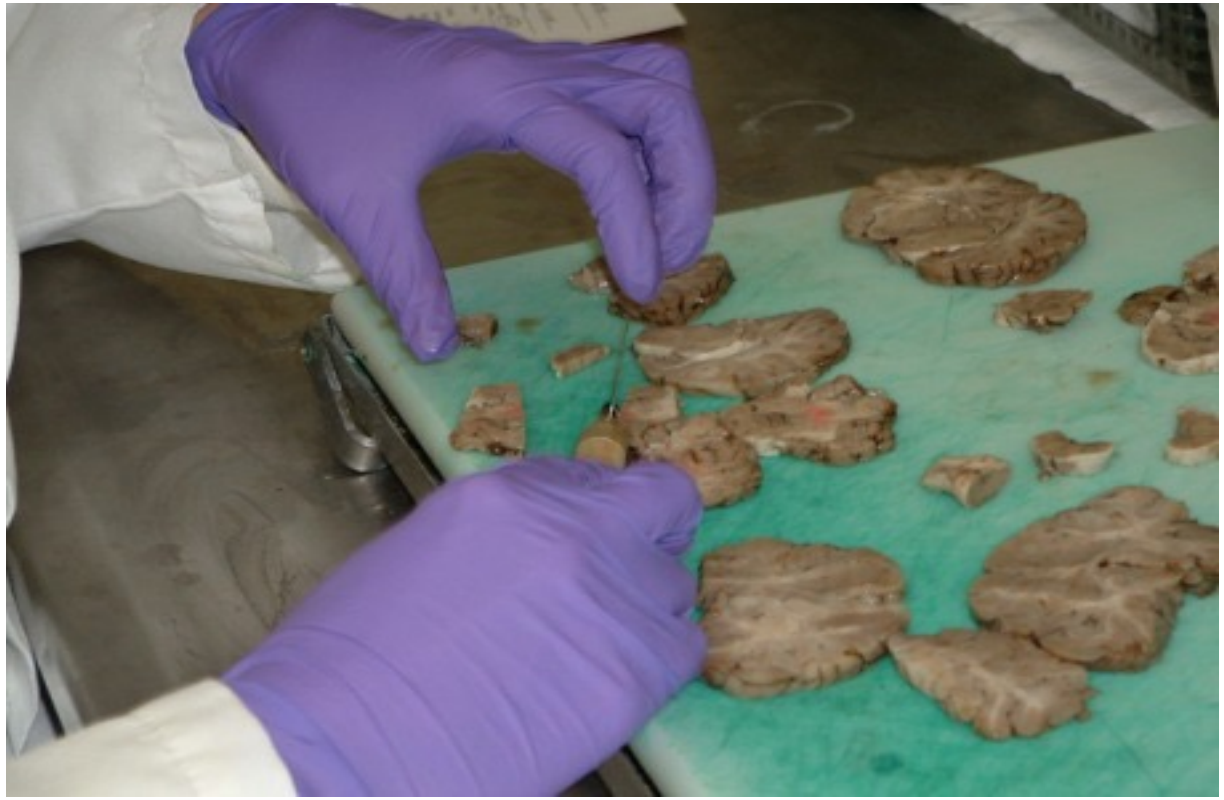
- Grossing=inspecting the specimens, describing and measuring the tissue, inking if needed, and sectioning the tissue to be processed for diagnosis.

- Biopsy specimens are grossed as an initial step in the preparation of a slide.

- The objective in preparing slides is to provide the pathologist with a clear and informative microscopic picture of the specimen.

Grossing is an art

- Proper grossing techniques are essential for accurate diagnosis.
- A knowledge of what needs to be taken for microscopic study is vital for final diagnosis.



Specimen Reception

- Verify that the sample is:
  - Properly labeled
  - The nature of tissue to be examined
  - Requisition form is also duly filled
  - Adequate volume of fixative

Specimen Reception

- Give the specimen a pathology number called the accession number.

e.g. case 139-2007 is the one hundred and thirty ninth sample of the year 2007.

- Note this number carefully on the requisition form as well as the container.

- Make the entries in biopsy register.

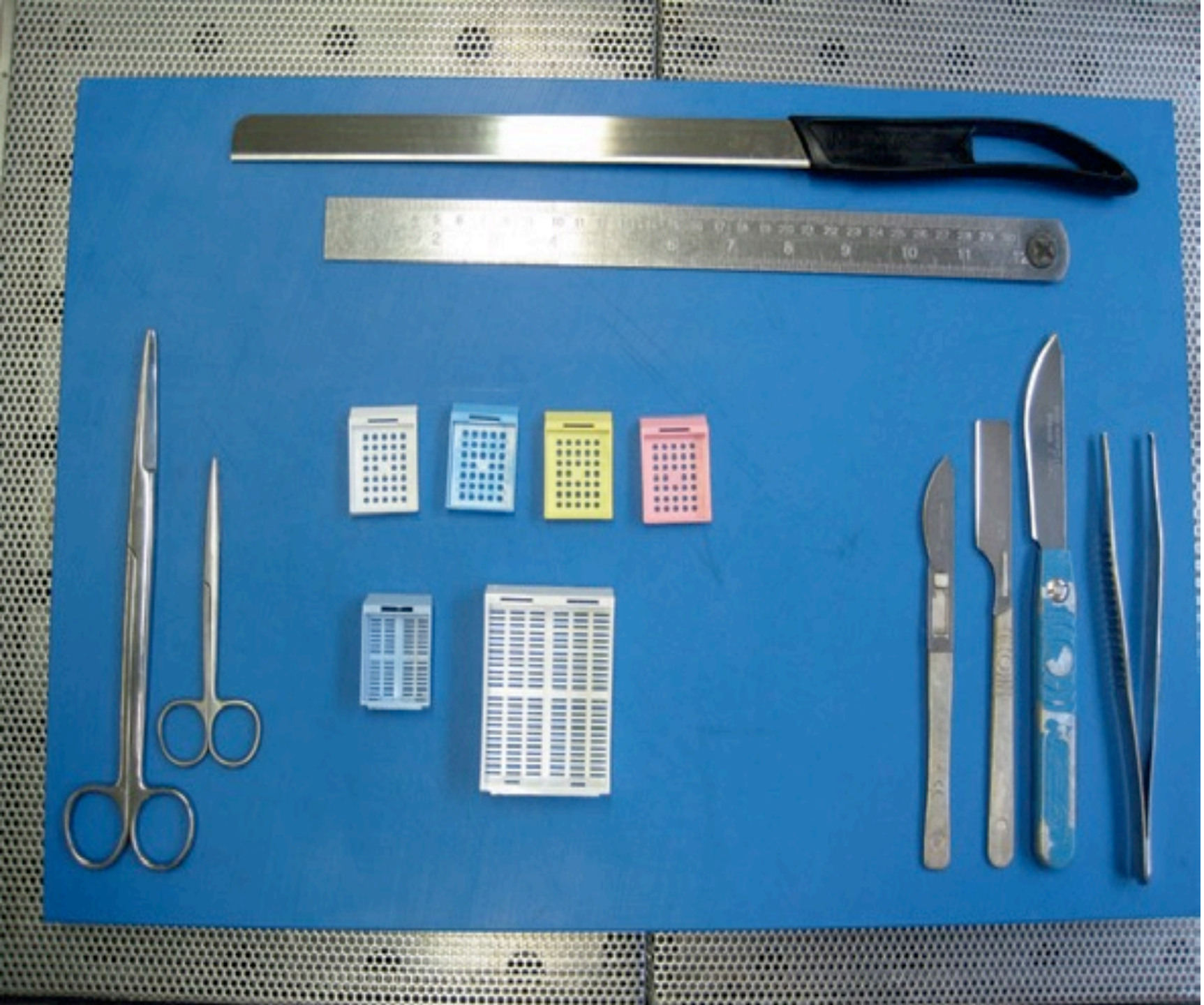
- Once validated and identified→ grossing/dissection room

Grossing/Surgical Cut-up/Specimen Dissection

- Gross examination is done to:
  - Describe the specimen’s size, shape, weight, color, and any apparent abnormalities.
  - Describe margins and orientation markers

- The specimen is cut into representative sections and put in small plastic cassettes to hold the tissue.

- Modern dissection areas often have:
  - Ventilation Filtration Hood
  - Integrated dissection desks
  - Shelves for specimen container
  - Ready access to sink with water
  - Ready access to formalin
  - Box of instruments, Box with cassettes, labels



Cut-up/grossing tools

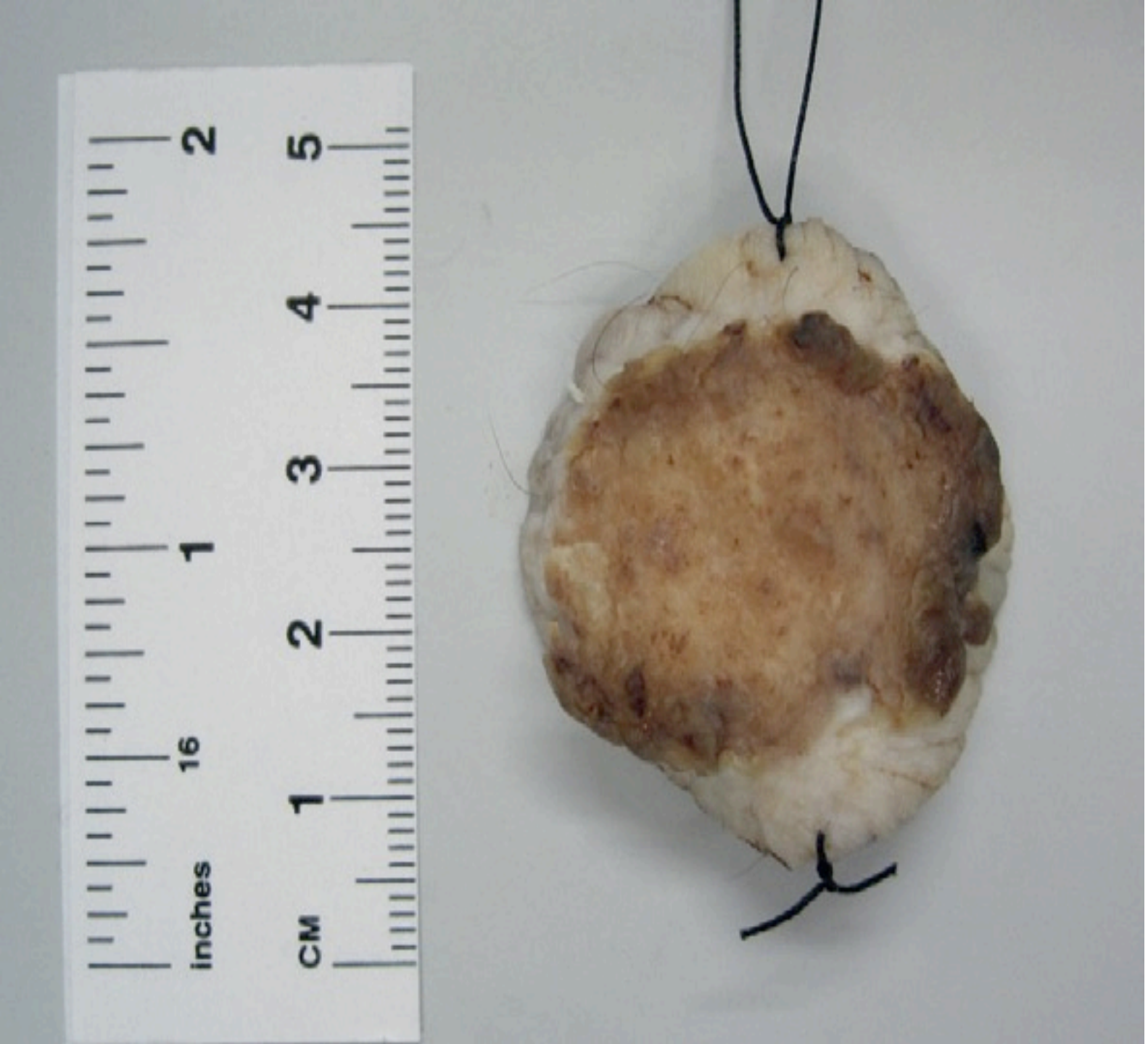
- A range of small and large bladed tools are advocated along with forceps, ruler and a fluid-resistant dissecting surface.
- An appropriate measure and access to photography are needed.
- Varying sizes of cassette (centrally) in a range of colors and sizes → handling of varying amounts of sample and also to indicate handling issues that follow tissue processing.

Thinking Before Dissection

- Prior to fixation it may be relevant to reserve some tissue from the specimens
- Some samples need fixation and then decalcification in EDTA.
- Some specimens are only examined by means of macroscopic assessment, possibly with photography
  - E.g. Gallstones, foreign bodies etc

- The specimens should be analyzed with only one container open at any one time.

- The request and specimen identity should be checked. Characteristics of the sample should be described e.g. size, shape, colour, apparent abnormalities
  - E.g. description in the form of the number of pieces and the size (SI units, usually mm) of the largest piece of tissue. An example could be ‘three pieces of brown tissue, the largest 3 mm diameter’.



A medium-sized skin sample with a central lesion.

Description:

‘A skin ellipse x by y by z mm depth is seen with an orientation suture, designated 12 o’clock.

The sample shows a central yellow-brown nodule z mm that is k mm clear of the closest margin’. It is sectioned into parallel slices and then placed into a cassette

Tissue blocks are placed into the cassette.

- They should not fill the cassette →permit room for processing fluid circulation.
- The orientation of the blocks is enhanced by a sponge →securing the specimens in sequential position.
- A colored agar marker→ designation of the order of slices taken.
- Samples marked with different colored inks →designation of the sidedness of the samples and the resection margins.

Specimen Dissection Plans

Small samples

- Rarely need dissection
- A count of the small tissue biopsy fragments
- Can be placed in a nylon bag, between metal disks with fine mesh, within porous paper, etc.
- Eosin can be used as a marker for small samples.

Core biopsies

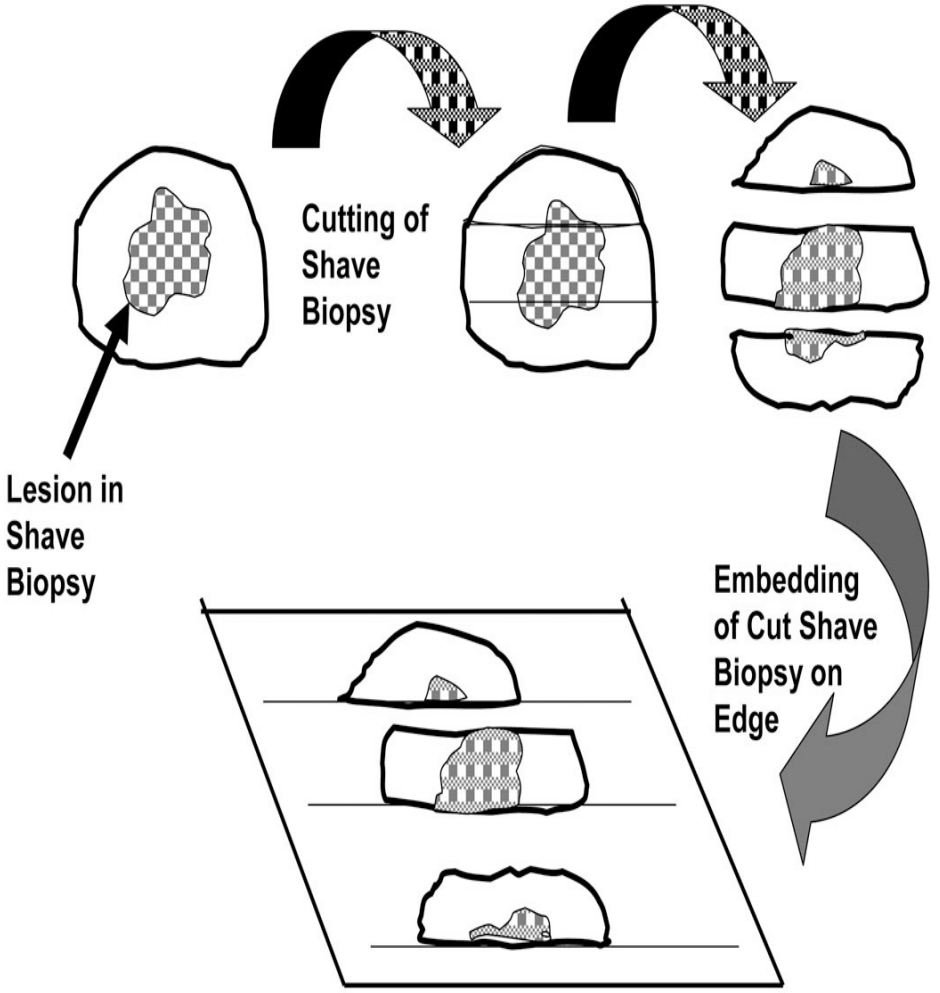
- E.g. cylinders or cores of tissue removed from breast tissue.
  - Require being laid out in longitudinal fashion

- Larger cores (with diameters of 4–5 mm or greater) may occasionally benefit by division into two halves along the long axis.

- Multiple cores often require each core being placed into individual cassettes.

Skin biopsies

- E.g. punch biopsies and shave biopsies
  - should be mounted on edge in order to provide an adequate view of the epidermis, dermis and subcuticular substrates.
- A marker item placed into the cassette e.g., plastic bead or colored paper
- Alternatively, cheese paste to help maintain specimen orientation.



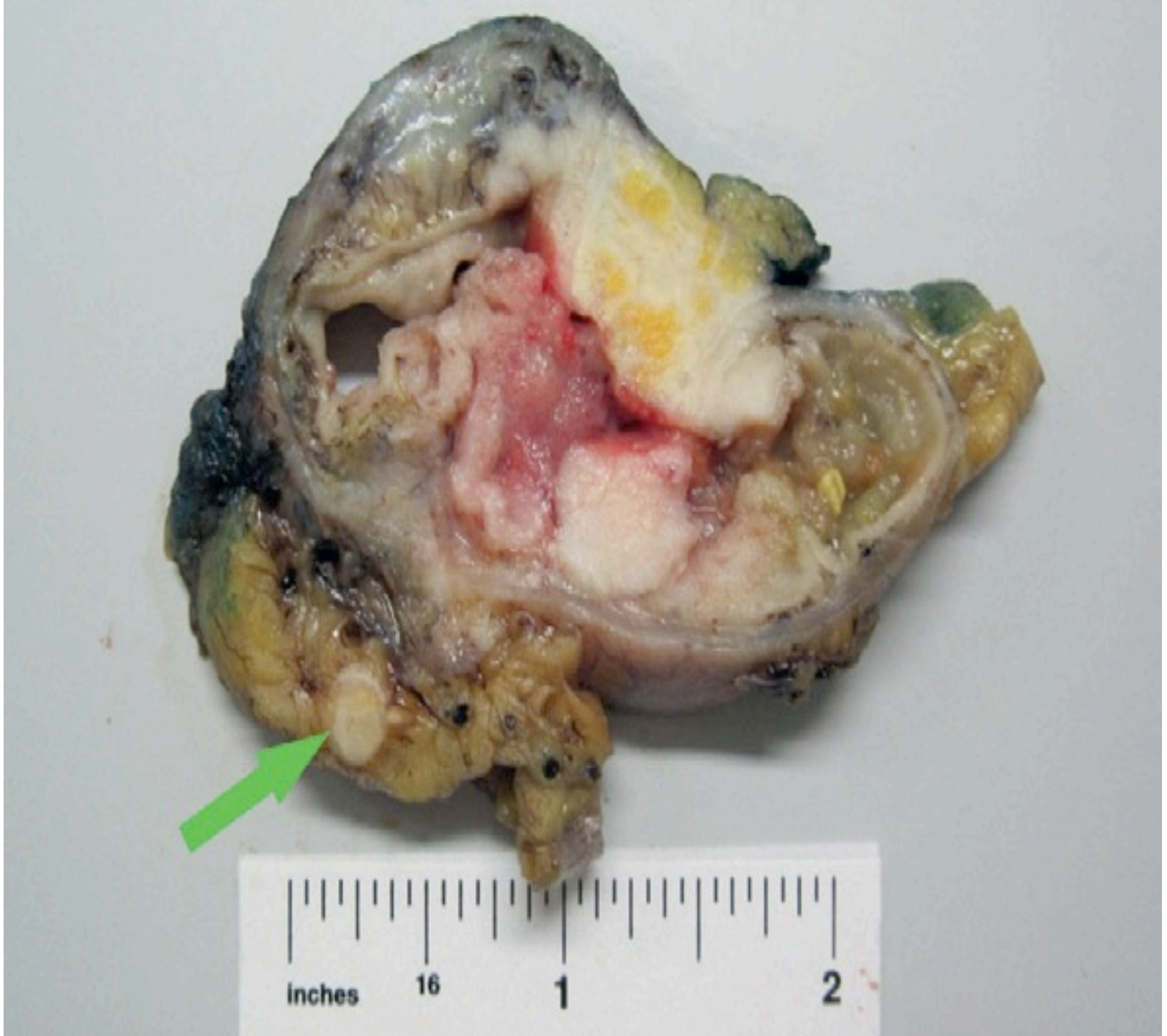
Cheese paste is seen holding the thin fragment of inked skin on edge and in position securely. The cheese protein matrix will survive tissue processing!

Bowel specimens

- Are medium and large tissue resections along the length of the gastrointestinal tract
  - e.g. partial colectomy/gastrectomy

- Best sampled with multiple blocks (usually n ≥ 3) of any lesion in relation to the adjacent mucosa, wall and serosal aspect tissues.

- Particular attention is paid to the lymph nodes.
  - Either manually dissected in groups or identified from fat-clearance protocols.



A large bowel specimen

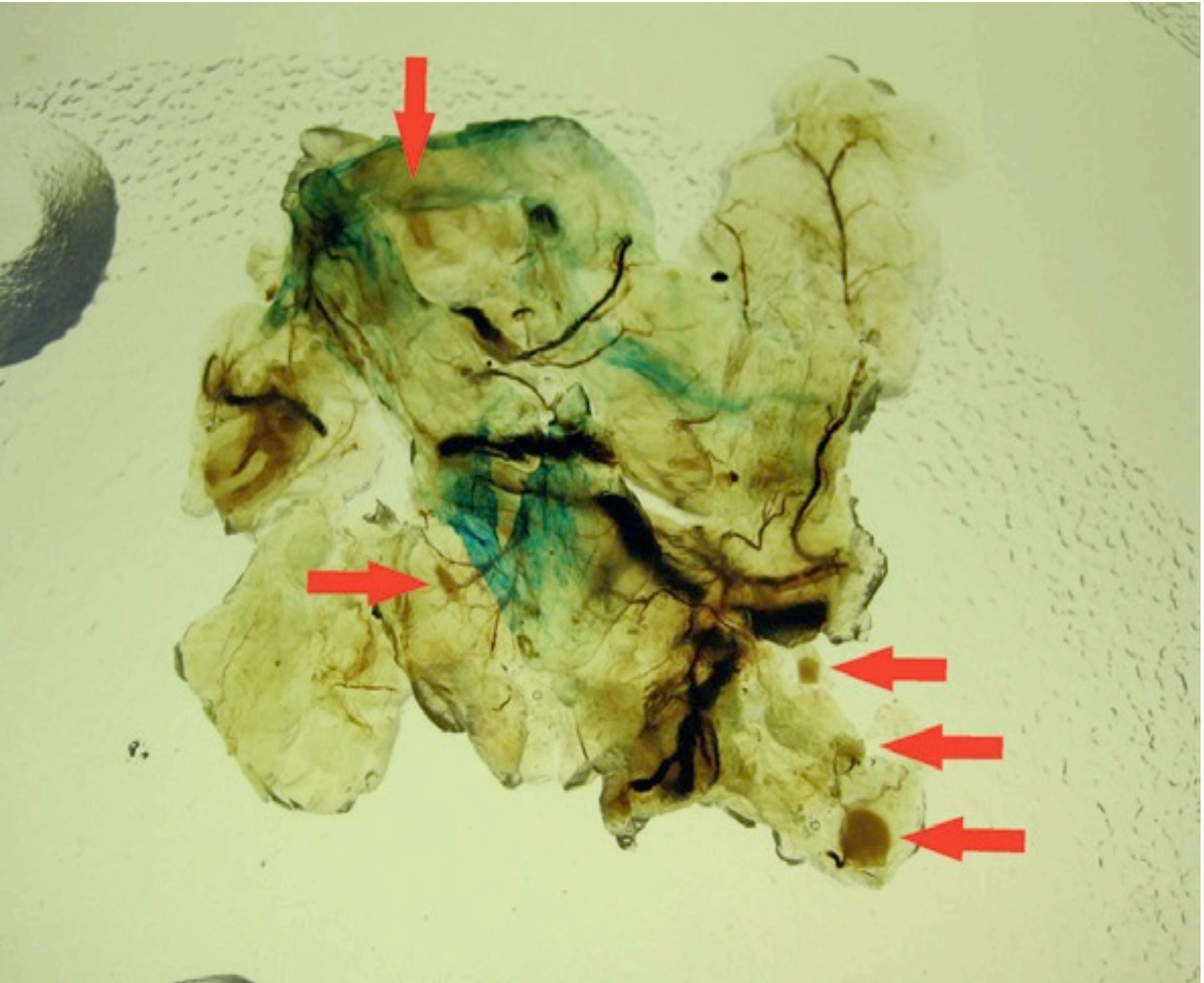
- With anatomical complexity requiring a good description and multiple blocks to be taken for full analysis.

- The specimen has been photographed to facilitate understanding of the local resection margins and the serosal surface (inked).

- A lymph node (arrowed) is clearly involved by tumor in the fatty serosal tissues.

Fat Clearance

- Fatty tissue is usually sliced into 10 mm fragments and placed into large cassettes.
- Fat removal occurs as part of the processing of tissues.
- Lymph nodes can be readily identified by transillumination.
- The sampled nodes can then be placed back in the tissue processor in a smaller cassette, with normal embedding, sectioning and staining to follow.



Following fat clearance, the trans illuminated sample is searched for nodes (arrowed). These are then extracted and placed into smaller cassettes for routine histology assessment after the final stage of processing and embedding.

Gynecological samples

- E.g. Cone biopsies from the cervix.
- Need appropriate inking of margins and orientation.
  - Often in a serial block fashion across the specimen this allows the three-dimensional assessment of dysplasia or invasive neoplasia in relation to the various surgical margins.
- Dysplastic and malignant lesions often require
  - Multiple blocks
  - Resection margins together with careful examination of related lymph nodes (usually presented, and therefore blocked, separately)

Breast Resections

- Usually require inking of margins.
- Multiple blocks of the tumor are usually required.
- Lymph nodes (if present) are often examined in tiered/grouped fashion in order to assess tumor spread.
- Fat clearance may be required to capture all the nodes in the axillary tail.

Summary

- Grossing is the first step to an accurate diagnosis

- Accurate diagnosis is achieved by:
  - Careful documentation, site and location of sutures and margins.
  - Applying correct cutting techniques
  - Inking parts of the specimen
  - Communicating all clinical information to the pathologist.

References

- Suvarna, S.K, Christopher L, Bancroft J.D, **Bancroft`s Theory & Practice of Histological Techniques**, 7th edition, Churchill Livingstone, NY, U.S.A.