

Necropsy

What is the necropsy?

- ▣ Necropsy may be defined as the systematic examination of an animal carcass aimed to search for lesions.
- ▣ It is an important diagnostic tool and supports other procedures performed in the diagnosis of disease cases in a herd or flock.

Necropsy Objectives

1. Expose all foci of disease/ abnormality.
2. Seek lesions to explain clinical and laboratory findings.
3. Identify the sequence of disease events.

Stages of Necropsy:

1. Systemic observation and dissection.
2. Collection and preservation of appropriate samples (tissue, fluids, etc) for histologic, cytologic, microbiologic, serologic, chemical, toxicological, parasitological, and/or radiologic evaluation.
3. Record findings logically, accurately, and completely.
4. **Interpret findings**

Necropsy Equipment

Will vary with the species, location of cadaver, etc.

CLOTHING:

1. Gloves
2. Boots
3. Coveralls
4. Apron



INSTRUMENTS:

- ▣ Sharp knife and sharpening equip (steel/stone) tissue forceps , scissors, saw, cleaver, osteotome, shears, axe, metric ruler, scale soap, water, brushes for cleaning



FIXATIVES & others:

Fixative and appropriate containers sterile syringes, needles, swabs, plastic bags, paper plates, microscope slides, tags, dissecting microscope, photographic capability (not essential)



Examples for some types of fixatives:

- **Formalin** is used for all routine surgical pathology and autopsy tissues when an H & E slide is to be produced.
- **Formalin** is the most forgiving of all fixatives when conditions are not ideal.

Glutaraldehyde is recommended for fixation of tissues for **electron microscopy**.

Bouin's Fluid: it composed of picric acid, acetic acid and formaldehyde in an aqueous solution. It is used to demonstrate glycogen, for GIT.

The appropriate amount of fixative must be three to four times the size of the sample for good fixation



TIME FOR NECROPSY

1-The best time for necropsy is immediately after death of an animal. This is because post mortem processes of decomposition (autolysis) follow at a rapid rate that obscures subtle changes in organs and tissues.

2-If necropsy will be delayed for some reason or another (example the cadaver will be shipped to a distant laboratory and will take considerable time before it reaches its destination), **freeze the whole cadaver solid**. Pack it in dry ice before shipping, observing the pertinent rules and regulation in the transport of suspected biological hazards.

STANDARD NECROPSY PROCEDURE

PRENECROPSY EVALUATION:

1. Identify the animal to ensure that the correct animal is being necropsied.
2. Read the clinical history carefully.
3. Examine the necropsy request form for the following:
 - ▣ a. Special organs or systems clinicians may want examined.
 - ▣ b. special requests (cultures, photos, etc).
 - ▣ 4. Fill container 75% full of 10% phosphate buffered formalin.
 - ▣ 5. Label container with necropsy number, species and initials of pathologist on duty.
 - ▣ 6. Weigh the animal - if possible.

NECROPSY REQUEST FORM

- ▣ Animal's ID -----Species-----
Breed -----Sex----- Age--- Wt-----.
- ▣ Died/Killed/Unknown Method of
Euthanasia Date & Time of Death -----

- ▣ number of animals on premises: -----
Adult /Young Duration of Illness-----
-
- ▣ Number affected: -----Adult/ Young
Number of Dead Seen by Vet.: yes no
- ▣ Antemortem Diagnosis:
- ▣ Address: City-----State-----ZIP
Telephone # ()

POSITIONING AND OPENING THE CARCASS:

[May vary from pathologist to pathologist and
from animal to animal]

Cattle are laid on left side to avoid the rumen.

Equines laid on right side to avoid the caecum.

NECROPSY EVALUATION

1. EXTERNAL EXAMINATION

- Note any abnormal external findings

2. Internal examination.

- Second section

EXTERNAL EXAMINATION

1 - Body Condition:

Muscle
mass

Fat stores

Decomposition

2 - Skin and hair coat:

parasites, dehydration, tumours, wounds, scars.



3- Discharges from body orifices

hemorrhage, nasal exudate, diarrhetic feces.



4- Eyes:

corneal opacities, unequal dilated pupils, exudates, ulcers, hemorrhages.



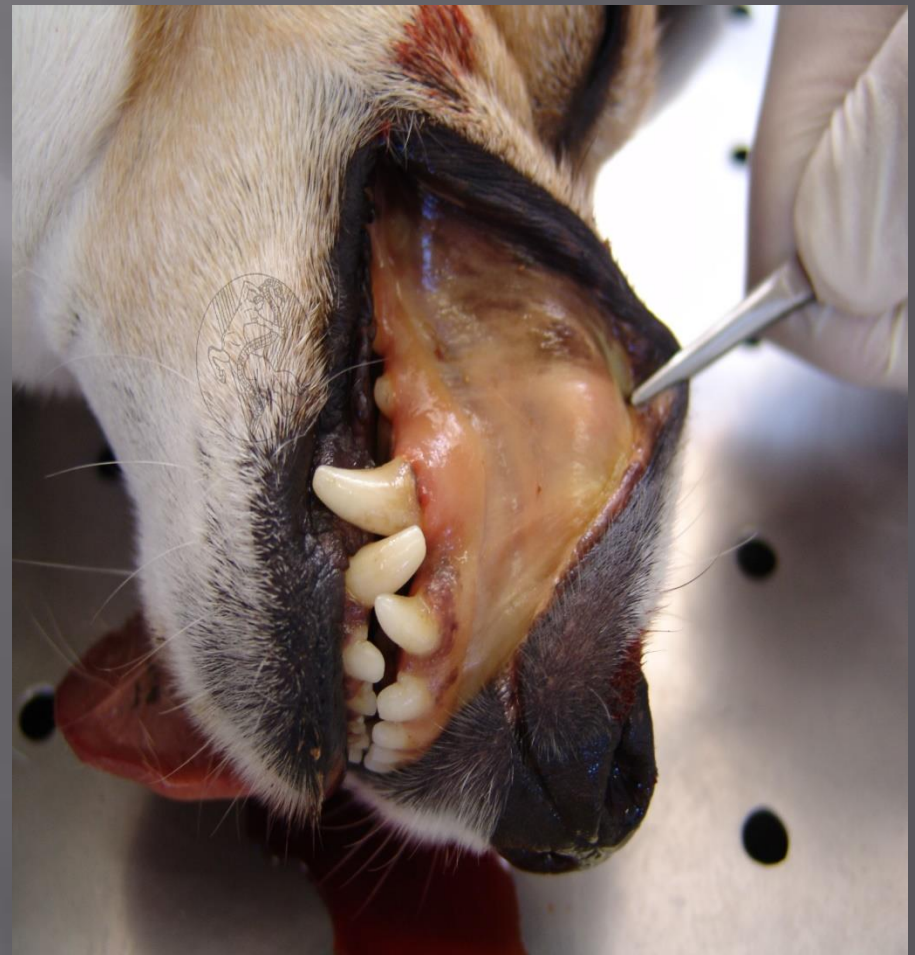
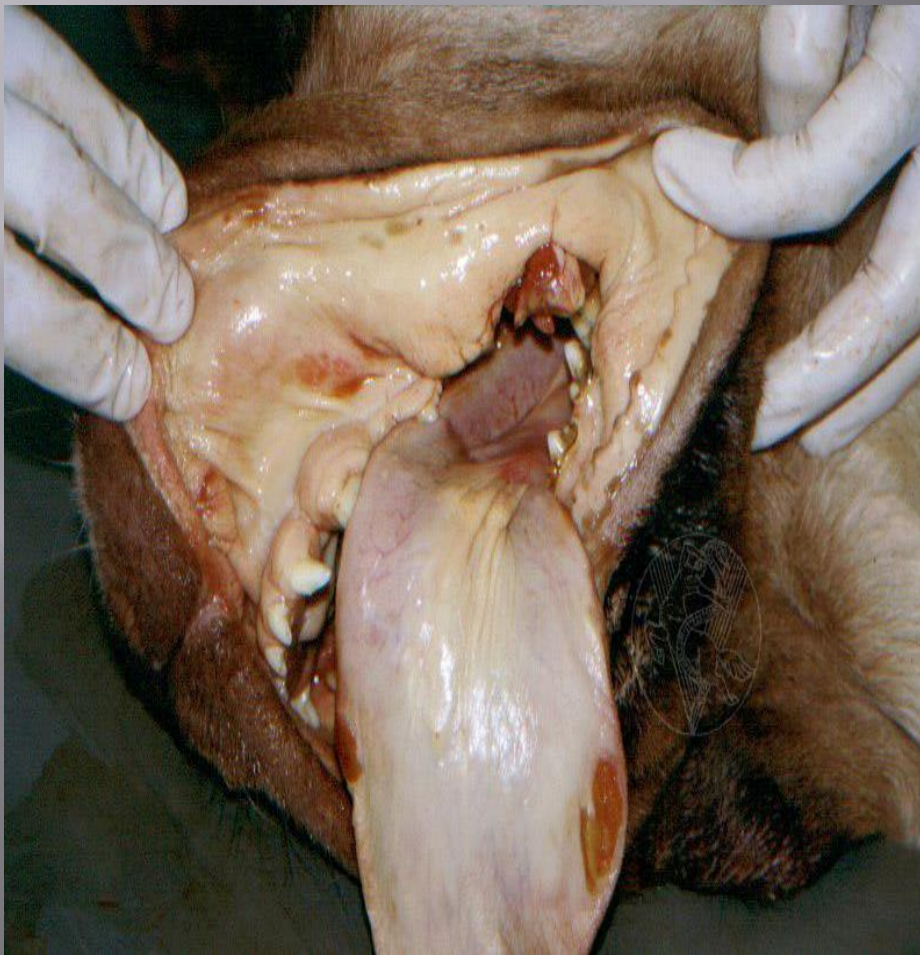
5 - Ears:

parasites, tumours, discharges.



6 - Mucous membranes:

colour, ulcers, abnormal discharges



Morphological diagnosis



HOW?

1-Duration

2-distribution

3-Nature of lesion

**4-Name of organ in relation to
the lesion nature**

1-Duration

ACUTE ,CHRONIC

2-Distribution

- ▣ Special arrangement of lesions
 - Focal (concentrated in one area)
 - Multifocal (several groups forming distinct agglomerates)
 - Diffuse (uniformly present)
 - Random (no clear pattern and not following any structure)
 - Symmetrical
 - Segmented (tubular structures only a part is concerned)

3-Nature of lesion

**Inflammatory, Tumor, Cyst,
Abscess,.....ect.**

4-Name of organ in relation to the lesion nature

- ▣ Pneumonia (Lung +inflammation)
- ▣ Pericarditis (Pericardium +Inflammation).
- ▣ Fibrosarcoma (fibrous tissue + Malignant tumor).
- ▣ect

Important

How to examine any organ grossly to reach the final morphological diagnosis???

Using the following points

Contour

Size

Color

Consistency

**Cut
section**

Distribution

Demarcation

Description:

The lung was diffuse dark red to plum colored, heavy, wet and foamy fluid freely ran from the cut surface. It felt firmer than normal and not

Describe first, then
interpret

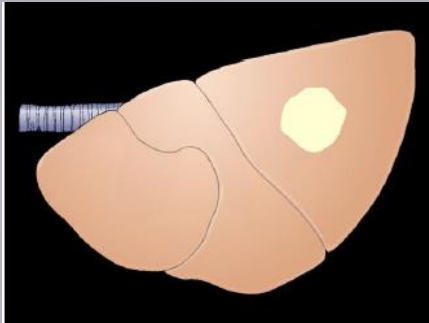


Interpretation:

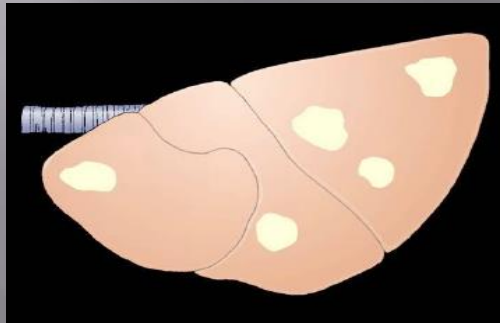
Diffuse pulmonary
congestion and
edema

Diffuse acute
interstitial
pneumonia

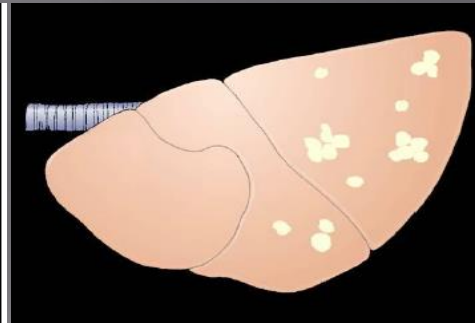
Distribution



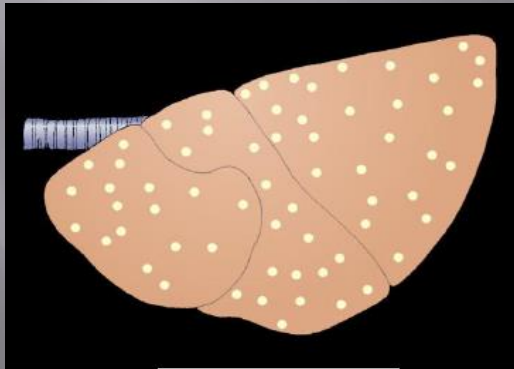
Focal



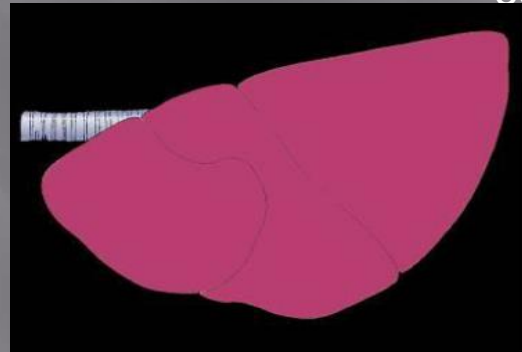
Multifocal



Multifocal to
coalescing

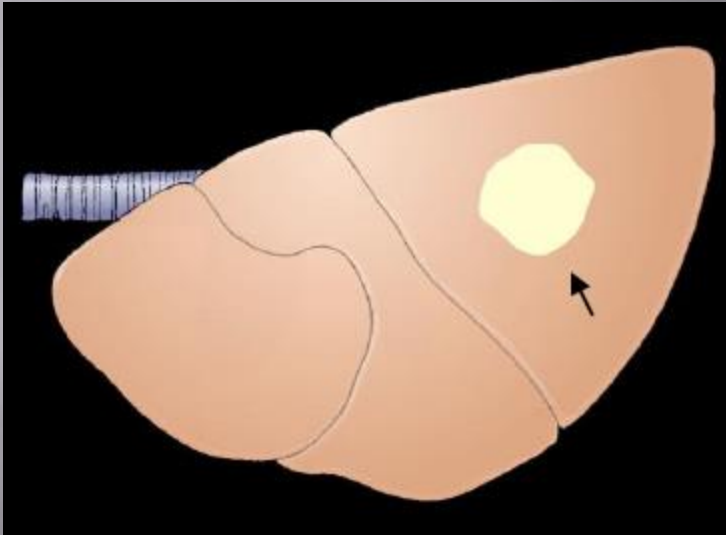


Milliary

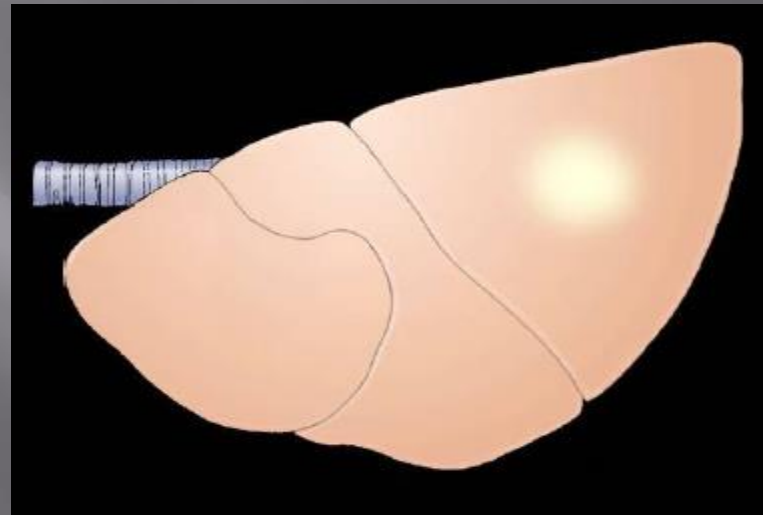


Diffuse

Demarcation

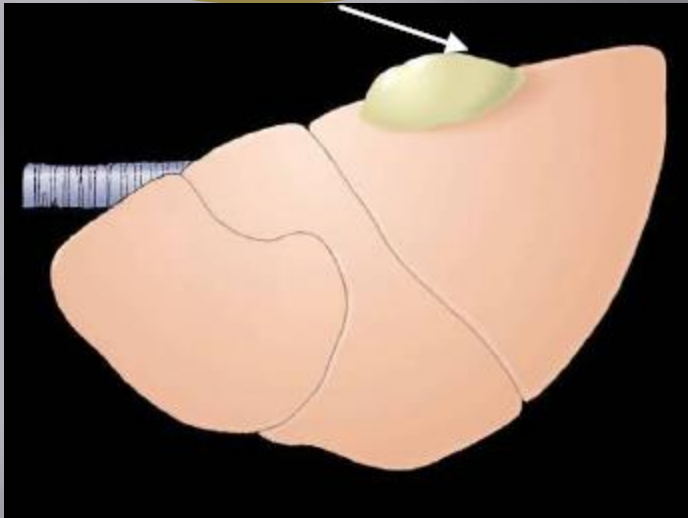


Well demarcated



Ill demarcated

Contour



1.. **Raised** - implies that “something is added” to the organ or tissue to cause expansion.

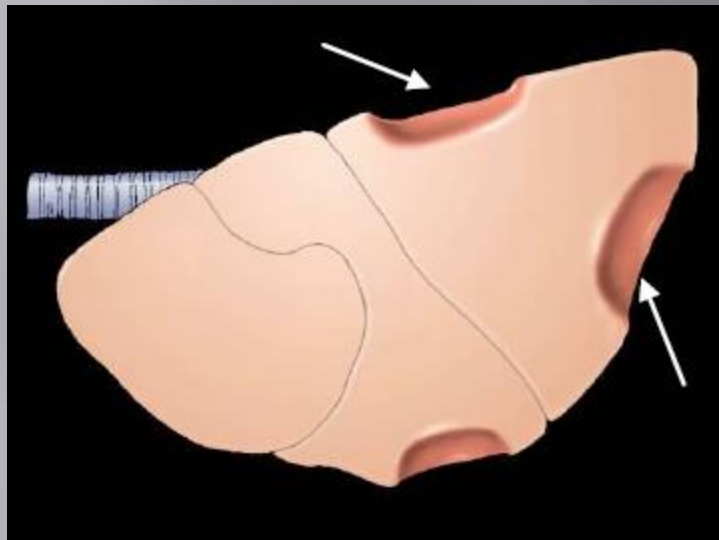
Fluids - blood, transudates, exudates, effusions,

Gas - emphysema

Cells - normal (= hyperplasia); abnormal (= neoplasia) or exudates (=inflammation)

Stroma – fibrous tissue, cartilage, bone

Foreign Material – plant material, parasites



2. **Depressed** - implies that **something is removed or lost** Most commonly this is related to necrosis or atrophy but remember some organs are physiologically dynamic like lung, spleen, urinary bladder. The most common thing taken away from the lung is air.

3. **Flat** - the lesion is neither raised nor depressed with respect to the surrounding tissues. This implies either *a recent event* which has not had sufficient time to progress or *a process that does not cause expansion or necrosis*.

Shape

SHAPE = beyond the contour, what geometric figure does the lesion resemble.

Is the lesion circular, rectangular, triangular, spherical etc.
Because the vasculature of tissues is often laid out in geometric patterns or distinct shapes this may reflect a pathologic process highlighting or outlining a vascular bed. i.e. infarcts or segmental

Color

Red to Reddish Black - usually means blood or hemoglobin pigment. The implication is congestion or hemorrhage. Differentiating between these two requires additional attributes. Congestion tends to be a wider spread phenomenon than hemorrhage and tends to be poorly demarcated.

White to Gray or Yellow - often ~ the lack of blood. Necrosis is often pale because of the lack of blood.

Coagulation necrosis (necrosis with preservation of architecture) is an *acute event* and therefore the *foci are flat*.

Exudates are also white to yellow and because *Exudates add something*, foci of exudation are often raised.

Fibrosis is pale to white but because scar tissue fills in areas of necrosis (something removed) and contracts as it matures, foci of fibrosis are often depressed.

Hyperplasia often light to white or the normal tissue color; granulation

***Yellow discoloration in the CNS may indicate malacia**

Green – Often **bile or bile pigments**. Post mortem bile staining of tissue is called Pseudomelanosis.

Coagulation necrosis may be various shades of green

Eosinophilic inflammation may impart a greenish discoloration to tissues

Aspiration pneumonia with plant material

Pigmented fungi can give a green color

Green – Black

Pseudomelanosis = Artificial staining of tissues post mortem by bile from the gall bladder and H₂S pigments from the GI.

**usually limited penetration into organ adjacent to liver or bowel.

Aspiration pneumonia = saprophytic bacteria cause green black discoloration.

Black –Brown

Black usually means melanin

Melanosis = flat. Not enough to create contour

Melanoma = raised. Proliferating cells create contour

Size

Larger than normal = “something added”. Think hyperplasia, edema, neoplasia, congestion, inflammation. Organs with capsules often *bulge on cut surface* because the *something added* increases pressure within capsule.

Smaller than normal = “something removed/lost”. Think hypoplasia, atrophy, and necrosis. Organ may have a *collapsed appearance*. The organ may be completely absent.

Texture

- 1. Amorphous** - semisolid, unorganized; no architecture; can't hold shape; not cohesive.
"You can spread it with a butter knife" = **pus, exudates, necrosis**
- 2. Solid tissue** - has apparent structure or architecture; holds together or maintains shape; *"Not spreadable with a butter knife"* = usually means **viable, living cells** and tissue or stroma. **Hyperplasia, neoplasia**, stromal deposition.

Consistency (How does it feel????)

GAS - air trapped in tissue = **emphysema**
Bubbles in fluid

FLUID - the tissue looks or feels wet or squishy, like a water balloon. Usually means edema, blood, transudates, fluid rich exudates, effusions, urine

SOFT - the tissue is fluid rich/cell or stroma poor.
Exudates.

FIRM - the tissue is fluid poor/cell or stroma rich.
Exudates, hyperplasia, neoplasia, scar tissue or fibrosis.

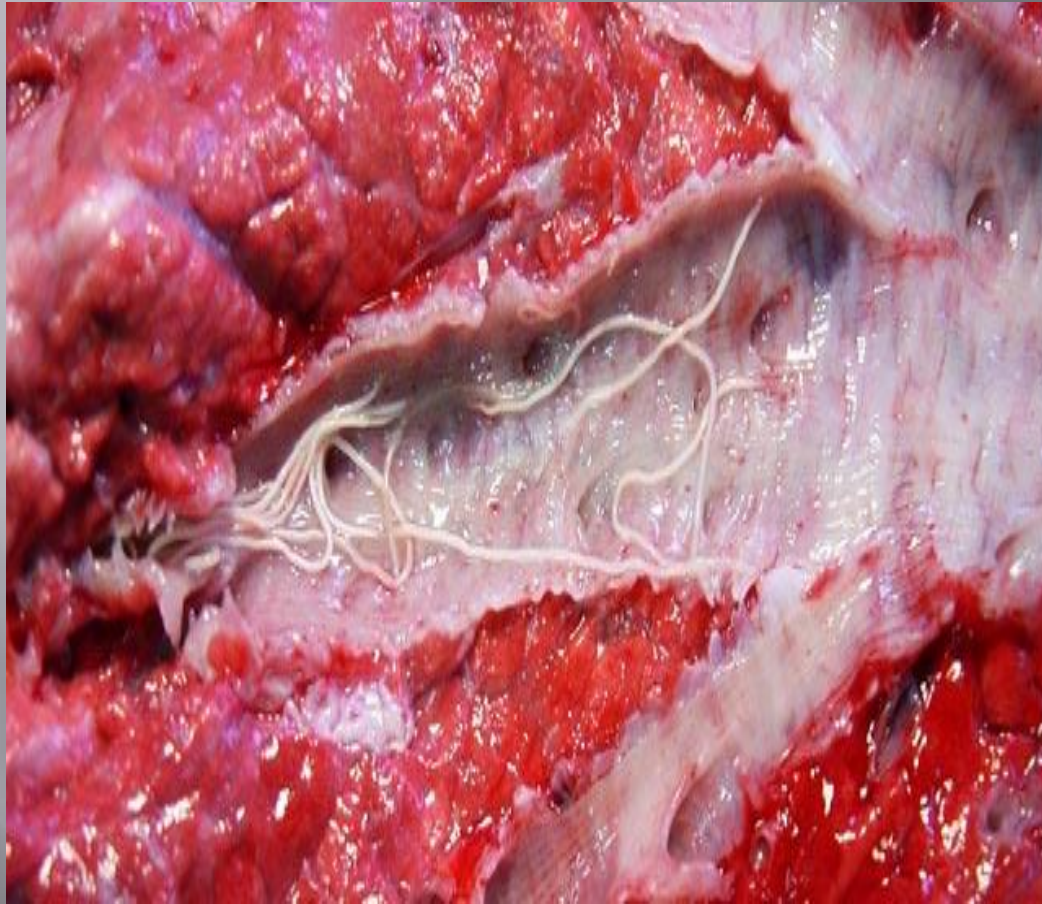
HARD or GRITTY - usually means mineralized stroma or matrix; cartilage, bone, calcified tissues.





1- Describe the macroscopic picture of lung?
Multifocal reddish areas (red hepatization) of variable sizes distributed in most areas of the lung lobules

2- what is your morphological diagnosis?
Acute moderate multifocal to coalescing interstitial pneumonia



1- Describe the macroscopic picture of lung?

Presence of long white thread like worms (lung worms) in the airways. The lung tissue is diffusely red (red hepatization).

2- what is your morphological diagnosis?

Chronic severe diffuse interstitial pneumonia (Lung worm)

Examples for Descriptions:

Description:-

The lung is diffuse red enlarged with frothy fluid oozed on cut section

Diagnosis: lung congestion and edema

Description:-

The liver has focal well circumscribed round raised white mass ,had soft amorphous cut section

Diagnosis:-liver abscess

