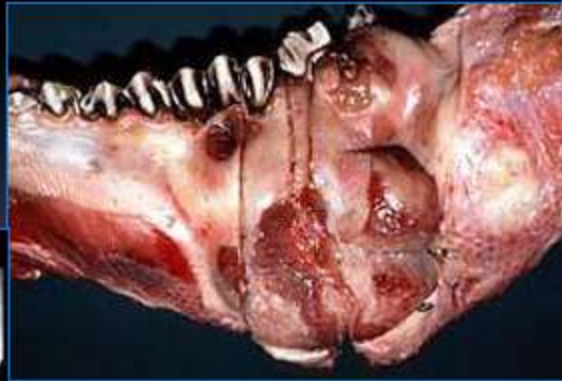


ACTINOMYCOSIS ("LUMPY JAW")

Actinomyces bovis



Actinomycosis

- It is a localized, chronic, progressive, granulomatous disease that most frequently involves the mandible, the maxillae, or other bony tissues in the head. Disease is seen when *A bovis* is introduced to underlying soft tissue via penetrating wounds of the oral mucosa from wire or coarse hay or sticks.

Etiology:

❖ *Actinomyces bovis* in animals.

❖ *A. israelii* in human.

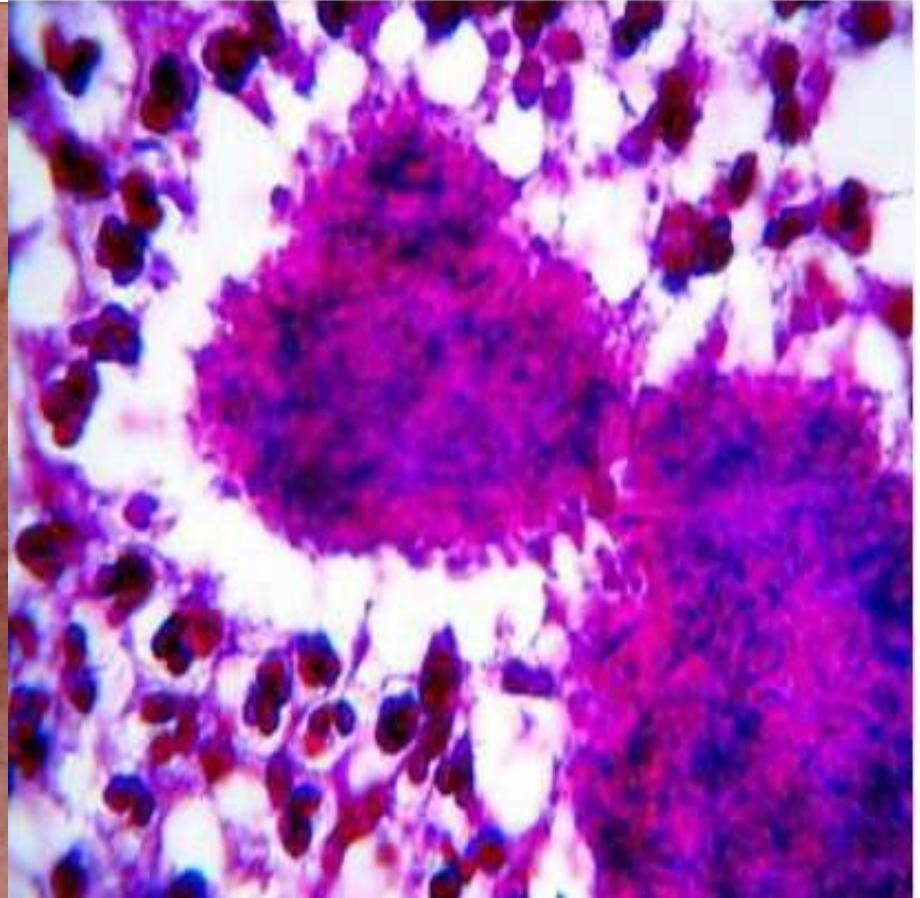
Members of the genus *Actinomyces* are;

- ❑ Gram-positive. non-acid-fast filamentous or branching (Branches are $<1 \mu\text{m}$ in diameter, as opposed to fungal filaments, which are $>1 \mu\text{m}$ in diameter). .
- ❑ Anaerobic.
- ❑ They are normal flora of the oral and nasopharyngeal membranes, several species are associated with diseases in animals.

Actinomycosis



Sulfur granules



G/S :sulfur granule

Animals affected:

- ❑ Common condition in cattle mostly weaned calves, young bulls and heifers.
- ❑ Also occur in horses, swine, dogs and rarely in sheep.
- ❑ In all these species, actinomycosis results in cold abscess, with granulomatous formations on the fistulised place.

Clinical signs:

- ❑ The primary lesion appears as a slow-growing, firm immovable hard swellings of the bones (lumps) that is attached to the mandible. They may take months to reach the size of a tennis ball.

Any part of the head can be affected; however, the alveoli around the roots of the cheek teeth are more frequently involved. lumps are produced on the upper and lower jawbones, hence the common name 'lumpy jaw'.

- ❑ Involvement of adjacent bone frequently results in facial distortion, loose teeth (making chewing difficult),
- ❑ In advanced cases, sinuses or openings develop and discharge small amounts of sticky pus containing gritty yellow granules. Unlike the case with wooden tongue, the local lymph nodes do not become involved.



- Osteomyelitis + pyogranulomatous
- Fistulous tracts open to surface and ooze purulent exudate → "sulphur granules"
colonies of bacteria surrounded by immune reactio



Lumpy Jaw (actinomycosis) - bacterial infection in the bone - this is a really extreme case



Early case of lumpy jaw:



- ❑ Lumpy jaw may be well advanced before external signs are visible. Difficult breathing due to involvement of the nasal bones may be the first sign.
- ❑ As the disease progresses, chewing becomes more difficult and painful, resulting in loss of condition.
- ❑ Occasionally, the soft tissues of the head and alimentary tract can be involved. Lesions in the alimentary tract give vague symptoms of indigestion, often with chronic bloat.

Pathogenesis:

- ❑ Disease is seen when *A. bovis* is introduced to underlying soft tissue via penetrating wounds of the oral mucosa from wire or coarse hay or sticks.
- ❑ In the bones (jaw bones) ----- rarefying osteomyelitis with characteristic granuloma in hard tissues and in visceral involvement.
- ❑ Effect on animal is purely physical; interference with prehension , mastication, and ruminal movement and digestion when alimentary tract is involved----- Starvation.

- The activity of the bacteria eats the bone away. The 'lumps' are a result of the interaction of the bacteria dissolving the bone, and the bone trying to repair itself, leaving a 'honeycomb' effect.



skull and one side of the grossly enlarged lower jaw of an animal that was euthanased because of a very severe case of lumpy jaw.



- The lump on this three-year-old cow began developing six months earlier. It has now broken through the skin.



Diagnosis:

1. Presumptive diagnosis is based on characteristic lesion and clinical signs.

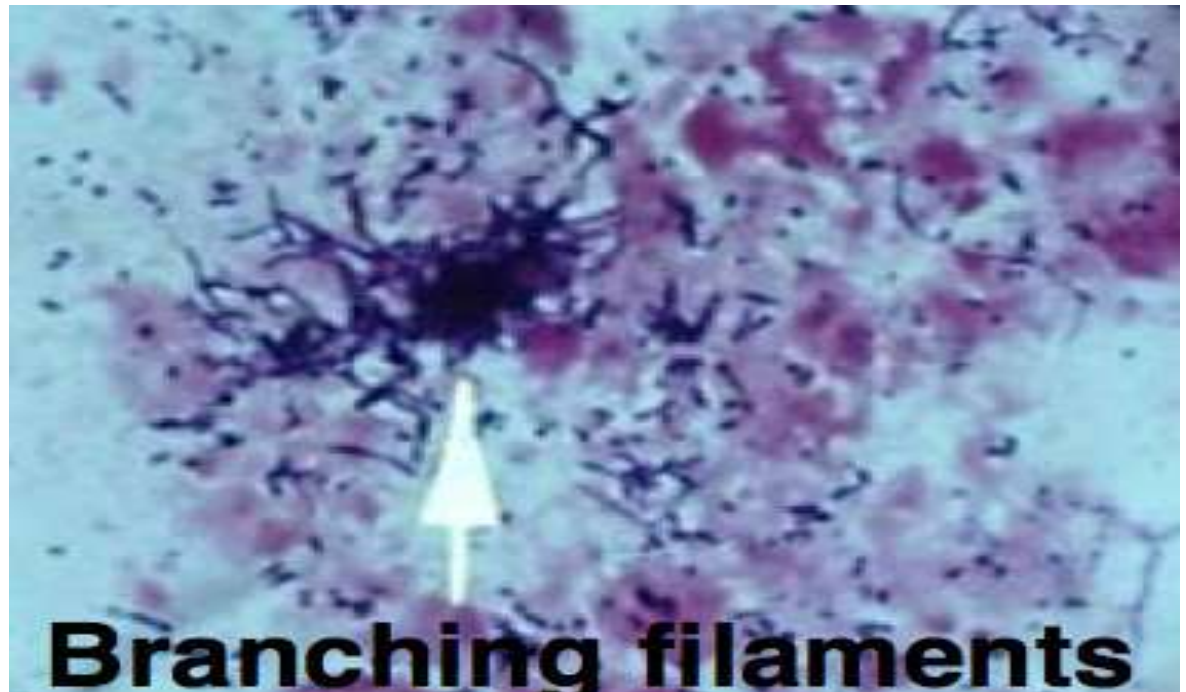


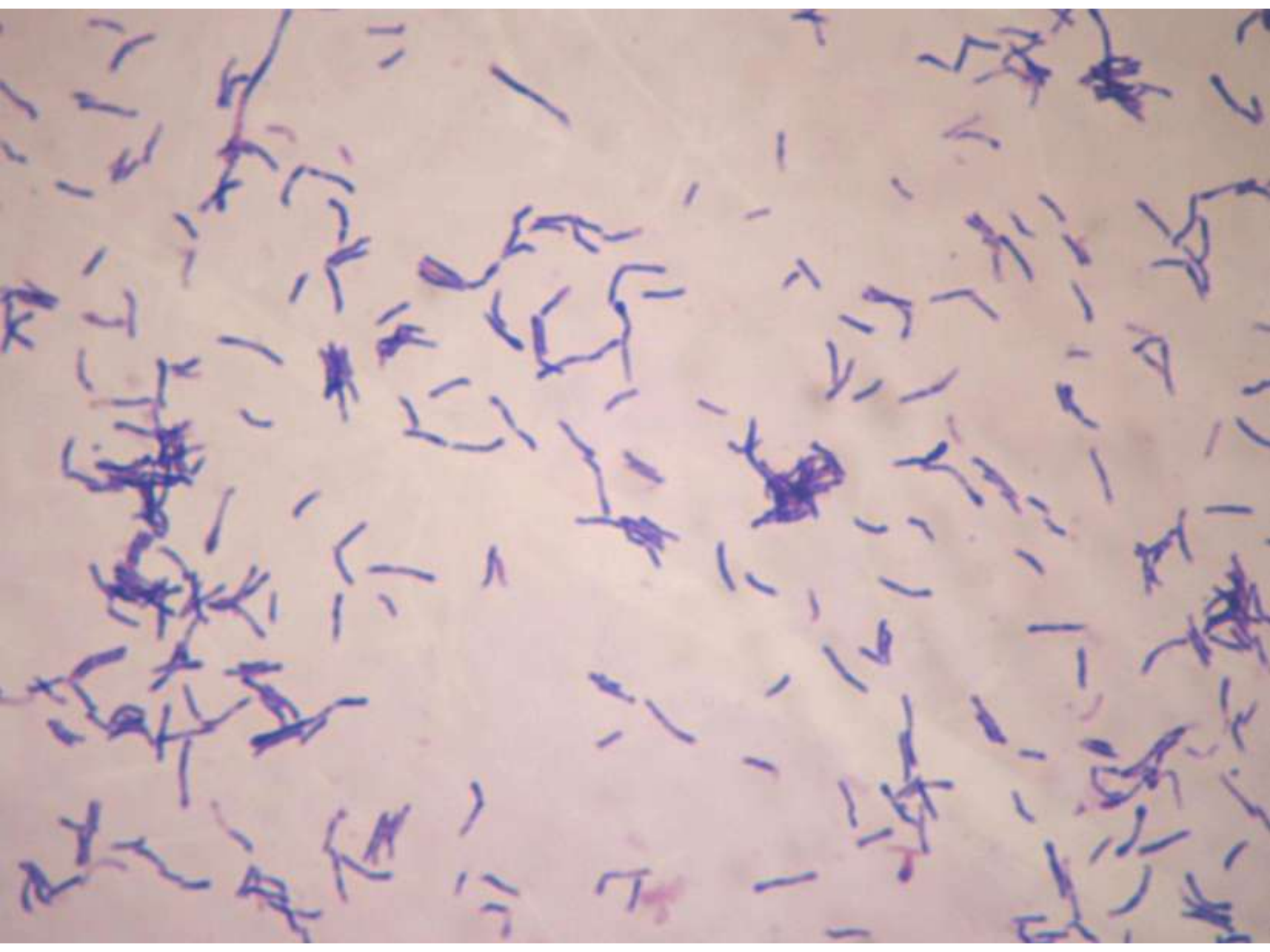
2. The diagnosis can be confirmed by culture of the organism from the lesion; it requires anaerobic conditions and enriched media, containing serum or blood. Development of macroscopic colonies may require several days at 37°C. Colonial morphology varies between and within species, but generally they are dry and adherent to the medium



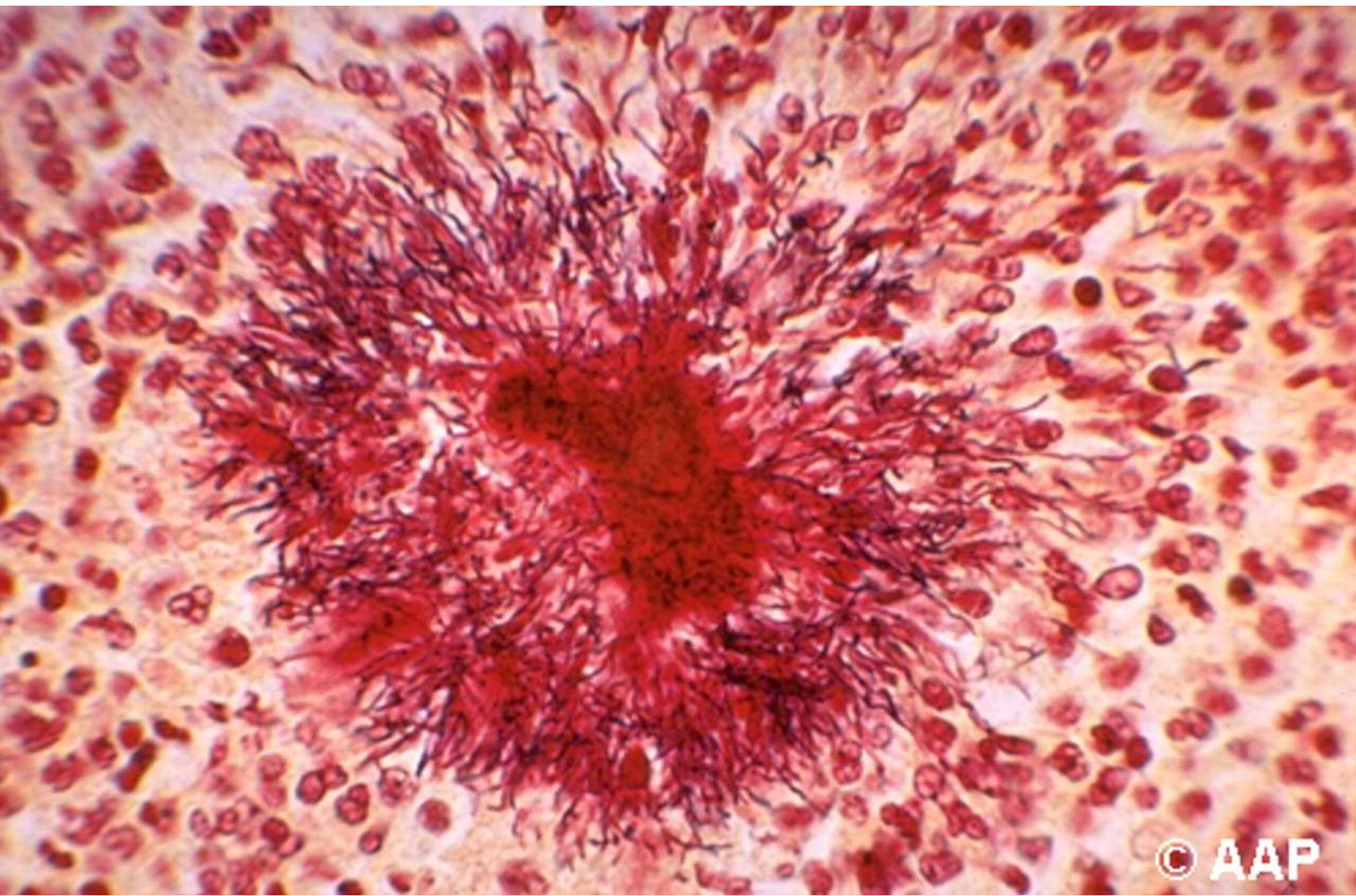
3. Direct smear prepared from pus made by crushing of the sulfur granules between two slides; stained with Gram stain reveal gram-positive, club-shaped rods and branching filaments (sulfur granules).

-They are non acid fast.

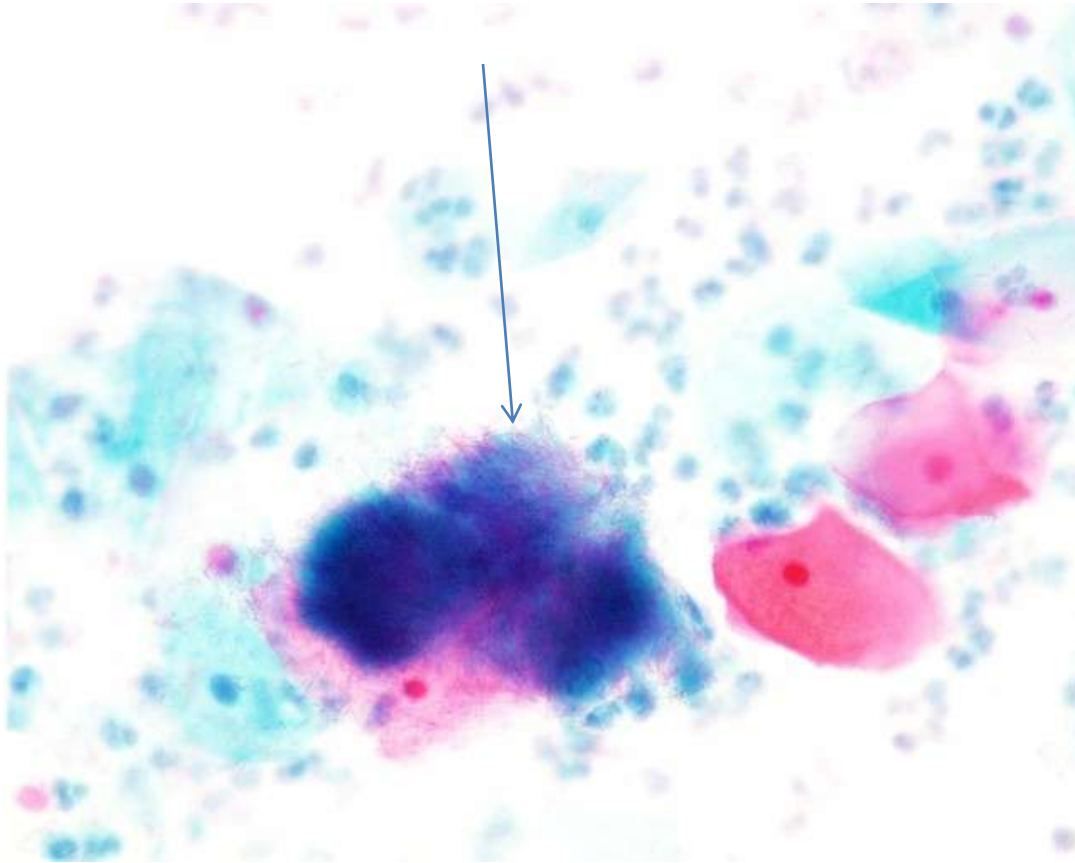




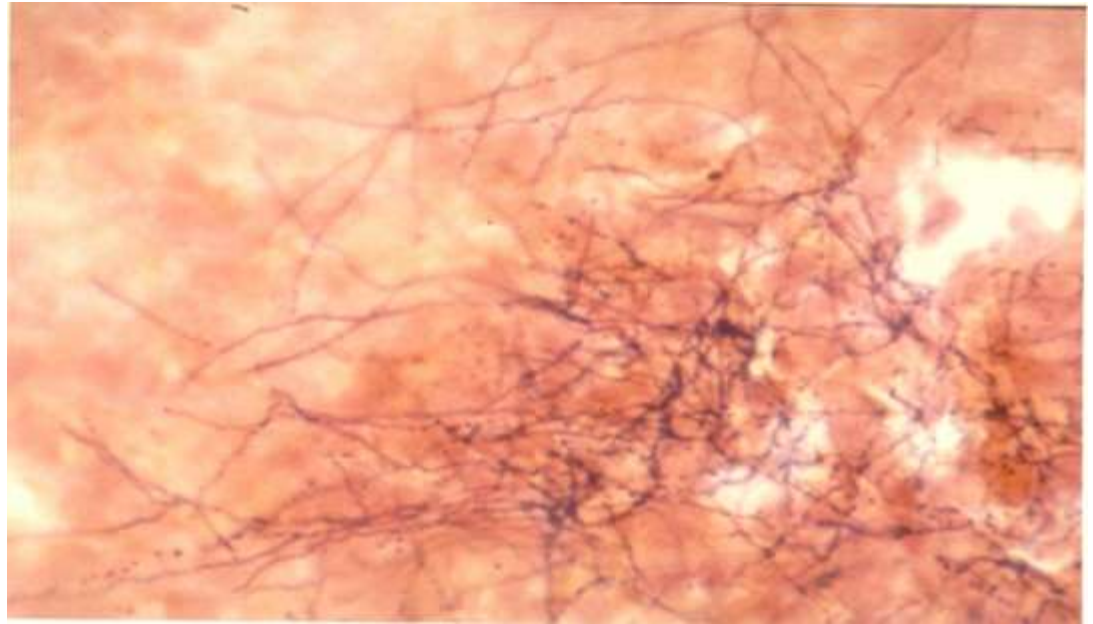




Non- acid fast collection of *A. bovis* in pus

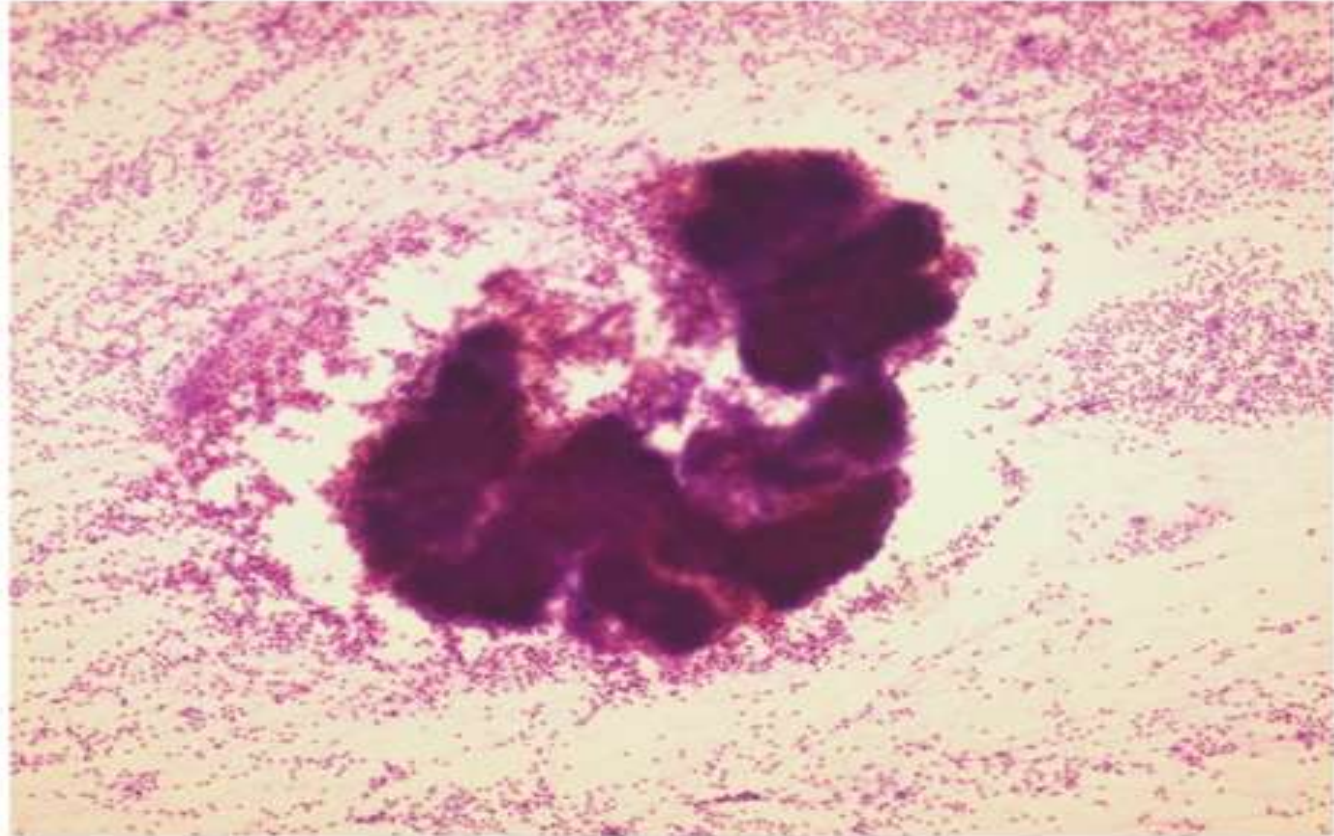


Gram positive
thin branching
Filaments in pus

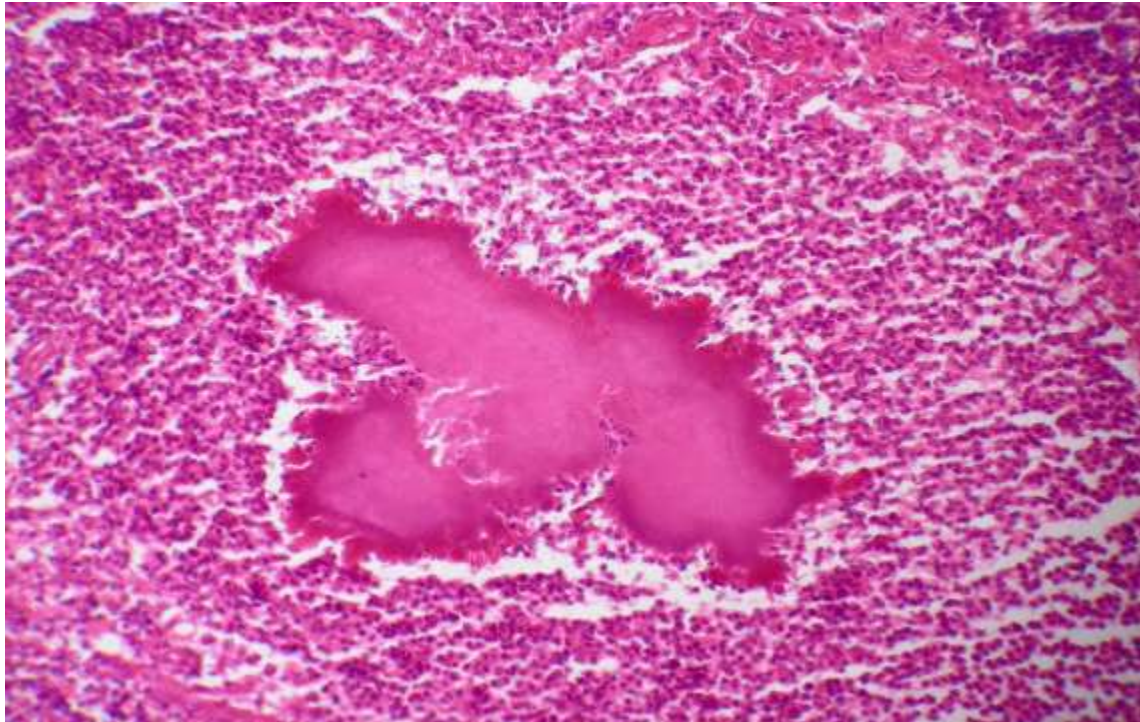


Non acid fast thin
fragmented filaments

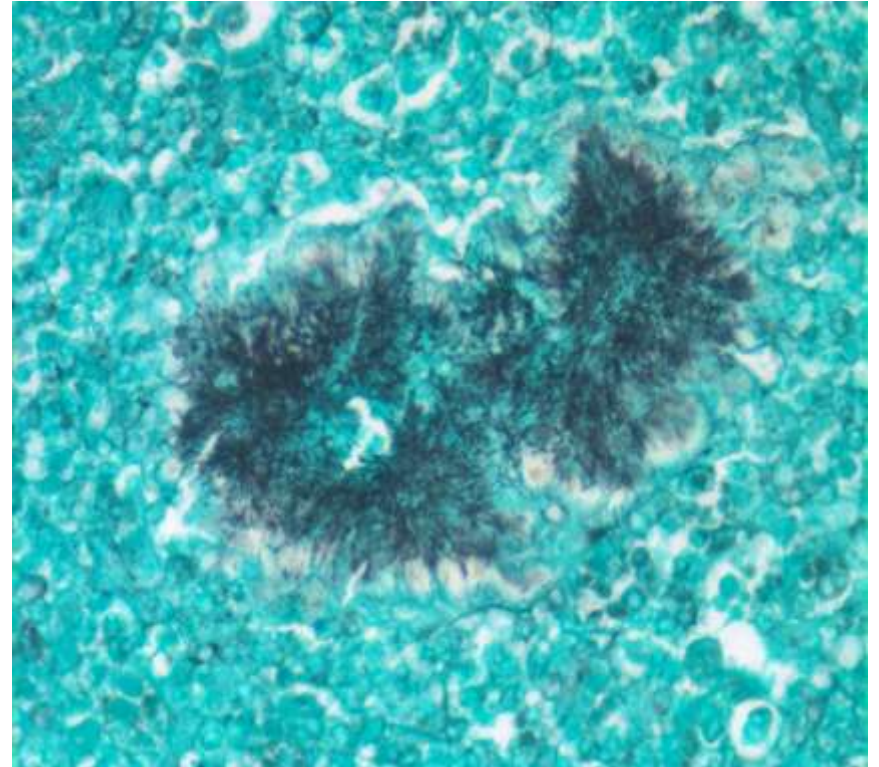
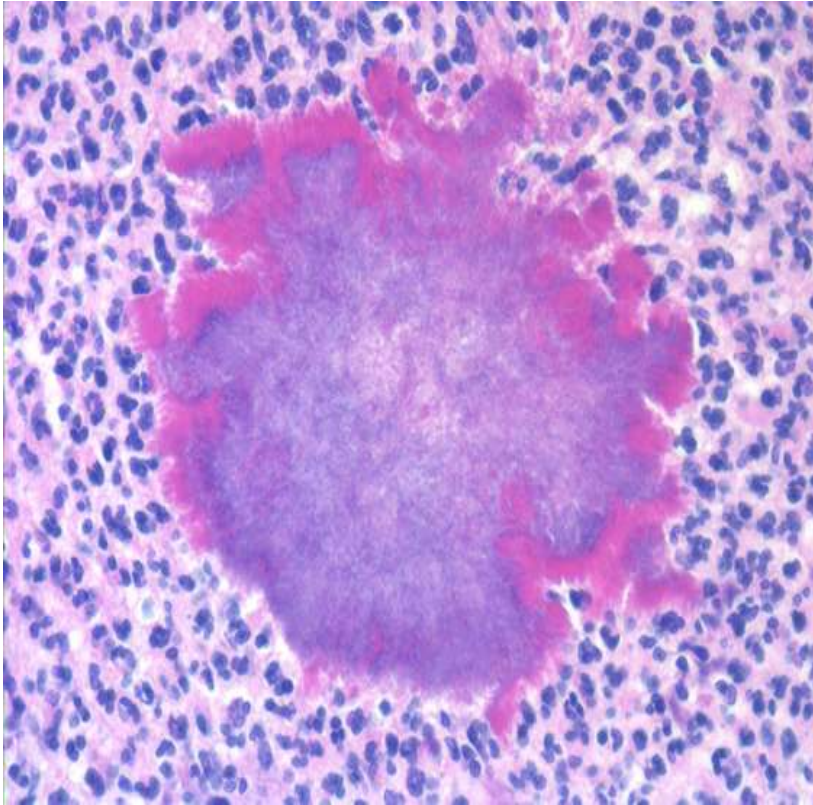
4. Histopathologic finding of actinomycosis. showing abundant radiating filamentous actinomyces colony. The pink-purple colored granule (sulfur granule) is surrounded by lymphocytes at periphery (Haematoxylin and eosin stain).



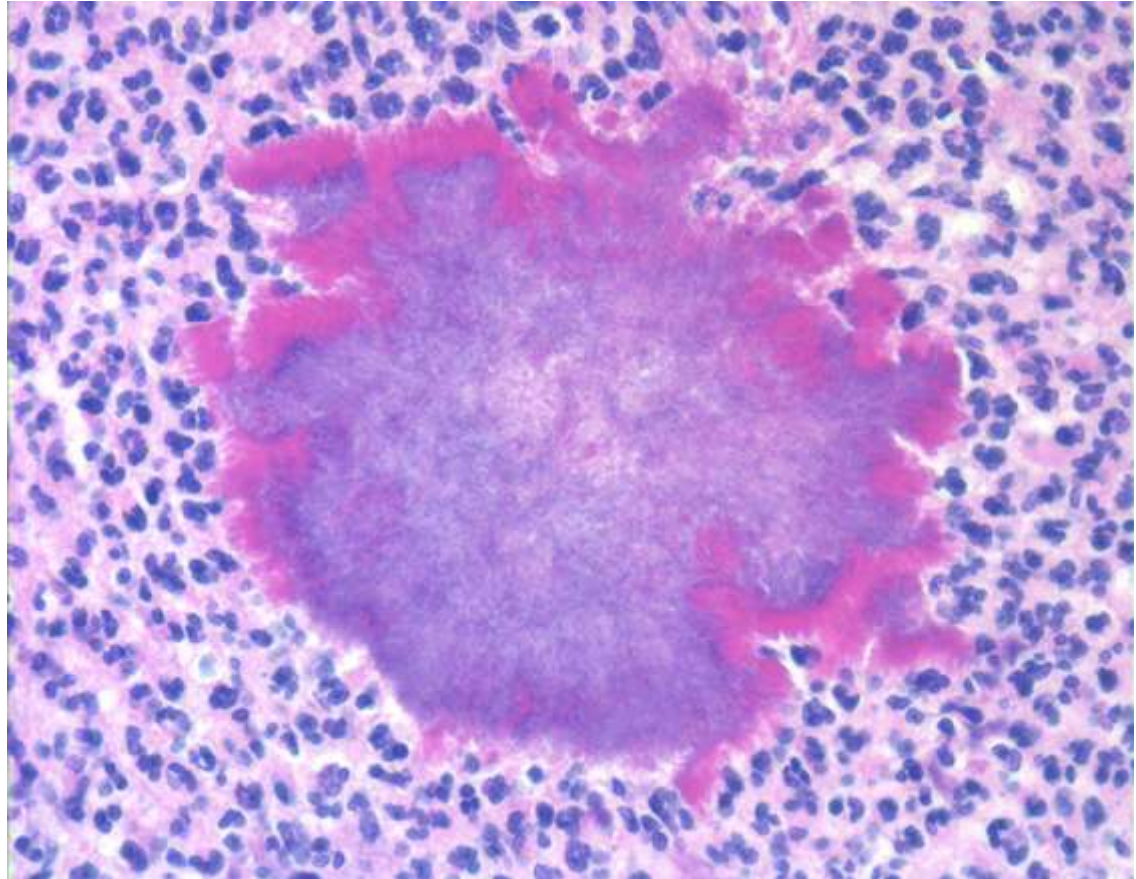
- The darkly staining eosinophilic rim at the periphery of the colony consists of immunoglobulin and cell debris. This deposition occurs around colonies of fungi and bacteria and around parasitic organisms



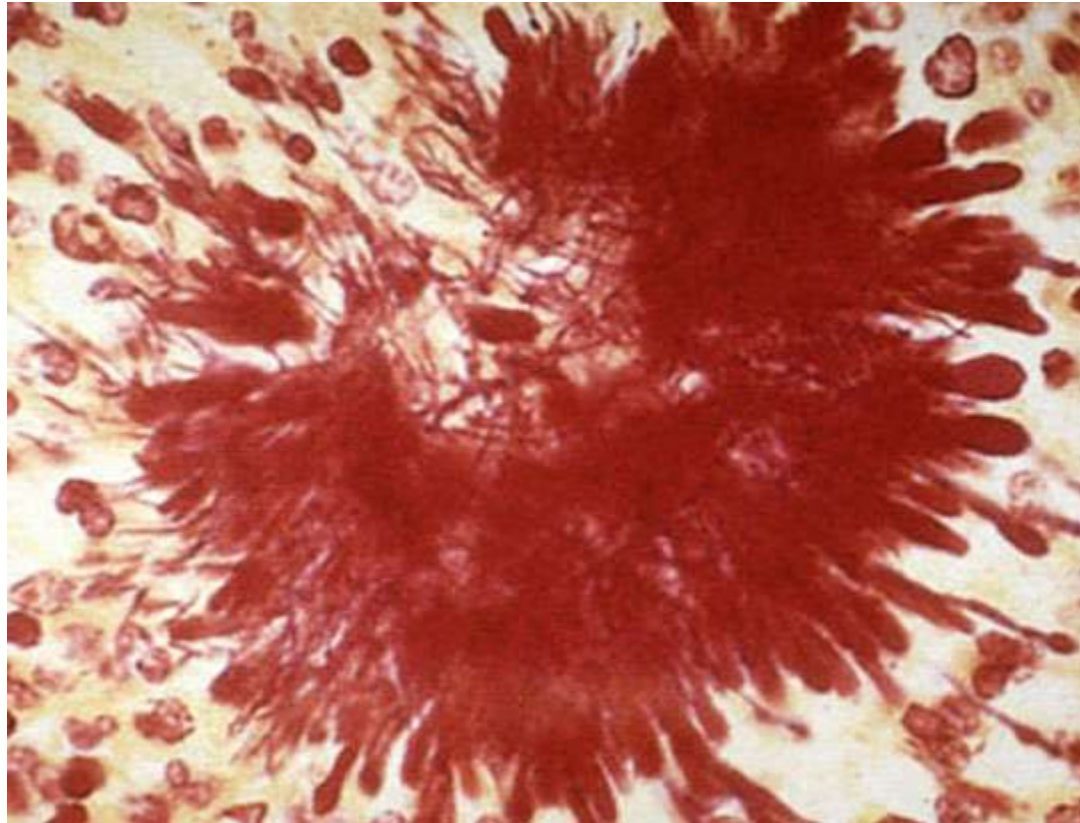
- Identification of sulfur granules or "grains" in pus or histological sections of surgical specimen is very helpful in the diagnosis.



- On hematoxylin-eosin stains, the sulfur granules appear eosinophilic and are composed of organisms coated by a proteinaceous material (Immune mediated reaction).



Club shaped radiating bodies with rounded end to the outside periphery of the lesion enclosing the branched filamentous *A. bovis* in the centre



Actinomycrosis in man



• Mandibular actinomycosis. Lesions are those of rarefactive osteomyelitis, due to the evident loss of bone tissue, and to ossifying periostitis, that leads (محيطي) to perimetral deformation of the bone which is increased in diameter.



Treatment:

- Goal of treatment is to kill the bacteria and stop the spread of the lesion. However, the hard mass will usually not regress significantly.
- Sodium iodide is the treatment of choice in ruminant actinomycosis. Sodium iodide (70 mg/kg of a 10%–20% solution, IV) is given once and repeated several times at 7- to 10-day intervals.
- If signs of iodine toxicity develop (eg, dandruff, diarrhea, anorexia, coughing, and excessive lacrimation), iodine administration should be discontinued or treatments given at longer intervals.
- Sodium iodide has been shown to be safe for use in pregnant cows and presents little risk of causing abortion.

- Concurrent administration of antimicrobials, including penicillin, florfenicol, or oxytetracycline, is recommended.
- Surgery to debride large mandibular lesions has also been described in conjunction with iodine and antimicrobial therapy.
- Under no circumstances should an animal be left untreated until the disease becomes this severe

Control:

Because *A bovis* is part of the normal oral flora in ruminants, control focuses on avoiding coarse, stemmy feeds or feeds with plant awns that might damage the mucosal epithelium. When multiple cases are seen in a herd, it is not from the contagious nature of the pathogen but the widespread exposure to a risk factor (eg, coarse feed)