



Industry &
Investment

Feedlot cattle disease & pathology

Dr Barbara Vanselow

Preparing animals for feedlot

For disease prevention/limitation

- Yard weaning
- Vaccination –IBR, pestivirus, Pasteurella/Mannheimia, Clostridia, Leptospirosis
- Internal parasite control
- External parasite control
- Gradual introduction to high concentrate feeding

L click [Feedlot manual DPI.pdf](#)



Industry &
Investment





PATENT NO. 2,341,717

498

Post- mortem examination

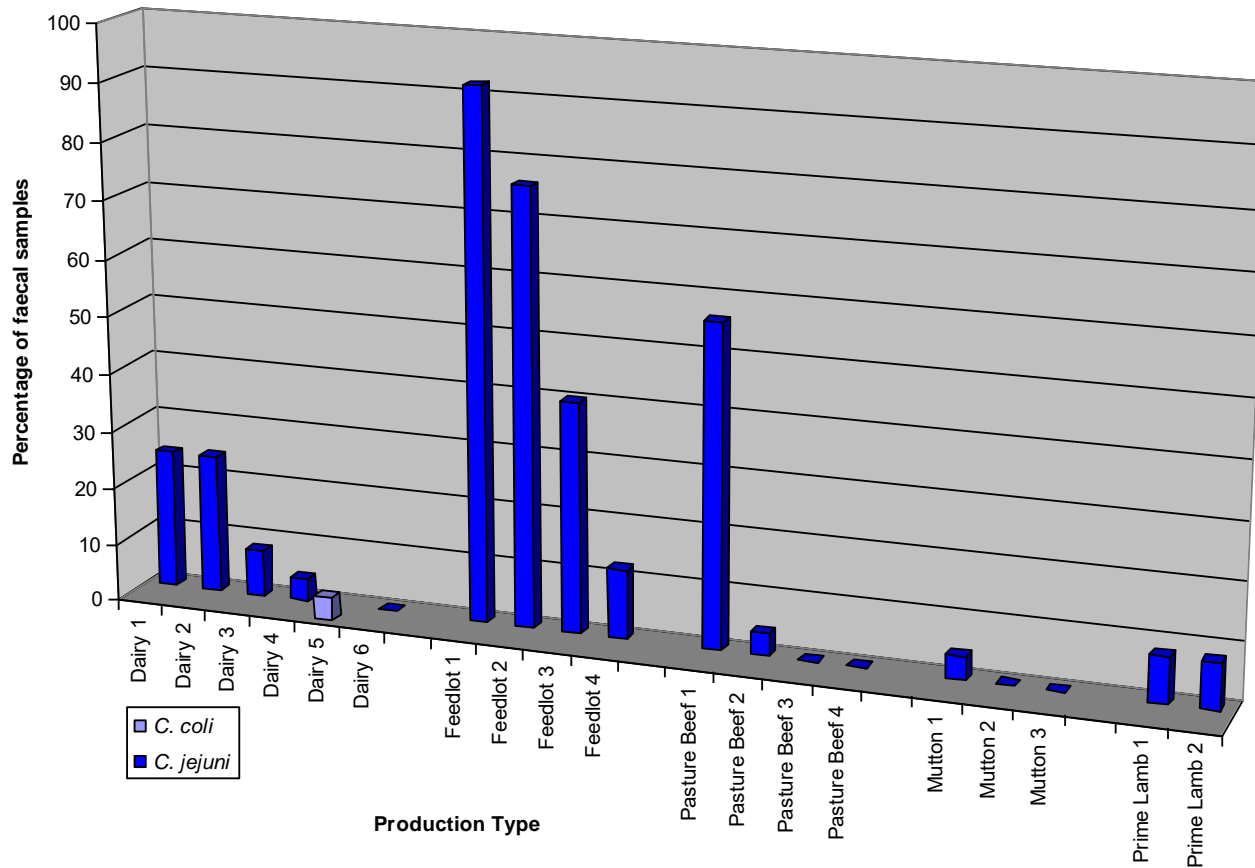


Necropsy kit and protective clothing

Remember zoonoses

- Salmonella
- *E. coli* (Shiga toxins)
- Campylobacter
- Leptospirosis
- Anthrax
- Q fever
- Other bacteria, fungi

Percentage of faecal samples positive for *Campylobacter* in Australian production systems



[Click *Intensive cattle prod and campylobacter.pdf*](#)

PM training session

Right lateral recumbency makes rumen removal easier. Rumen may weigh >70kg and is a critical organ to examine in feedlot cattle





One method of opening skull - using a tomahawk

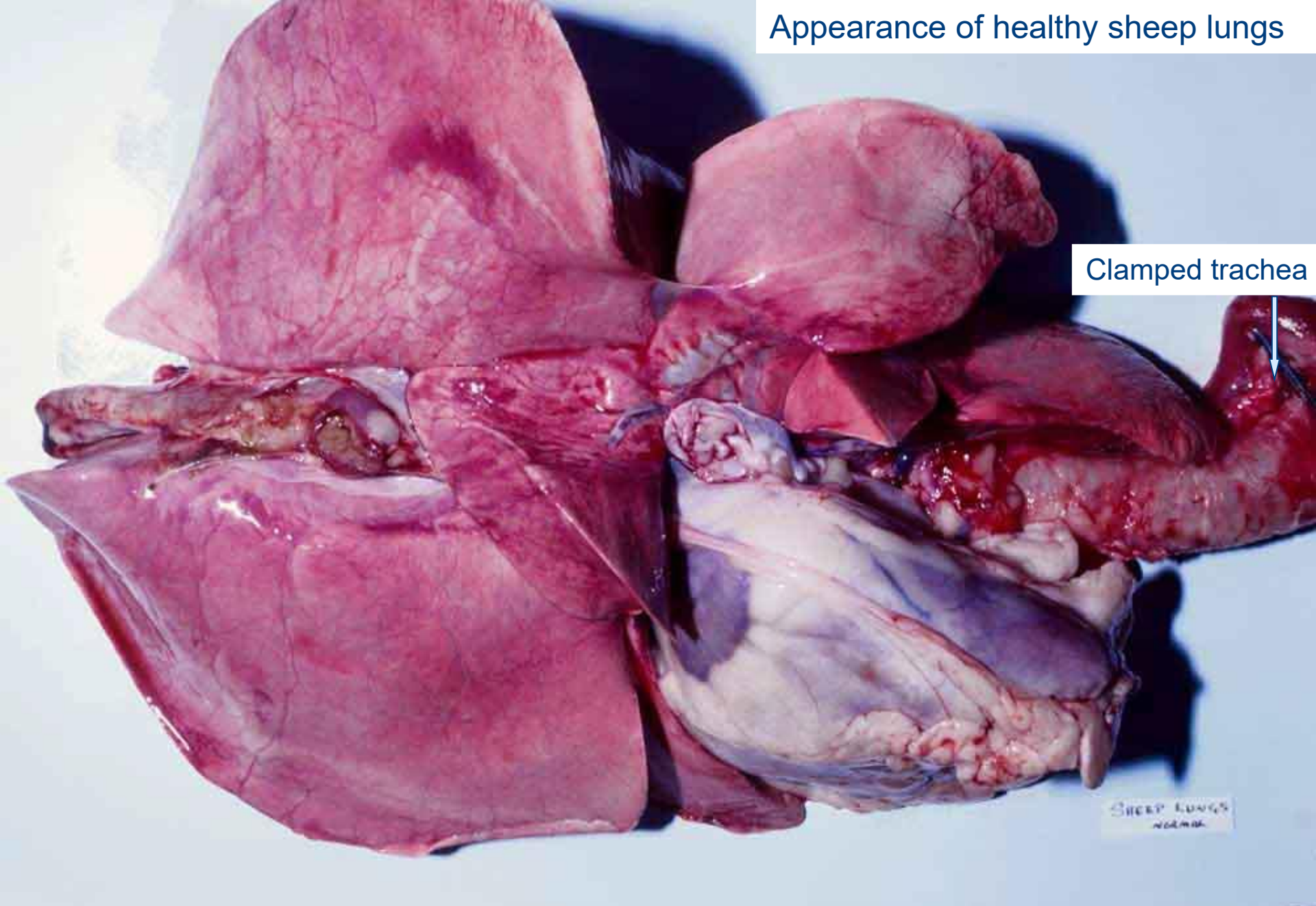


Respiratory disease

Gross appearance and morphological pattern of lung injury varies according to the causative agents and route of infection



Appearance of healthy sheep lungs



Clamped trachea

If airways are patent, lungs will collapse when chest is opened

Bronchopneumonia



Dependent and cranioventral parts are the most severely affected by bronchopneumonia

Image courtesy Roger Kelly

Interstitial pneumonia

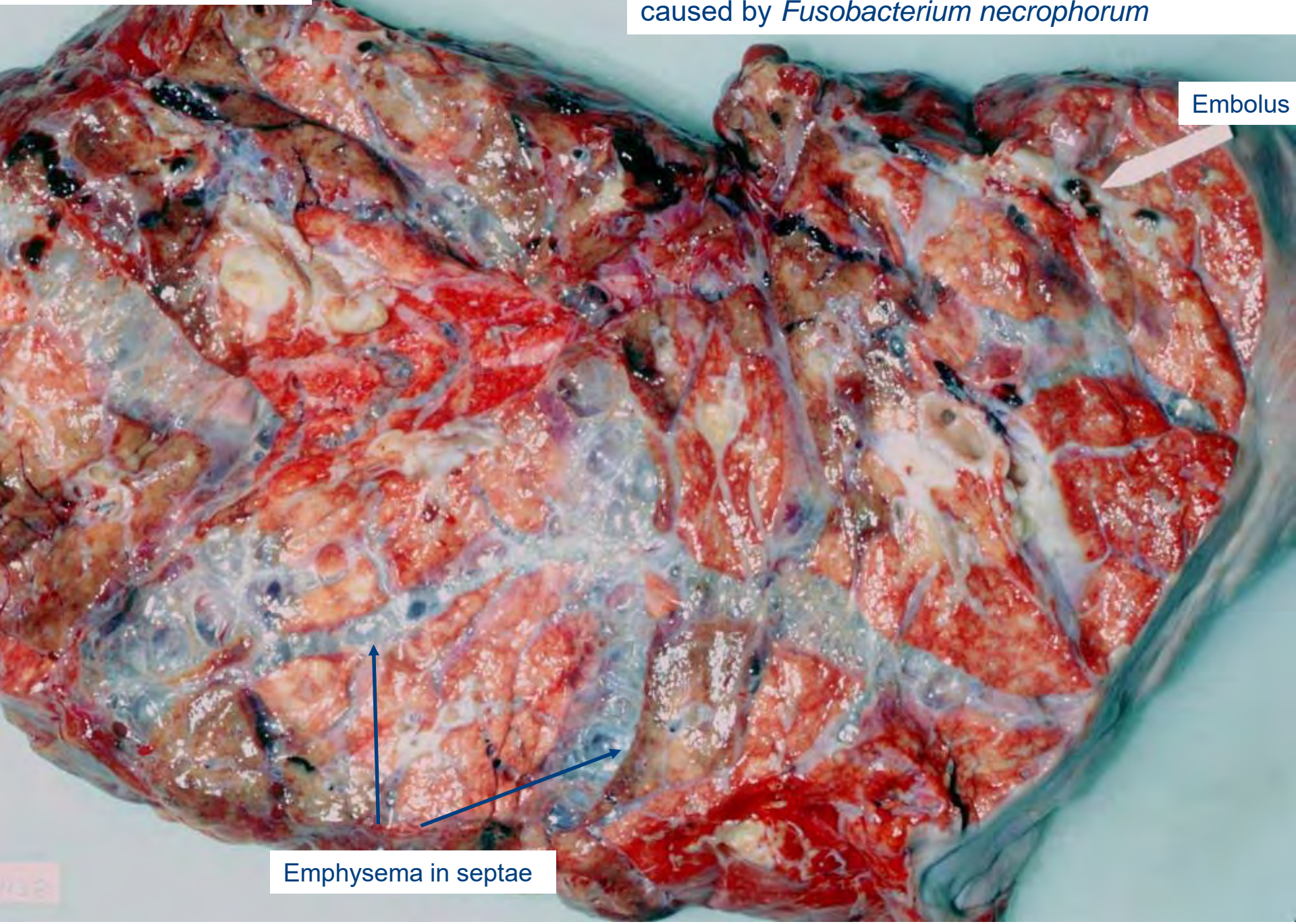


© UniMelb 2005

Interstitial pneumonia affects all lobes uniformly

Embolic pneumonia

AN68/1138 Embolic pneumonia from endocarditis caused by *Fusobacterium necrophorum*

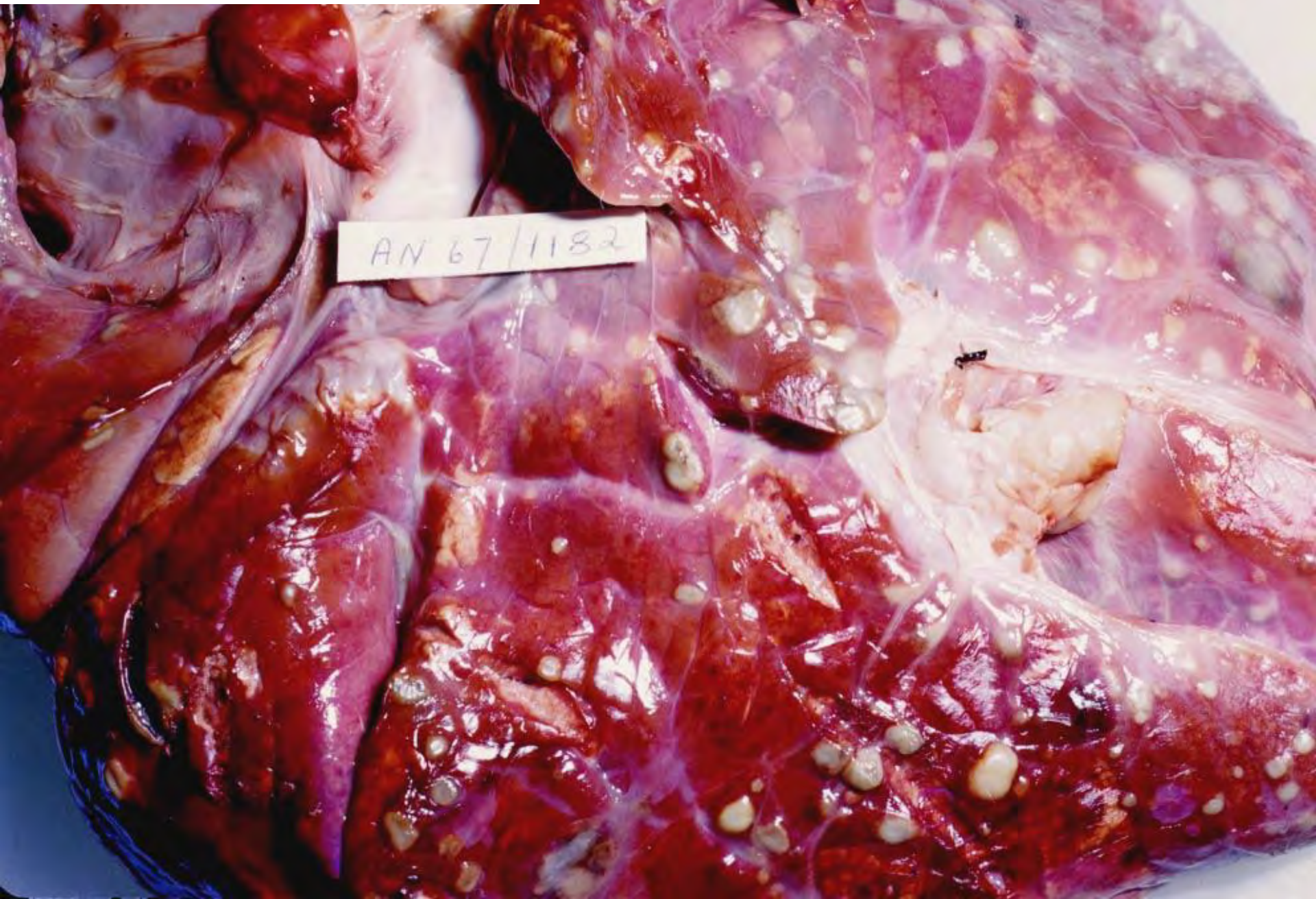


Embolus

Emphysema in septae

1138

Embolic pneumonia – *A. pyogenes*
and *F. necrophorum*



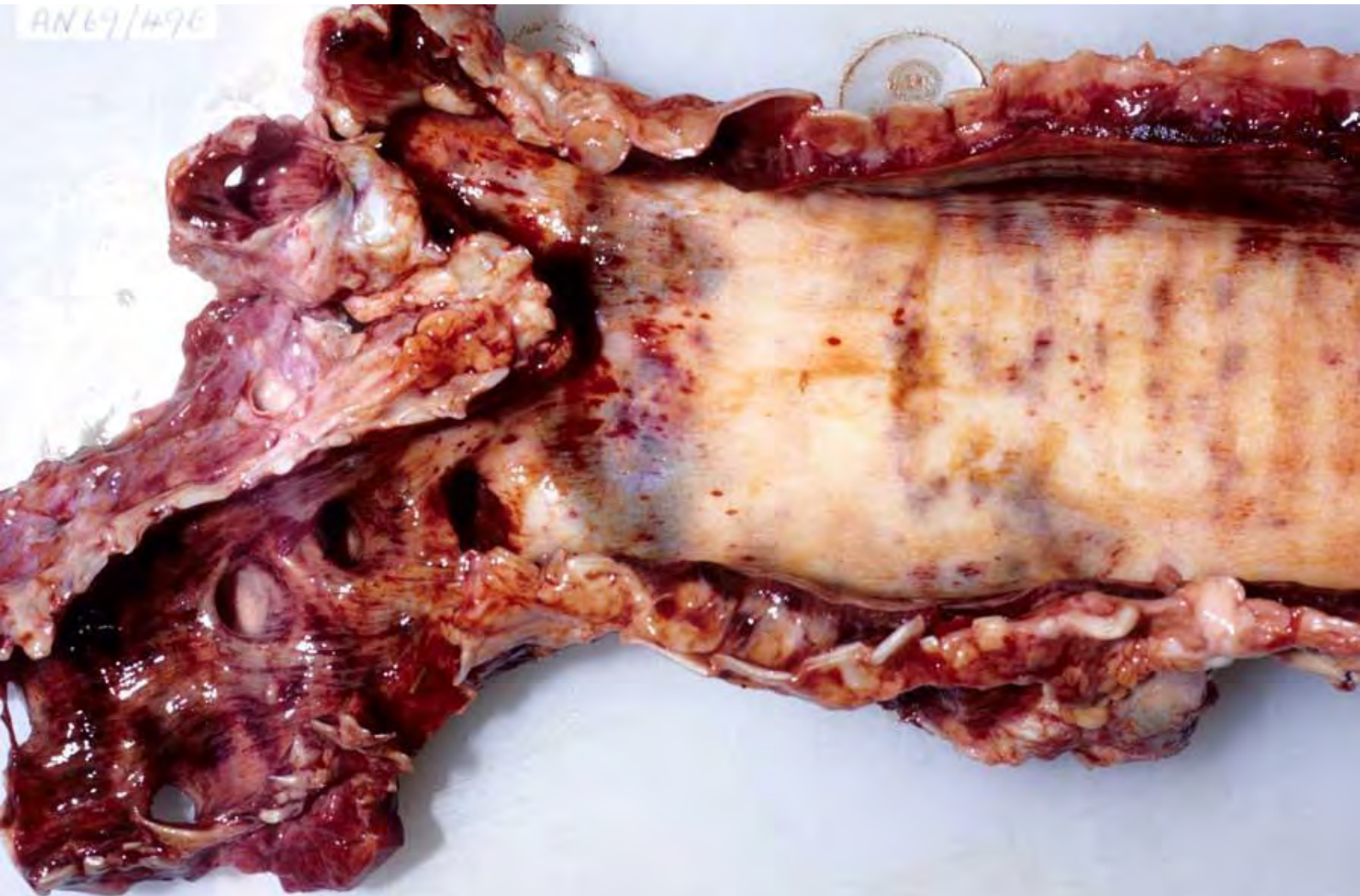
Respiratory disease complex

- Viruses – IBR, pestivirus, parainfluenza 3, bovine respiratory syncytial virus
- Bacteria – usually secondary to viral infection, bronchopneumonia – *Pasteurella multocida*, *Mannheimia haemolytica*, *Haemophilus somnus*, *Arcanobacterium pyogenes*

AN95/4197 Infectious bovine rhinotracheitis. Mouth breathing, tongue protruded, neck extended, nasal discharge, drooling



AN69/496 Suspect IBR. Haemorrhagic tracheitis, bronchitis – acute bronchopneumonia, cause not determined.





aerated

consolidated
("hepatisation")

AN69/496

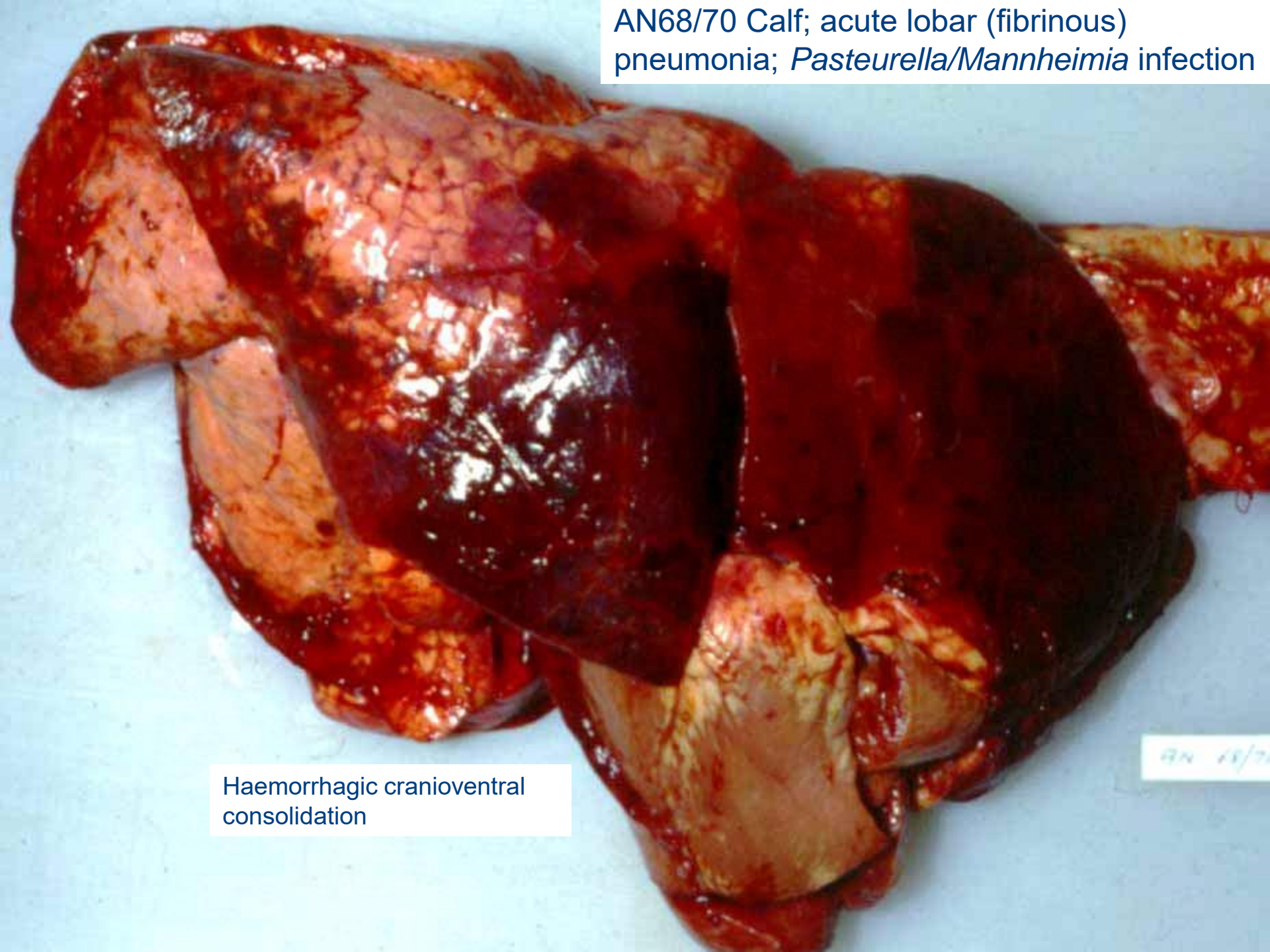
AN69/496 (previous 2 slides)

Histopathology Lung – Acute bronchopneumonia with suppurative exudate plugging bronchi and bronchioles; and septal vessel congestion. The interlobular connective tissue was distended with inflammatory exudate.

Lung culture yielded no significant organisms. Suspect IBR and secondary bacterial bronchopneumonia.
(possibility of unrecorded antibiotic admin?)



AN68/70 Calf; acute lobar (fibrinous) pneumonia; *Pasteurella/Mannheimia* infection



Haemorrhagic cranioventral consolidation

AN 68/70

Pasteurella/Mannheimia fibrinous (lobar) pneumonia.
Marked expansion of interlobular septa

(indistinguishable grossly from
bovine pleuropneumonia due to
Mycoplasma mycoides)



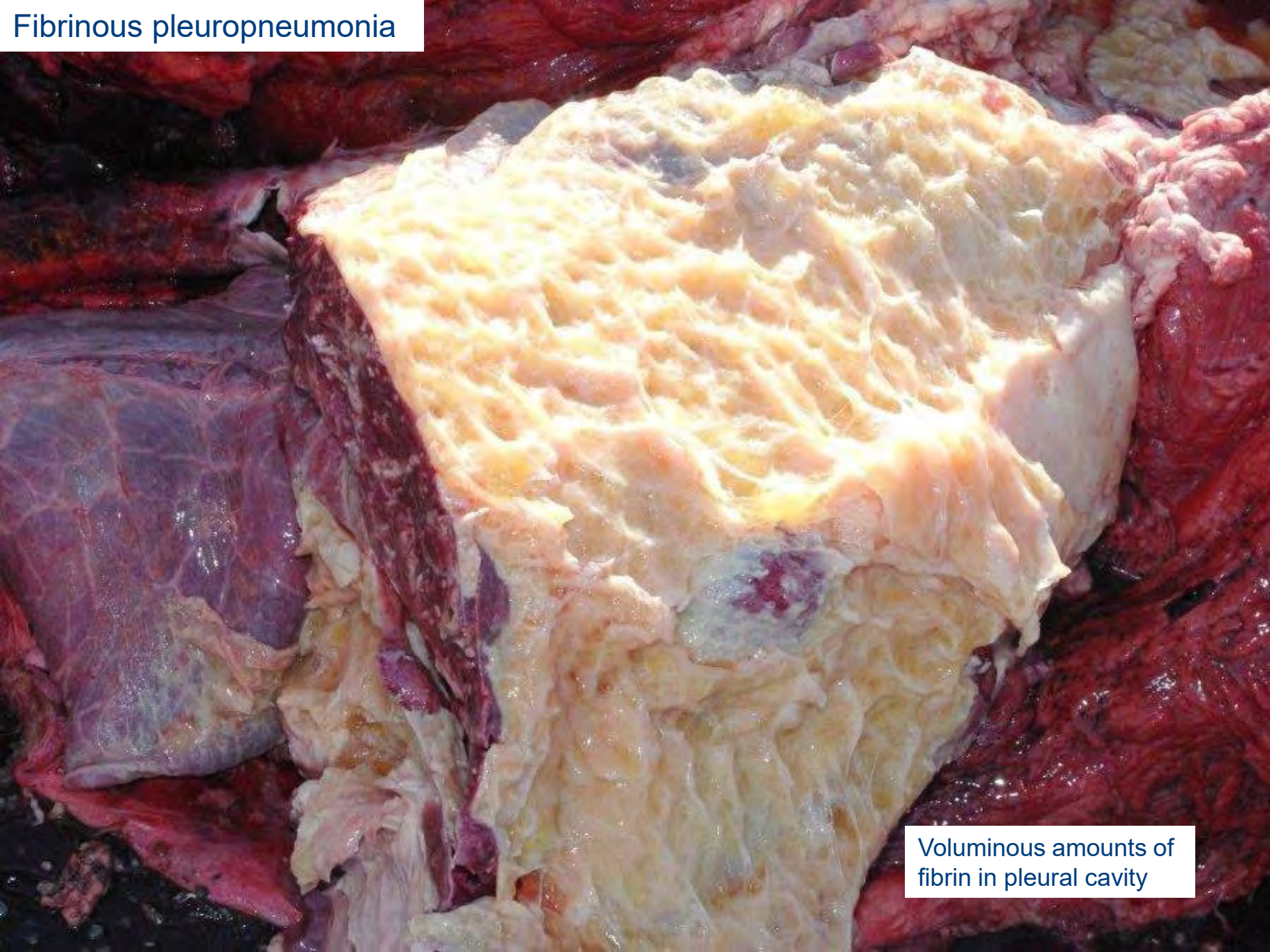
979/423

© 2005 DPI Victoria

Fibrinous pleuropneumonia (suspect *Pasteurella*/ *Mannheimia*)

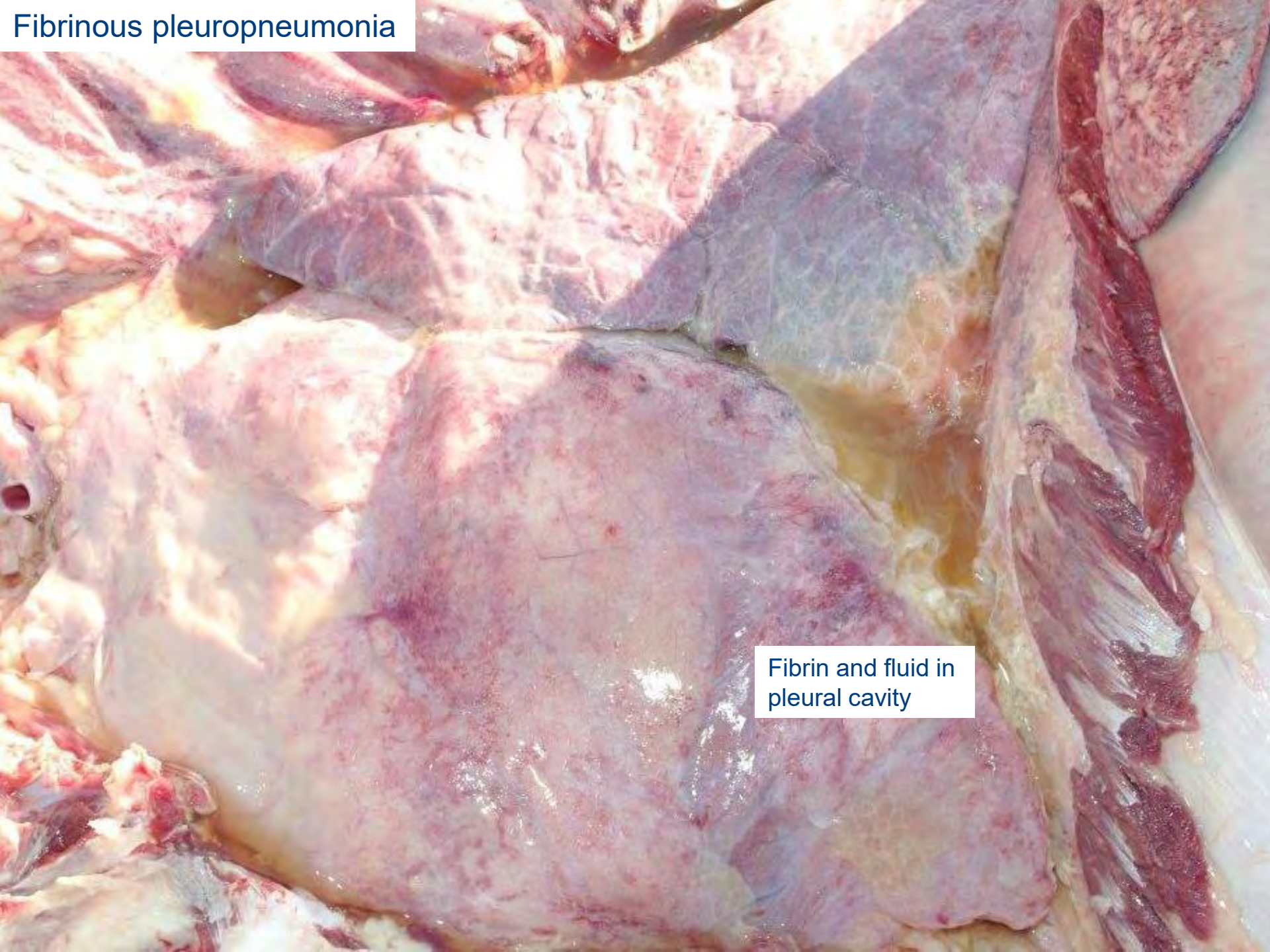


Fibrinous pleuropneumonia



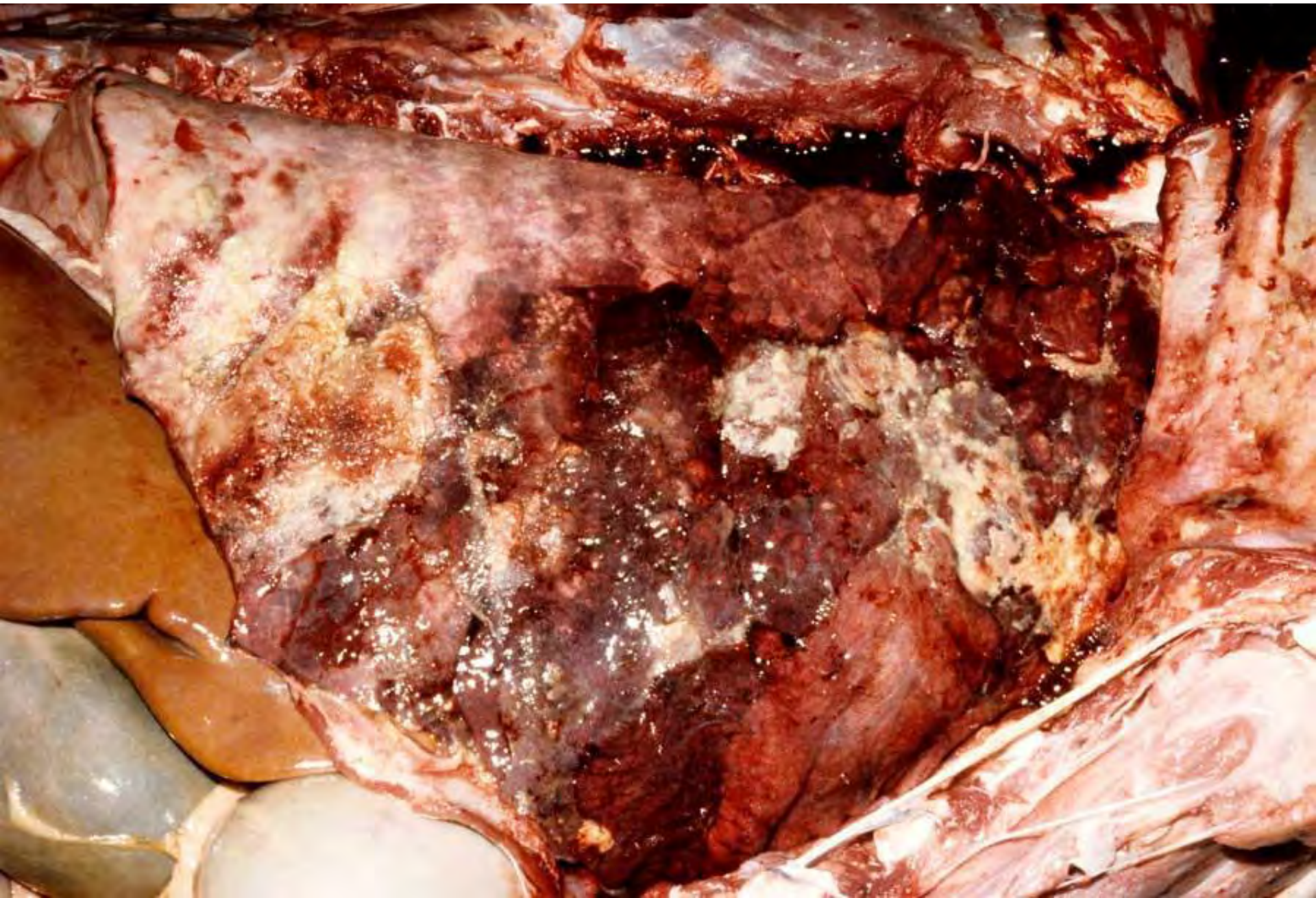
Voluminous amounts of fibrin in pleural cavity

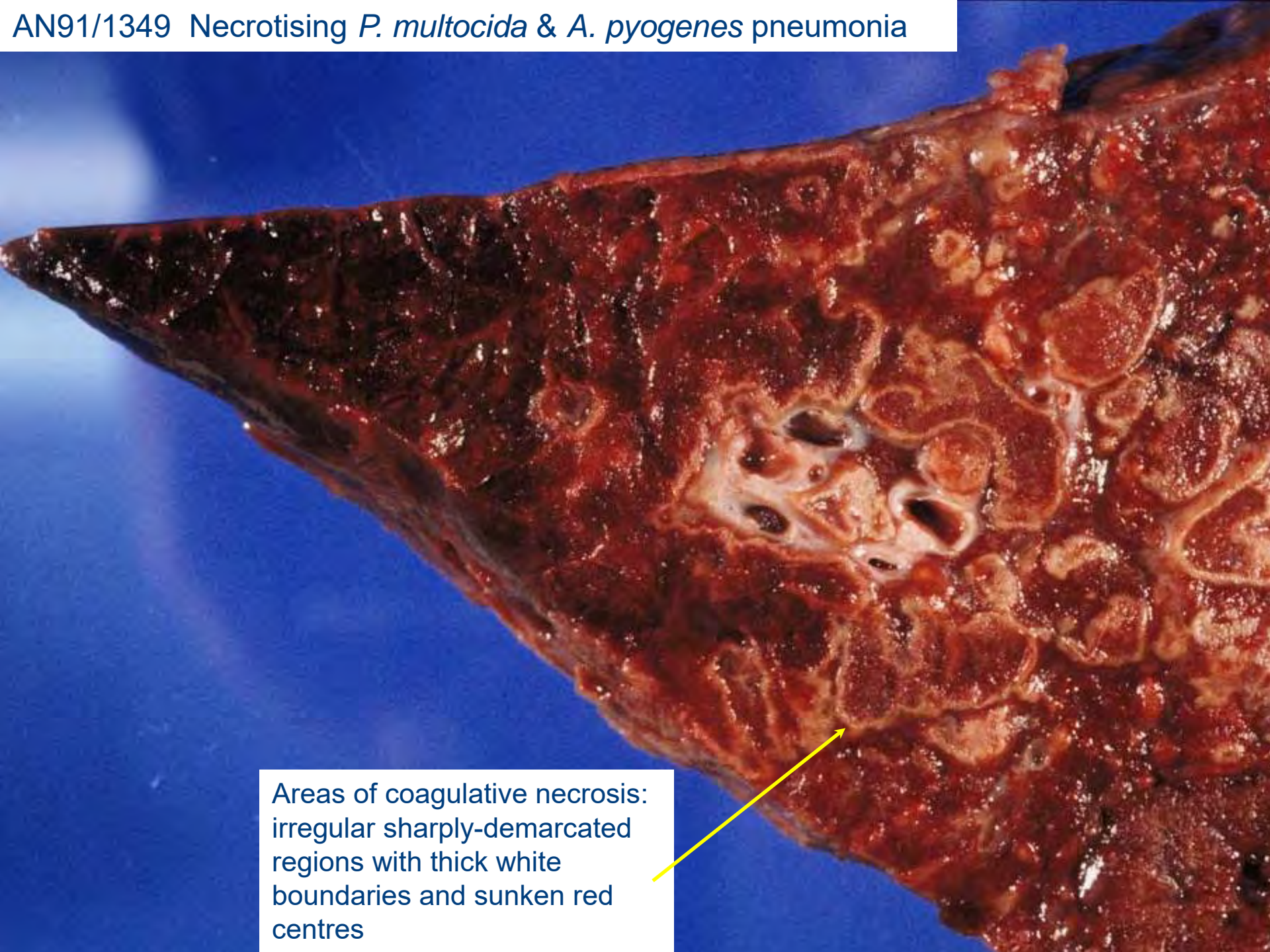
Fibrinous pleuropneumonia



Fibrin and fluid in pleural cavity

AN91/1349 Fibrinonecrotic pneumonia & pleuritis; *Pasteurella multocida* & *Arcanobacterium pyogenes* infection





Areas of coagulative necrosis:
irregular sharply-demarcated
regions with thick white
boundaries and sunken red
centres

AN91/1349 (previous 2 slides)

GROSS FINDINGS: Lung consolidated, pleural adhesions, marbling and encapsulation of necrotic material. The ventral aspect of the lung worst affected, other parts oedematous. Froth in airways.

HISTOPATH: Lung: areas of multifocal necrosis, fibrinous exudation into alveoli and interlobular septa.

DIAGNOSIS: Acute fibrinonecrotic pneumonia.
Pasteurella multocida and *Arcanobacterium pyogenes* isolated from lung

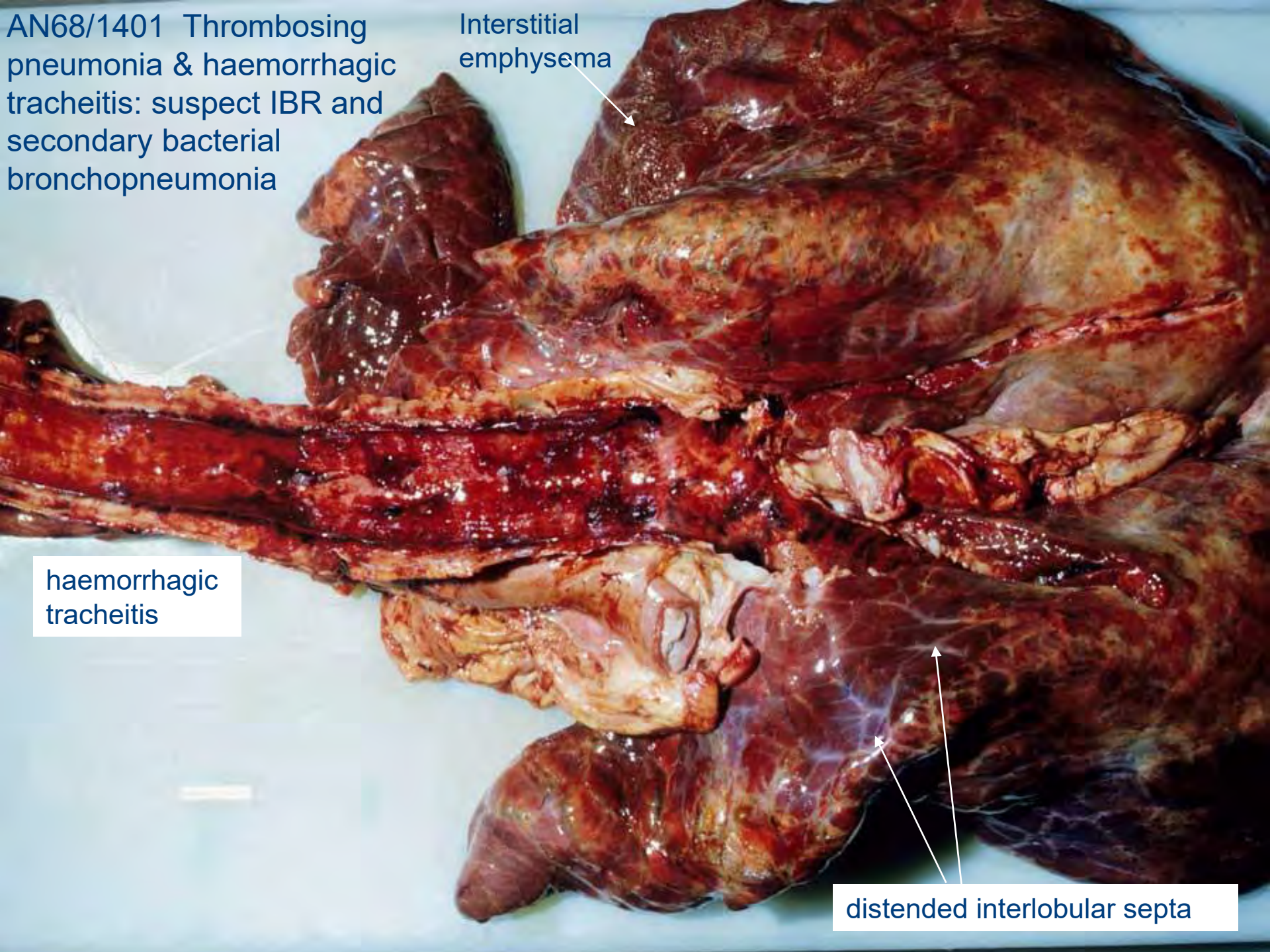


AN68/1401 Thrombosing pneumonia & haemorrhagic tracheitis: suspect IBR and secondary bacterial bronchopneumonia

Interstitial emphysema

haemorrhagic tracheitis

distended interlobular septa

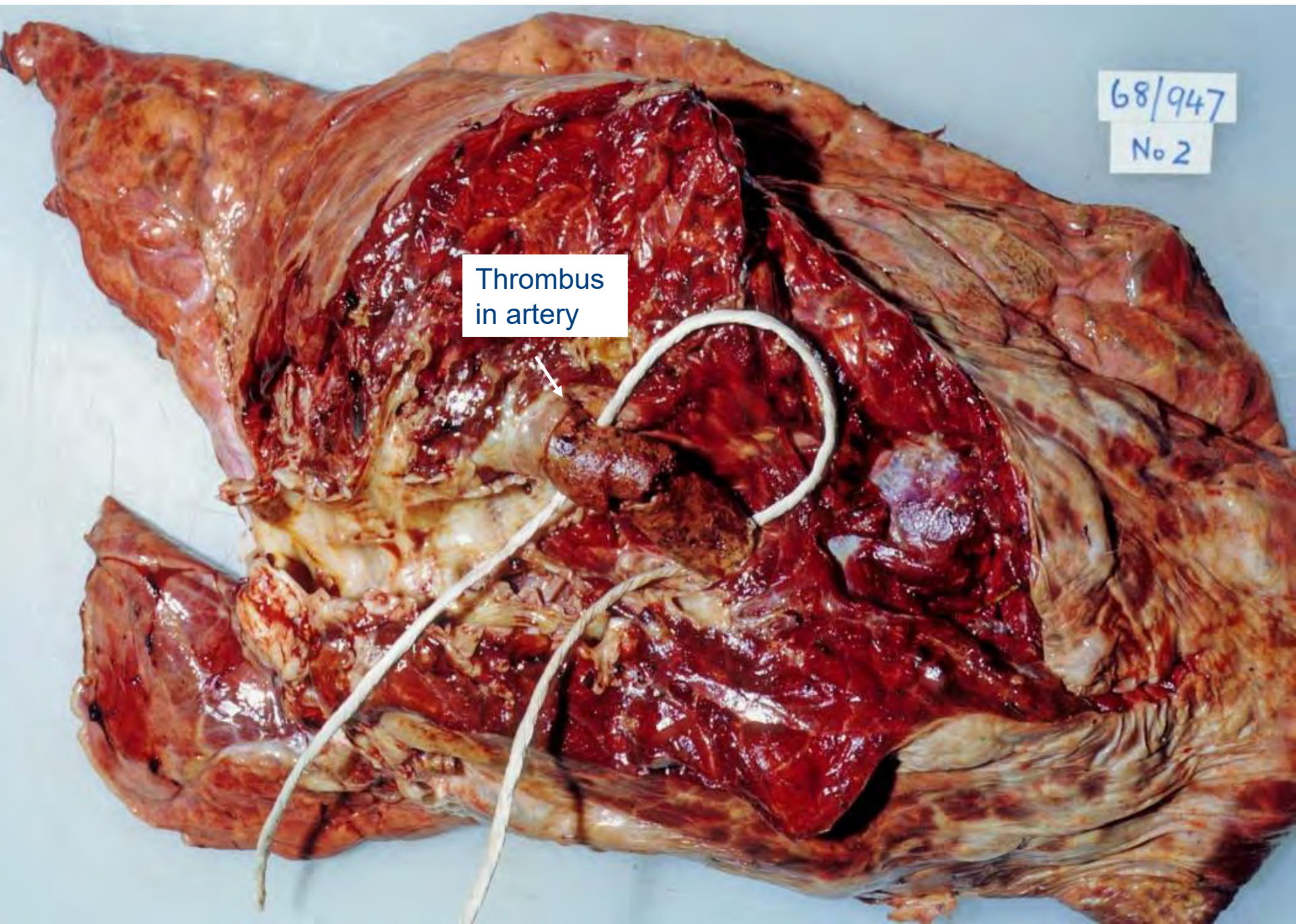


AN68/1401 Haemorrhagic tracheitis



AN68/1401

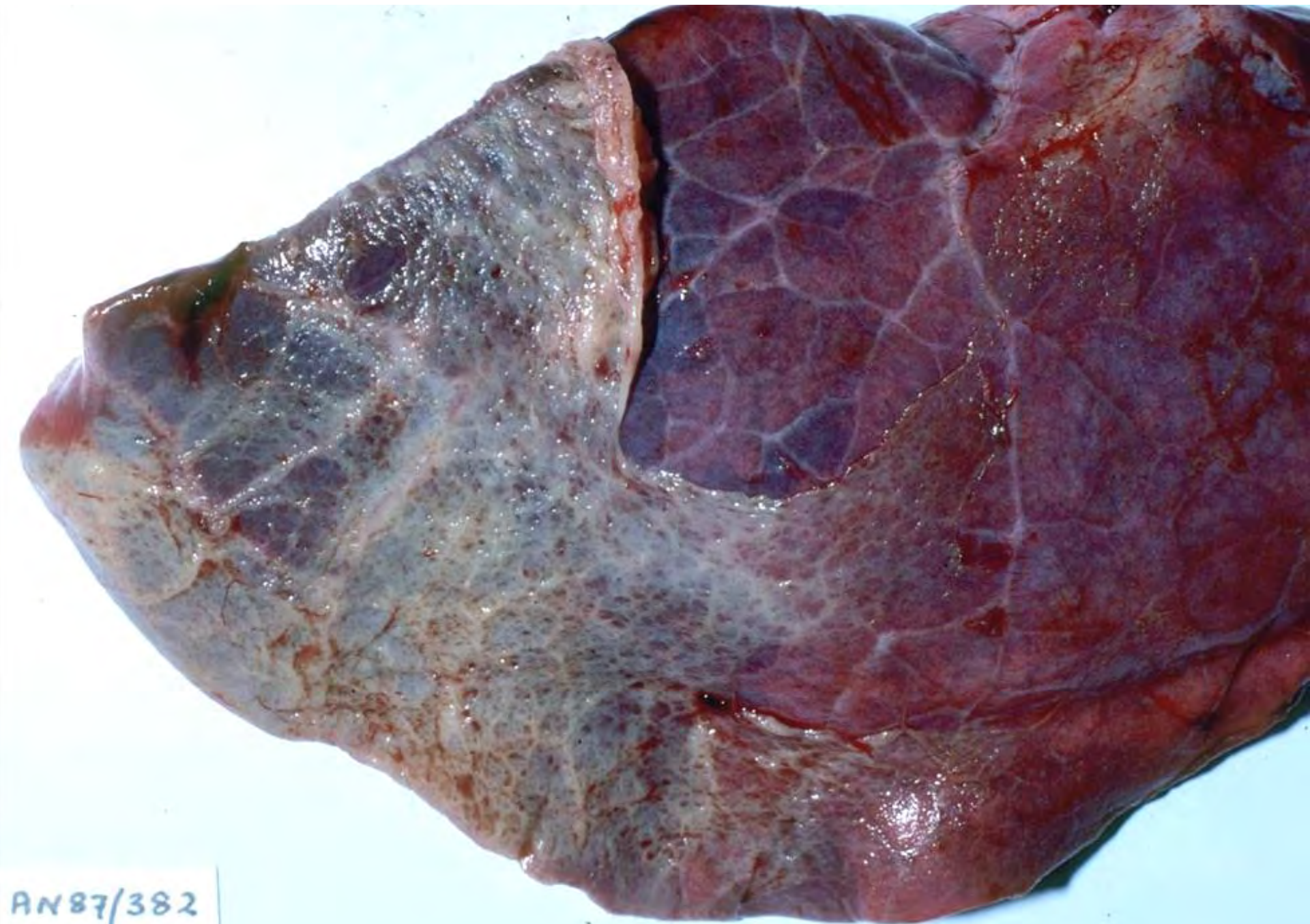
Thrombosing pneumonia; suspect IBR and secondary bacterial pneumonia



68/947
No 2

Thrombus
in artery

AN87/382 Fibrinous pleuritis; possibly pasteurellosis



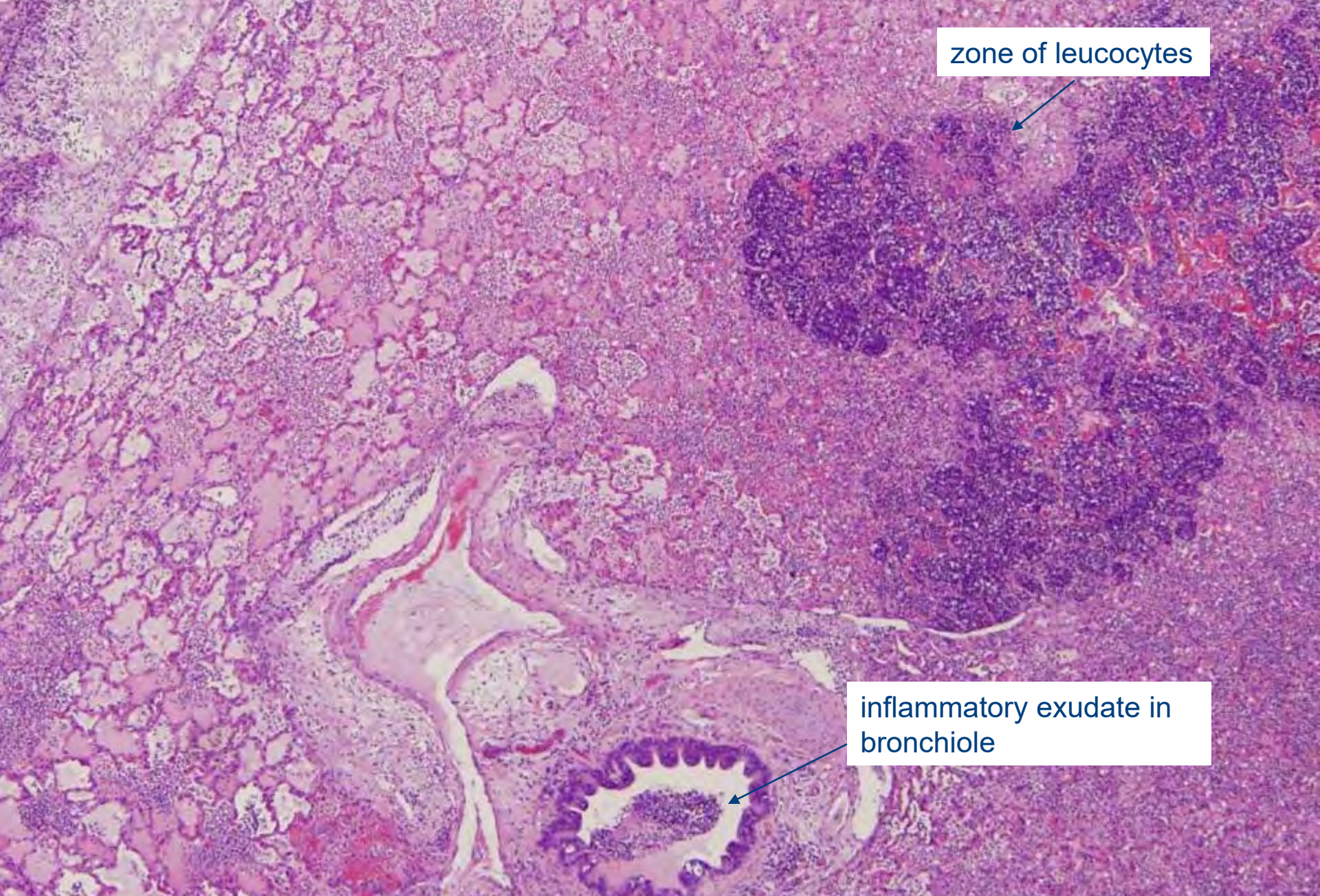
AN87/382

Bronchopneumonia histopathology

MN04/1596 (next 5 slides)

- Angus feedlot steer, Quirindi NSW February
- Signs of heat stress
- Knuckling
- Increased respiratory rate
- Later recumbent to lateral recumbency
- Euthanasia
- Severe diffuse fibrinopurulent bronchopneumonia

MN04/1596 Acute fibrinous/lobar pneumonia, suspect *Pasteurella*.
Alveolae and I/L septa filled with fibrin and leucocytes



zone of leucocytes

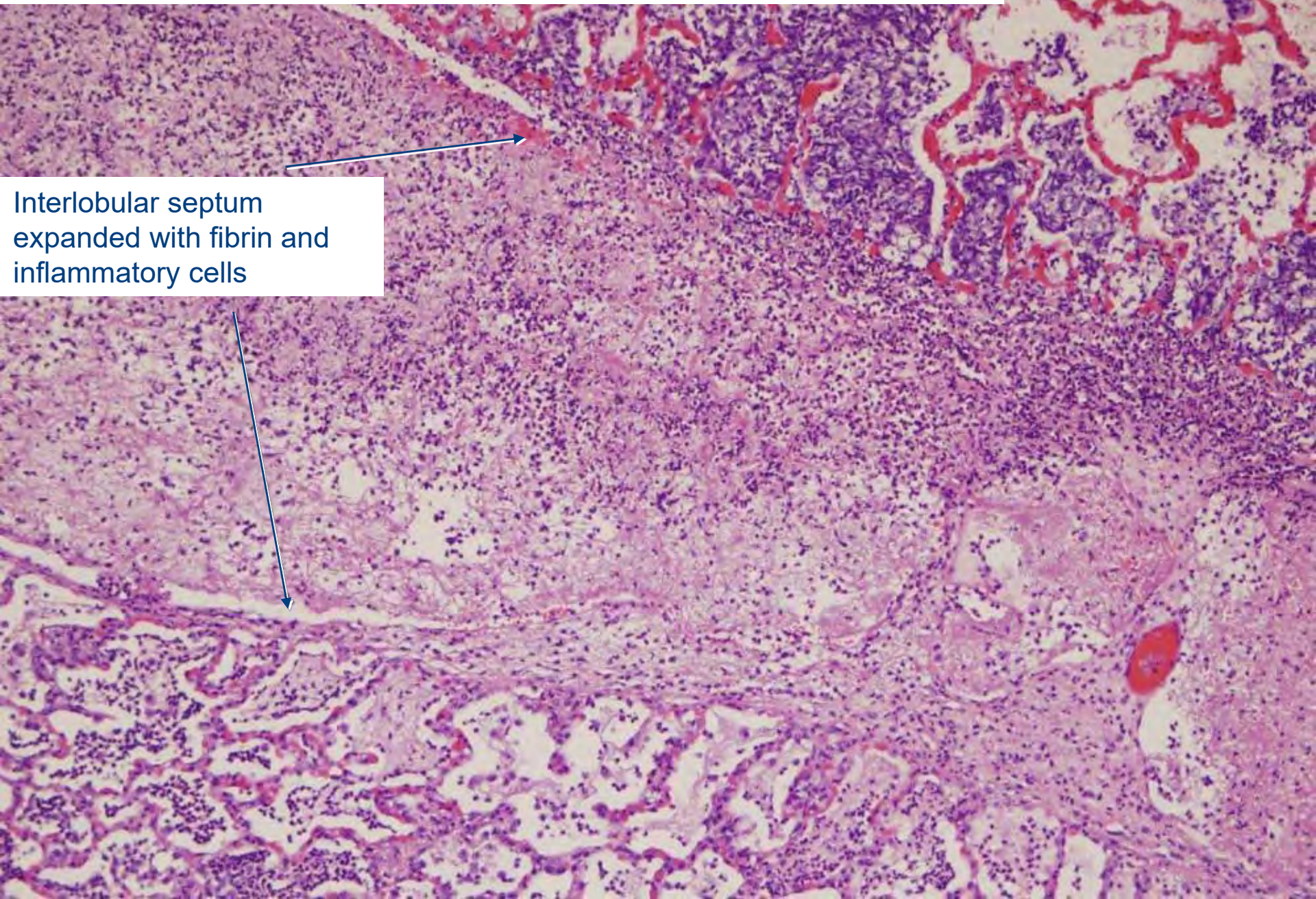


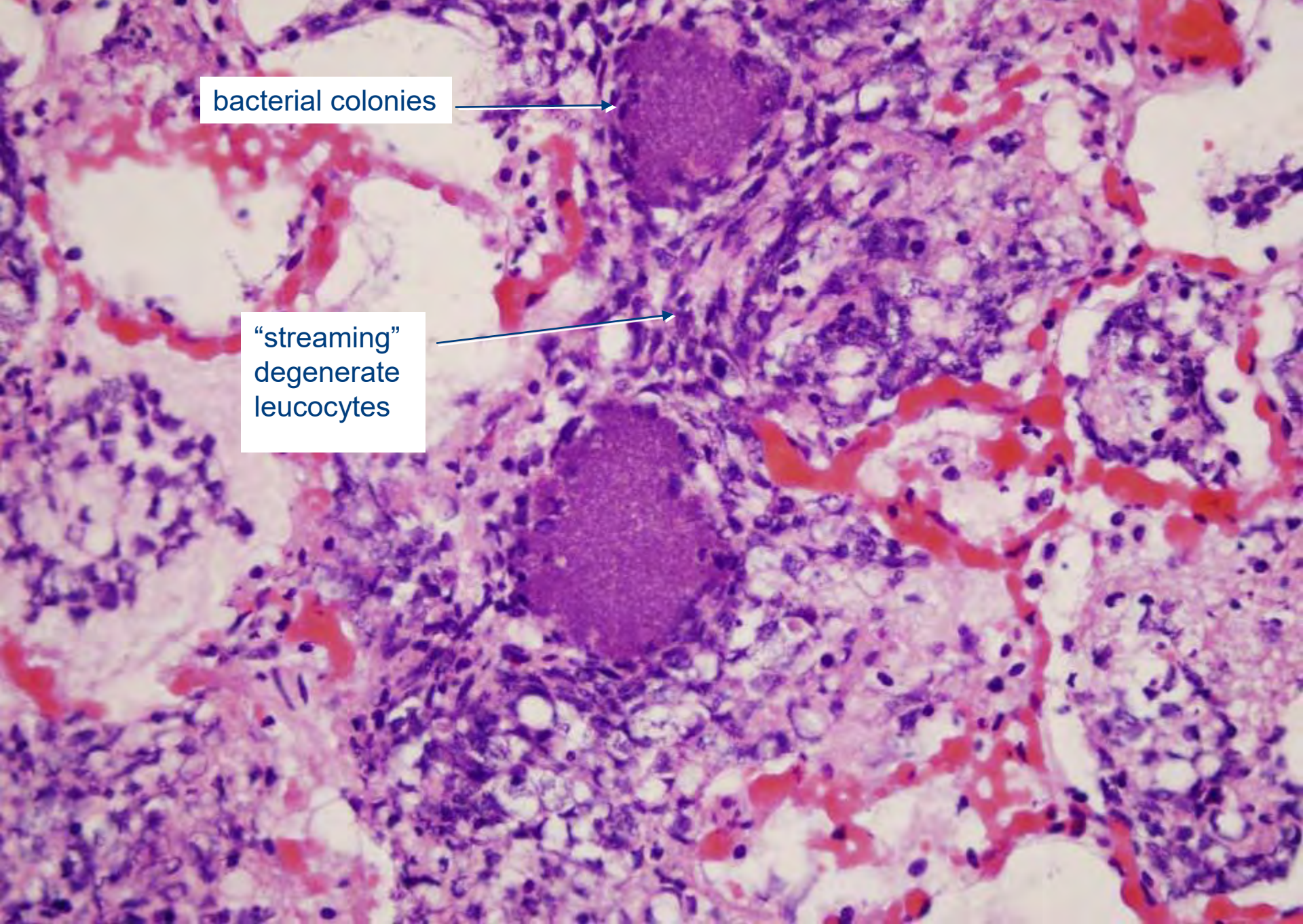
inflammatory exudate in bronchiole



MN04/1596 Acute fibrinous/lobar pneumonia, suspect *Pasteurella*.
Alveolae and I/L septa filled with fibrin and leucocytes

Interlobular septum
expanded with fibrin and
inflammatory cells





bacterial colonies

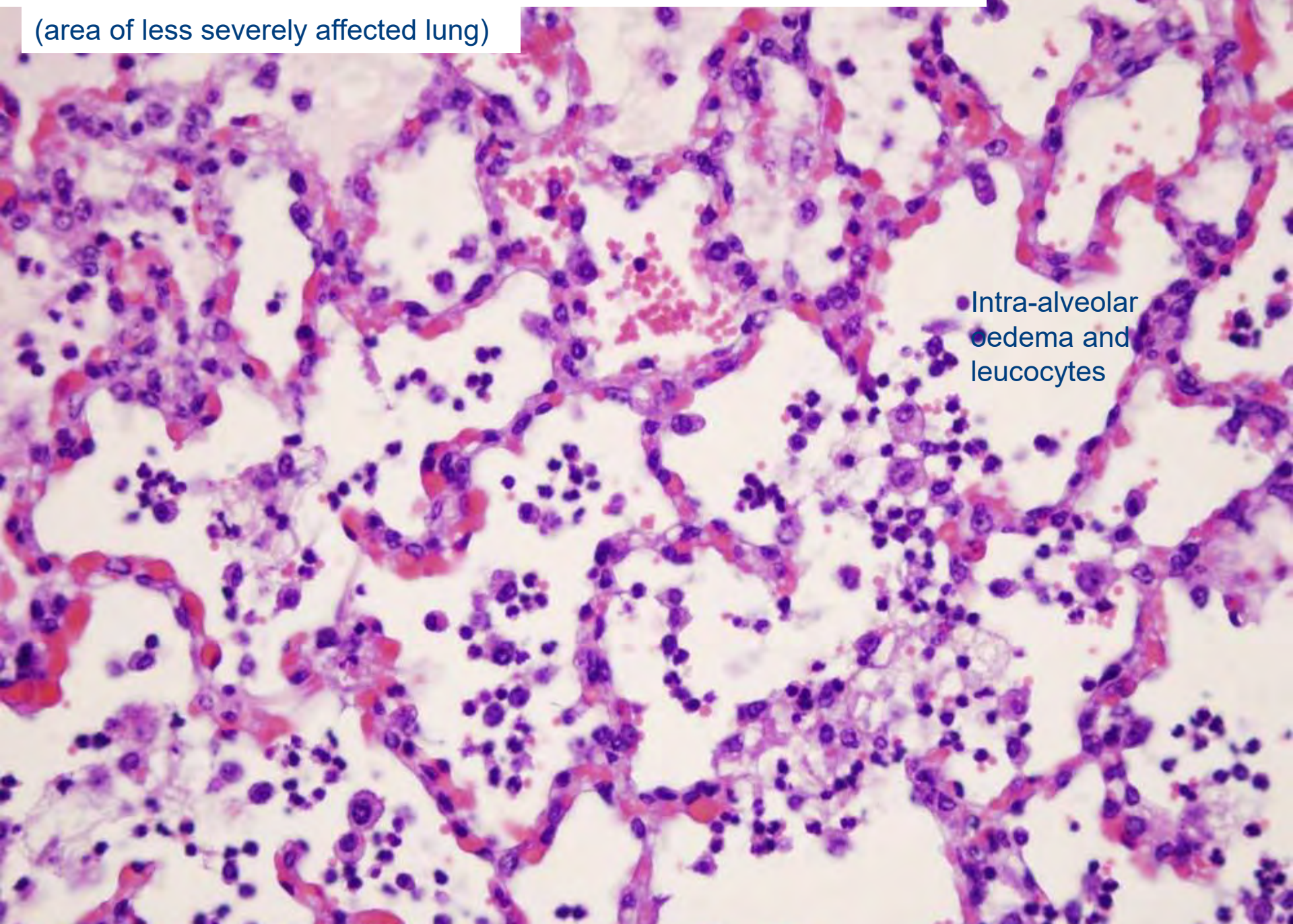


"streaming"
degenerate
leucocytes



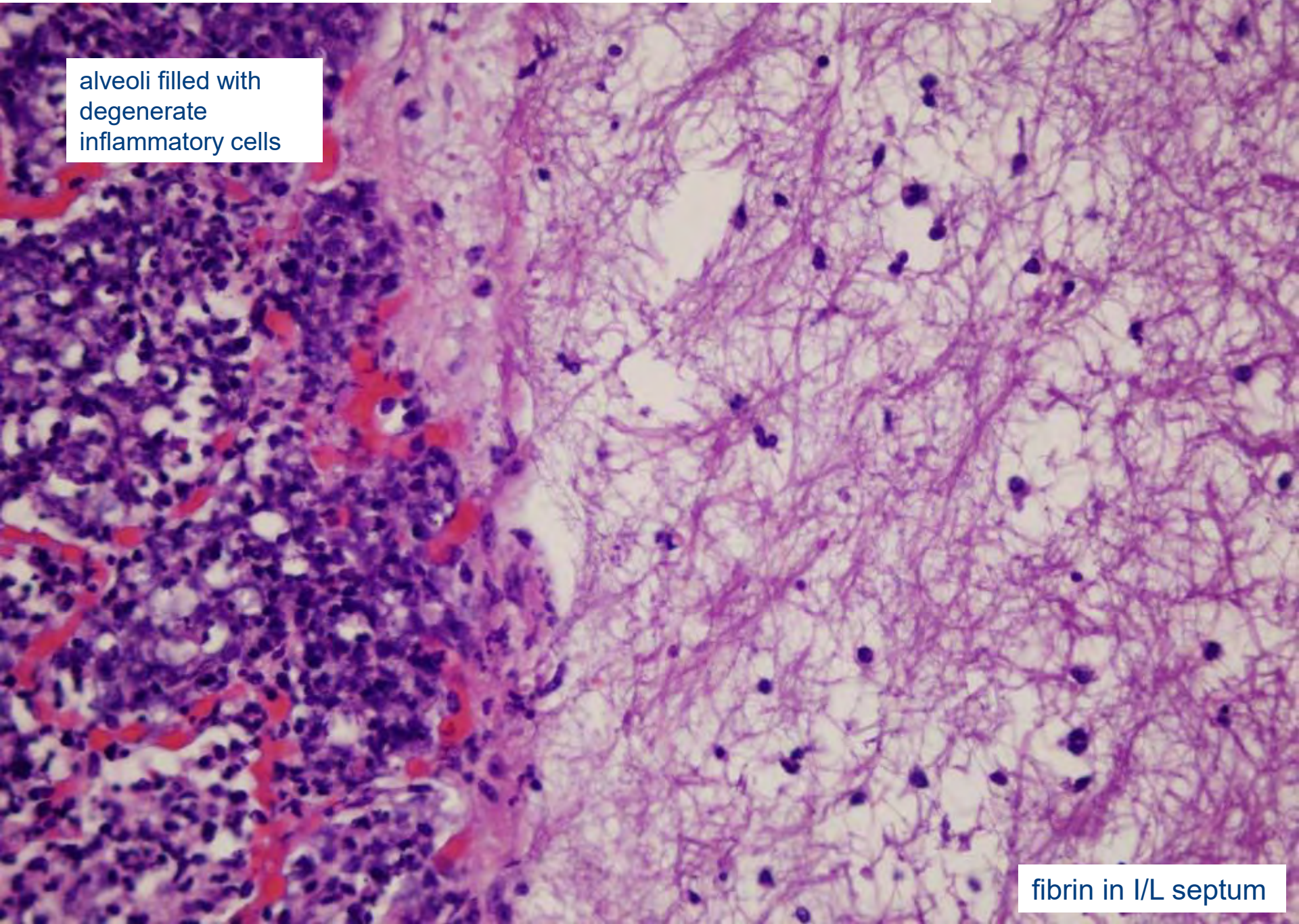
MN04/1596 Acute fibrinous/lobar pneumonia, suspect *Pasteurella*

(area of less severely affected lung)



● Intra-alveolar
oedema and
leucocytes

alveoli filled with
degenerate
inflammatory cells

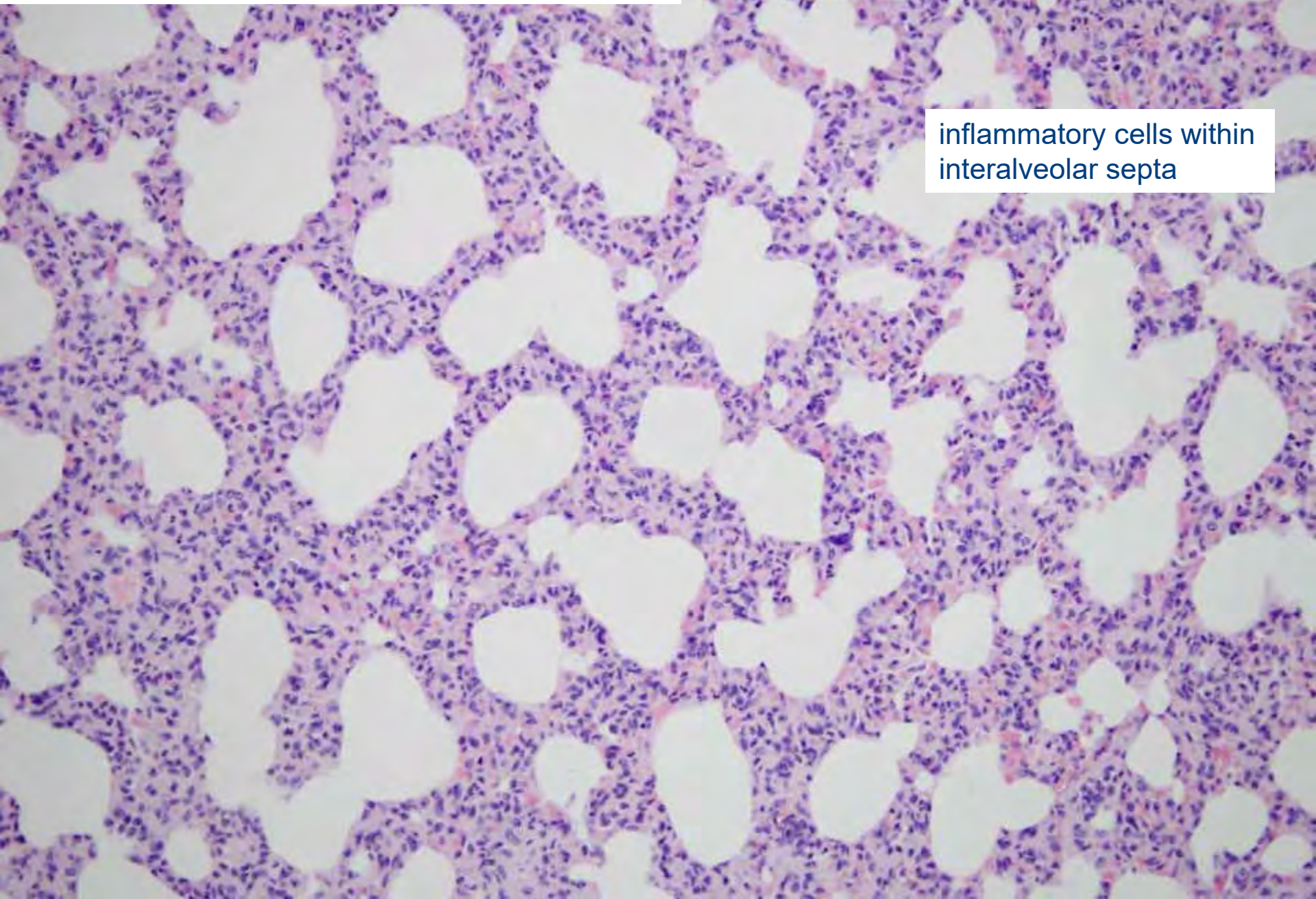


fibrin in I/L septum

Interstitial pneumonia histopathology MN04/9876 (next 2 slides)

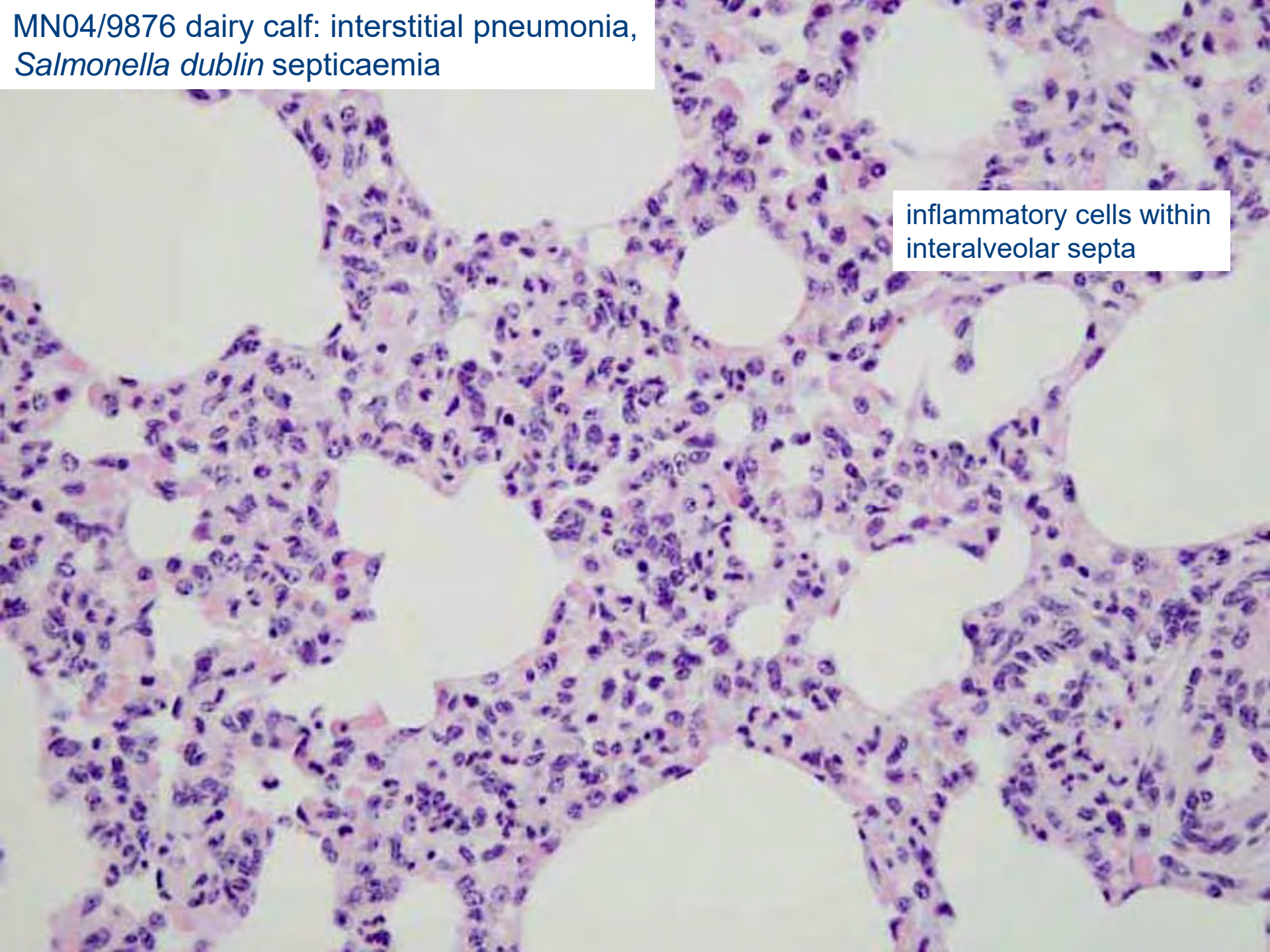
Two week-old dairy calf; interstitial pneumonia
(*Salmonella dublin* septicaemia)

MN04/9876 dairy calf: interstitial pneumonia,
Salmonella dublin septicaemia



inflammatory cells within
interalveolar septa

MN04/9876 dairy calf: interstitial pneumonia,
Salmonella dublin septicaemia



inflammatory cells within
interalveolar septa

Gastrointestinal

- Ruminal acidosis

Normal rumen papillae



papillae reduced on
pillars of normal
rumen

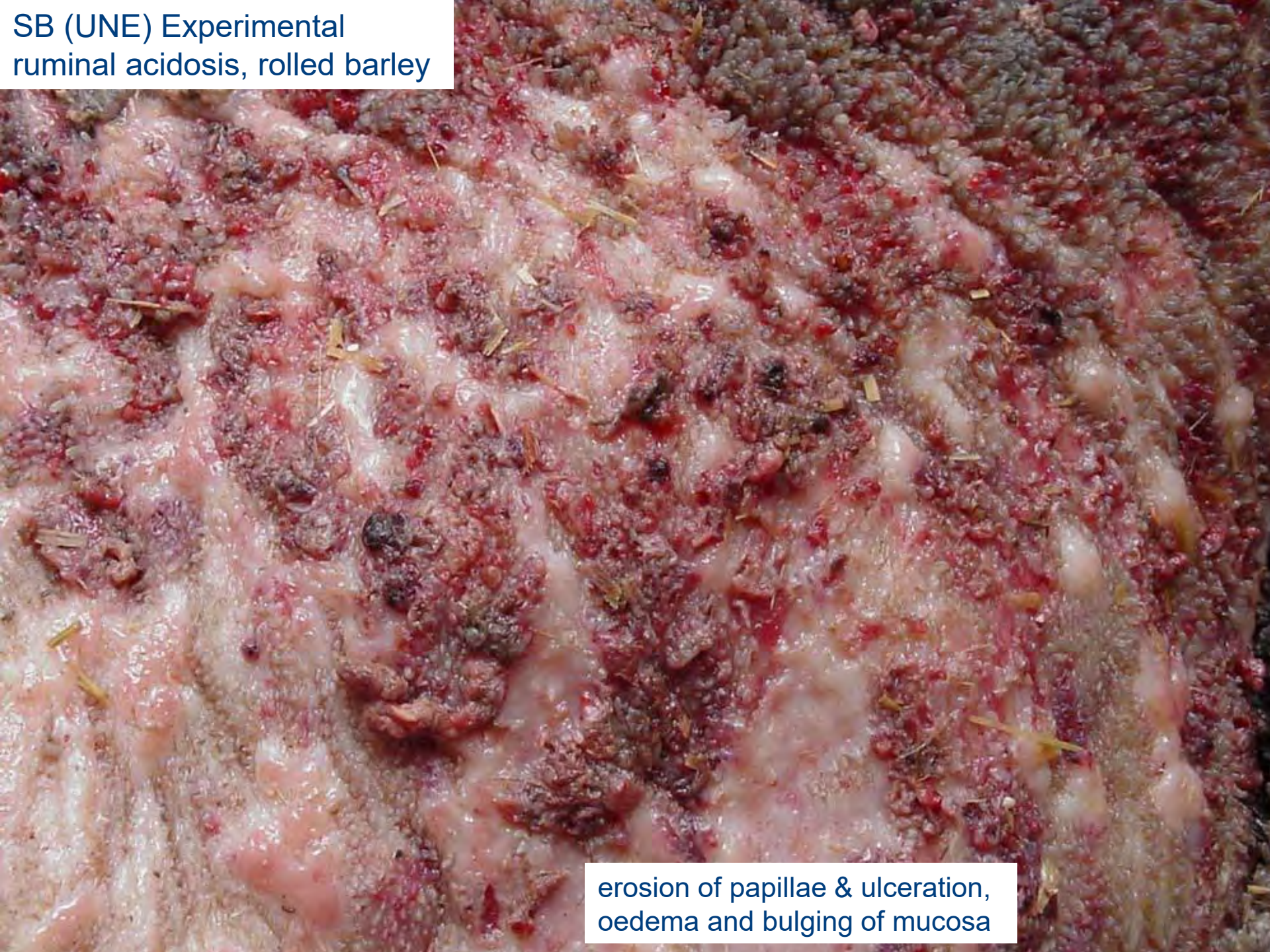
SB (UNE) Experimental bovine
ruminal acidosis, rolled barley

ruminal acidosis:
predominantly
affects ventral sac

normal
rumen



SB (UNE) Experimental
ruminal acidosis, rolled barley



erosion of papillae & ulceration,
oedema and bulging of mucosa

SB (UNE) Experimental
ruminal acidosis, rolled barley



Acute acidosis

- Ruminant pH < 5
- Protozoa show no mobility
- Protozoa die
- Without acidosis, motile protozoa are visible at low magnification without staining

Healthy motile ruminal protozoa

Entodinium spp.



Eudiplodinium maggi



Polyplastron multivesiculatum



Isotricha prostoma



Photos courtesy D. Tucker NSW DII. Protozoa stained with Methylene Blue or Iodine

AN68/1023 *Fusobacterium necrophorum* commonly invades rumen mucosa as a result of lactic acidosis



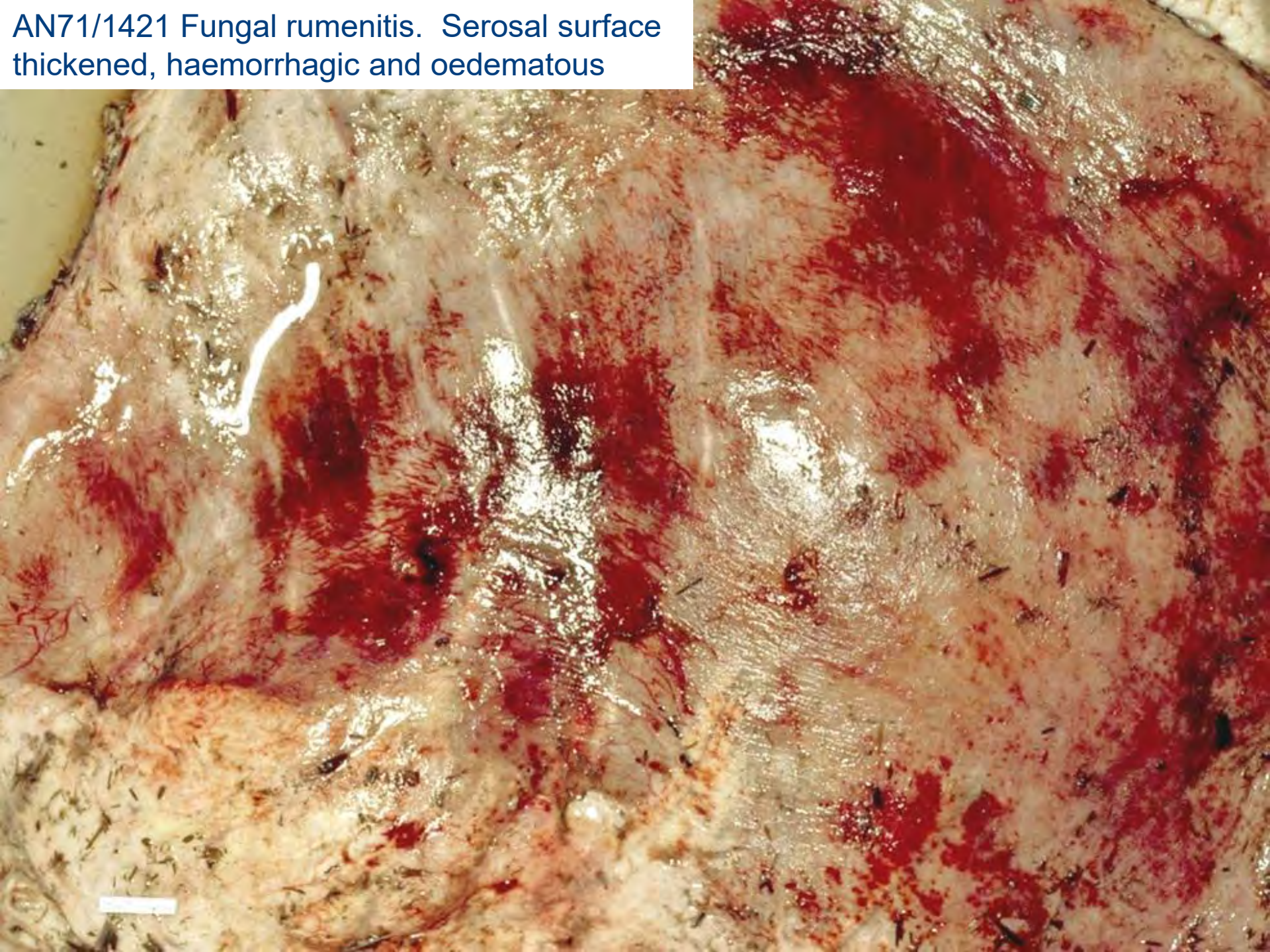
Fusobacterium necrophorum (necrobacillosis) in reticulum



AN71/1421

- Fungal rumenitis & thrombotic phlebitis (suspect *Aspergillus fumigatus*) - excess sunflower husks/few seeds in rumen
- Suspect post-lactic acidosis (other grains fed previously?)

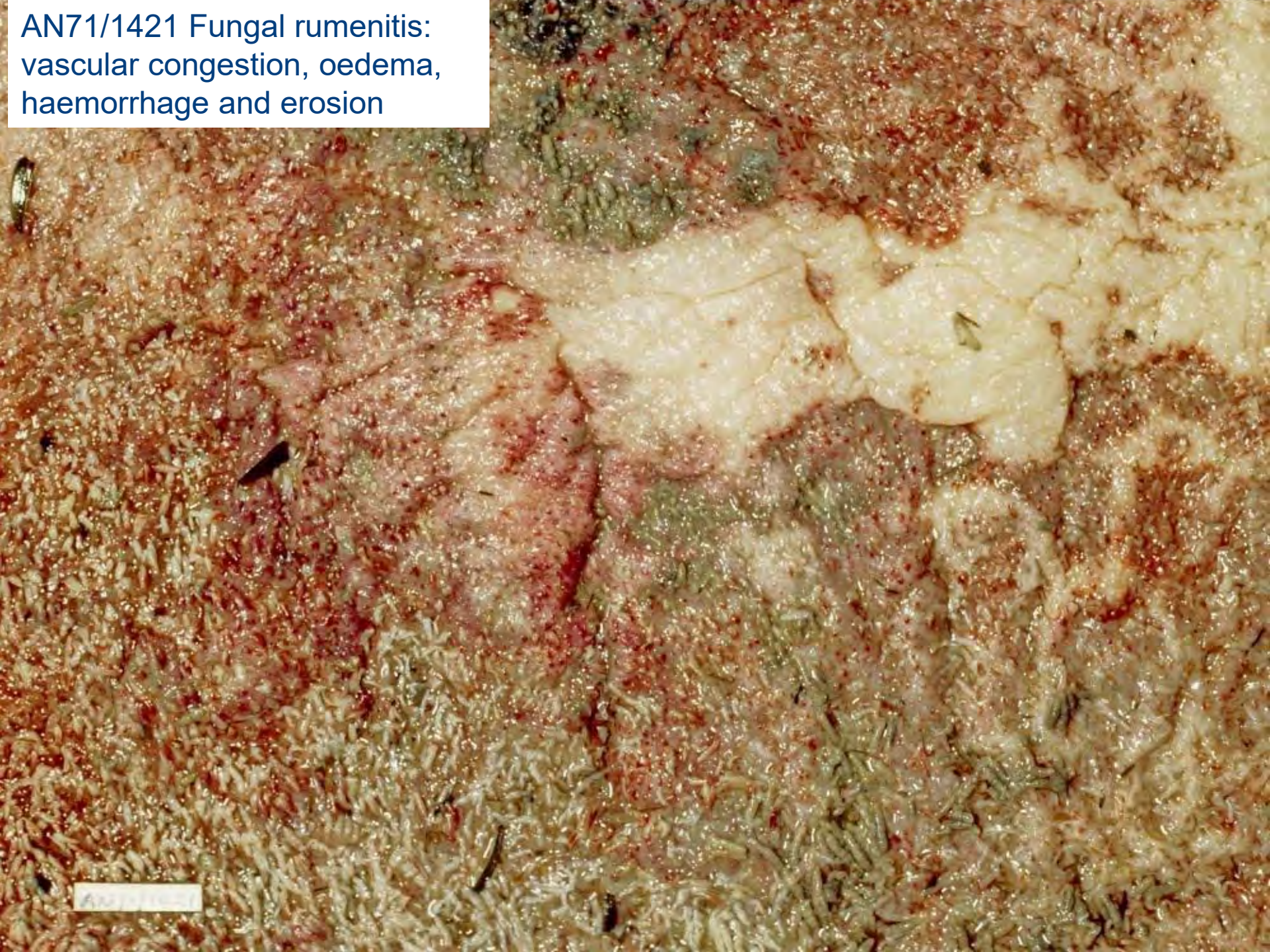
AN71/1421 Fungal rumenitis. Serosal surface thickened, haemorrhagic and oedematous



AN71/1421 Fungal rumenitis/reticulitis



AN71/1421 Fungal rumenitis:
vascular congestion, oedema,
haemorrhage and erosion

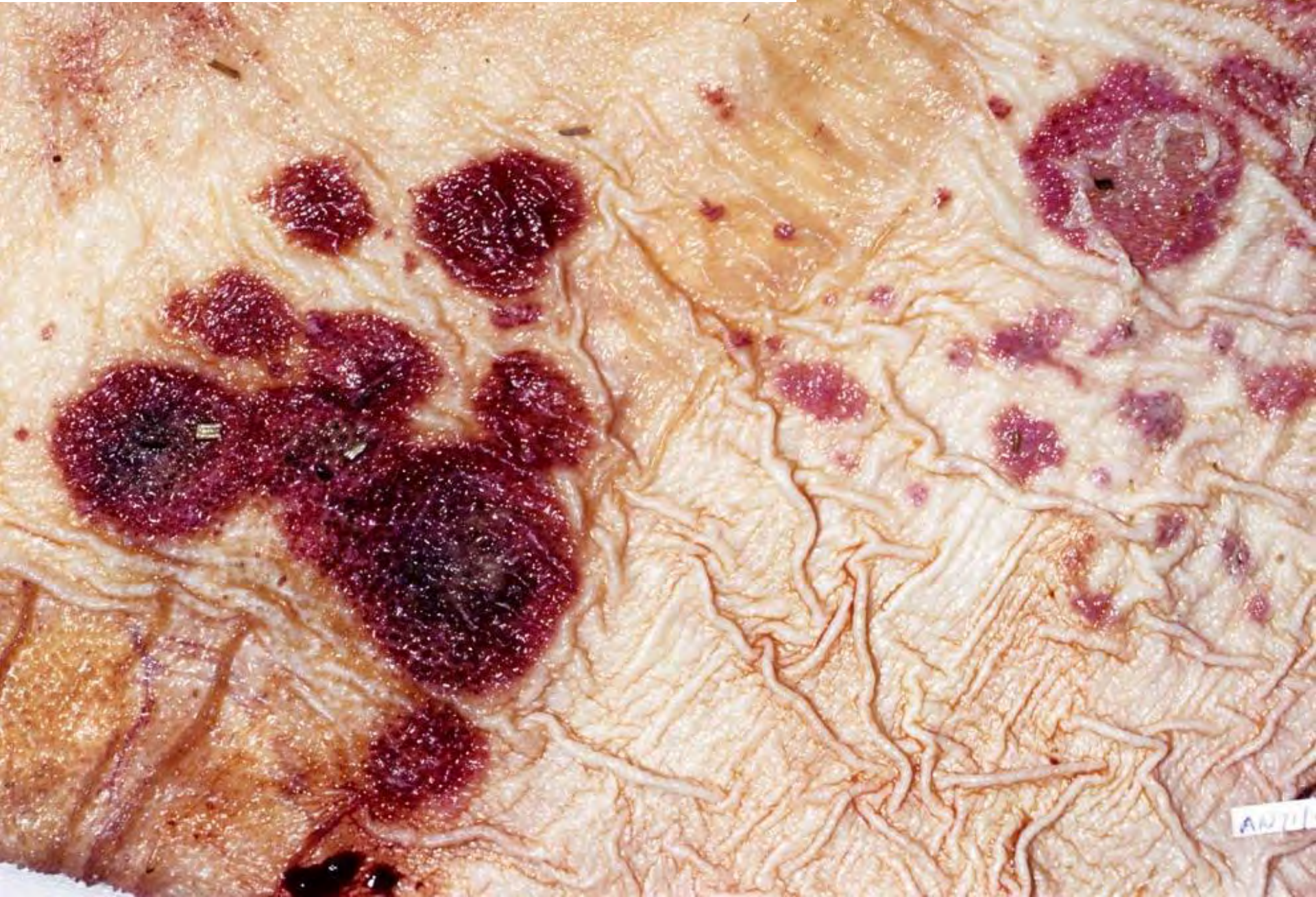


AN71/1421 Fungal reticulitis

Congestion, haemorrhage and necrosis



AN71/1421 Fungal rumenitis & thrombotic phlebitis
(suspect *Aspergillus fumigatus*)

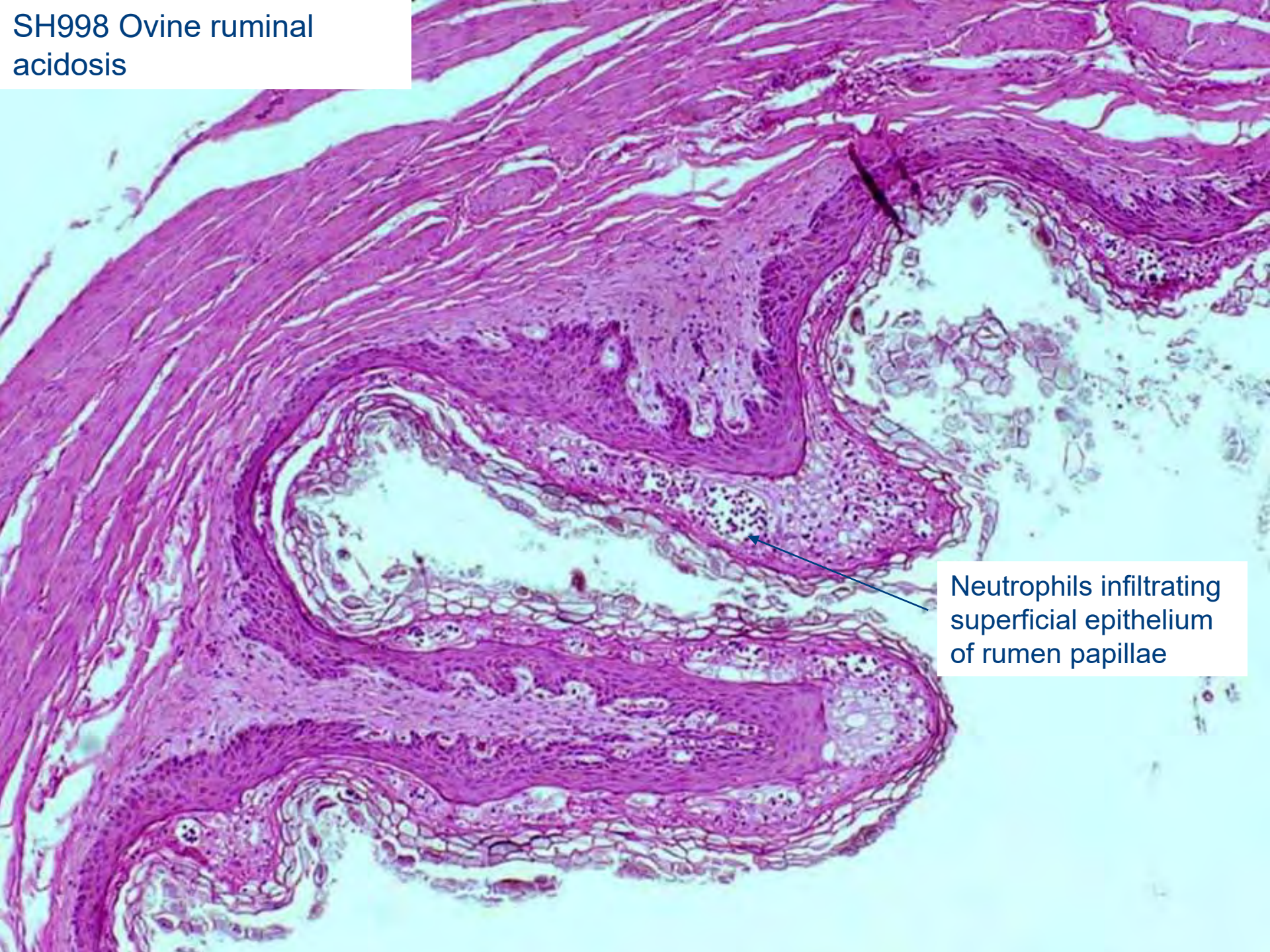


Rumen approx. one month post-experimental ruminal acidosis; scarring, stunted papillae



Photo courtesy Simon Bird (UNE)

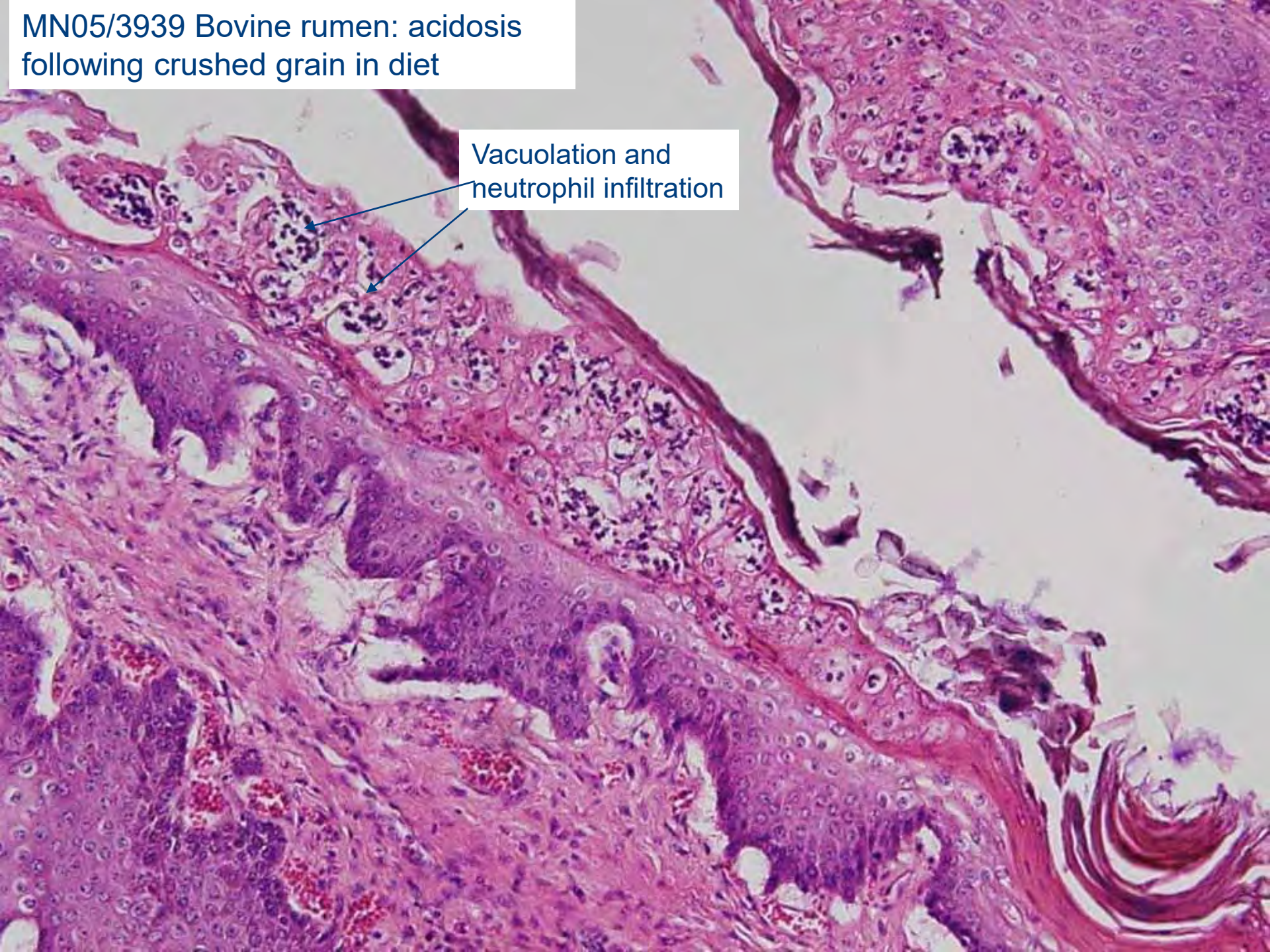
SH998 Ovine ruminal
acidosis



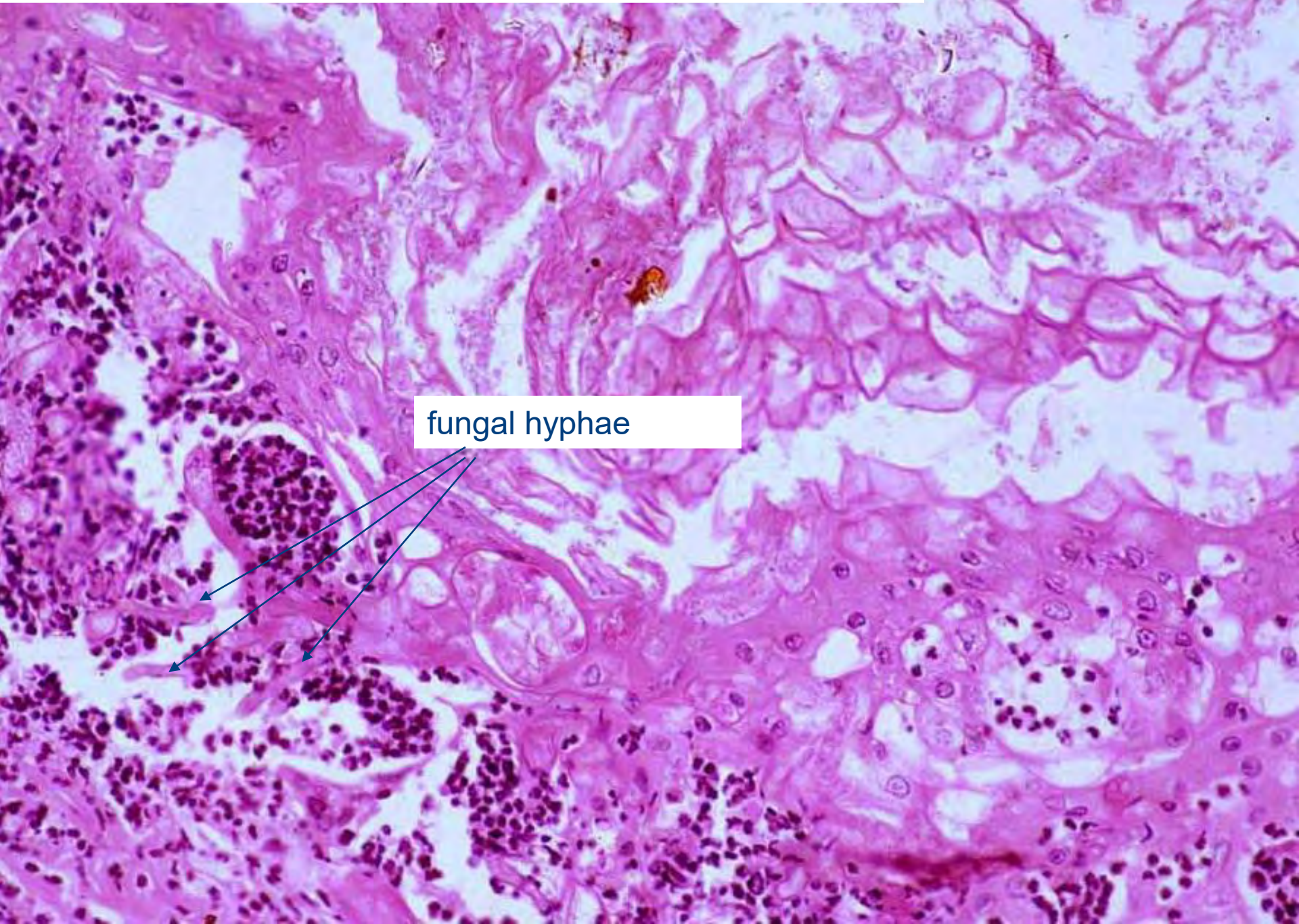
Neutrophils infiltrating
superficial epithelium
of rumen papillae

MN05/3939 Bovine rumen: acidosis following crushed grain in diet

Vacuolation and neutrophil infiltration

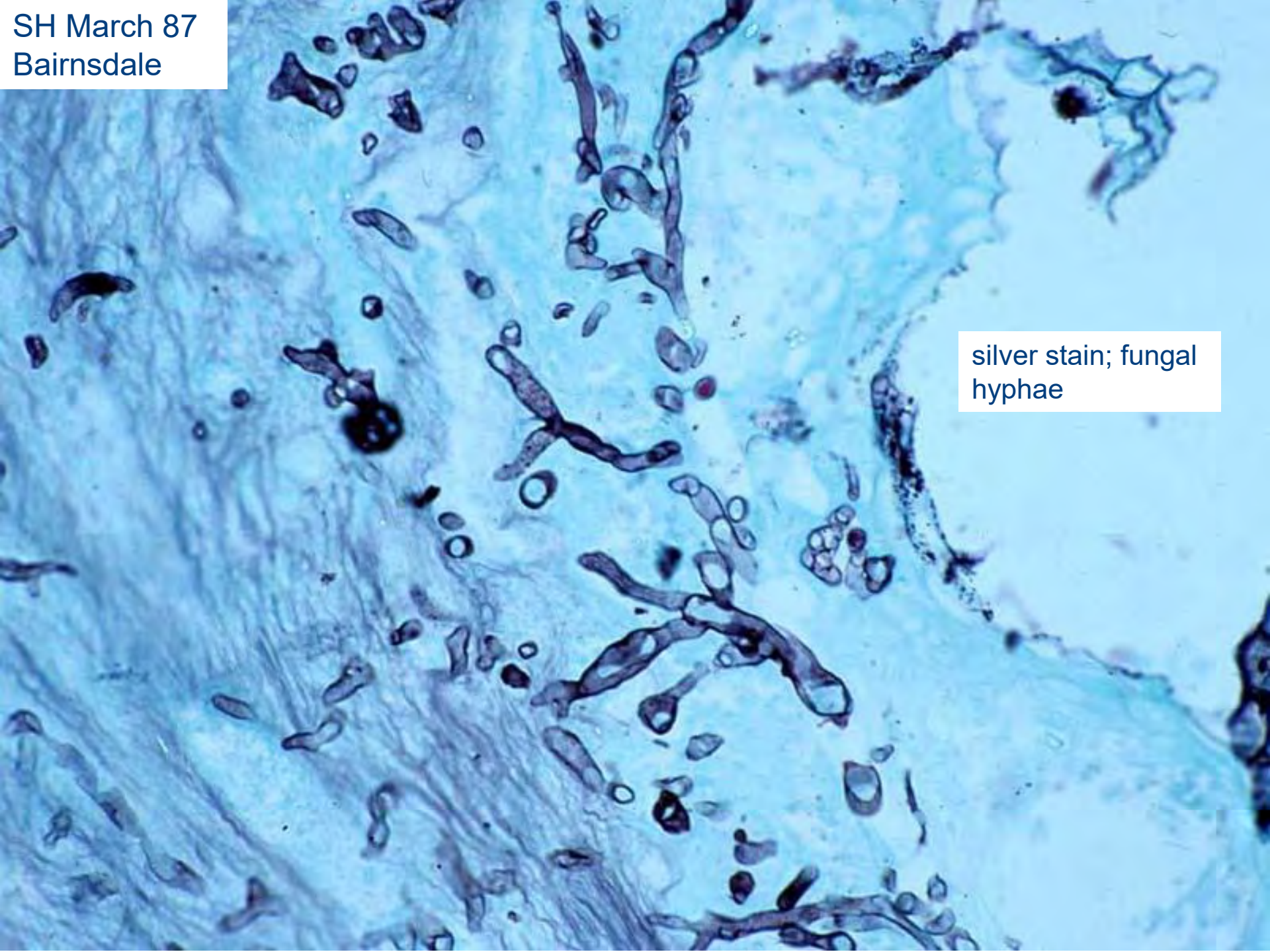


SH March 87 Bairnsdale Ruminal acidosis and fungal infiltration



fungal hyphae

SH March 87
Bairnsdale



silver stain; fungal
hyphae

AN73/2516 Suspect fungal abscesses.
Liver abscesses commonly occur after acidosis

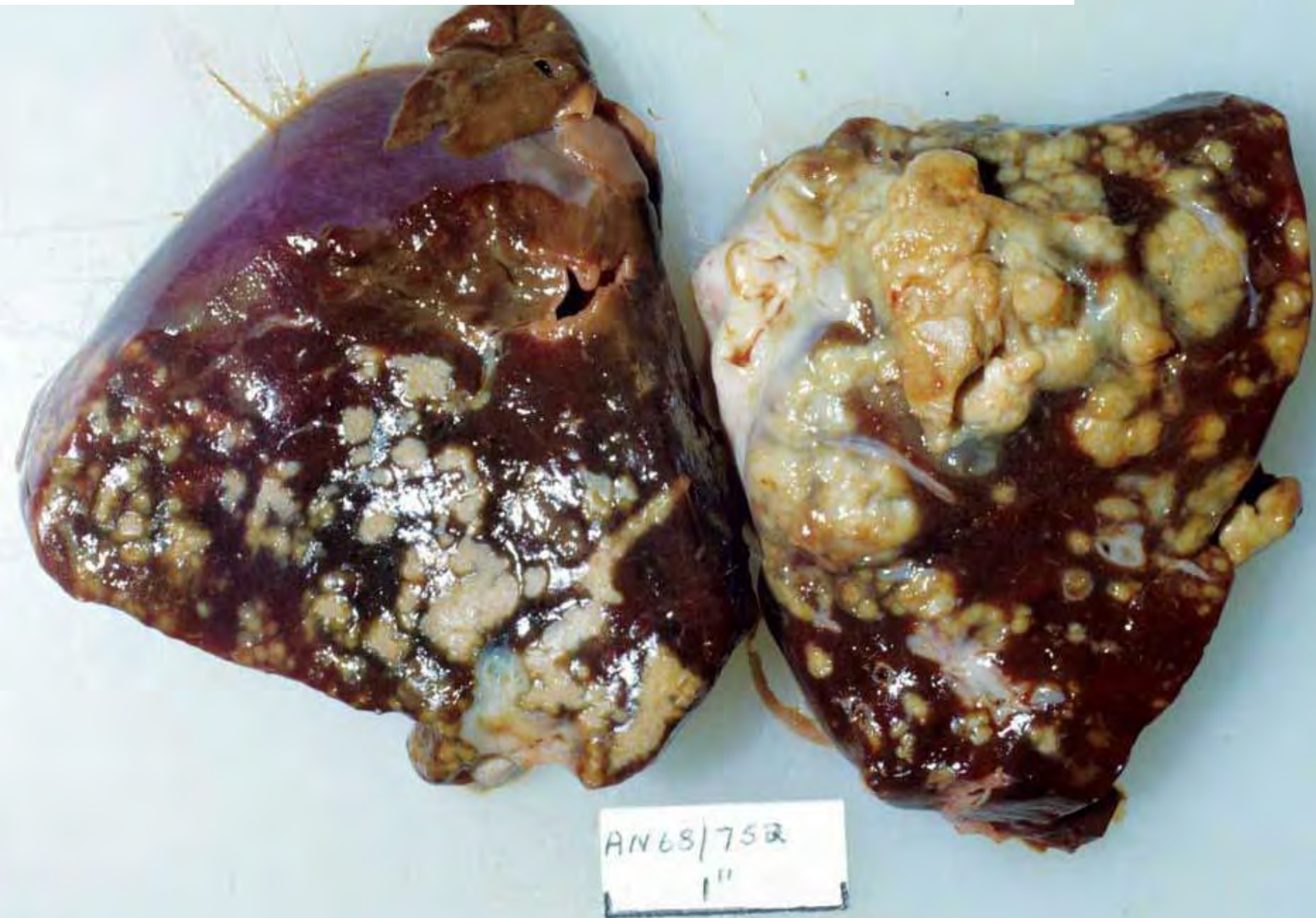


AN67/307 Early bovine liver abscesses – *Fusobacterium necrophorum*

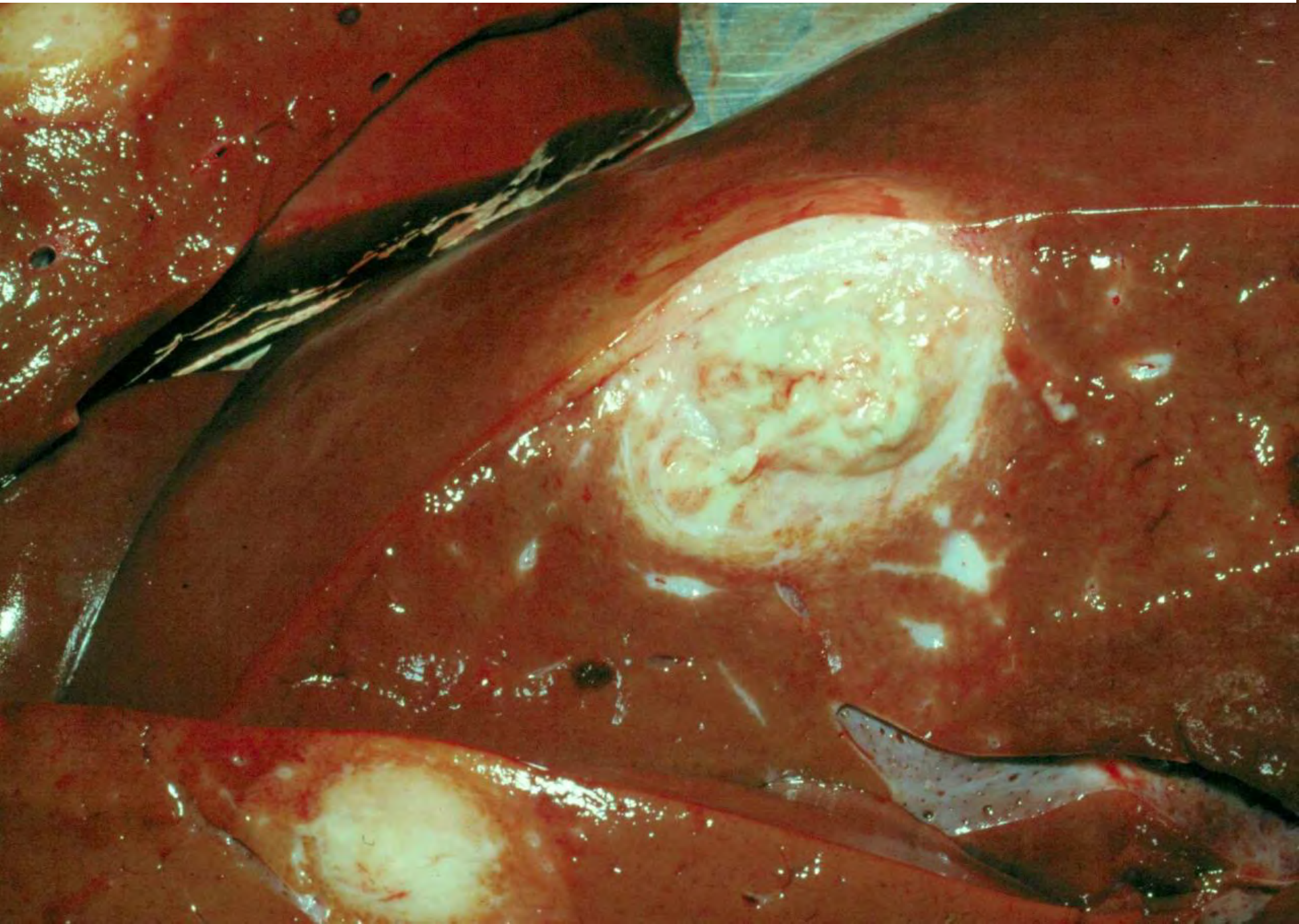


AN 67/307

AN68/752 More chronic liver abscesses: *Fusobacterium necrophorum*



In this abscess, *F. necrophorum* has likely been replaced by *Arcanobacterium pyogenes*



Liver abscesses

- 85-100 % of feedlot liver abscesses are due to *Fusobacterium necrophorum*
- Gram-negative strict anaerobe
- Normal inhabitant of GI tract
- Increased population with lactate in rumen
- Invades rumen wall in rumenitis
- Secondary invasion of liver
- Often in association with *A. pyogenes*

AN73/140 Rumen; pestivirus:
papillary atrophy

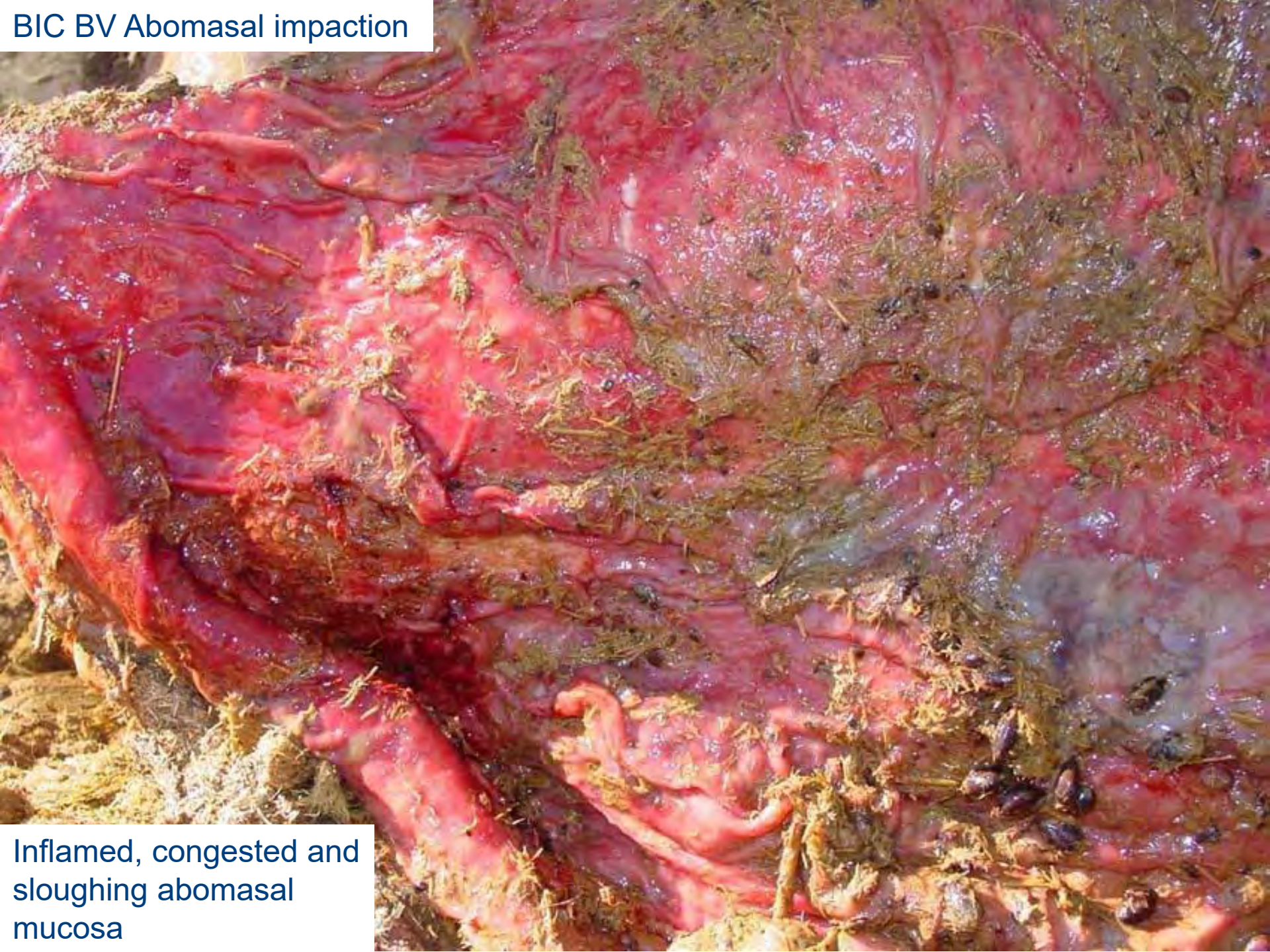


AN73/140

Abomasal impaction/ abomasitis

- Due to consumption of excess poor quality roughage
- Can occur in feedlot cattle on high roughage (eg 80% roughage, 20% grain)

BIC BV Abomasal impaction



Inflamed, congested and sloughing abomasal mucosa

BIC BV Dry, impacted
abomasal contents



AN70/106 Abomasal fundic ulcer; often stress-related (eg, in downers)



AN70/106

Twine in feed bunk – potential for causing GI blockage



Bloat



Feedlot bloat

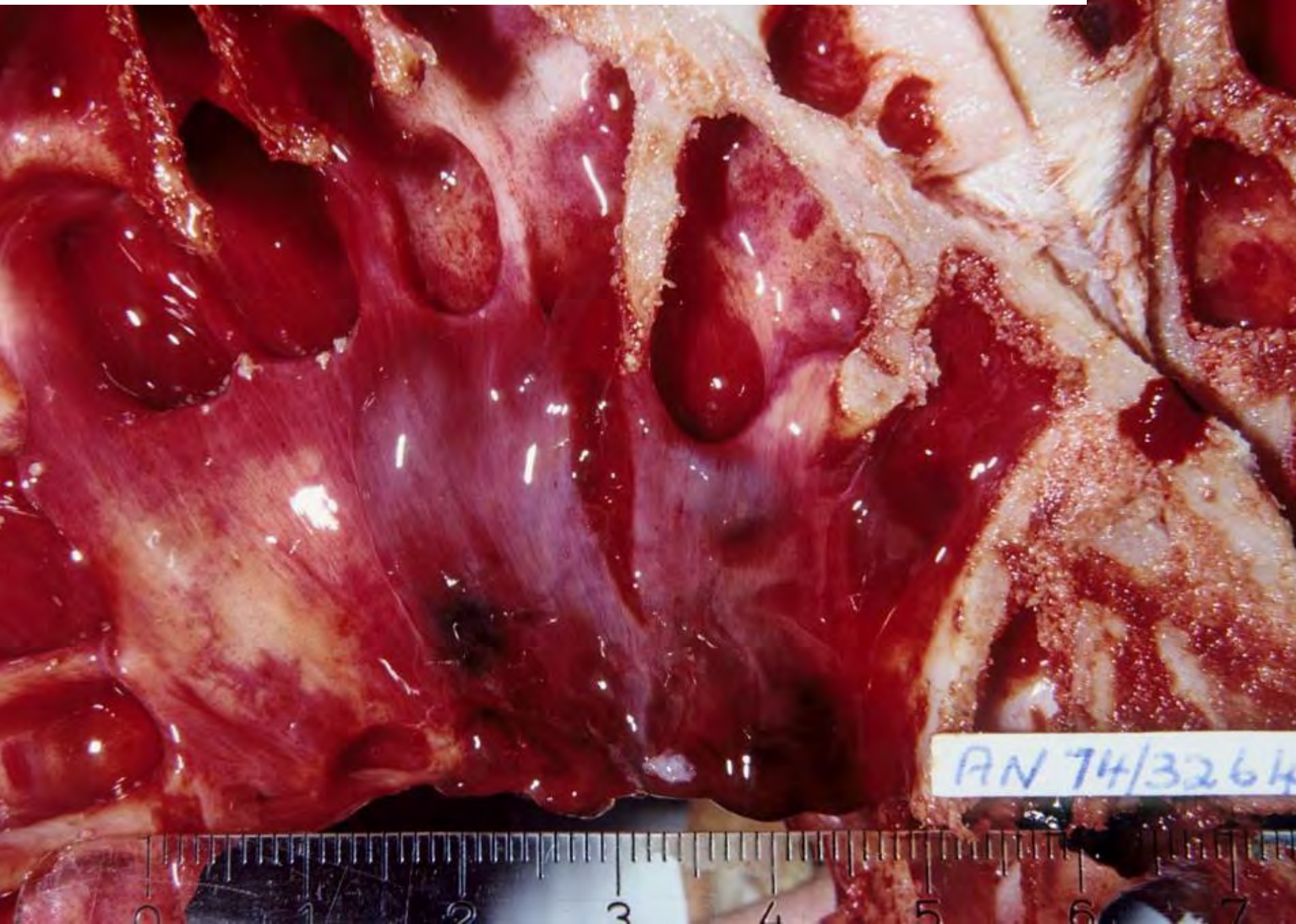
- Insufficient roughage
- Finely ground grain



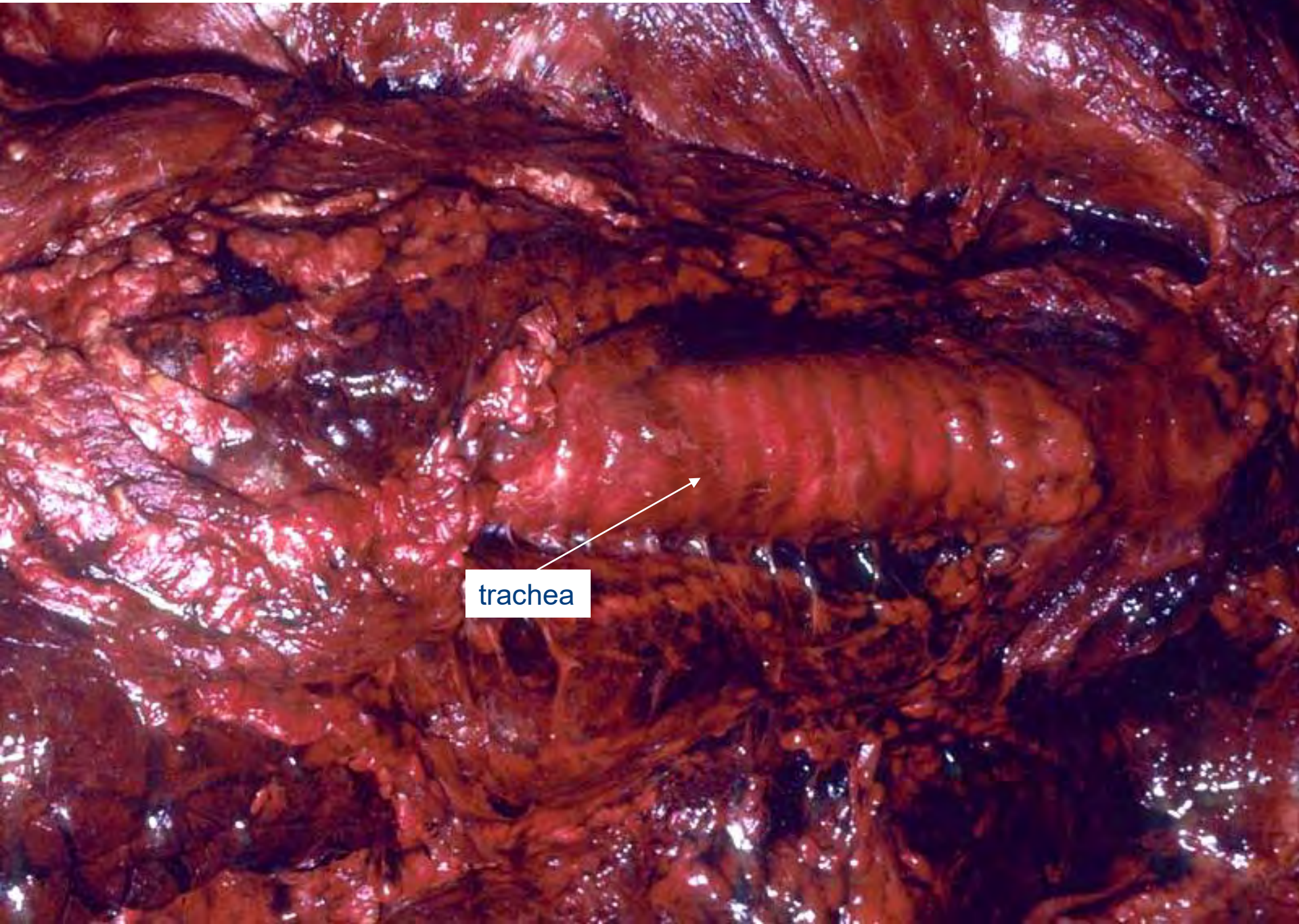
Bloat

- Conjunctiva congested to haemorrhagic
- Tongue protruded and congested

Bloat : congestion, haemorrhage and haematomas in paranasal sinuses



Bloat : neck region congested and haemorrhagic



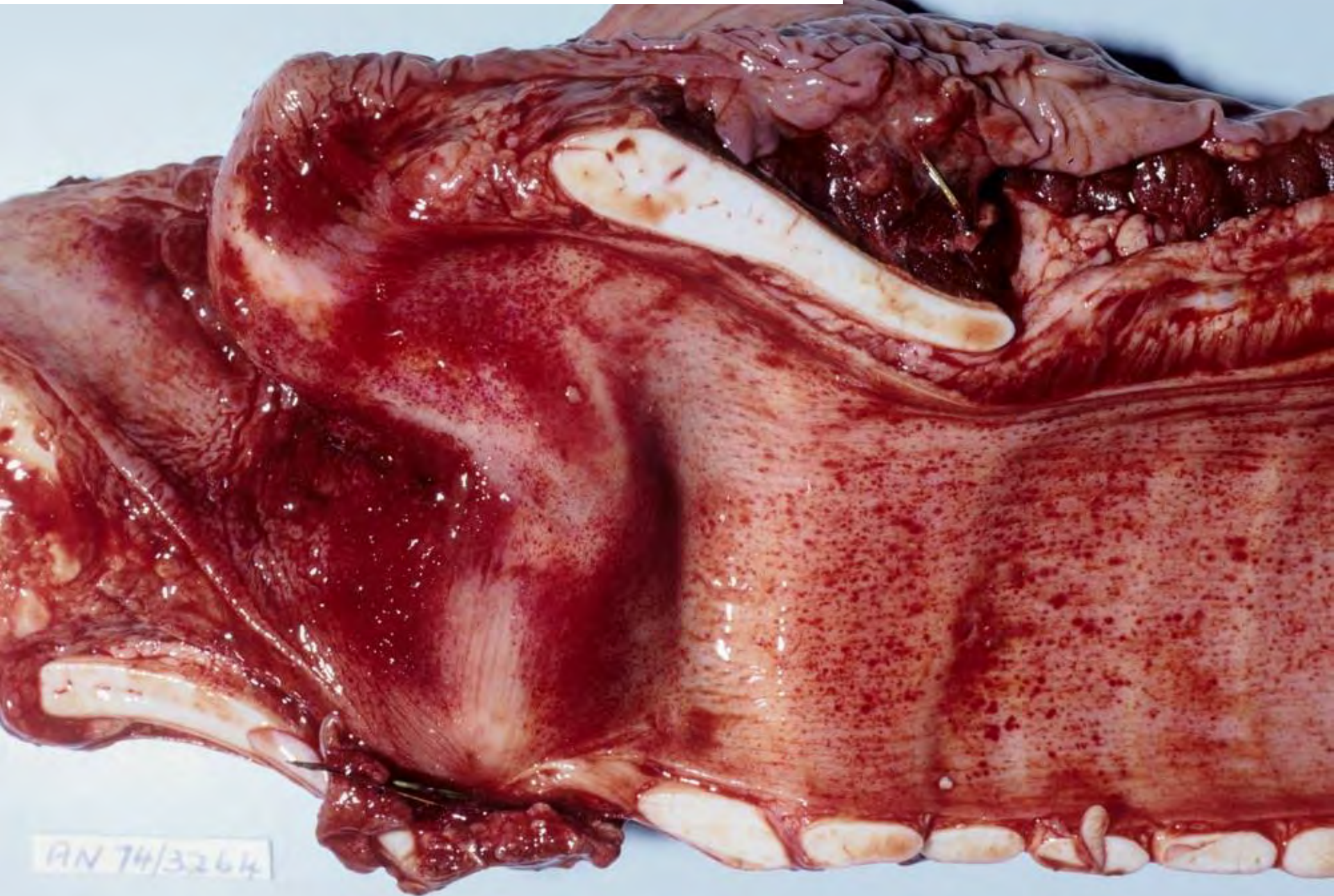
trachea

Bloat : lymph nodes of head and neck
enlarged, oedematous, congested, and
haemorrhagic

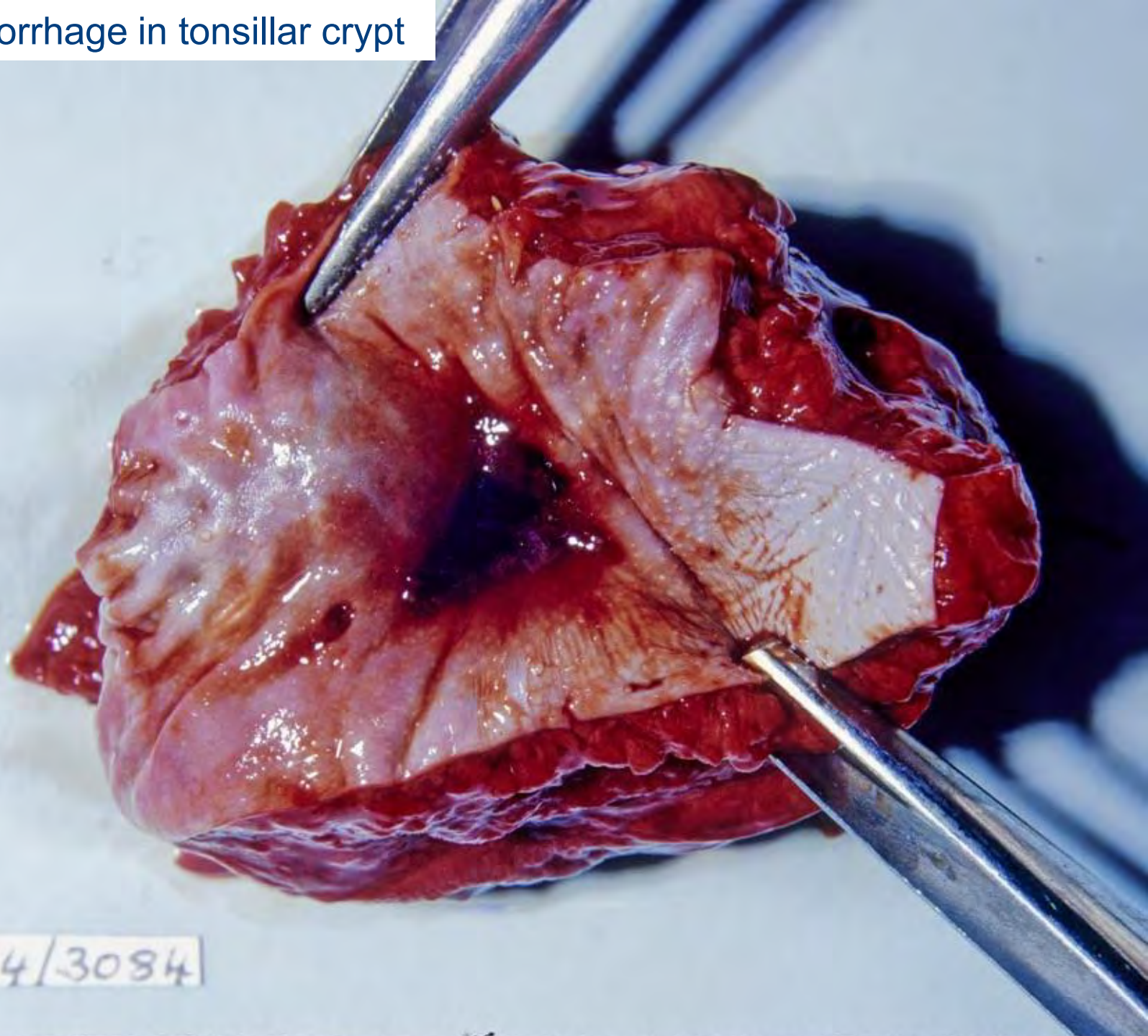


AN 74/3264

AN74/3264 Bloat : haemorrhages in trachea and larynx

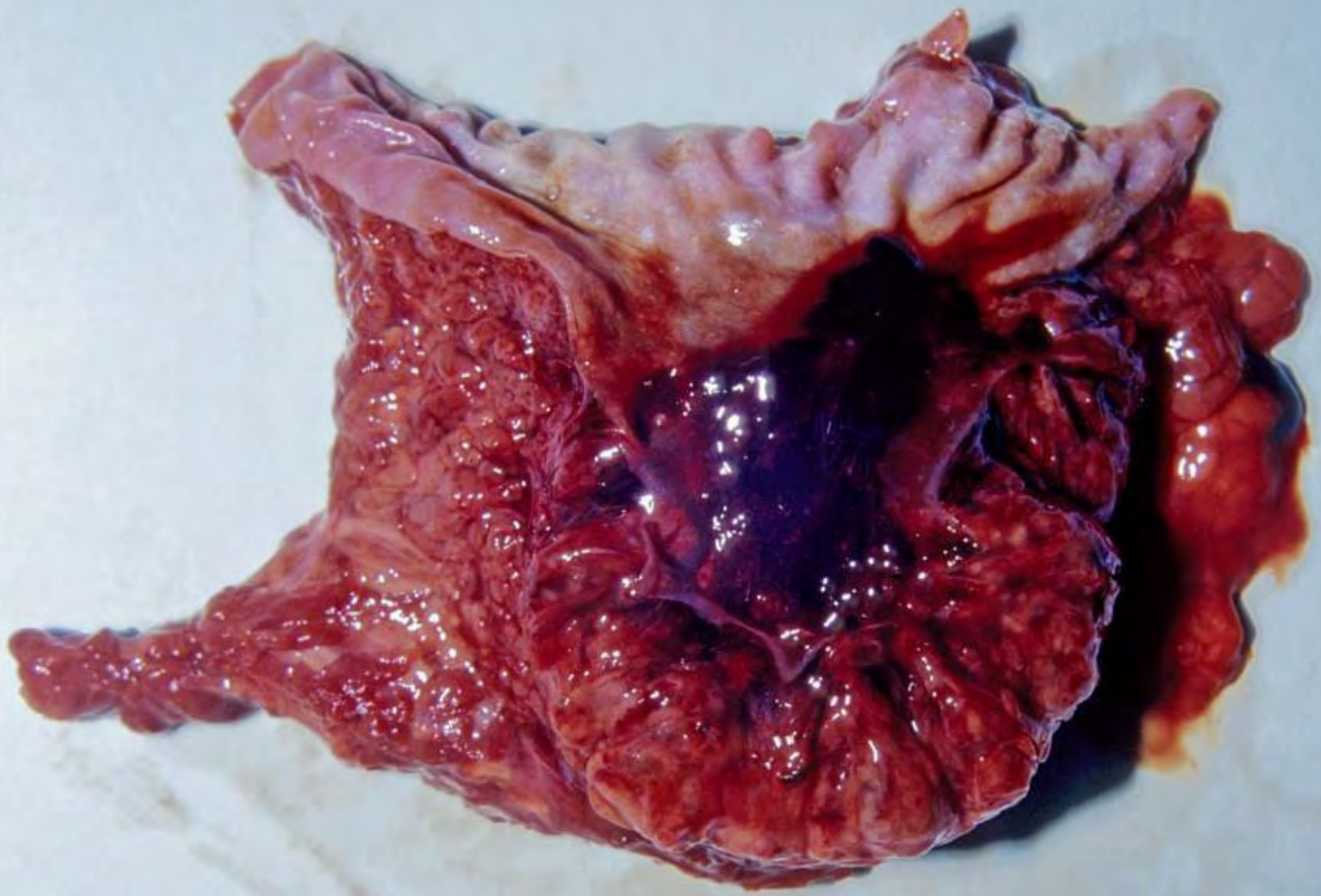


Bloat : haemorrhage in tonsillar crypt



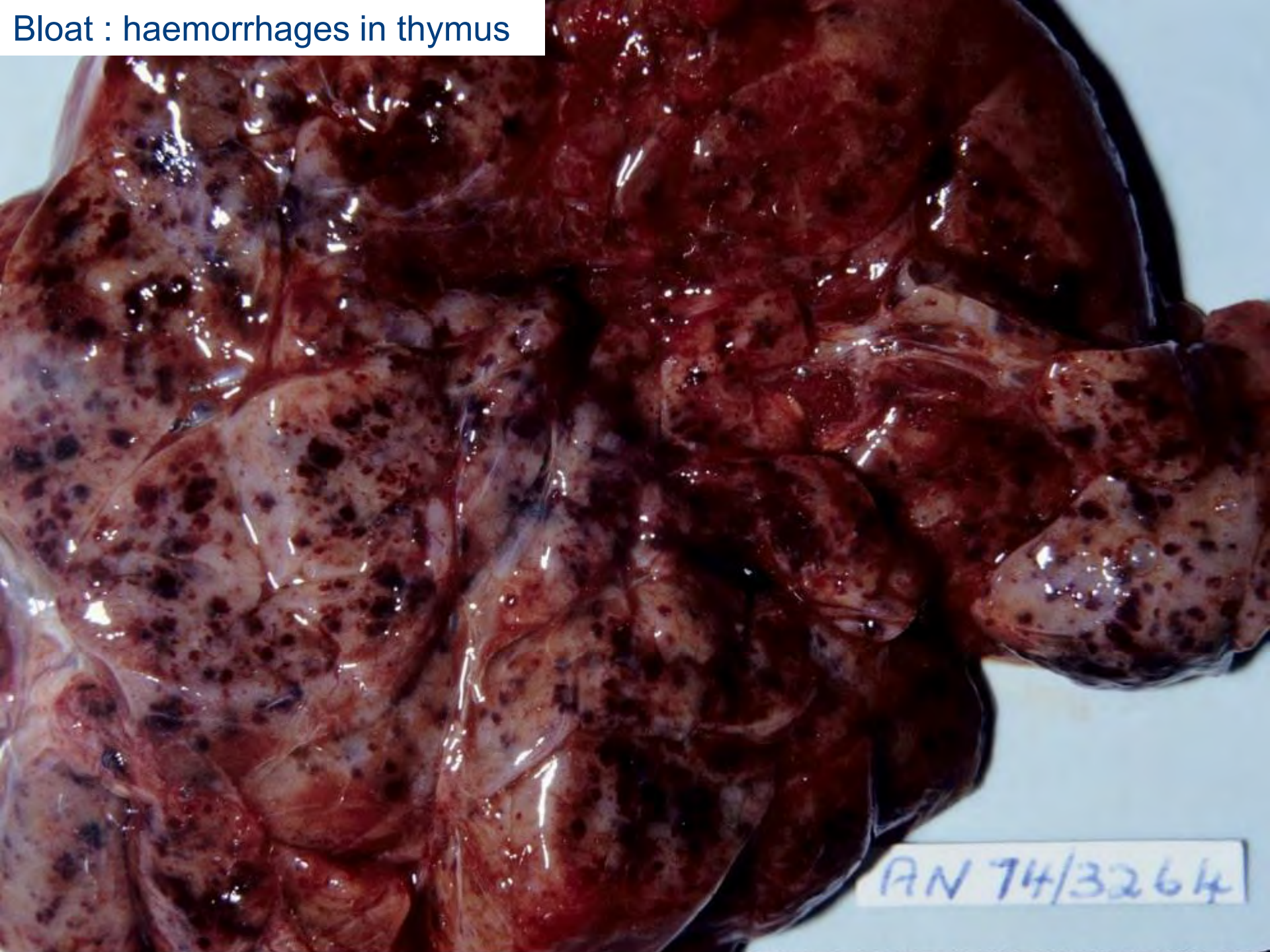
AN 74/3084

Bloat : haemorrhage in tonsillar crypt



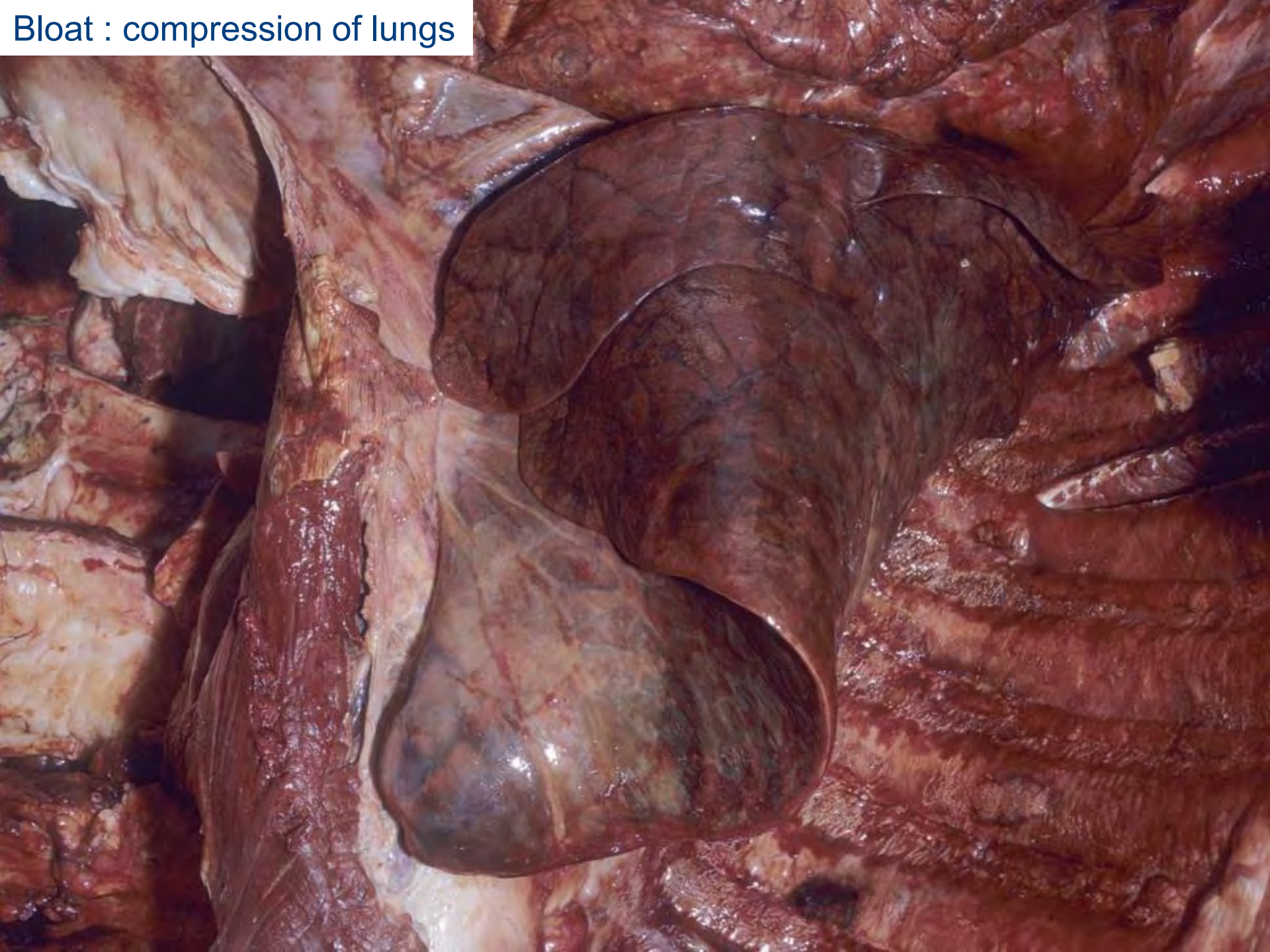
AN74/3084

Bloat : haemorrhages in thymus



RN 74/3264

Bloat : compression of lungs



Although often seen in bloat, this variation in blood-staining of intestinal content can be due to agonal factors and is of no use in diagnostic interpretation



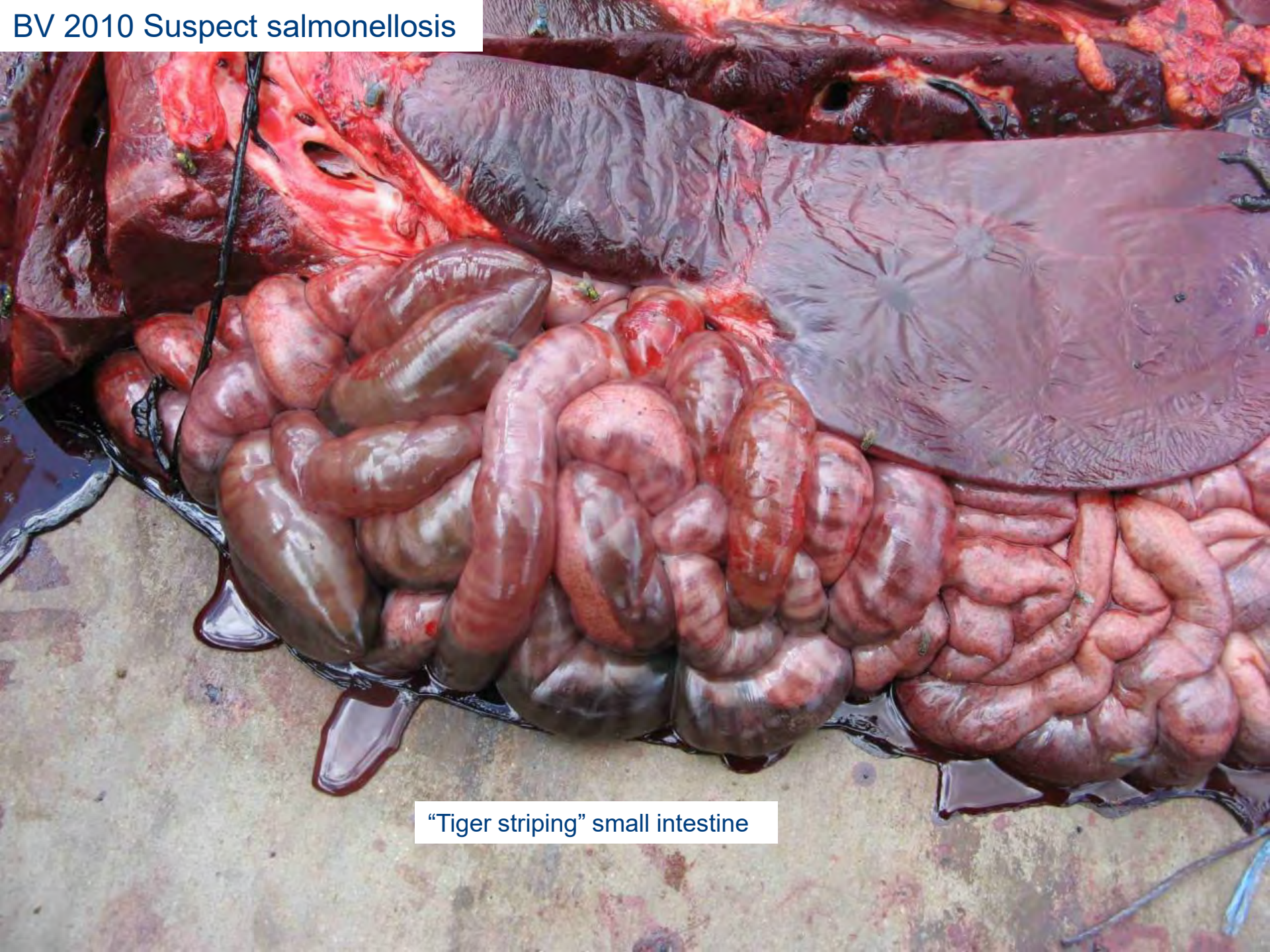
Salmonellosis

AN67/329 : Salmonellosis, calf. *Salmonella* grown from mesenteric lymph node and small intestine

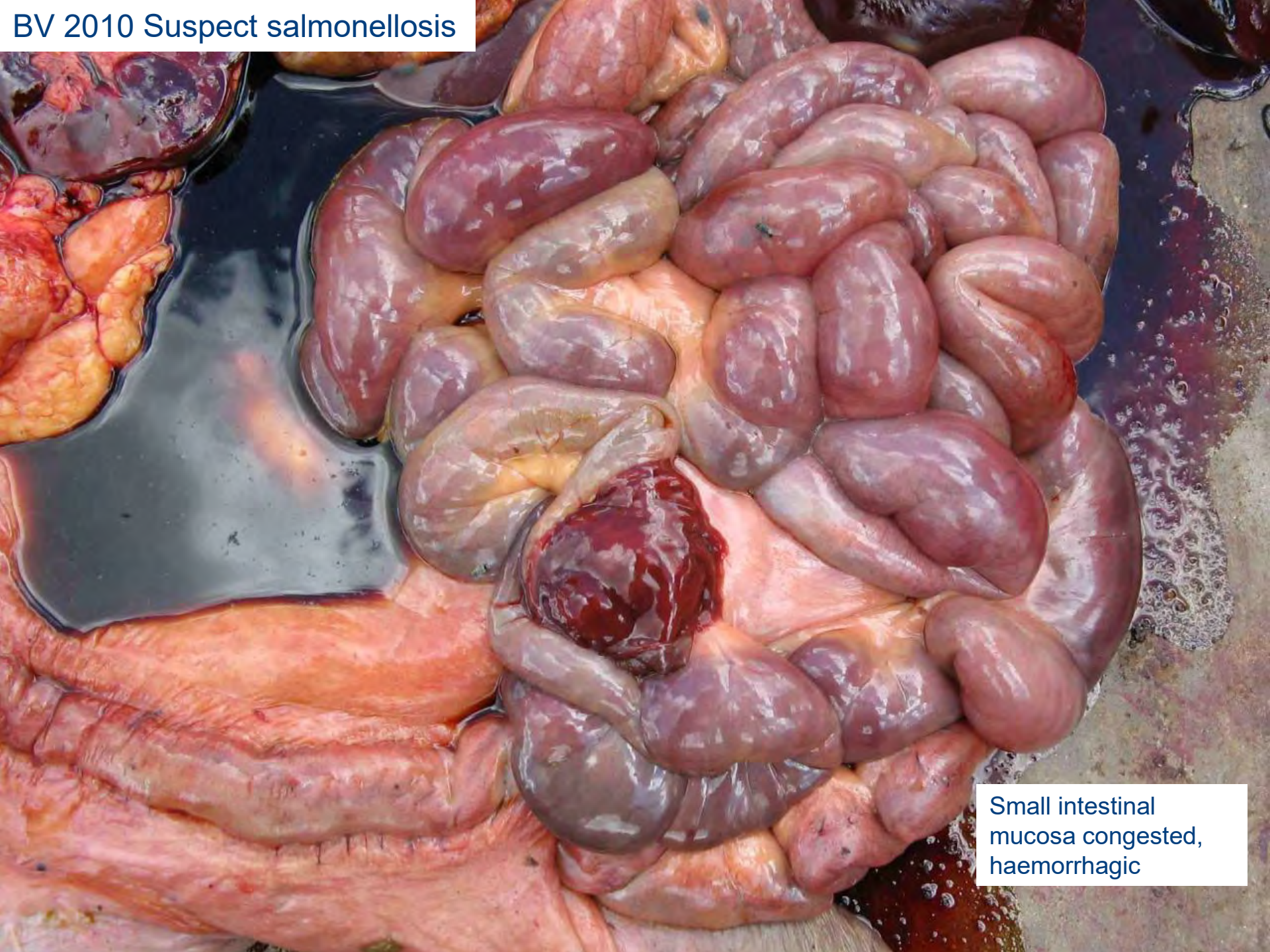


gastroenteritis with
serosal hyperaemia
& haemorrhage

BV 2010 Suspect salmonellosis



"Tiger striping" small intestine



Small intestinal mucosa congested, haemorrhagic

Suspect salmonellosis : haemorrhagic / fibrinous enteritis



AN69/1347

Salmonellosis histopathology – AN94/3600 (*next slide*)

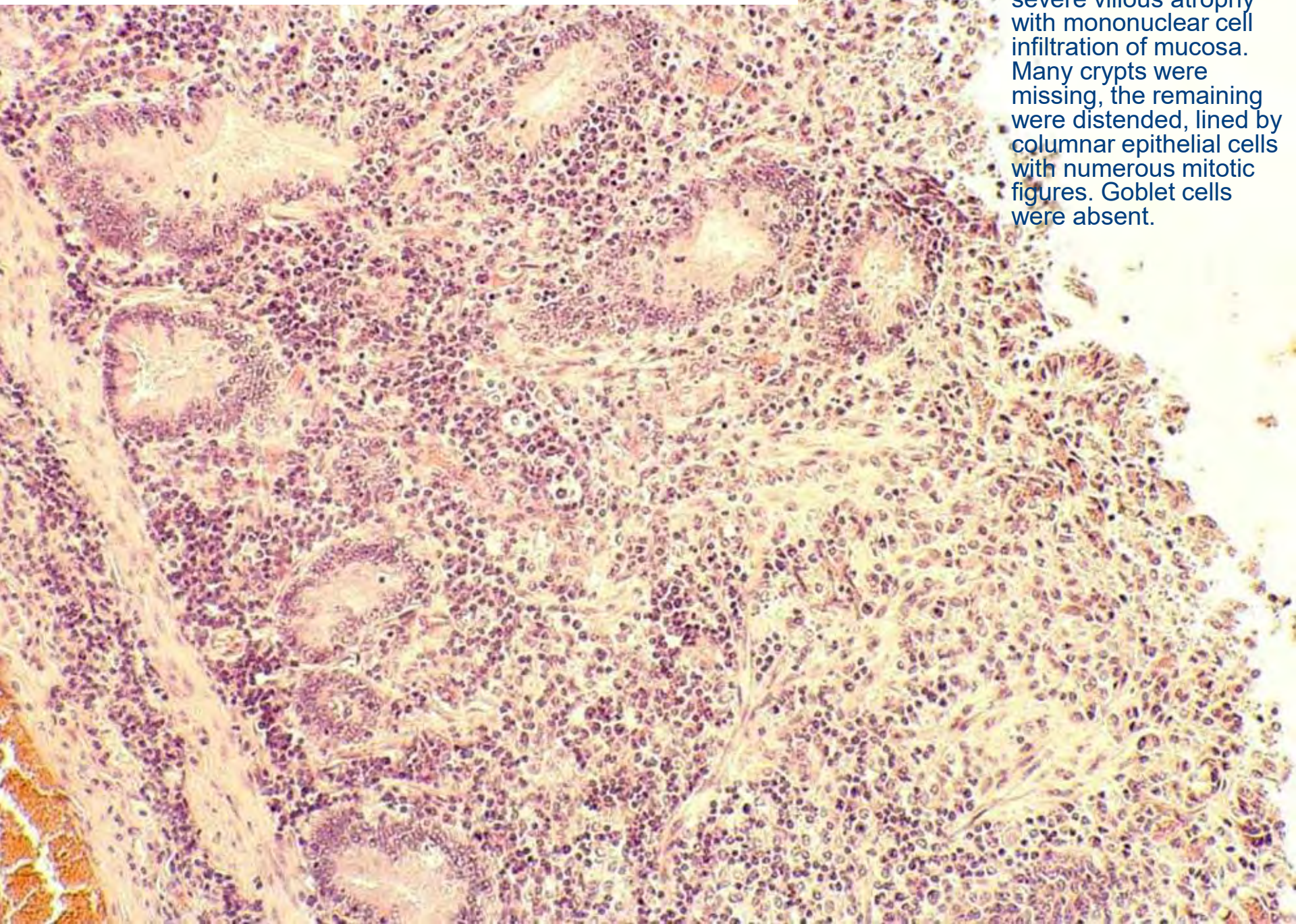
Feedlot Quirindi NSW Beef cattle (Shorthorn breed). 15 month-old steer. Number at risk 50; sick 4; dead 6.

Wasting, depression, recumbency; also some sudden deaths within 6 days of entry to feedlot.

At necropsy, haemorrhages in small intestine mucosa, enlarged dark mesenteric lymph nodes.

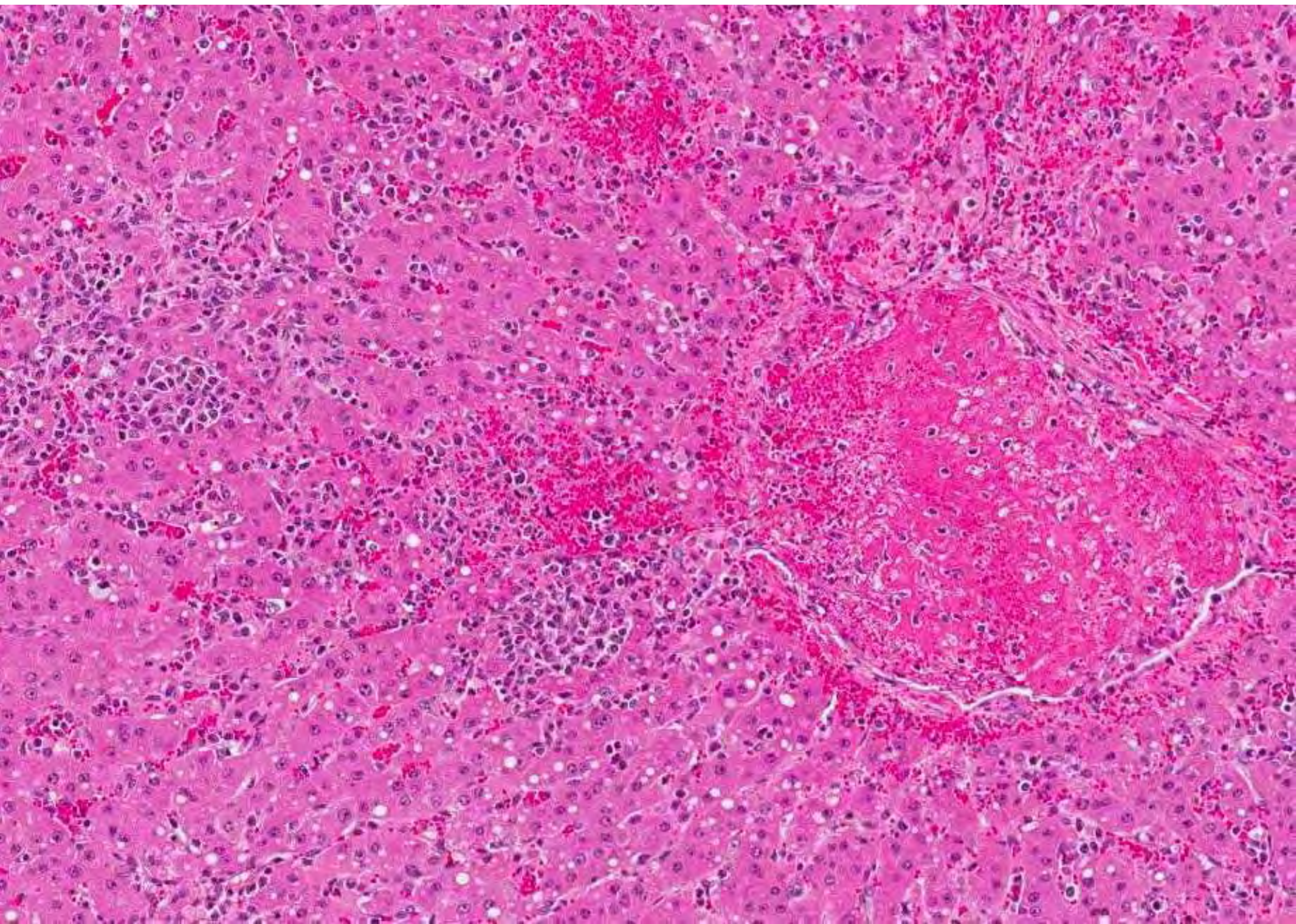


AN94/3600 Salmonellosis (*Salmonella typhimurium*)



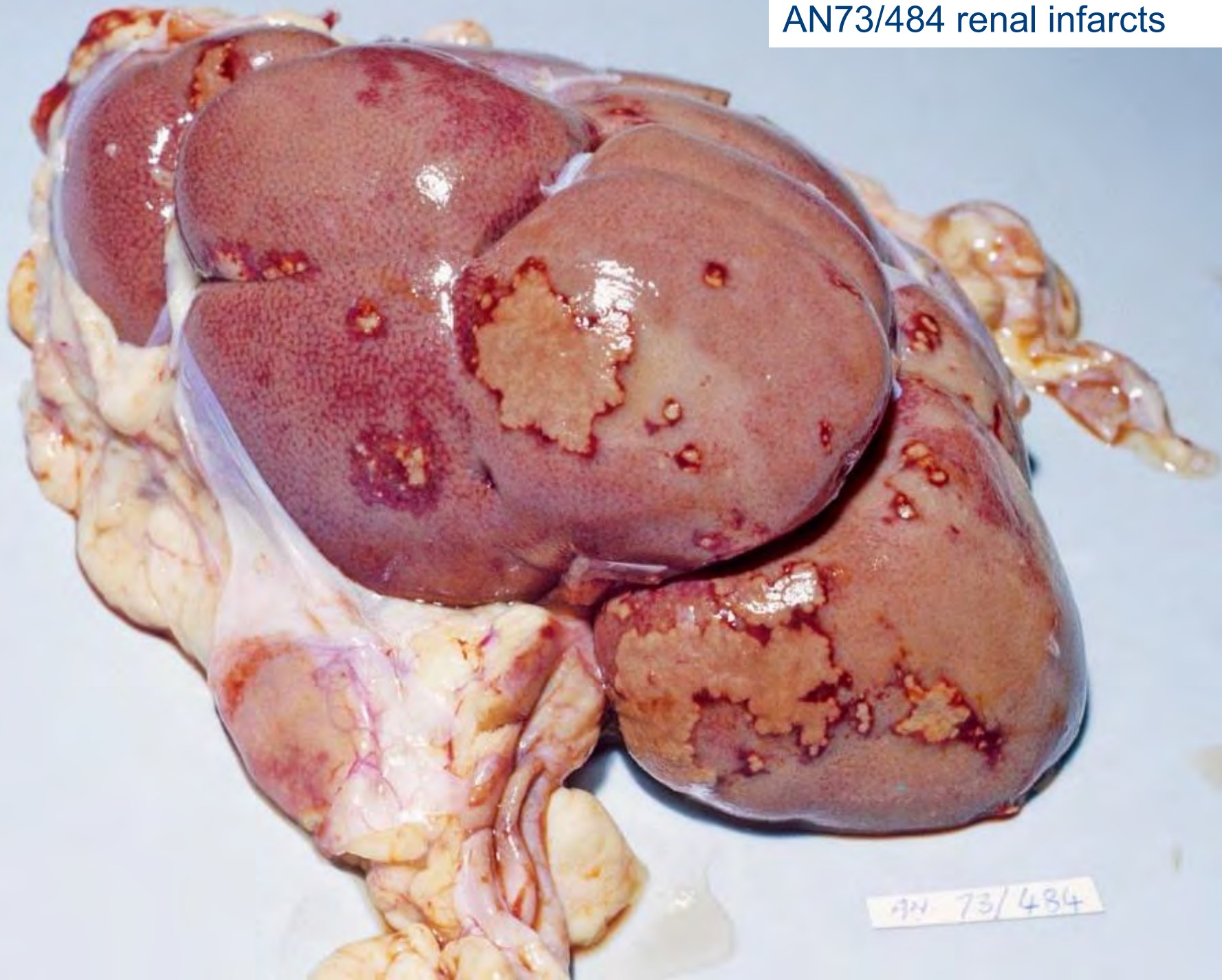
Small intestine:
severe villous atrophy
with mononuclear cell
infiltration of mucosa.
Many crypts were
missing, the remaining
were distended, lined by
columnar epithelial cells
with numerous mitotic
figures. Goblet cells
were absent.

AN94/3600 Salmonellosis (*S. typhimurium*): hepatitis, thrombotic phlebitis



Urinary

AN73/484 renal infarcts



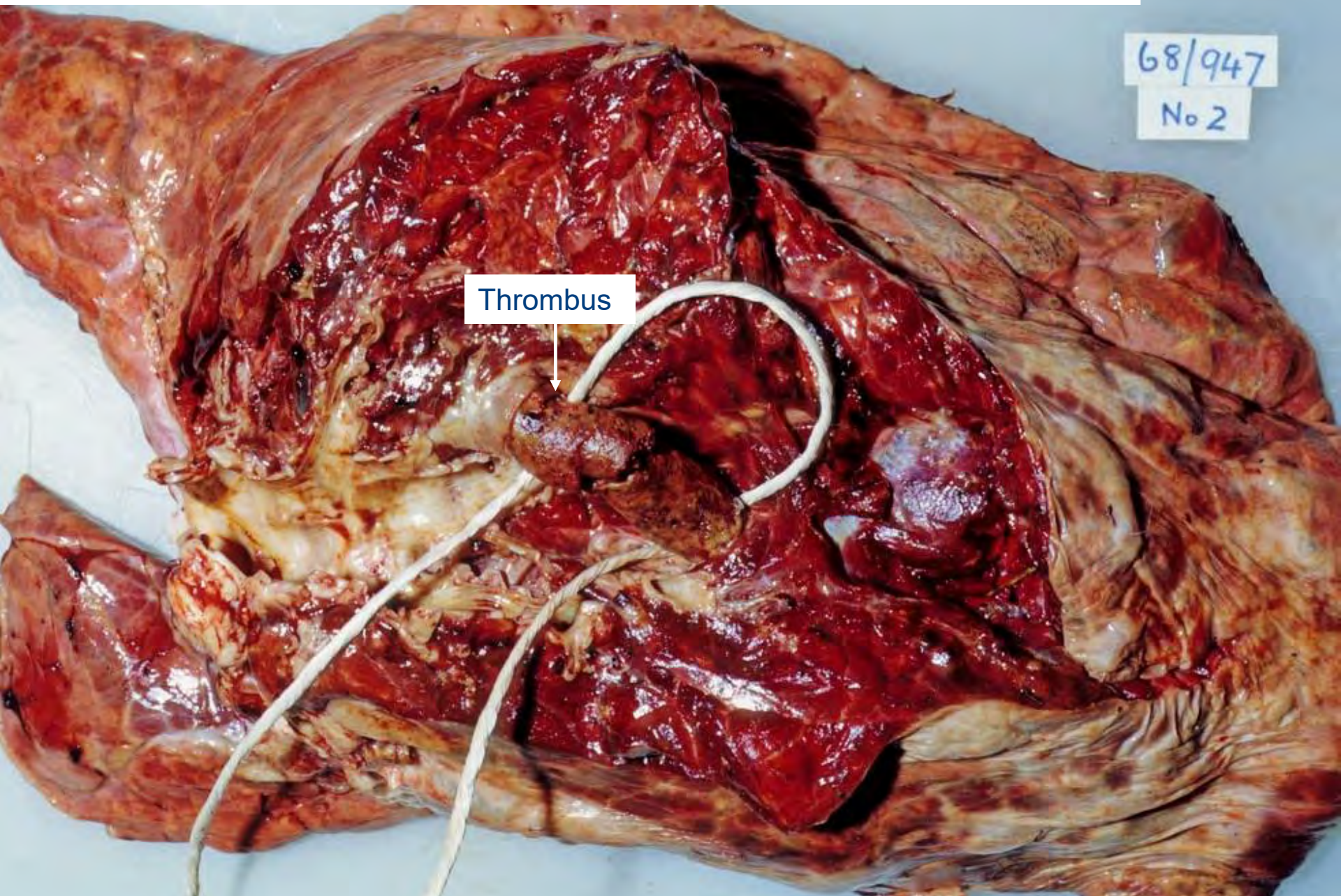
AN 73/484

AN68/947 Infarction associated with embolic pneumonia (*next slide*)



Same case as previous slide: thrombotic embolic pneumonia, suspect IBR

68/947
No 2



Thrombus

(go and examine the posterior vena cava and the left heart valves for septic thrombi)

Urolithiasis - AN93/2849

- 13000 head feedlot – long term 300 days on feed (DOF).
- Over 7 weeks 1000 animals could not urinate

L click [Urolithiasis paper .pdf](#)

Urolithiasis



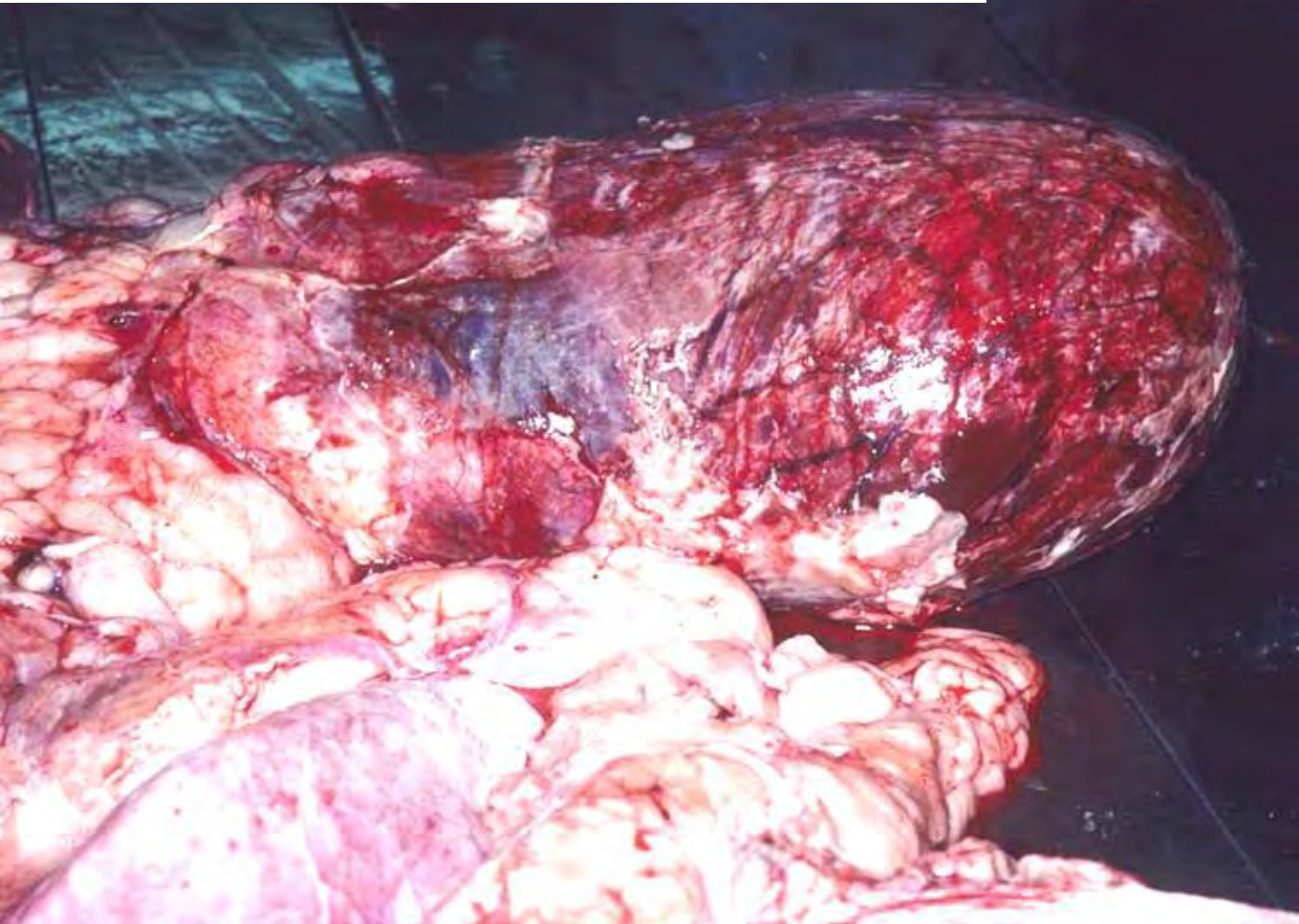
Fluid accumulation around prepuce; distended abdomen

Urolithiasis

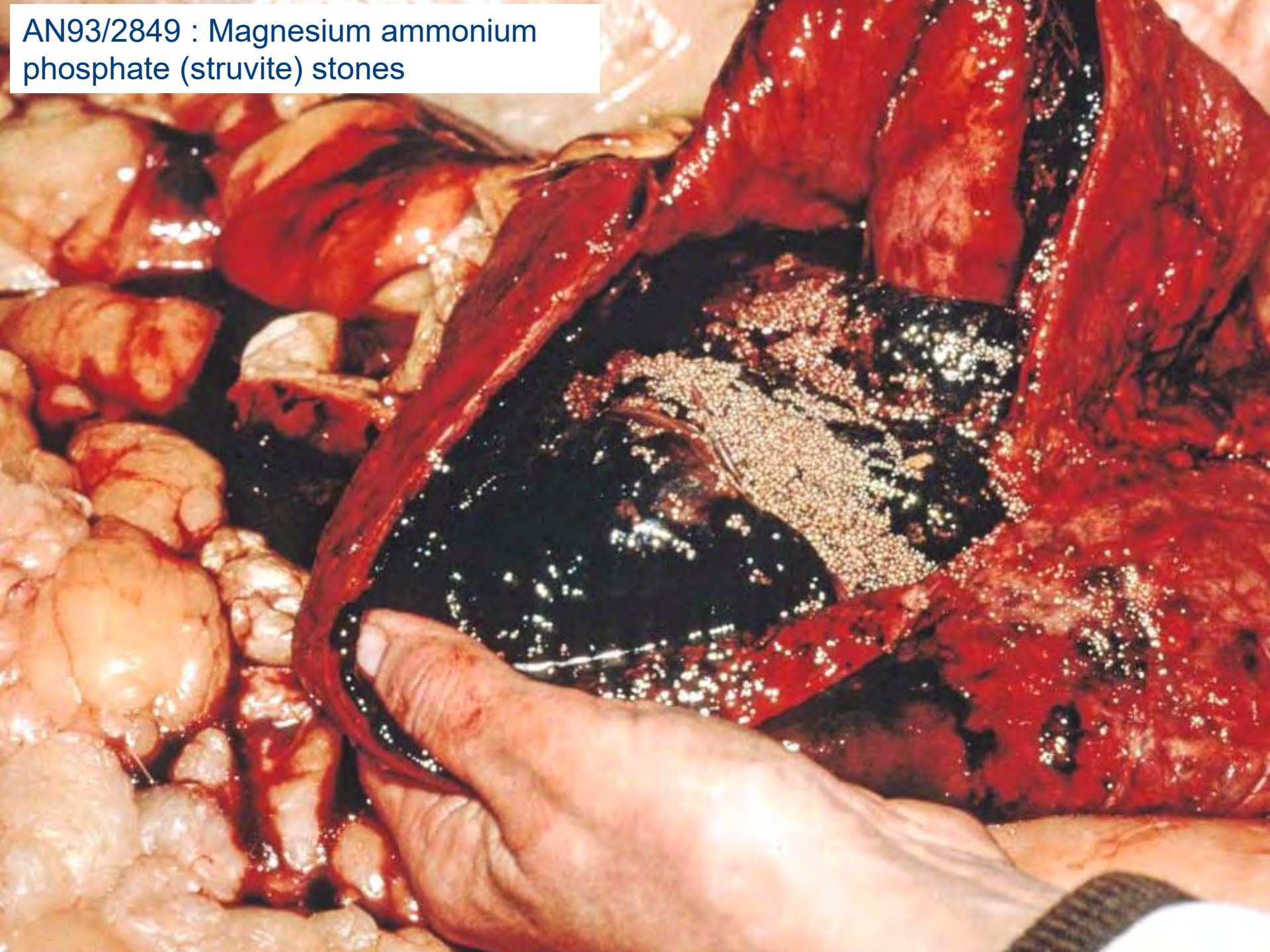


RV 68211 : Saw-horse posture and flank-watching characteristic of severe abdominal pain

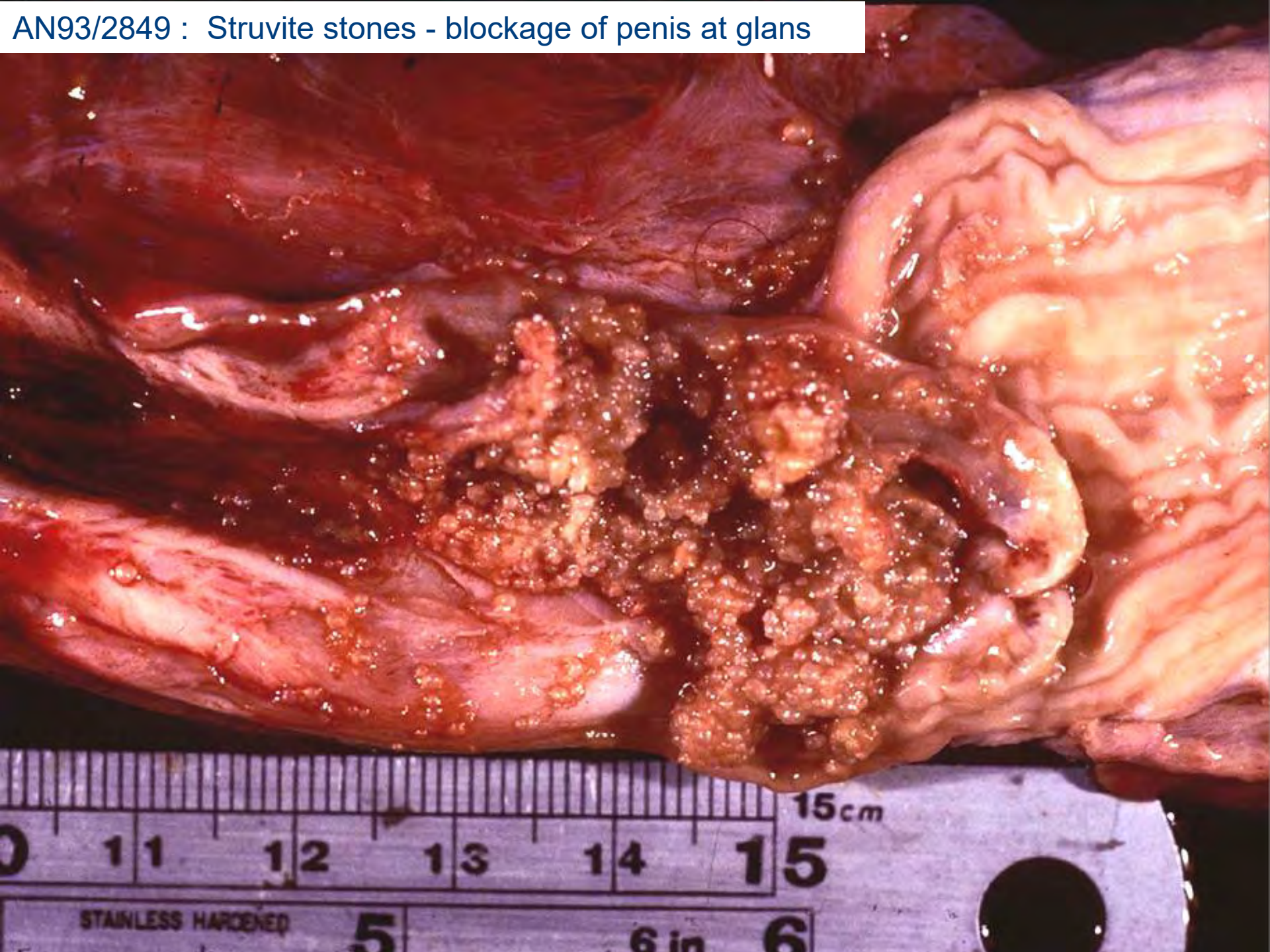
AN93/2849 : Urolithiasis. Grossly distended haemorrhagic bladder



AN93/2849 : Magnesium ammonium phosphate (struvite) stones

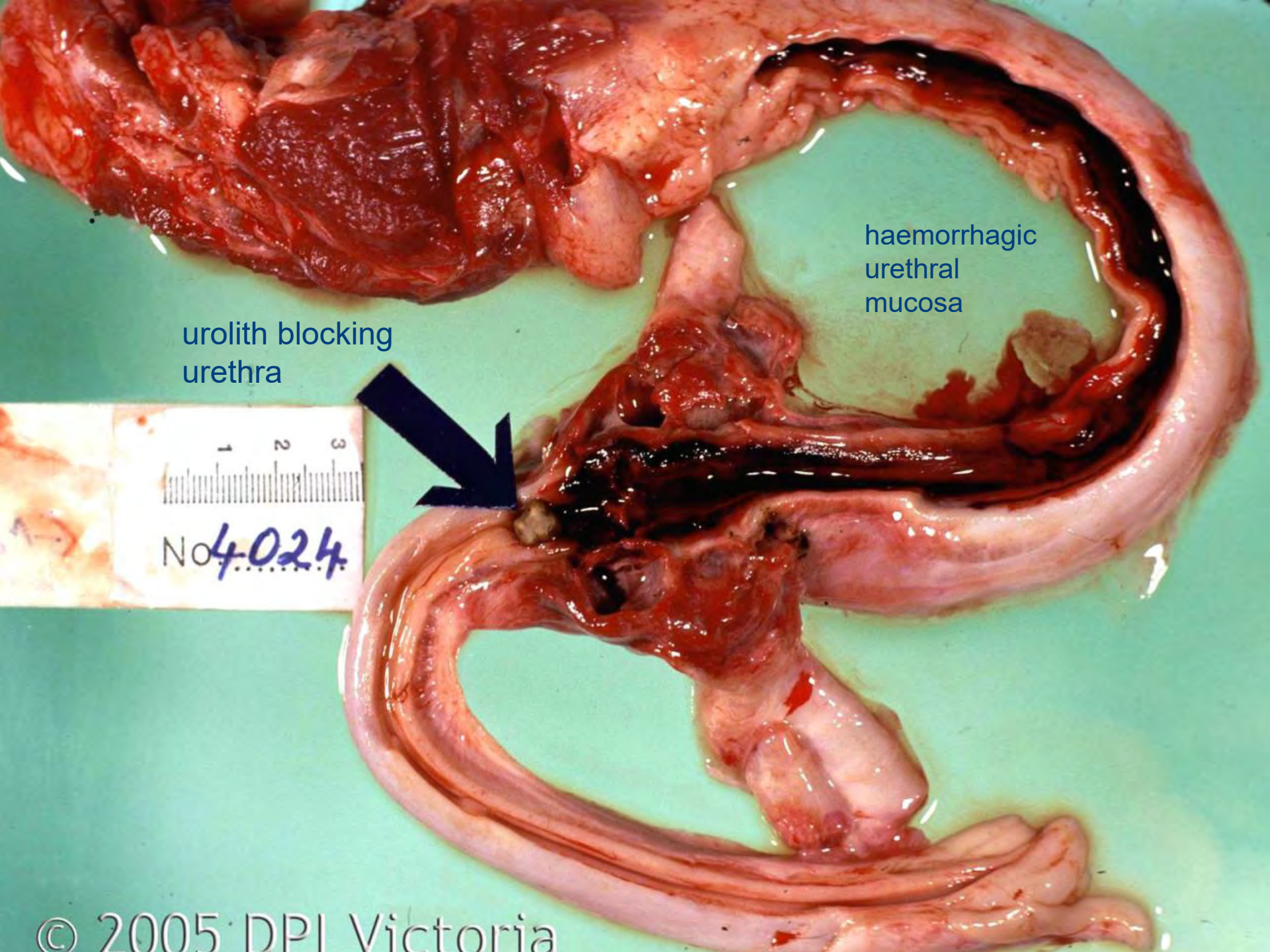


AN93/2849 : Struvite stones - blockage of penis at glans



AN93/2849 : Struvite stones blocking urethra at sigmoid flexure





urolith blocking
urethra

haemorrhagic
urethral
mucosa

1 2 3
No. 4024

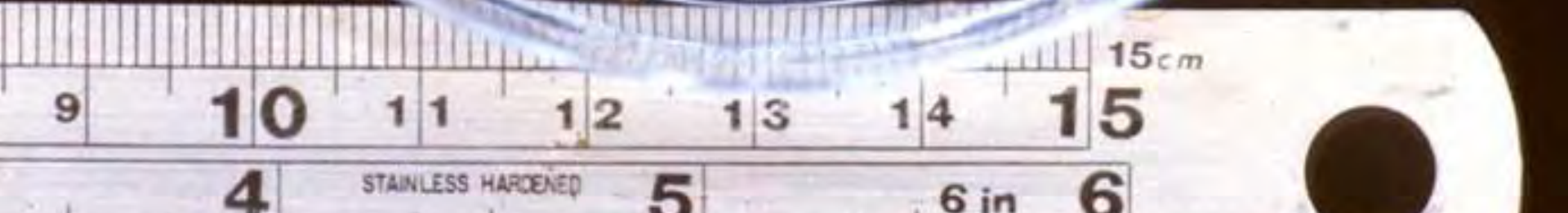
AN93/2849

Struvite (magnesium
ammonium phosphate)
stones





Calcium carbonate stones – note rough surface

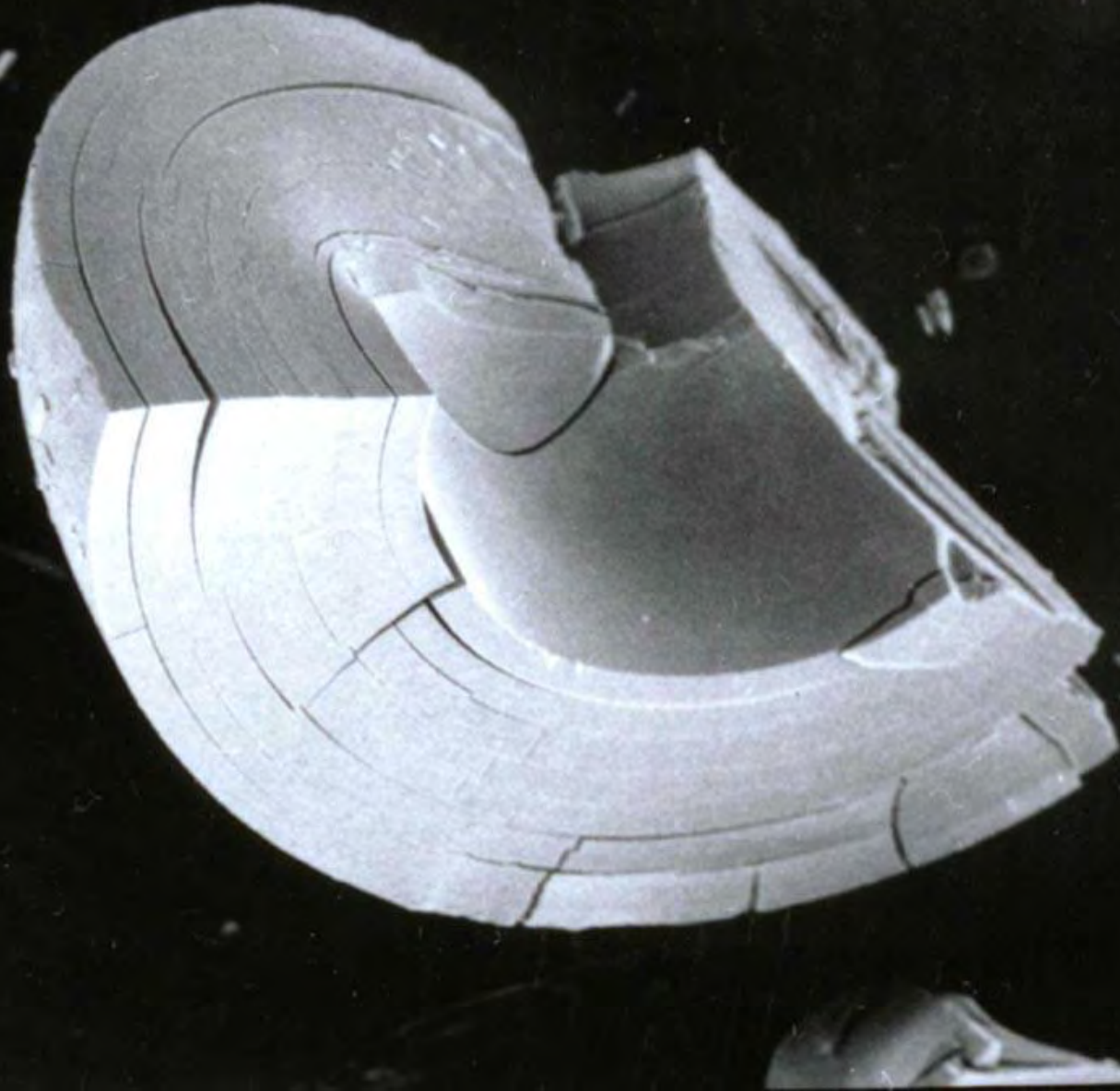




Scanning EM
of struvite
stones



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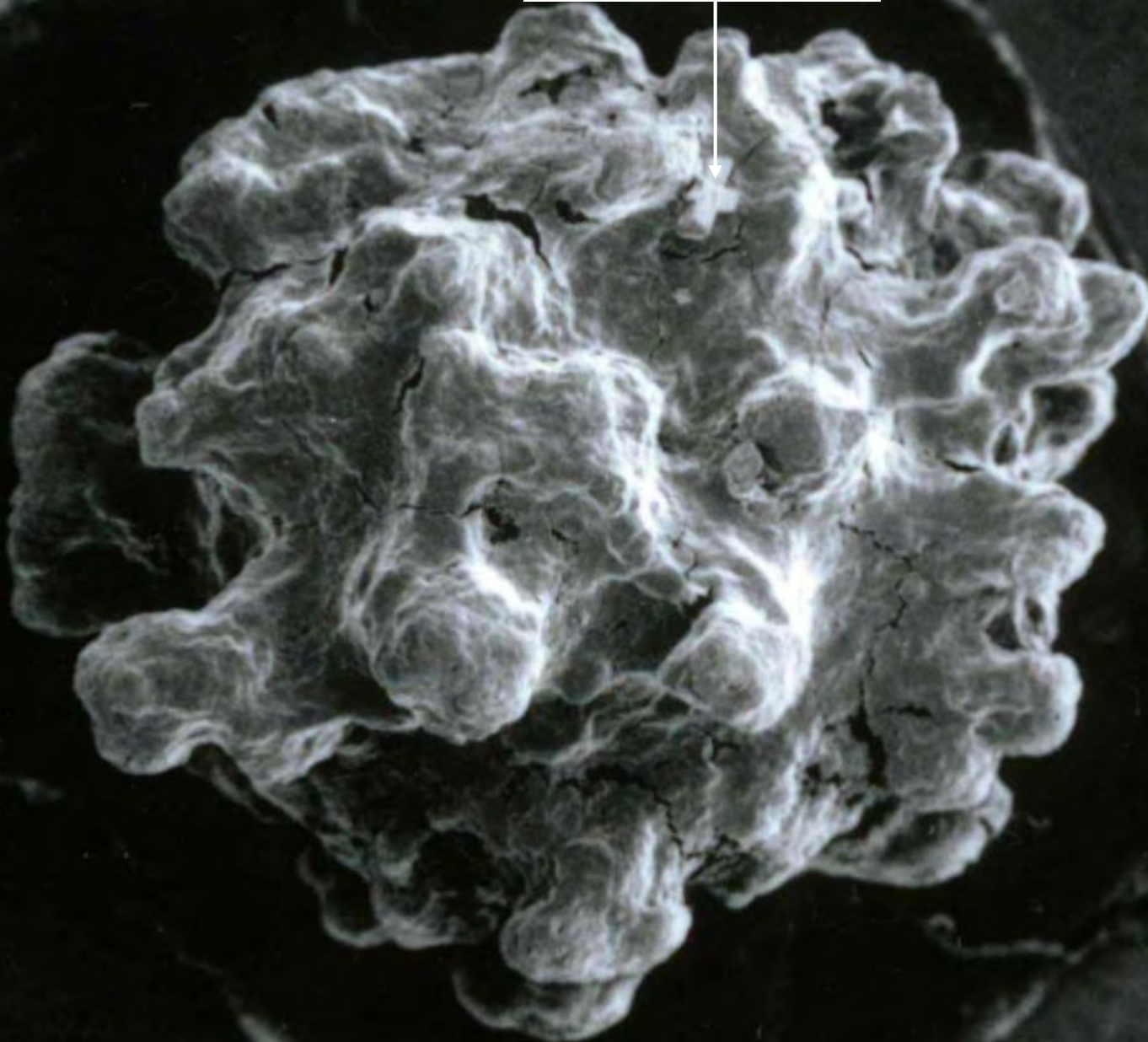


“Onion ring” layering
of crystals in struvite
urolith



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Investment

Struvite crystals



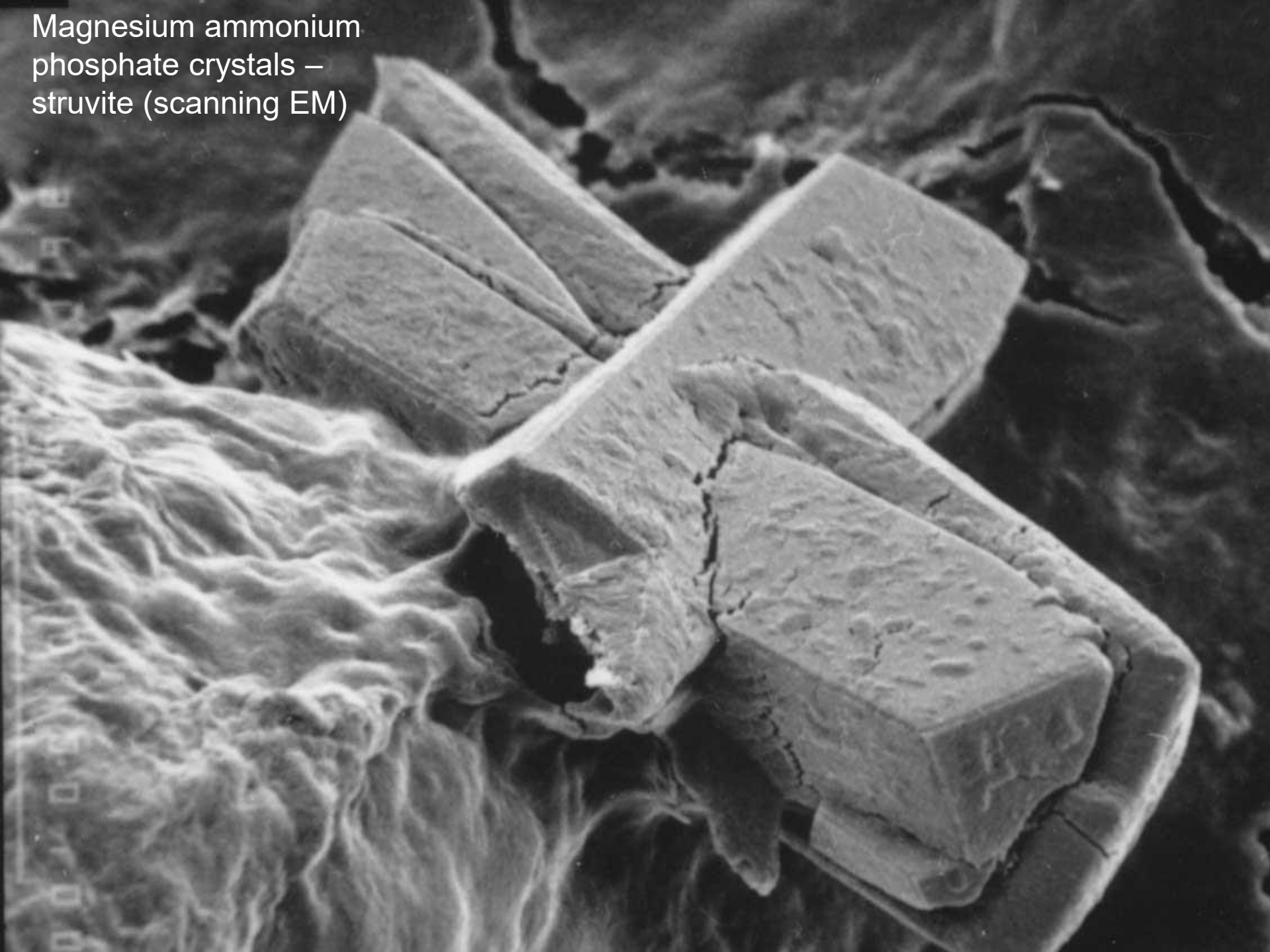
Calcium
carbonate
urolith

Struvite crystals
may be laid
down on a pre-
existing
carbonate
crystal



Industry &
Investment

Magnesium ammonium
phosphate crystals –
struvite (scanning EM)



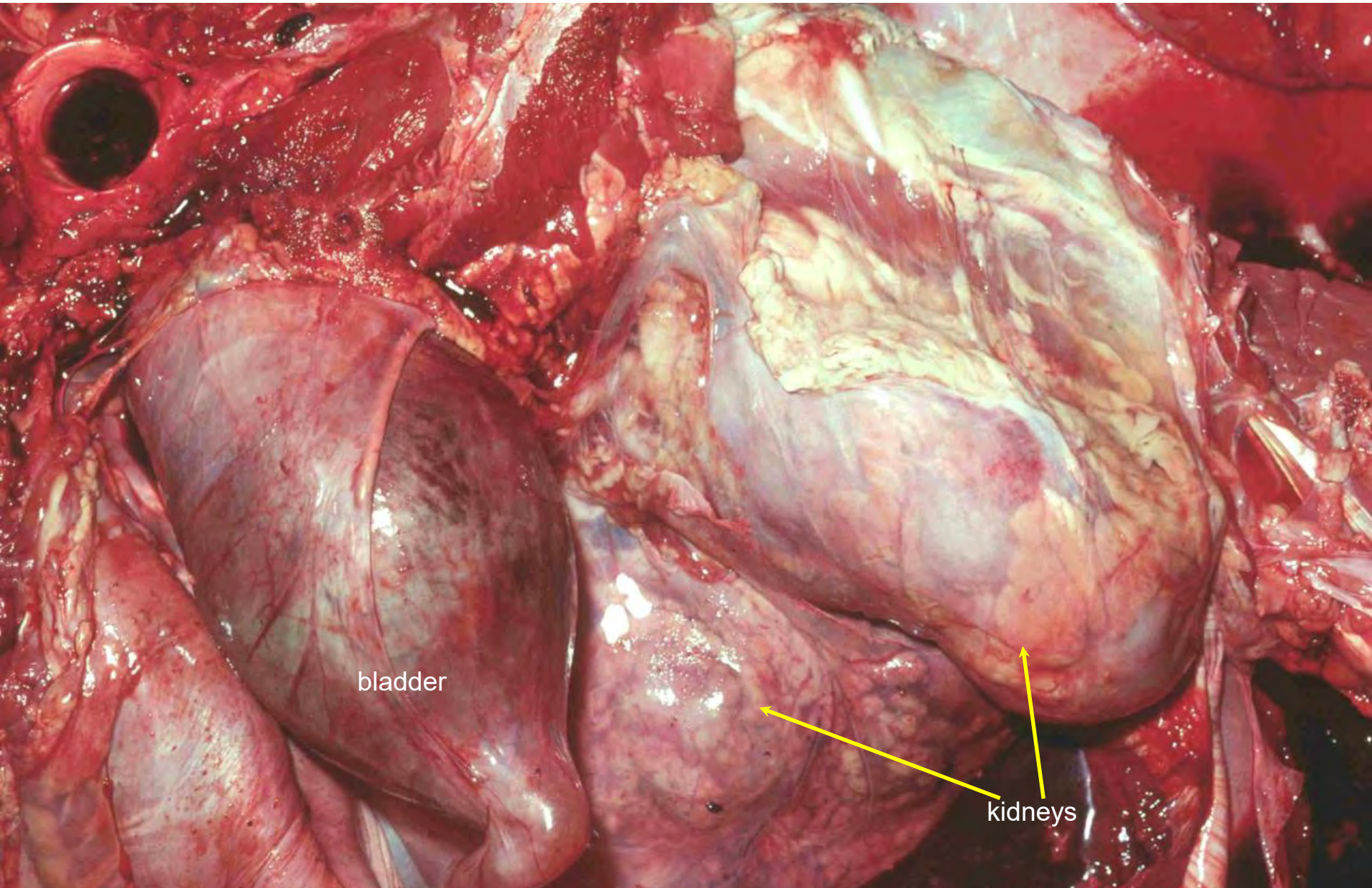
Struvite crystals in dog's urine

Photo by Barbara Vanselow



Another bovine obstructive urolithiasis case. Severe posterior perirenal and retroperitoneal oedema is expected in renal failure of any cause in ruminants and pigs.

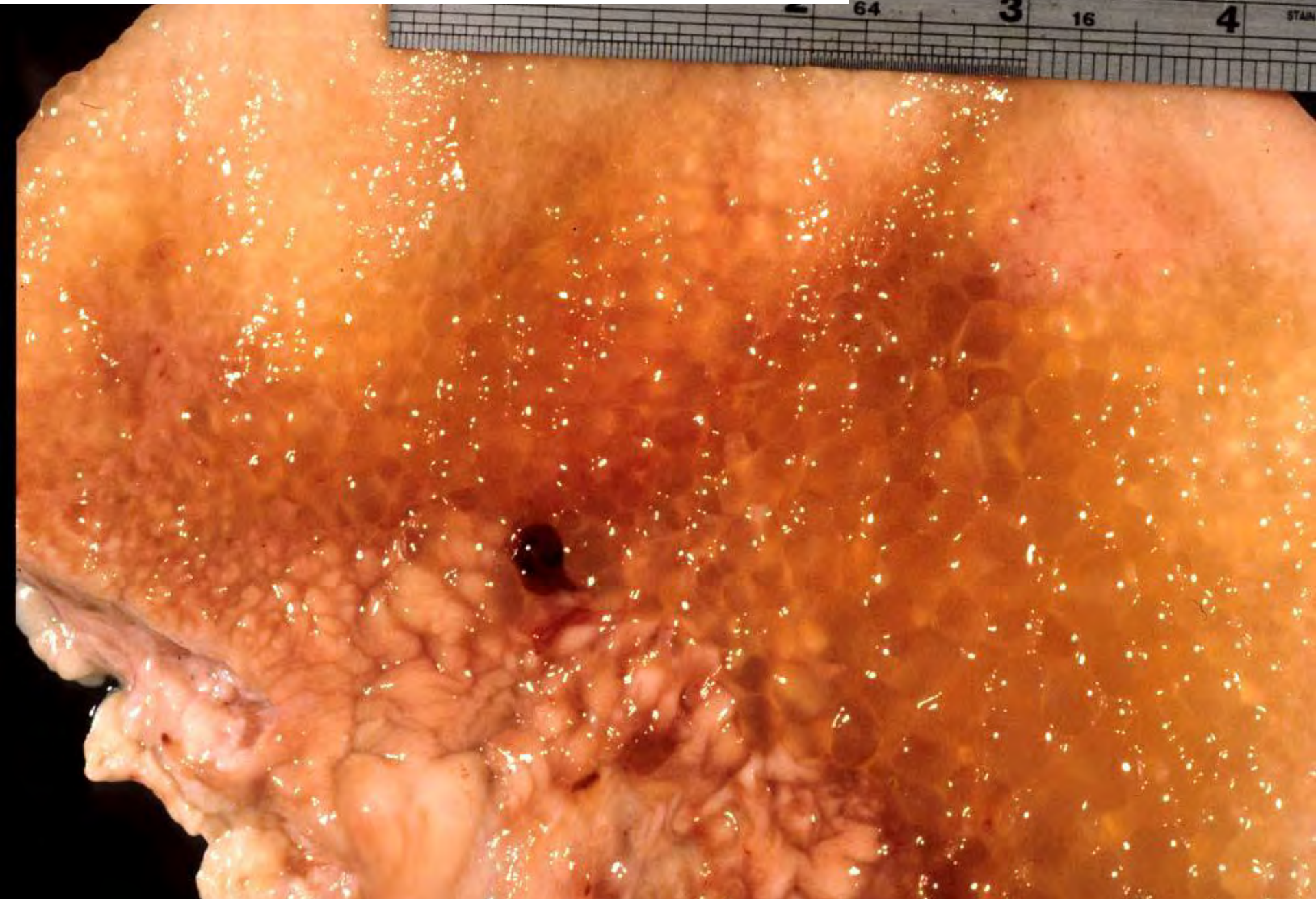
Photo: R Kelly



AN94/2716 –next 3 slides

- **HISTORY:** Feedlot with urolithiasis problem.
- **NECROPSY:** No stones were seen. Oedema and thickening of bladder wall. The bladder mucosa was made up of fluid-filled polyp-like structures 3 -10mm long. These were largest near the urethral outlet.
- **HISTOPATH:** Marked oedema of submucosa. Oedematous submucosa and epithelium forming polyps. Inflammatory cells are present in the submucosa: lymphocytes, plasma cells, some neutrophils, with oedema of the tunica muscularis. Blood vessels are oedematous and inflammatory cells, particularly neutrophils, surround the vessels.
- **CONCLUSION:** Bladder oedema plus inflammation; could have been due to previous urolithiasis.

AN94/2617 Oedematous bladder wall possibly has been irritated by rough calcium stones, but none were found





AN94/2617 close-up of previous slide. Cystic/polypoid mucosa

Ketosis

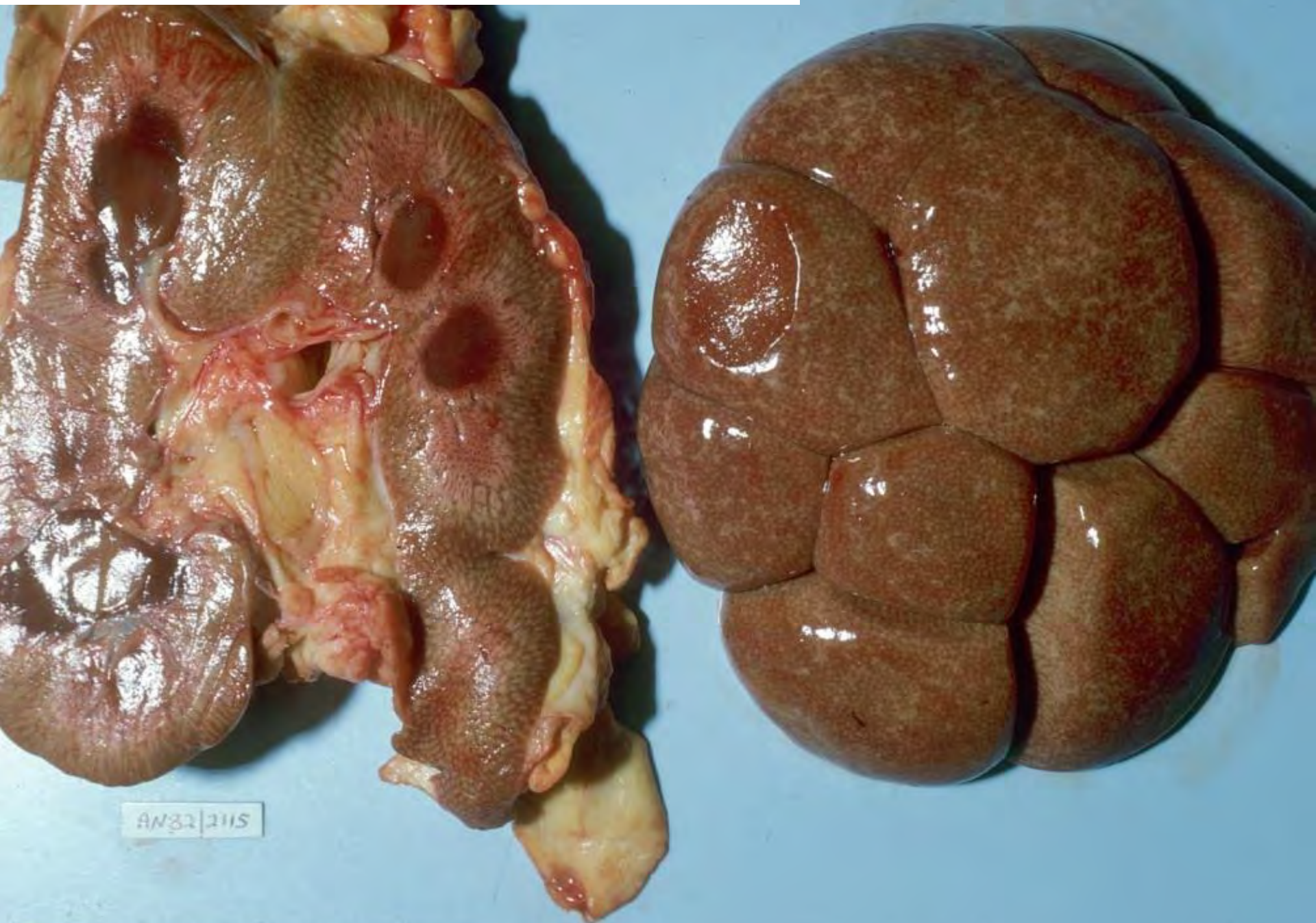
68/947 : Hepatic lipidosis associated with ketosis



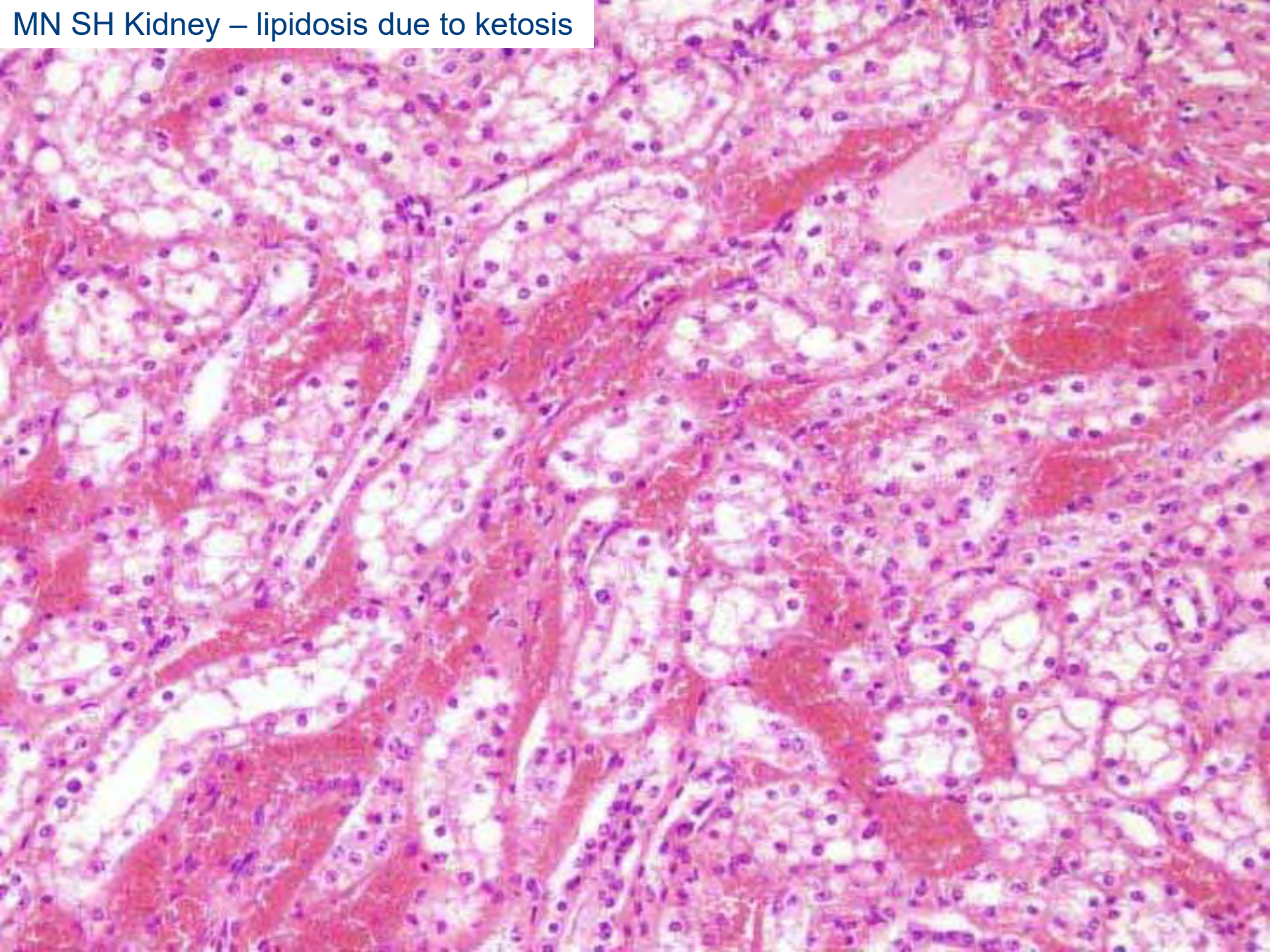
68/947

No 1

AN82/2115 : Renal lipidosis associated with ketosis



MN SH Kidney – lipidosis due to ketosis



CNS disease

Polioencephalomalacia (PEM)

L click [PEM paper .pdf](#)

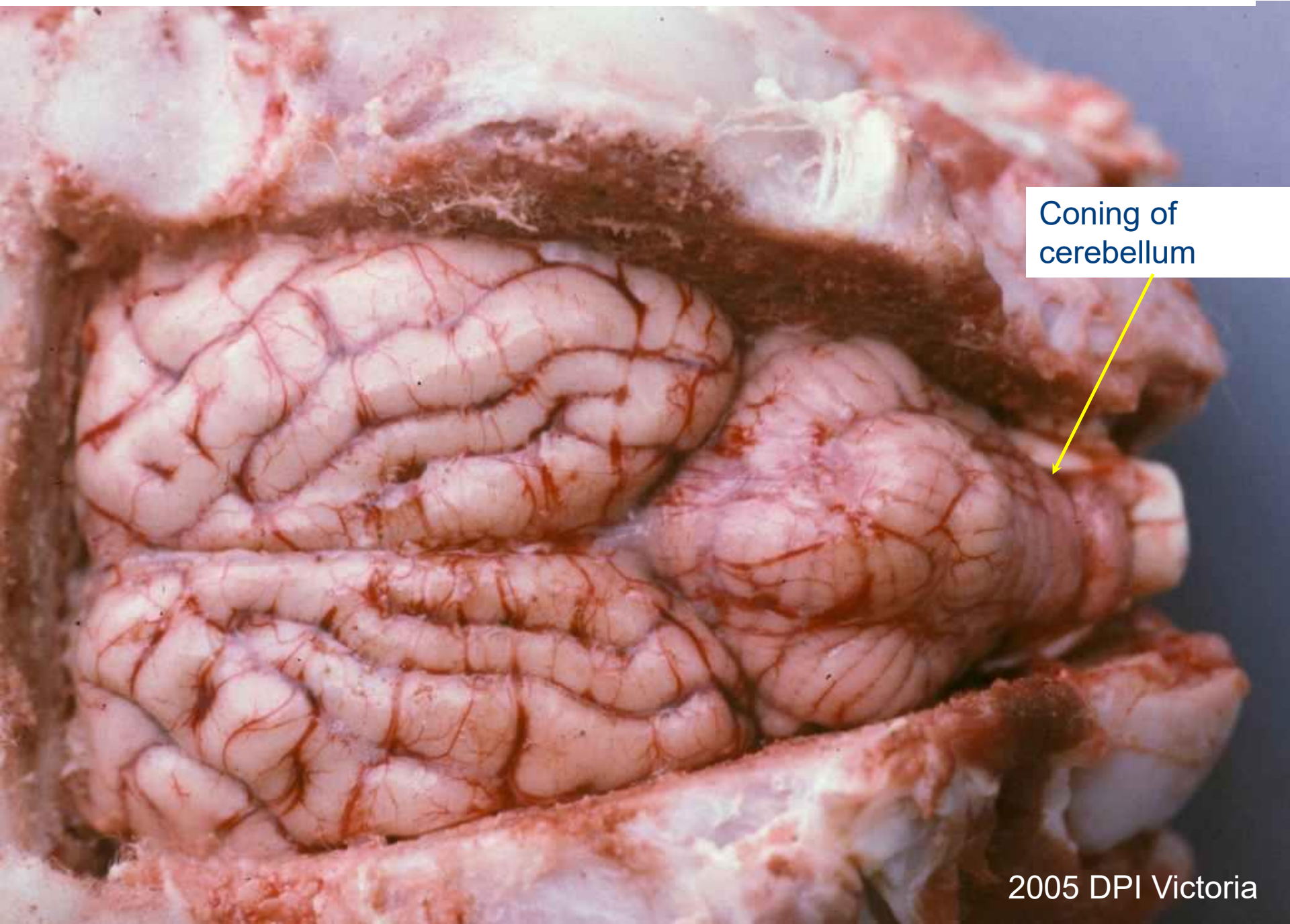
AN95/2158 PEM steer “dopey” and unresponsive



AN95/2158 PEM : easily handled –unusual for feedlot cattle



Polioencephalomalacia, bovine



Coning of cerebellum



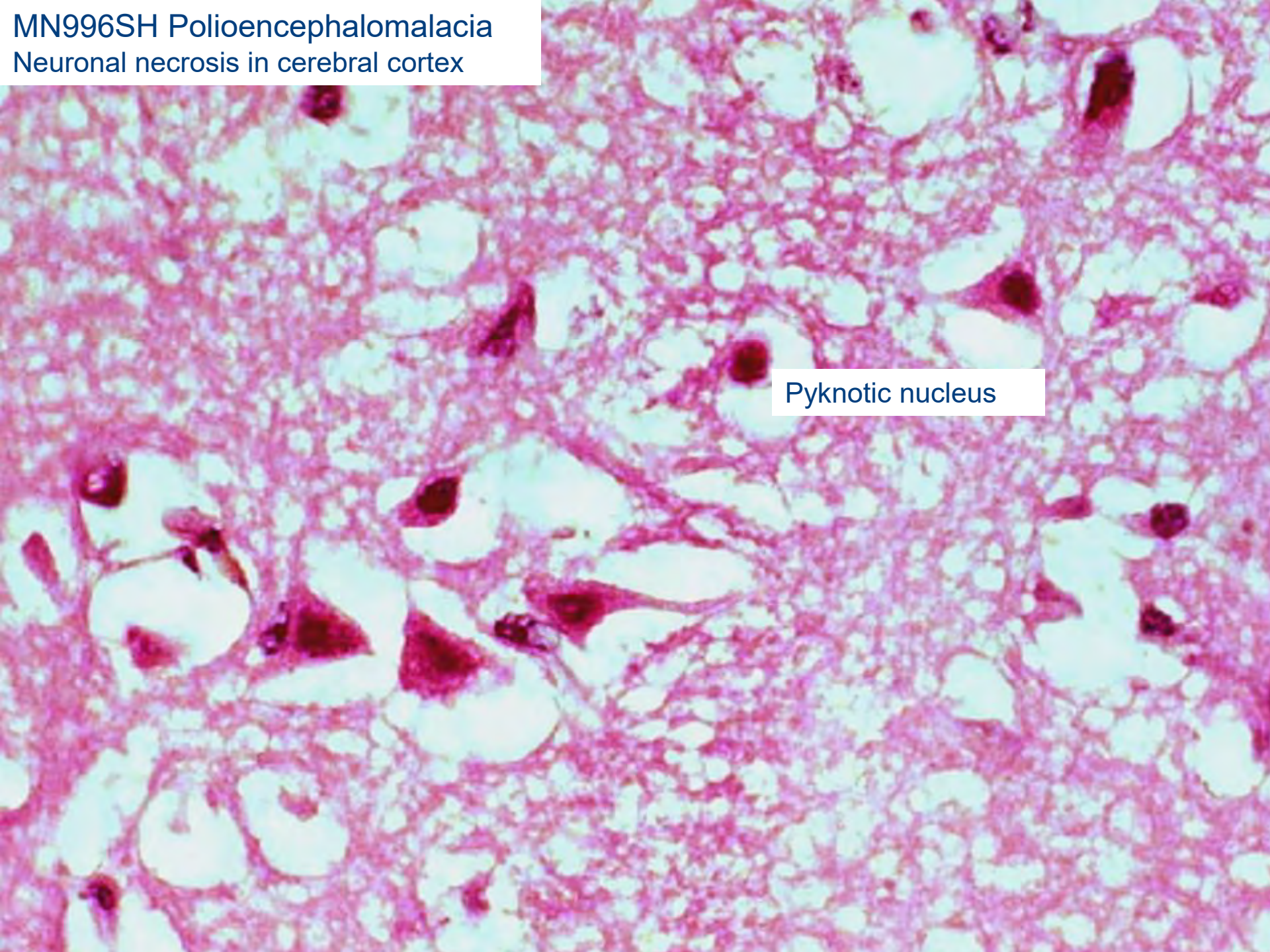
AN88/270 : Fluorescence under UV
light indicating neuropil necrosis



AN88/270 : Fluorescence under UV light indicating neuropil necrosis



MN996SH Polioencephalomalacia
Neuronal necrosis in cerebral cortex

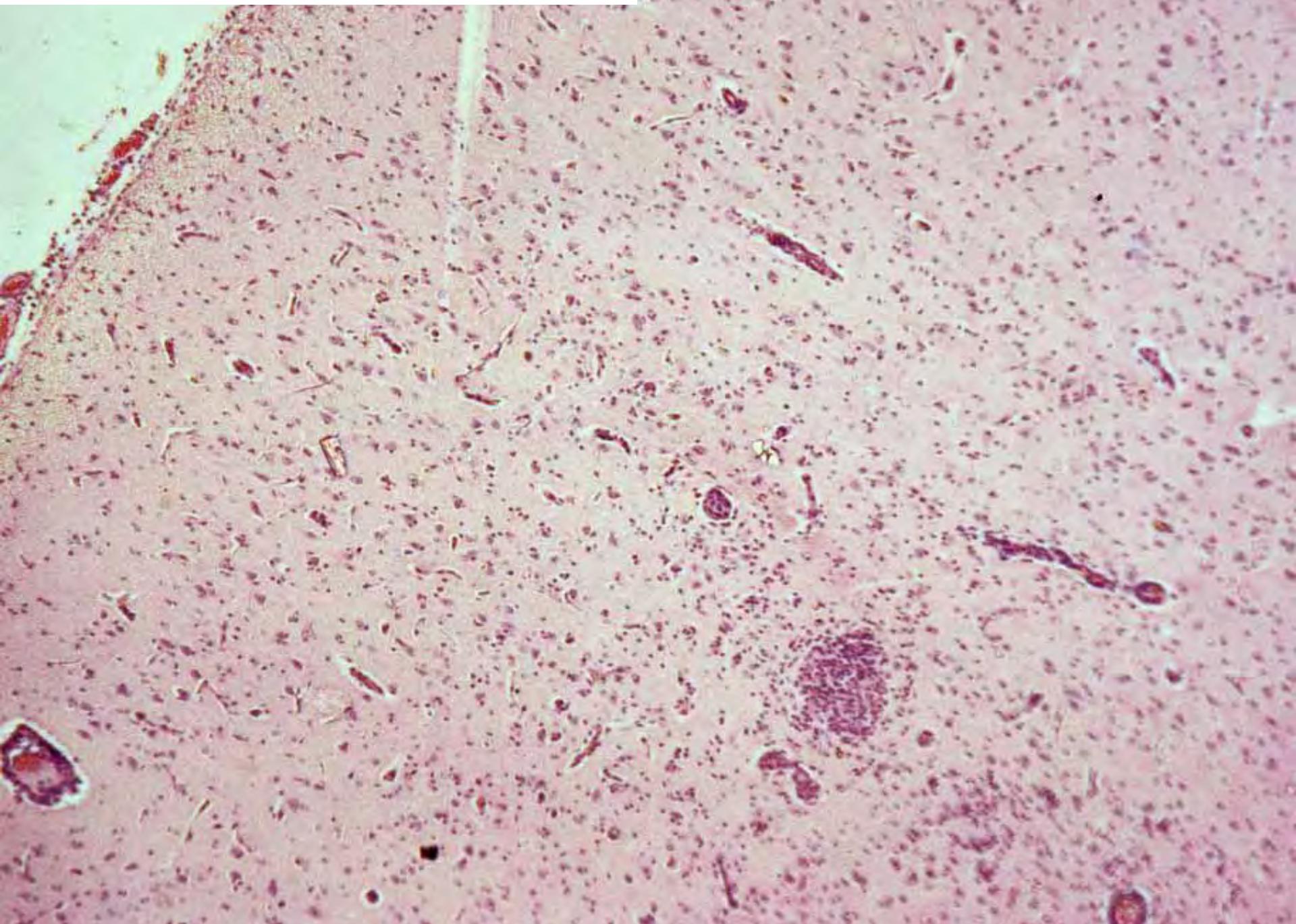


Pyknotic nucleus

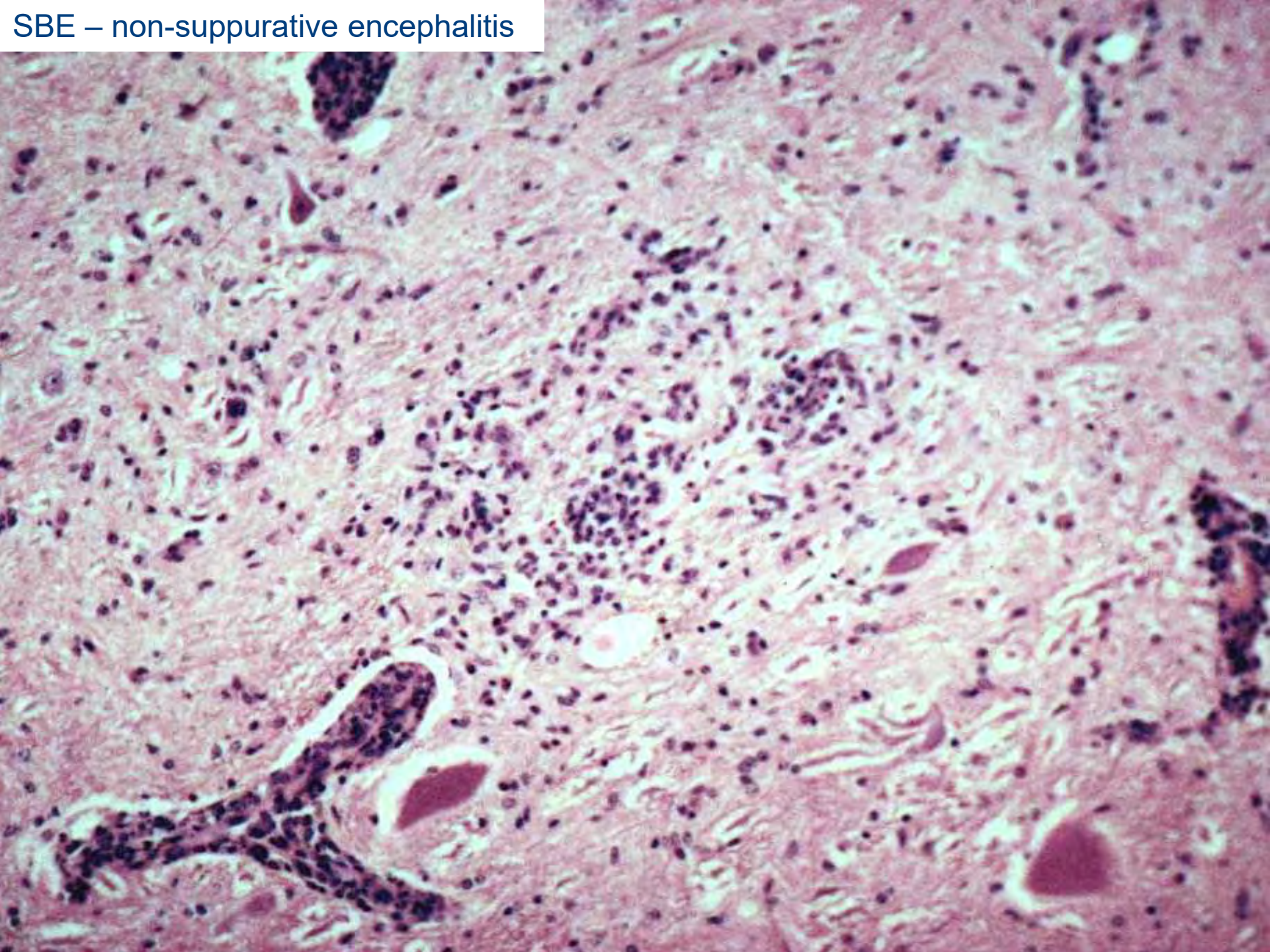
SBE

- Sporadic bovine encephalomyelitis
- Chlamydophila
- Non-suppurative vasculitis/encephalitis

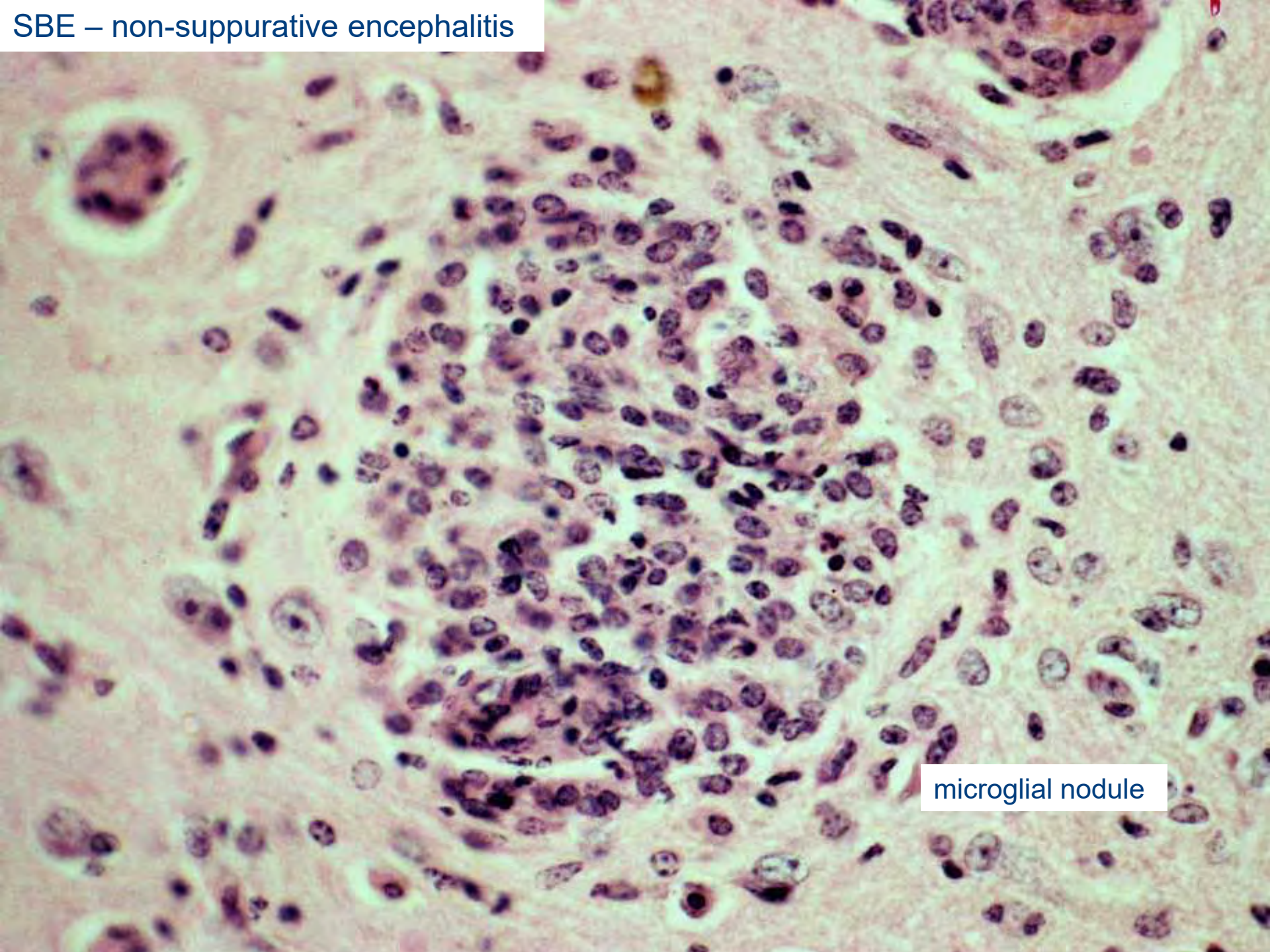
SBE; brain : non-suppurative encephalitis



SBE – non-suppurative encephalitis

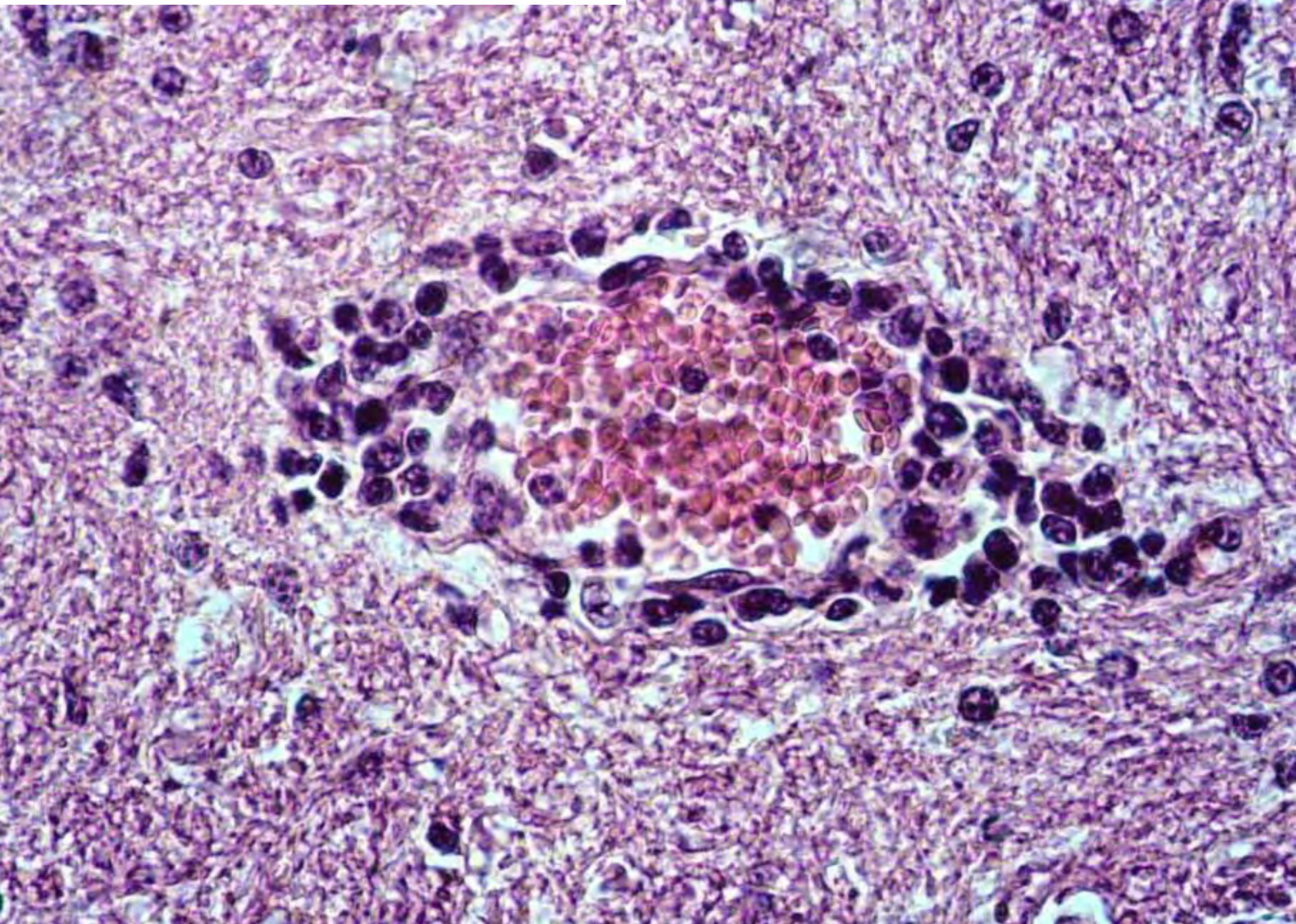


SBE – non-suppurative encephalitis



microglial nodule

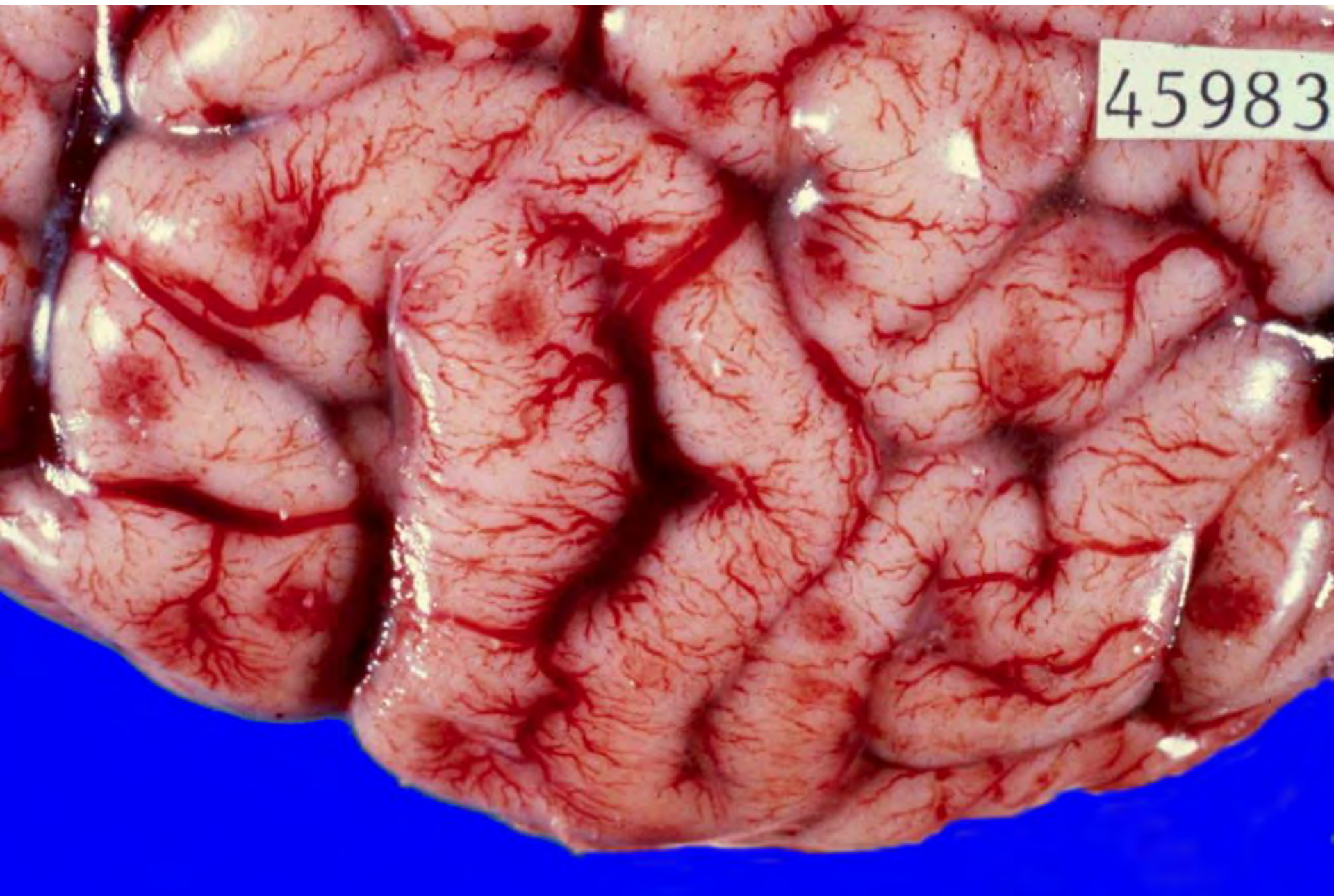
SBE – mononuclear perivascular cuffing



Haemophilus somnus (*Histophilus somni*)

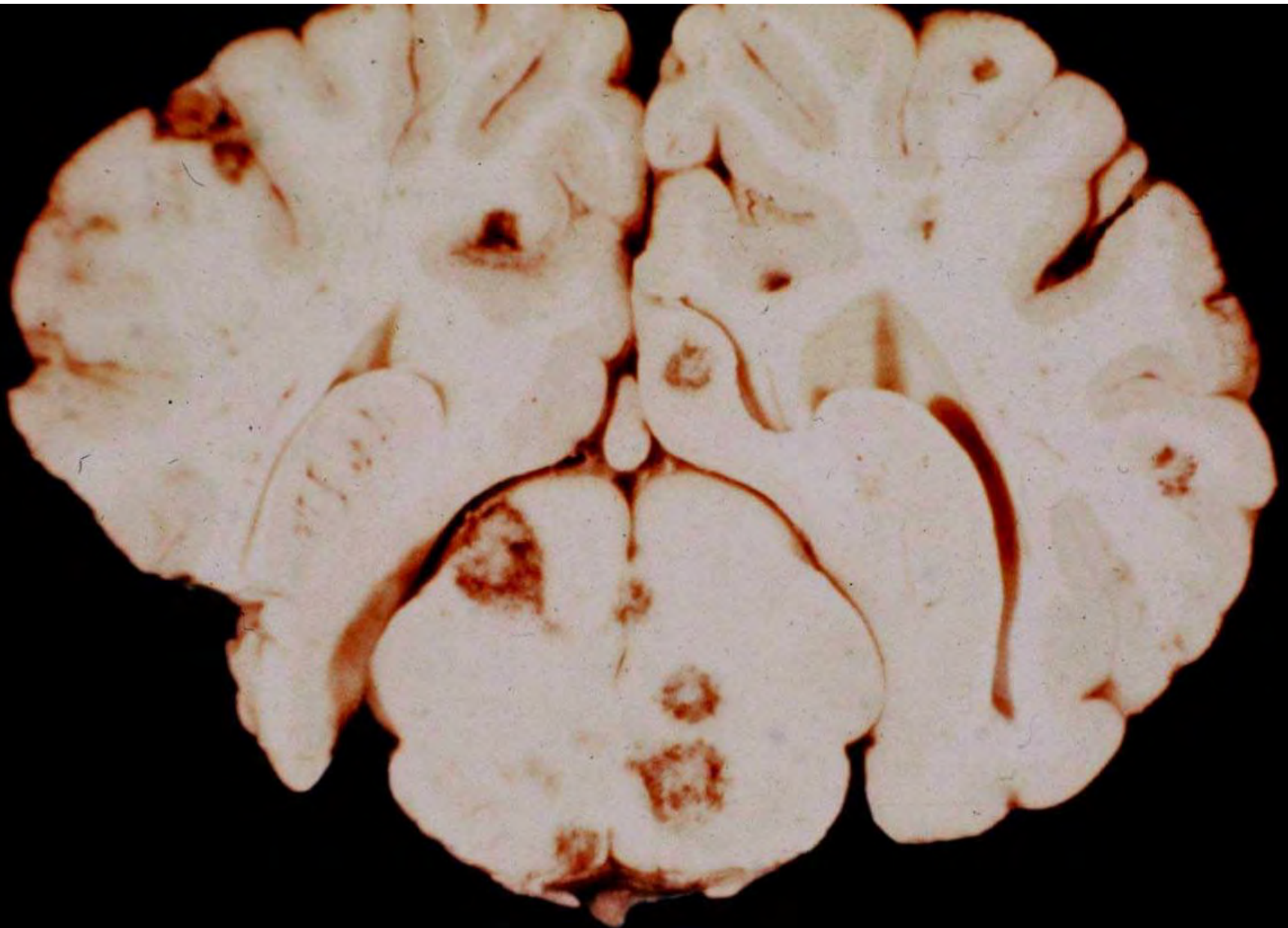
Thrombotic meningoencephalitis (TME)

TME, bovine (courtesy Ontario Veterinary College).



Leptomeningeal hyperaemia, haemorrhages

TME, multiple brain infarcts; bovine (*courtesy Ontario Veterinary College*).

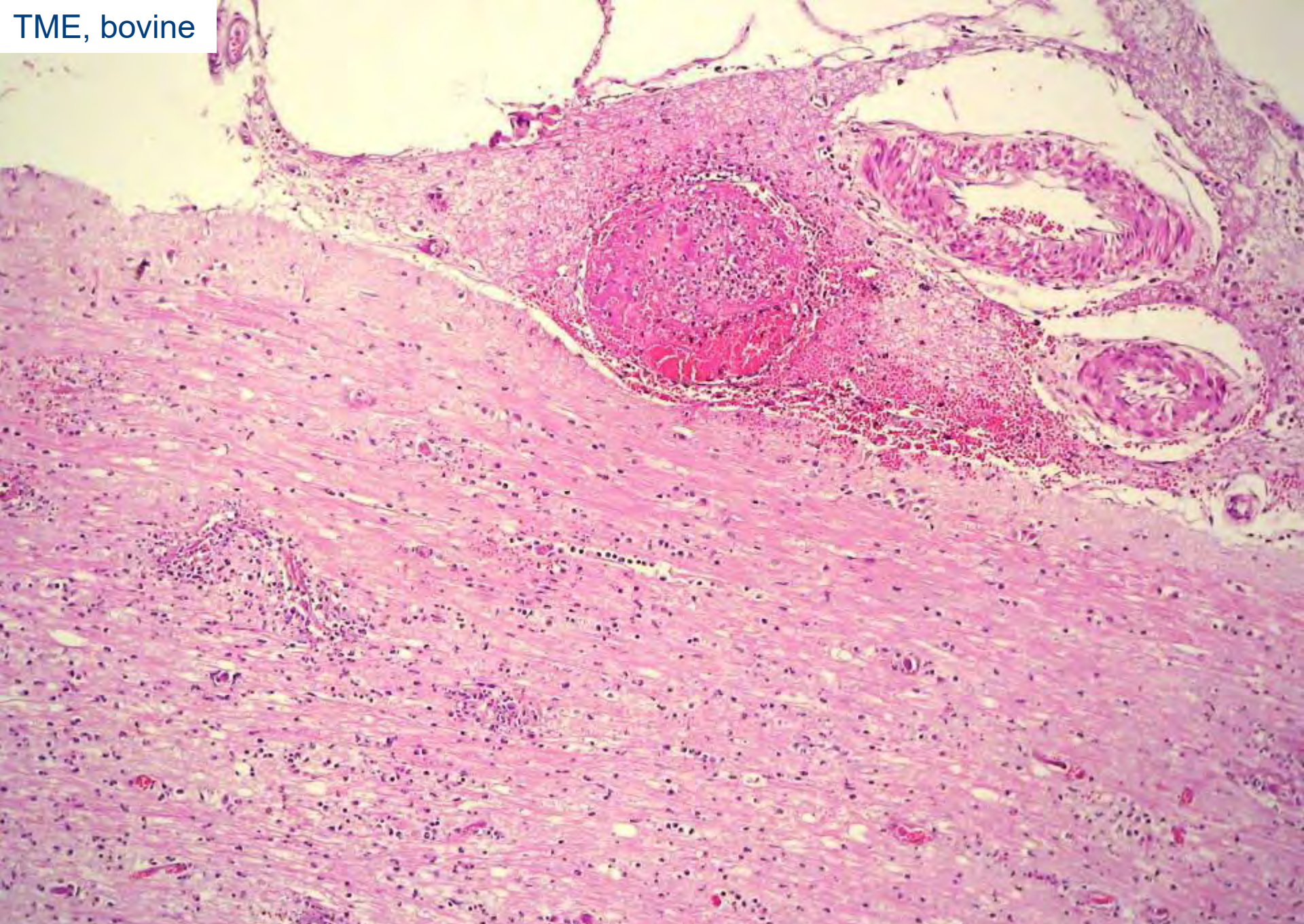


35026

TME, multiple brain infarcts; bovine (*courtesy M Dennis Univ Sydney*).



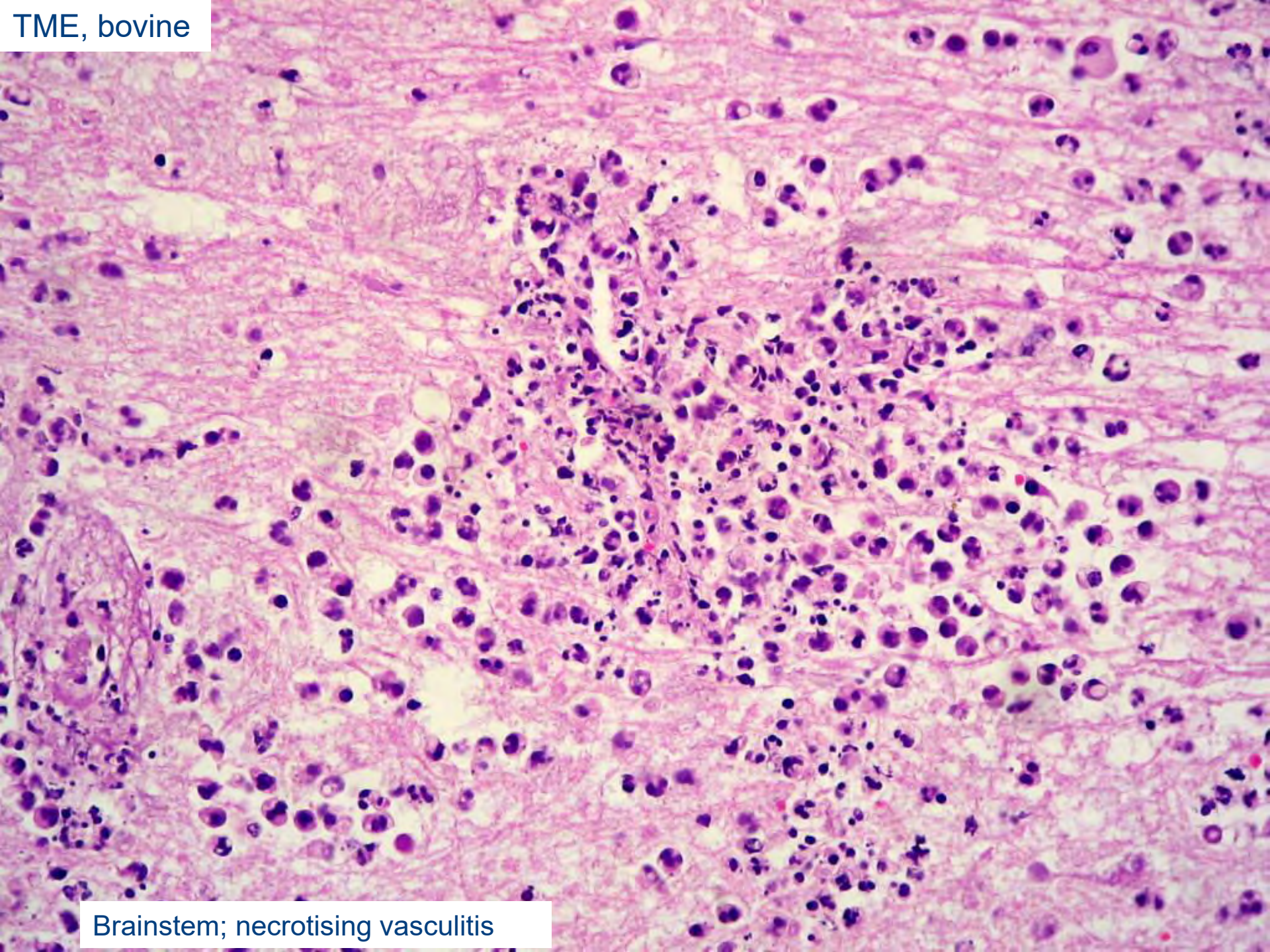
TME, bovine



Leptomeningeal vasculitis and thrombosis

(image courtesy Roger Kelly)

TME, bovine

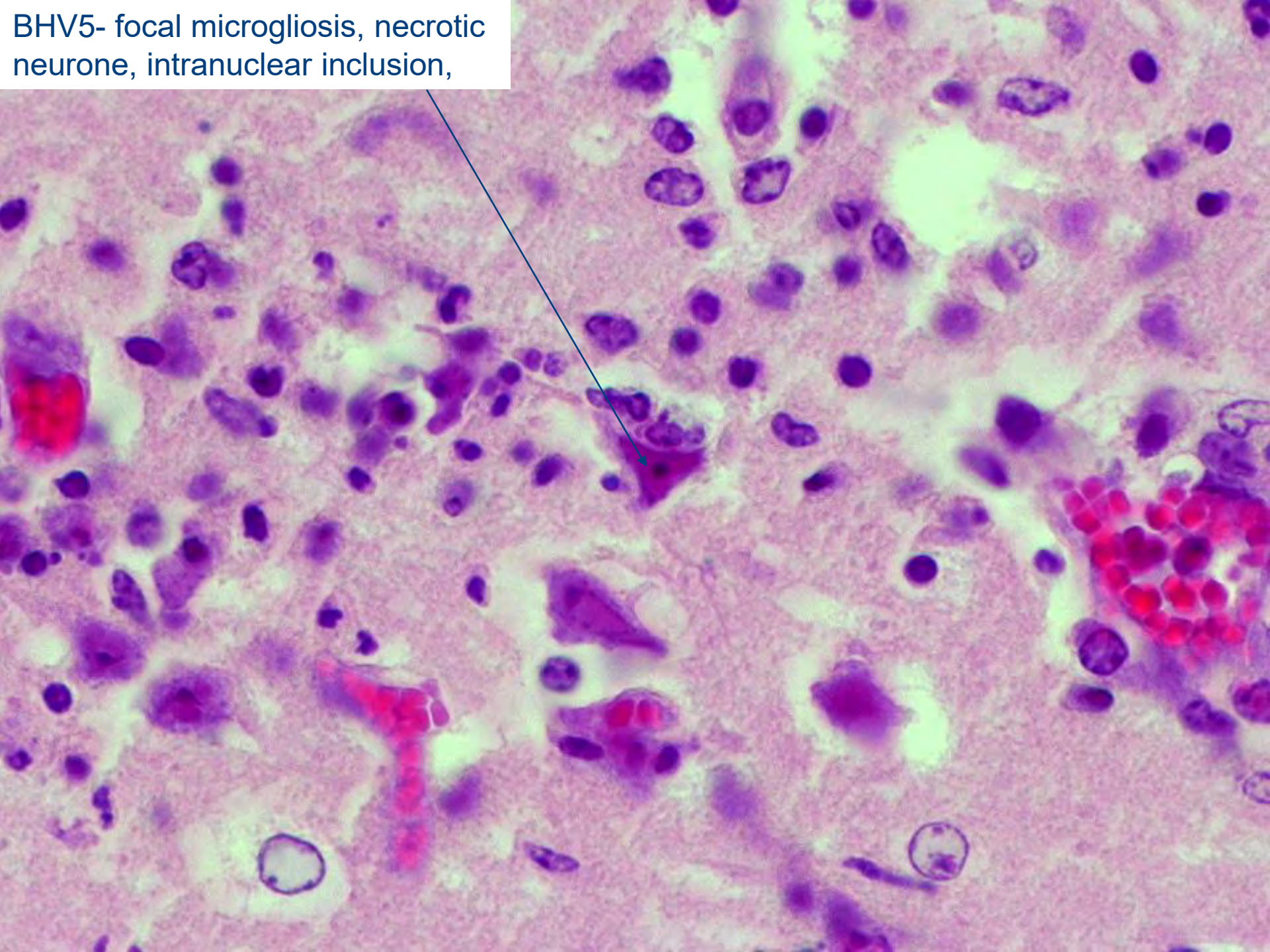


Brainstem; necrotising vasculitis

BHV5

Bovine herpes virus 5

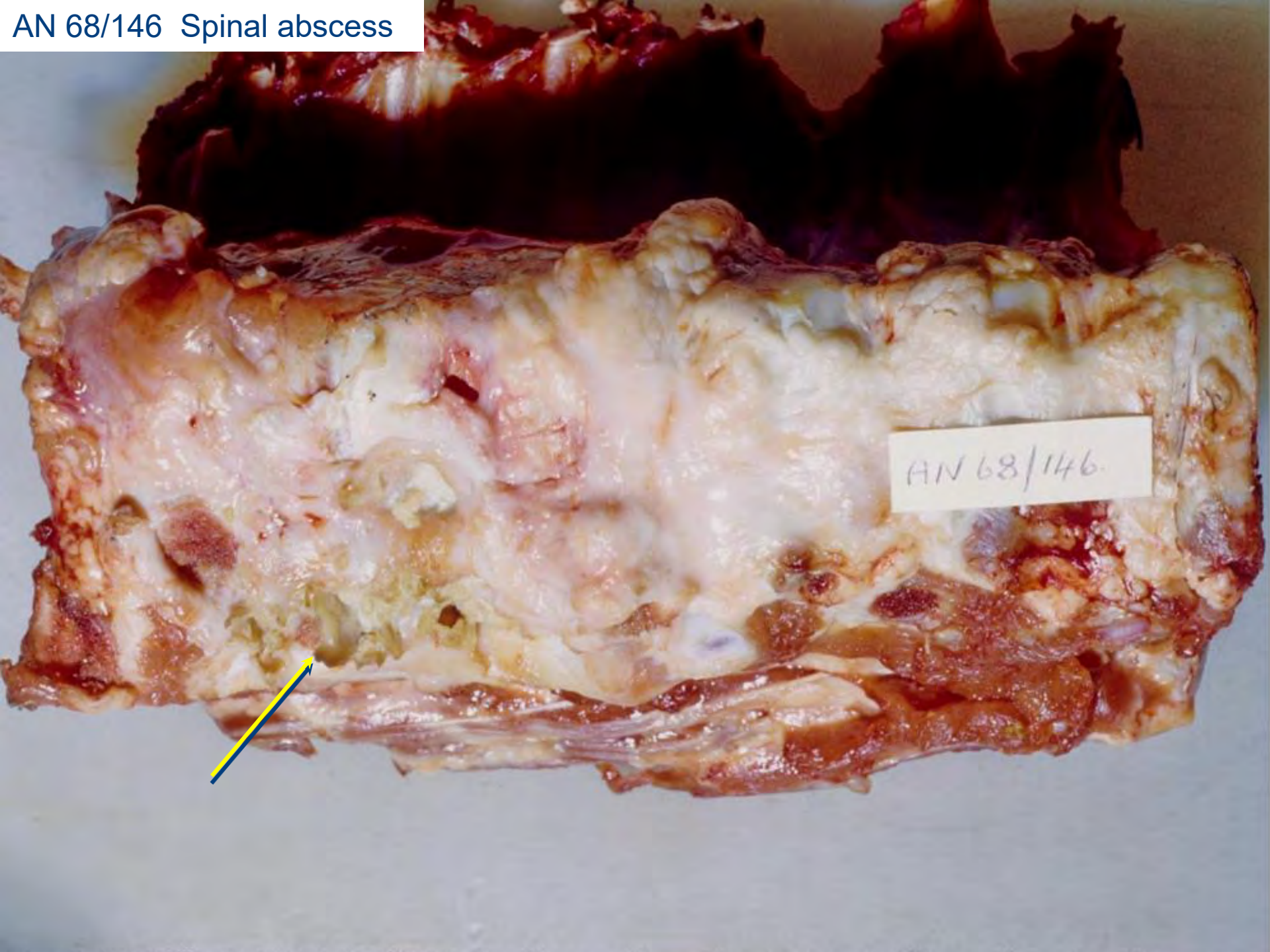
BHV5- focal microgliosis, necrotic neurone, intranuclear inclusion,



MN152SH Brain abscesses



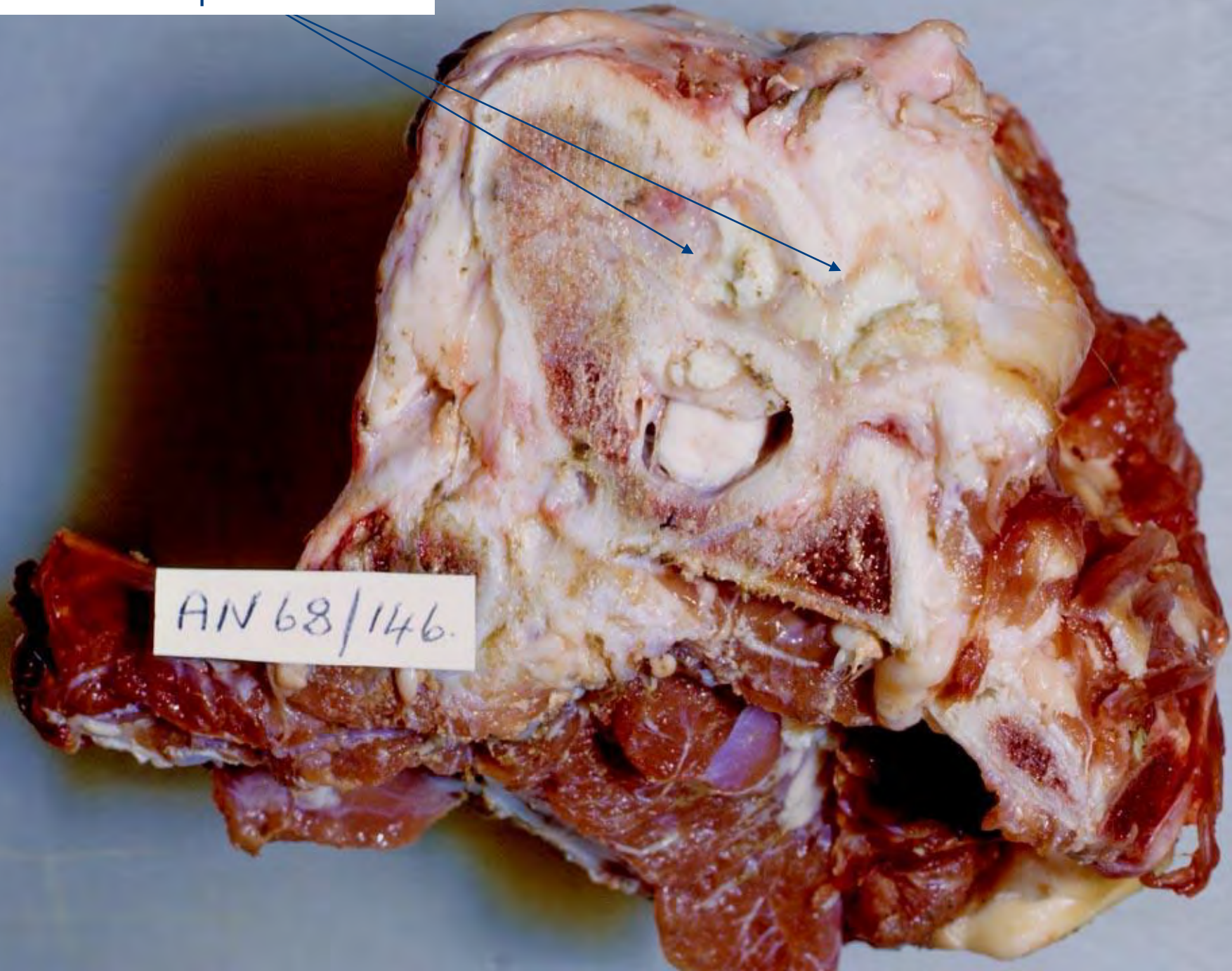
AN 68/146 Spinal abscess



AN 68/146



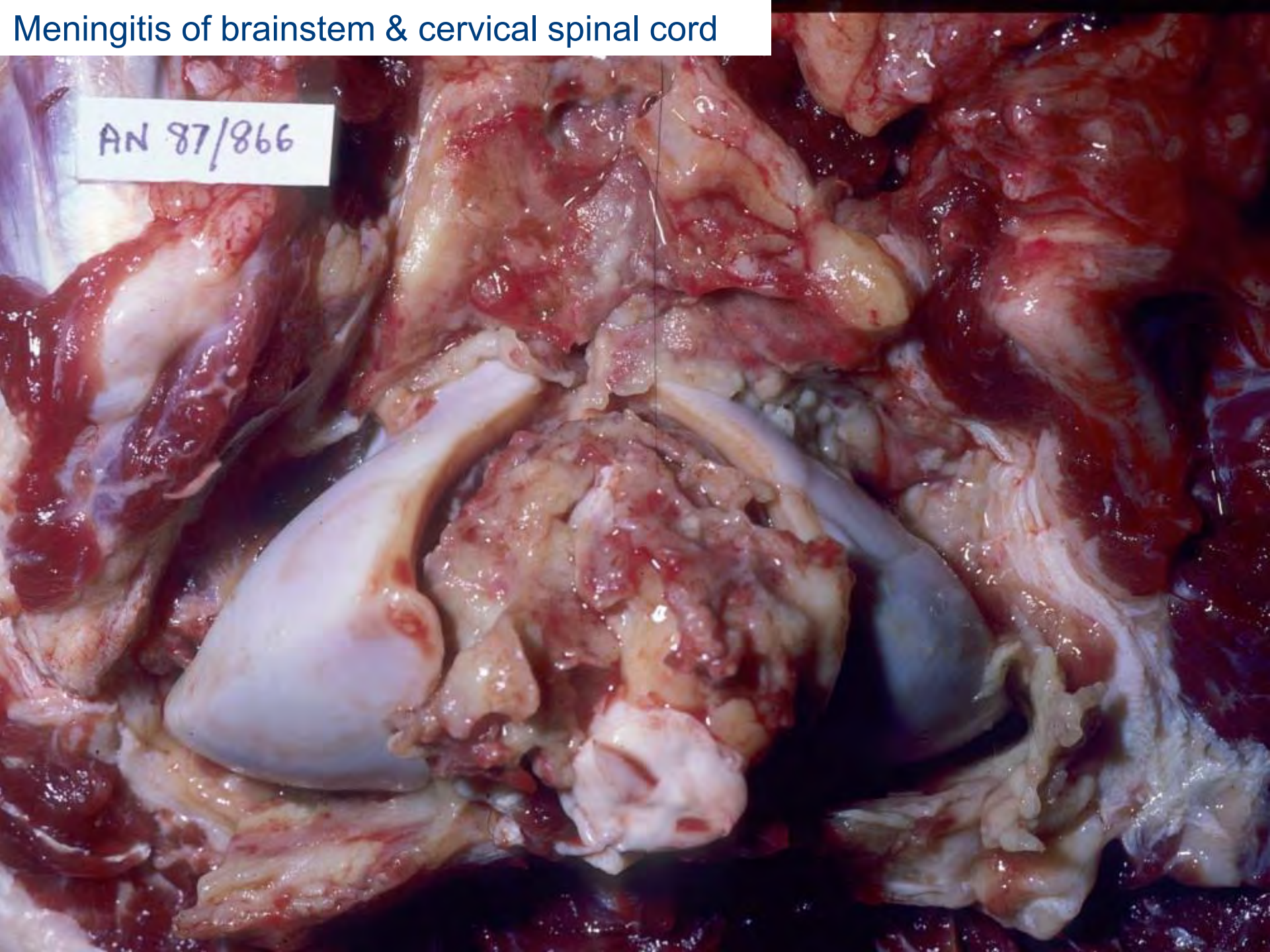
AN 68/146 Spinal abscess



AN 68/146.

Meningitis of brainstem & cervical spinal cord

AN 87/866



Fractured spine (courtesy Ontario Veterinary College)



39706

Clostridial disease

- Gram positive anaerobes
- Produce destructive enzymes – collagenase, deoxyribonuclease, lecithinase, neuraminidase
- Some produce toxins: neurotoxins of tetanus & botulism, haemolysins, alpha, beta and epsilon toxins
- Produce gas from fermentation of sugars
- Common post-mortem invaders

Blackleg (*Clostridium chauvoei* clostridial myositis)



(image courtesy Roger Kelly)

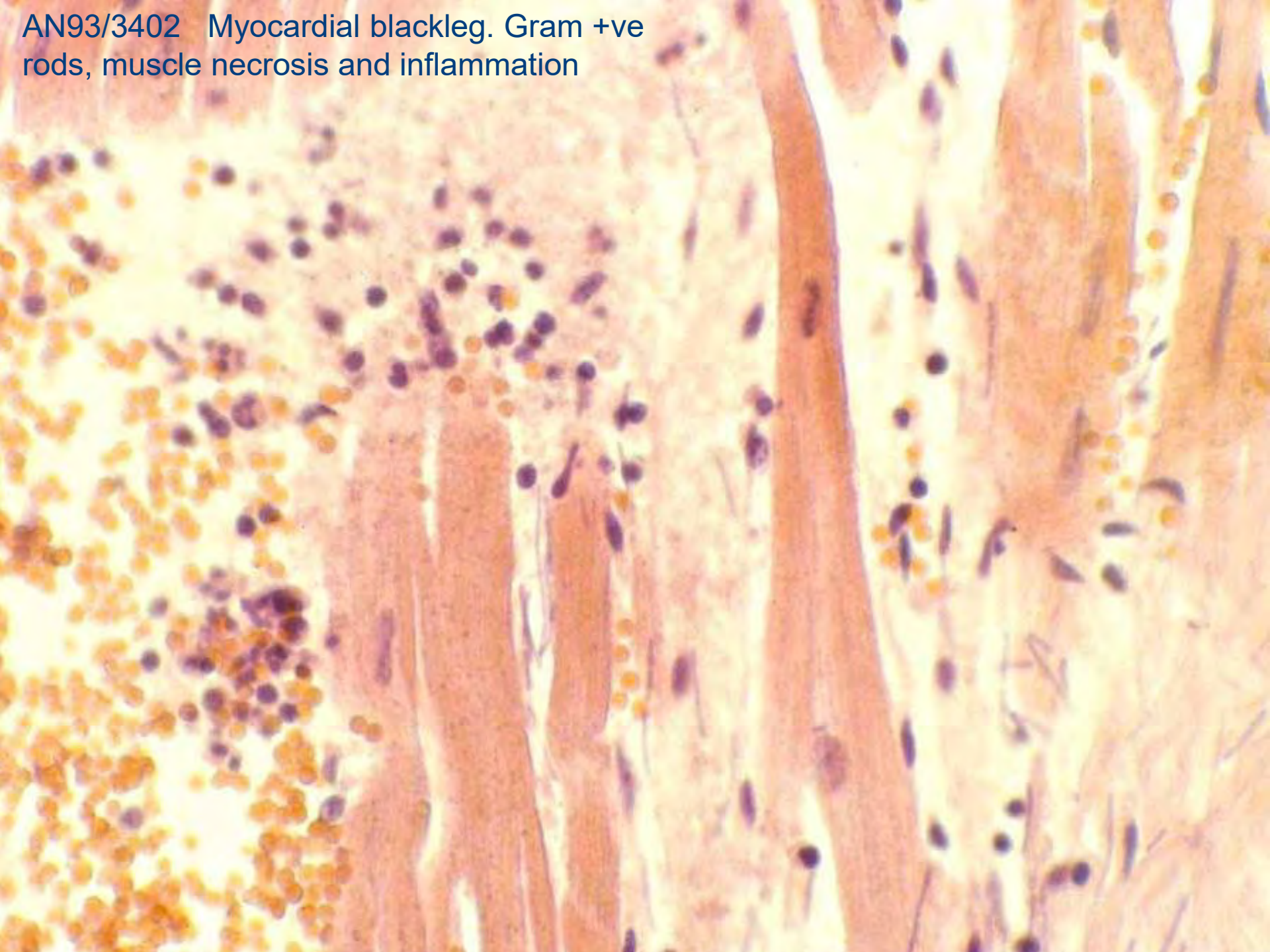
AN73/738 Tongue : Blackleg



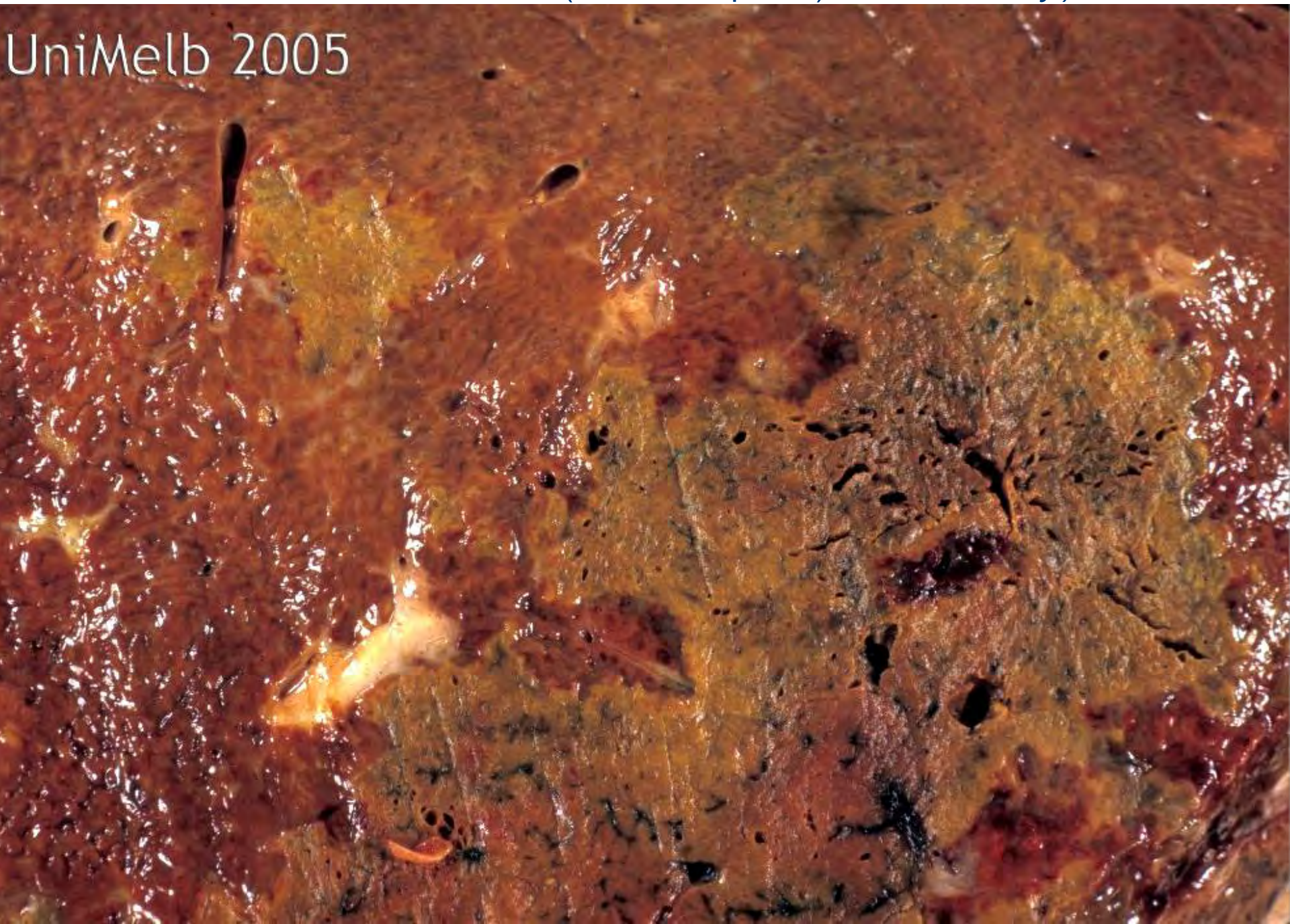
AN73/738 Tongue : Blackleg



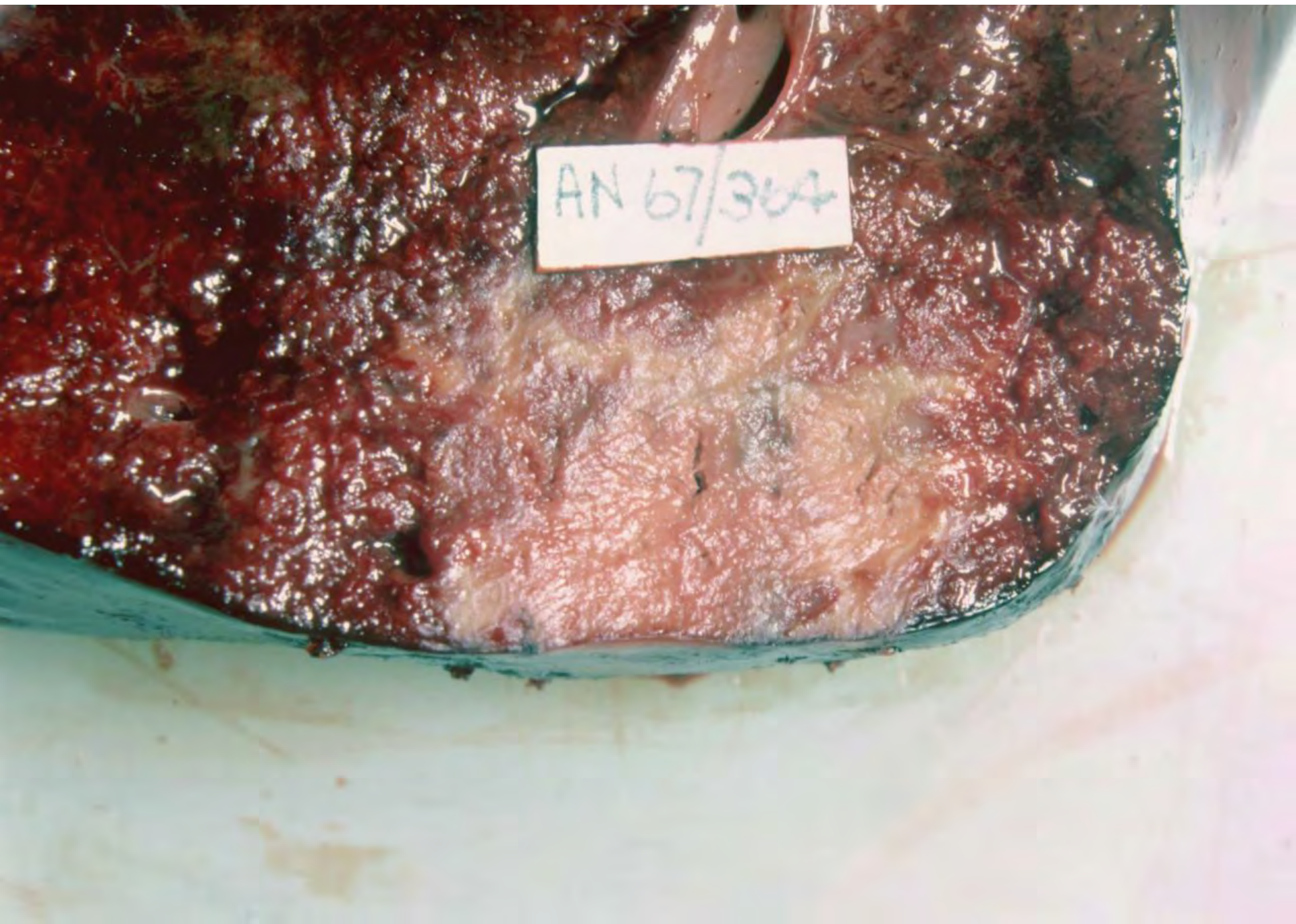
AN93/3402 Myocardial blackleg. Gram +ve rods, muscle necrosis and inflammation



UniMelb 2005

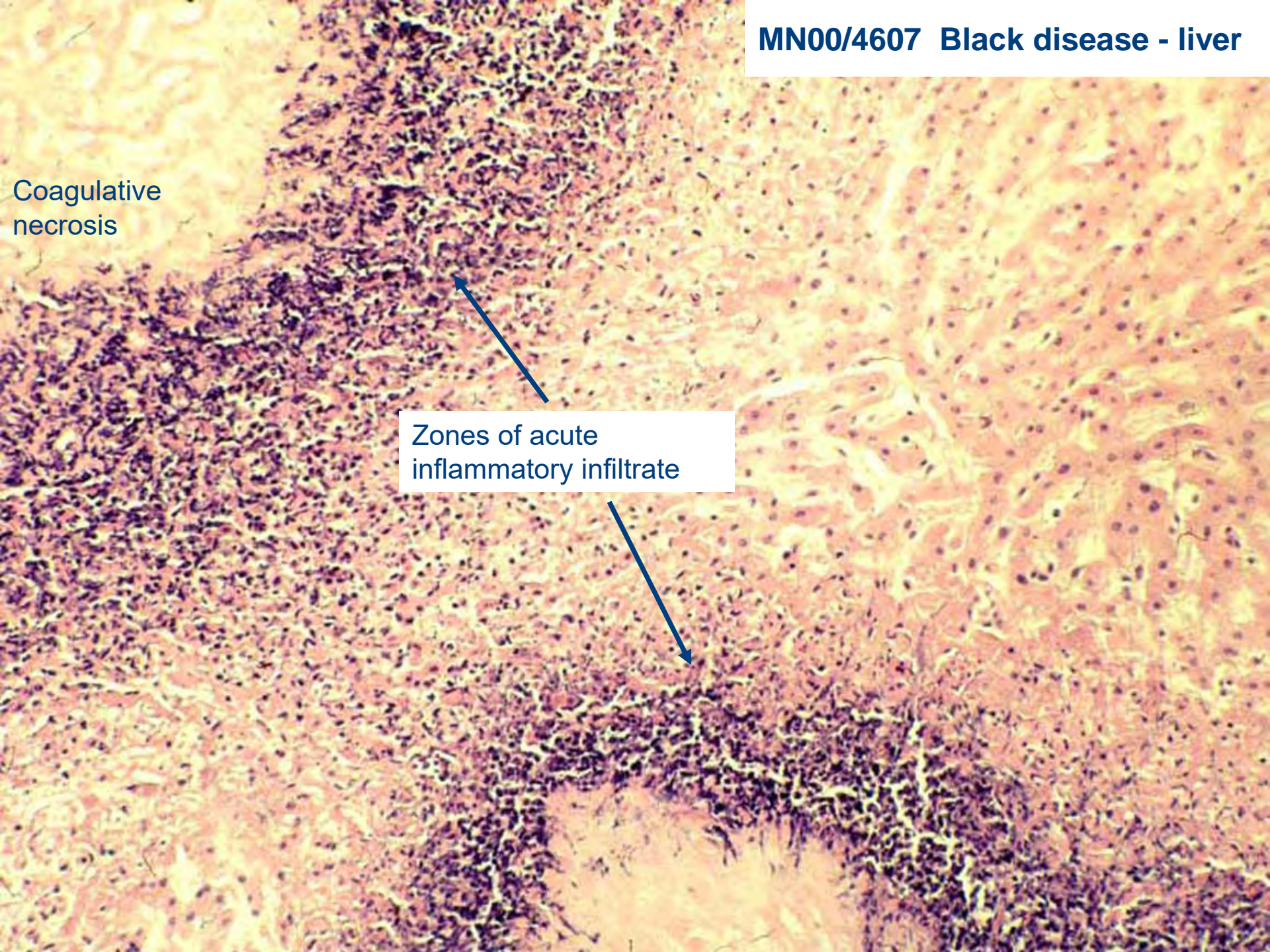


AN67/364 Bovine liver, black disease; irregular pale area of necrosis

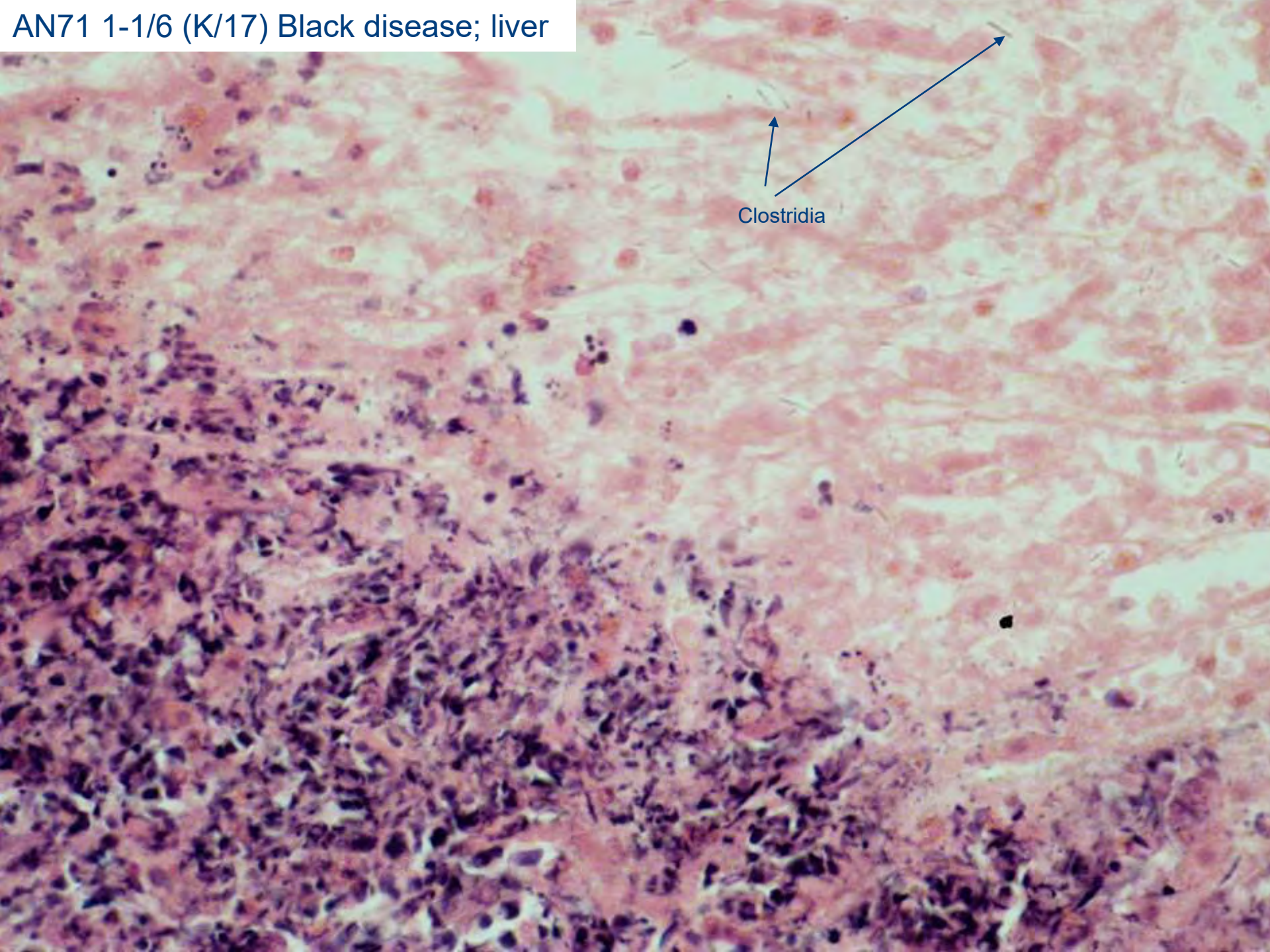


Coagulative
necrosis

Zones of acute
inflammatory infiltrate



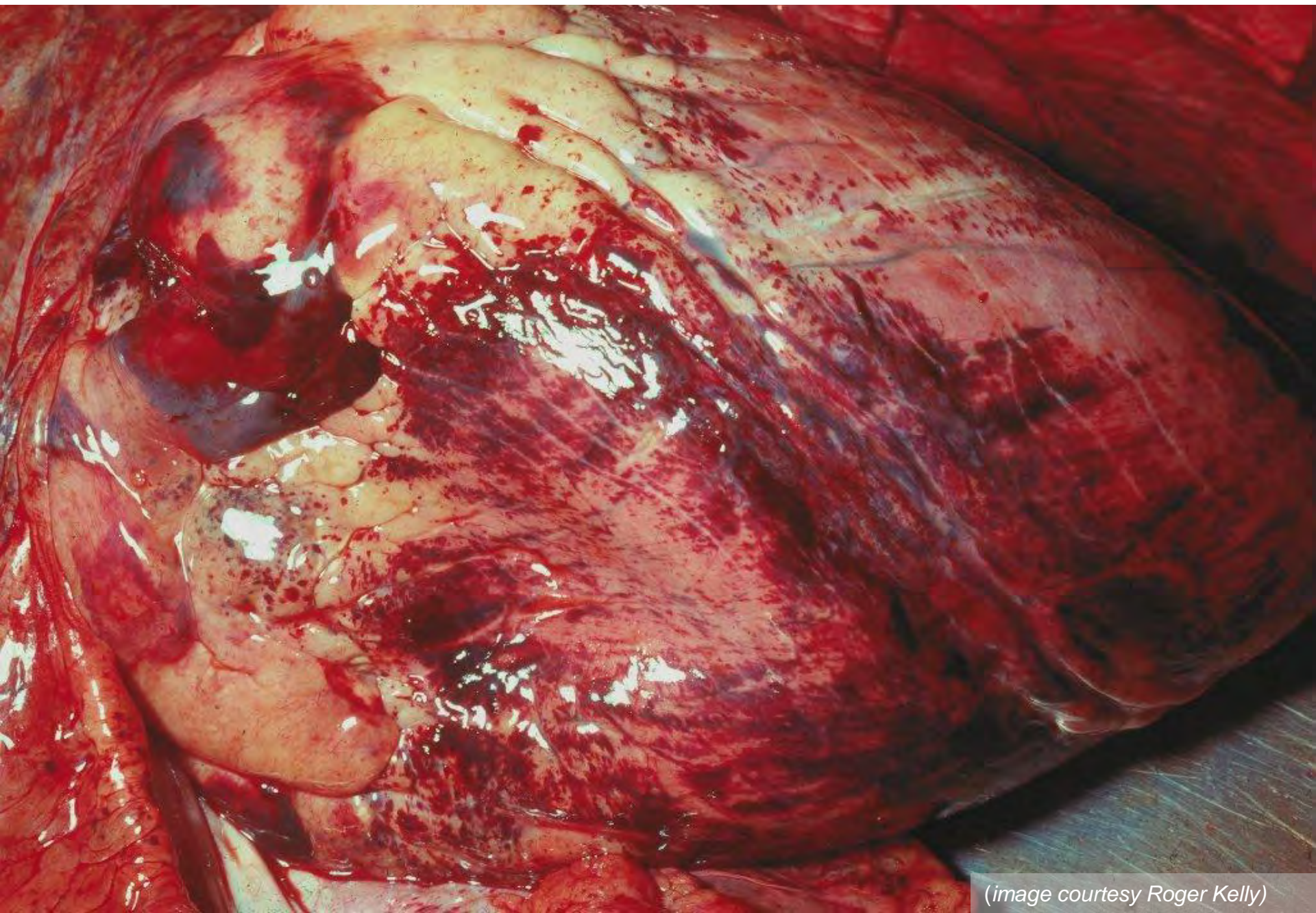
AN71 1-1/6 (K/17) Black disease; liver



Clostridia

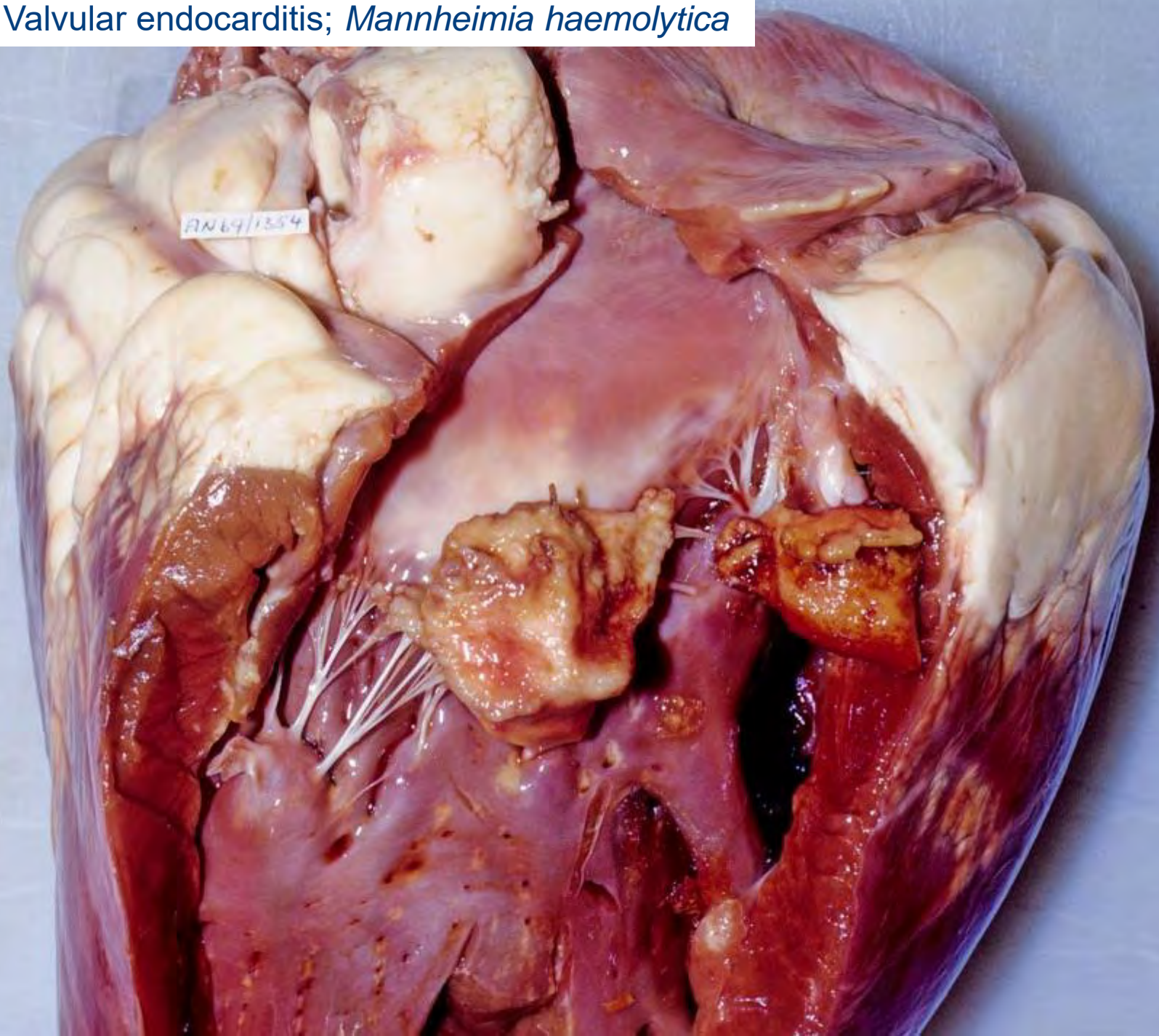
Heart

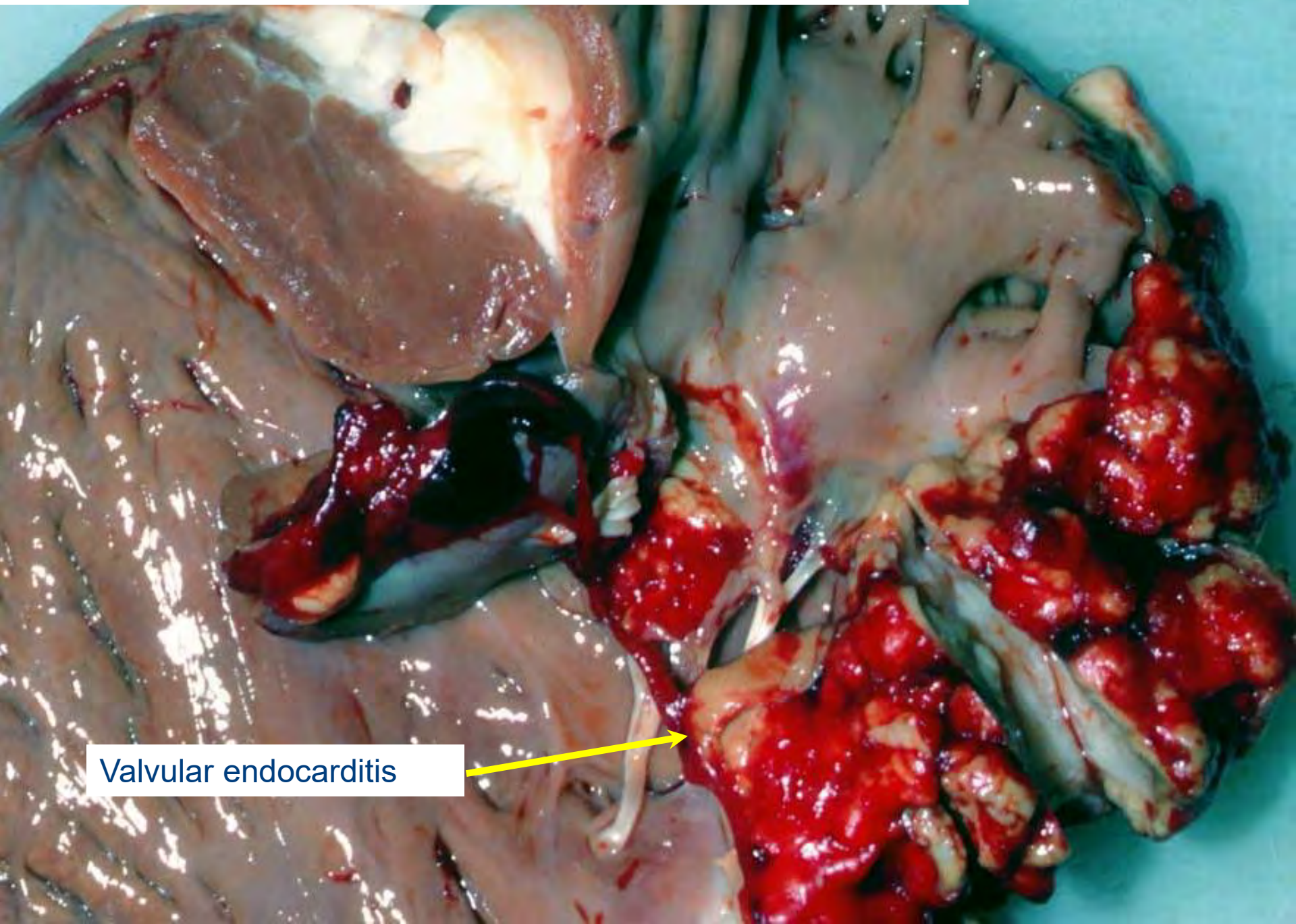
Epicardial haemorrhage: a common agonal change denoting nothing more specific than terminal disseminated consumption coagulopathy (may be due to sudden liver failure, as in this case)



(image courtesy Roger Kelly)

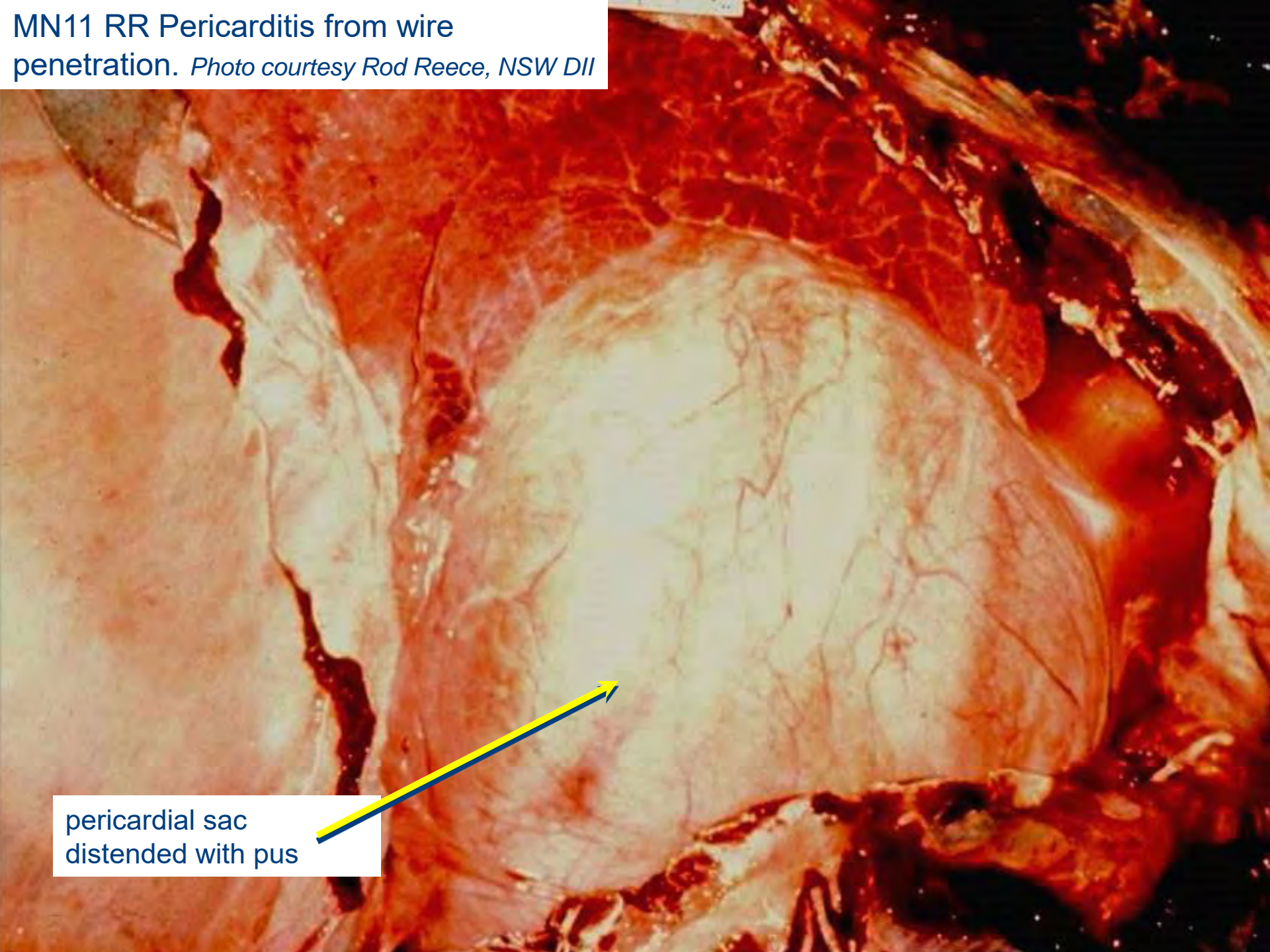
AN69/1354 Valvular endocarditis; *Mannheimia haemolytica*



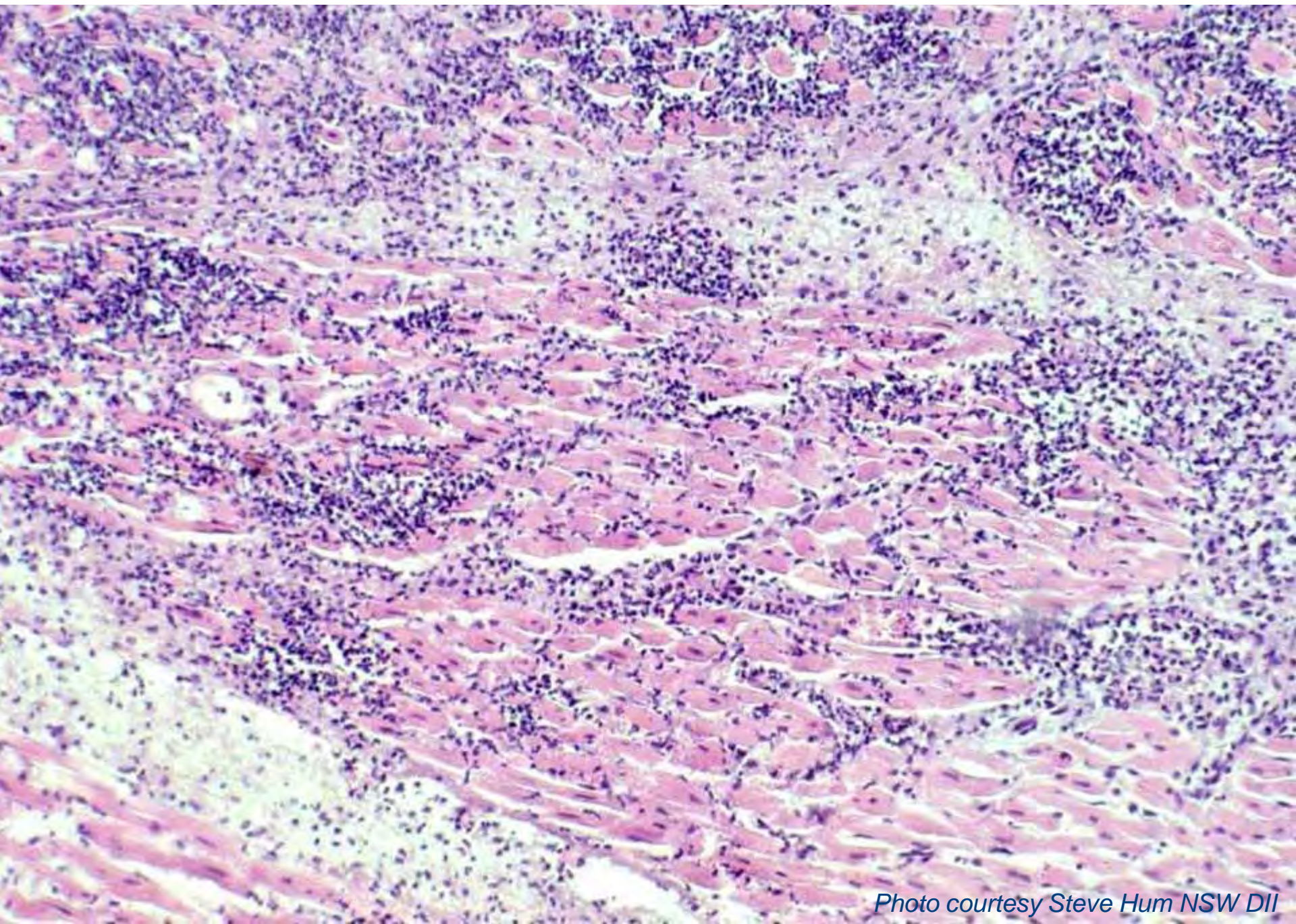


Valvular endocarditis

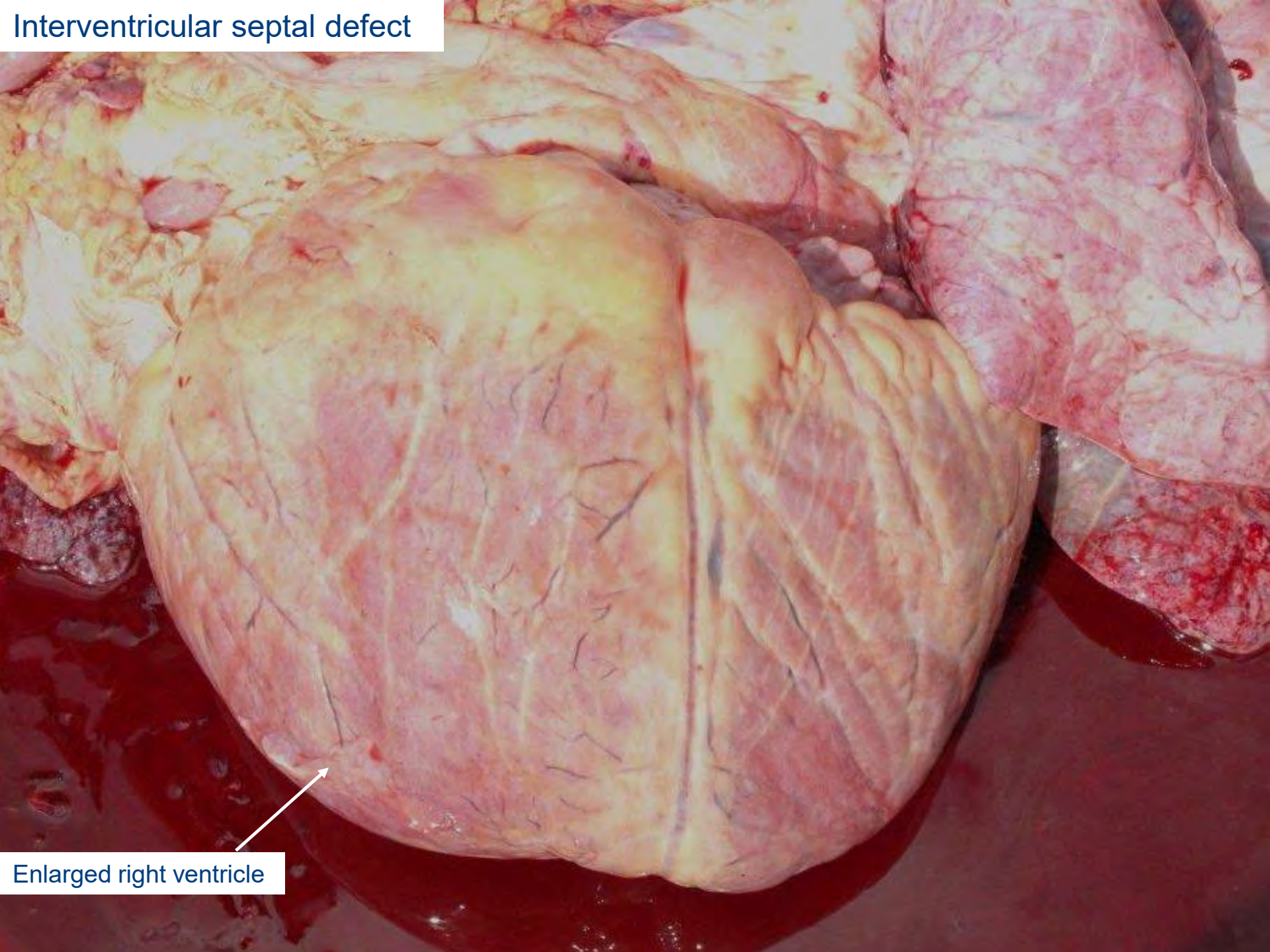
MN11 RR Pericarditis from wire penetration. *Photo courtesy Rod Reece, NSW DII*



pericardial sac
distended with pus

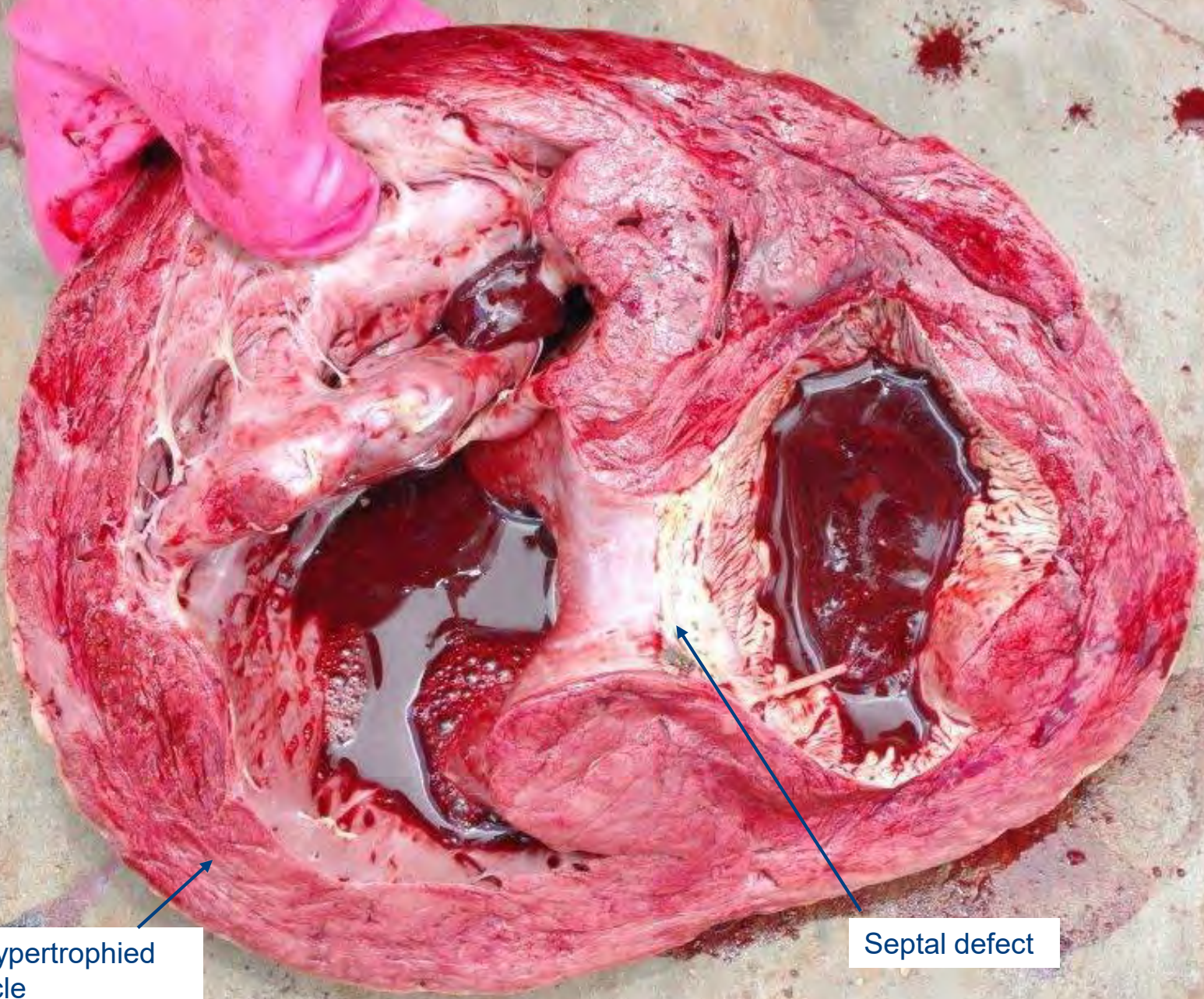


Interventricular septal defect



Enlarged right ventricle

Interventricular septal defect (heart cut transversely through ventricles)



Enlarged hypertrophied right ventricle

Septal defect

Passive congestion of liver with right-sided heart failure ("nutmeg liver")



Skin

Fibropapillomas

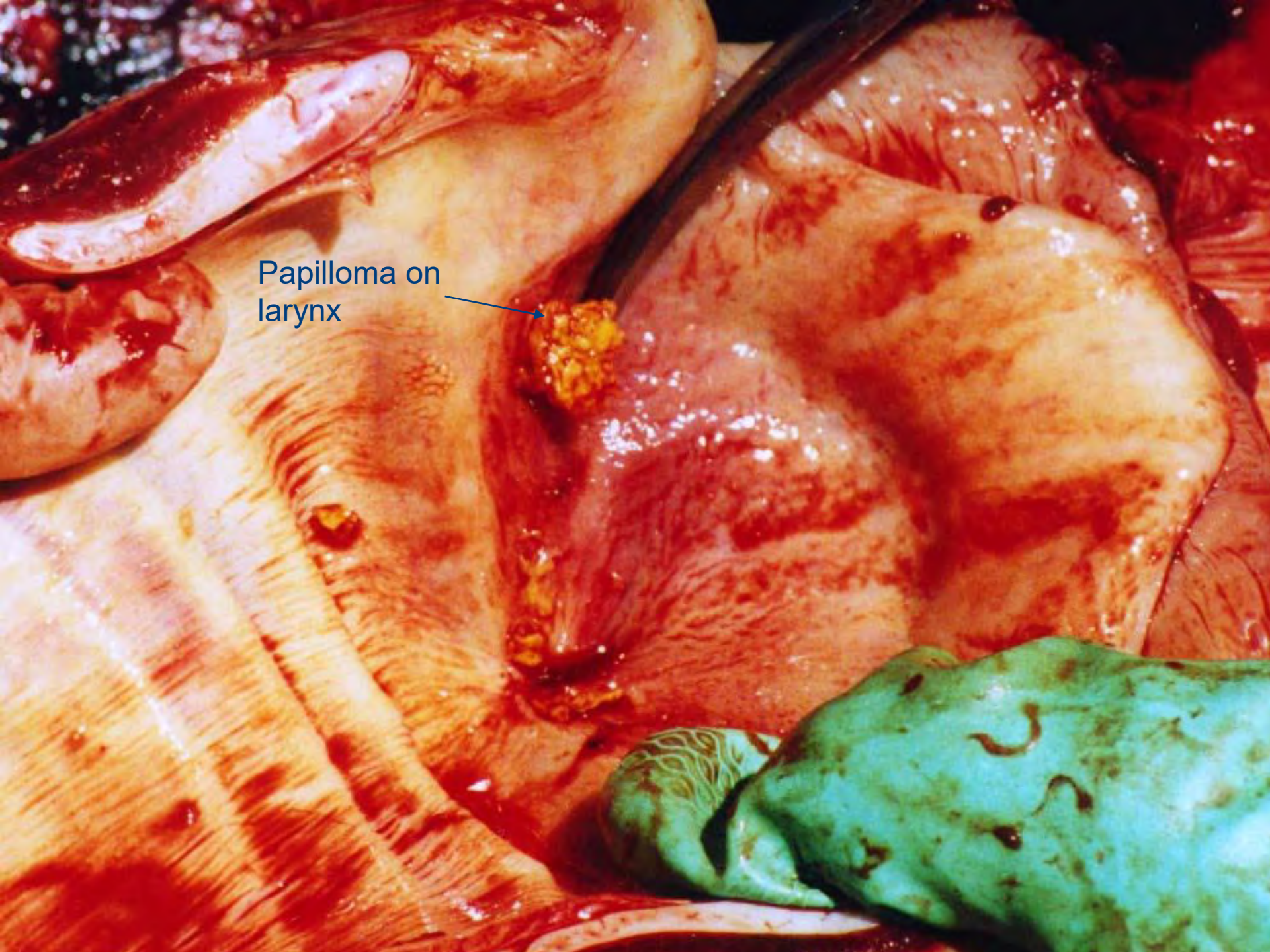


(image courtesy Roger Kelly)



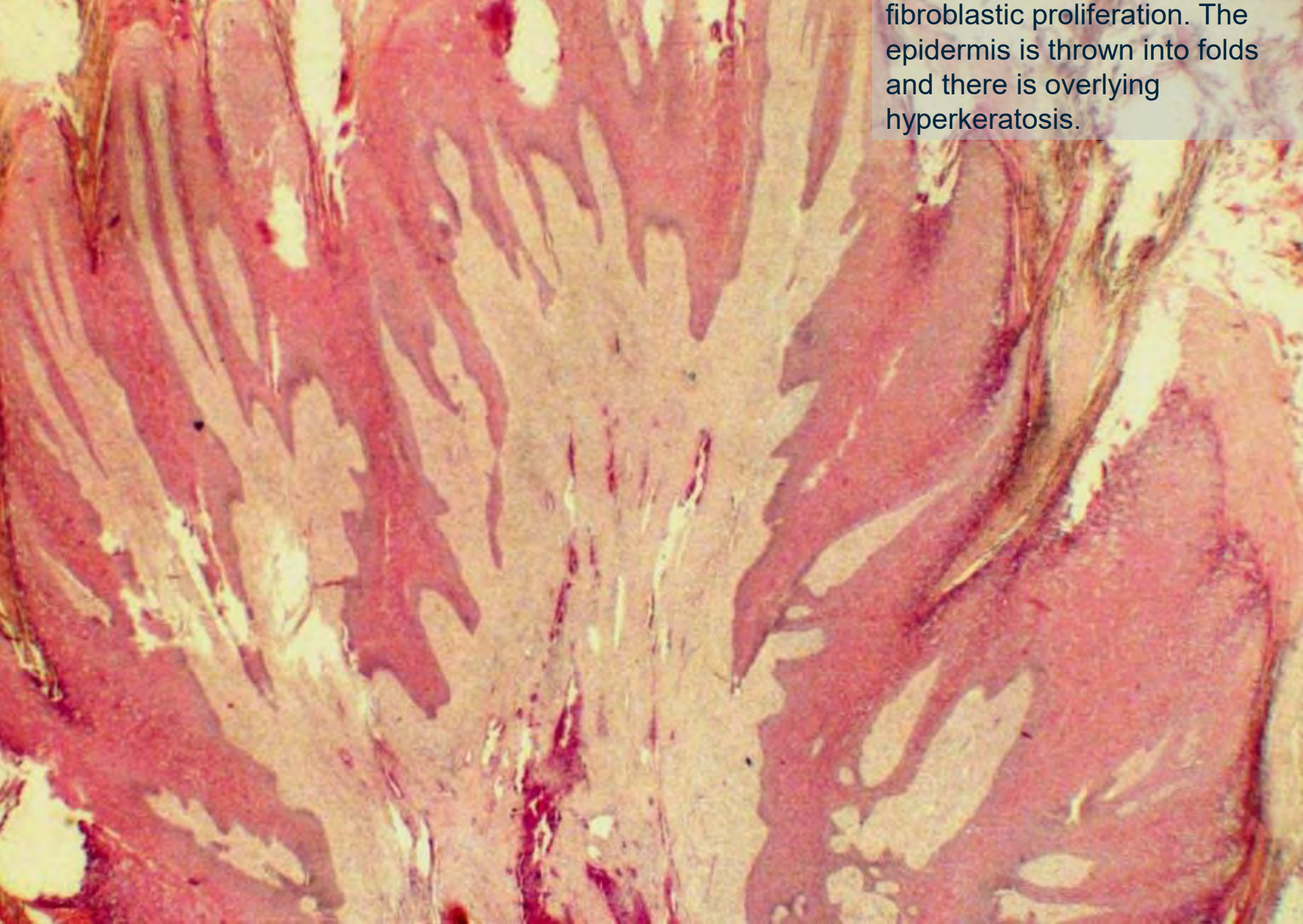
Fibropapillomas

Papilloma on
larynx



Fibropapilloma; section

The dermis has extensive fibroblastic proliferation. The epidermis is thrown into folds and there is overlying hyperkeratosis.



Ringworm (dermatophytosis)

Ringworm (dermatophytosis)



Brahman cattle; NSW DPI Beef Industry Centre

Ringworm (dermatophytosis)



Brahman cattle; NSW DPI Beef Industry Centre

Ringworm histopathology

AN95/3330 (next slide)

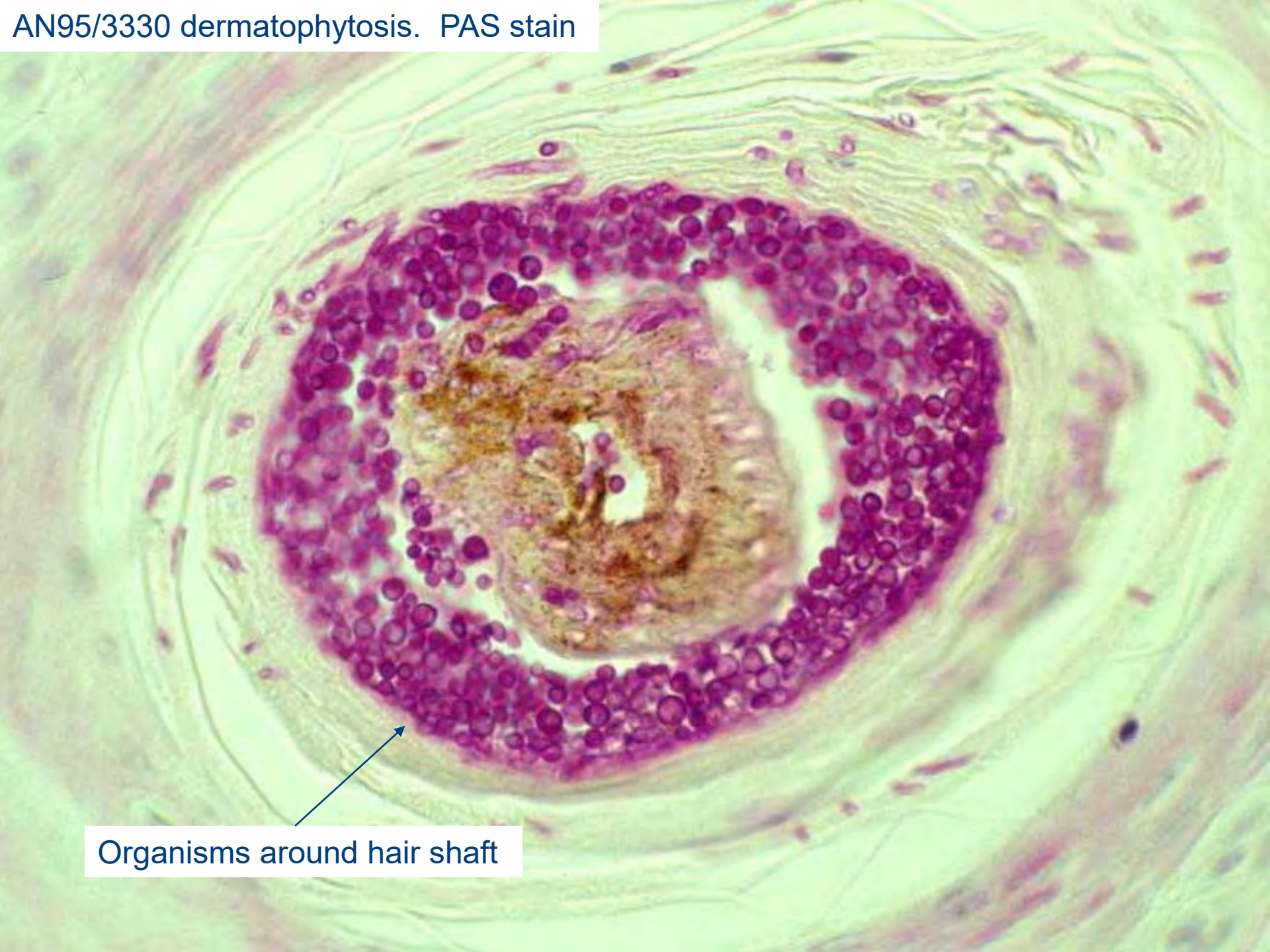
**HISTORY: Beef cattle (Limousin breed). Tingha NSW.
Age 3.5 months.**

Skin lesions - Massive hyperkeratosis.

HISTOPATH: Skin; hyperkeratosis. Fungal hyphae and spores in follicles around hair shafts, in H&E- and PAS-stained sections. Mononuclear inflammatory infiltrate.

CONCLUSION: Chronic active dermatophyte skin infection.





Organisms around hair shaft



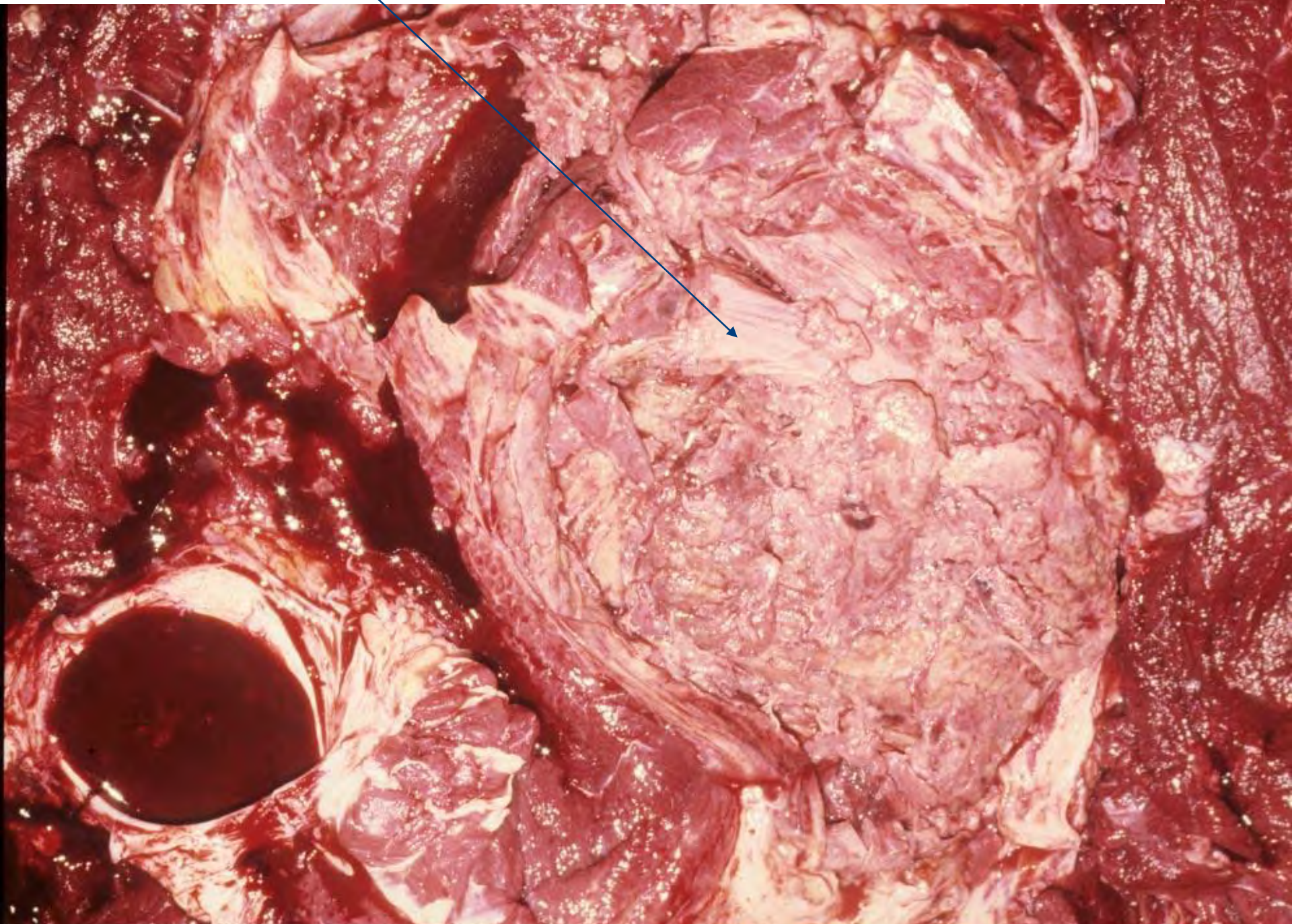
Fungal
organisms
in skin

A "Buller" showing skin abrasions from being ridden by other steers.



Muscle

AN 89/3666 Myonecrosis. Seen in feedlot cattle, especially in heavy downers



AN60/613: Muscular steatosis to a pathologist; highly marbled meat to a Japanese chef!

... a feature of feedlot cattle; a combination of genetics and dietary manipulation

[L click VitA deficiency paper.pdf](#)



AN60/613

Joints, bones, feet etc

Swollen right carpal joint



AN68/1378 Mycoplasma arthritis

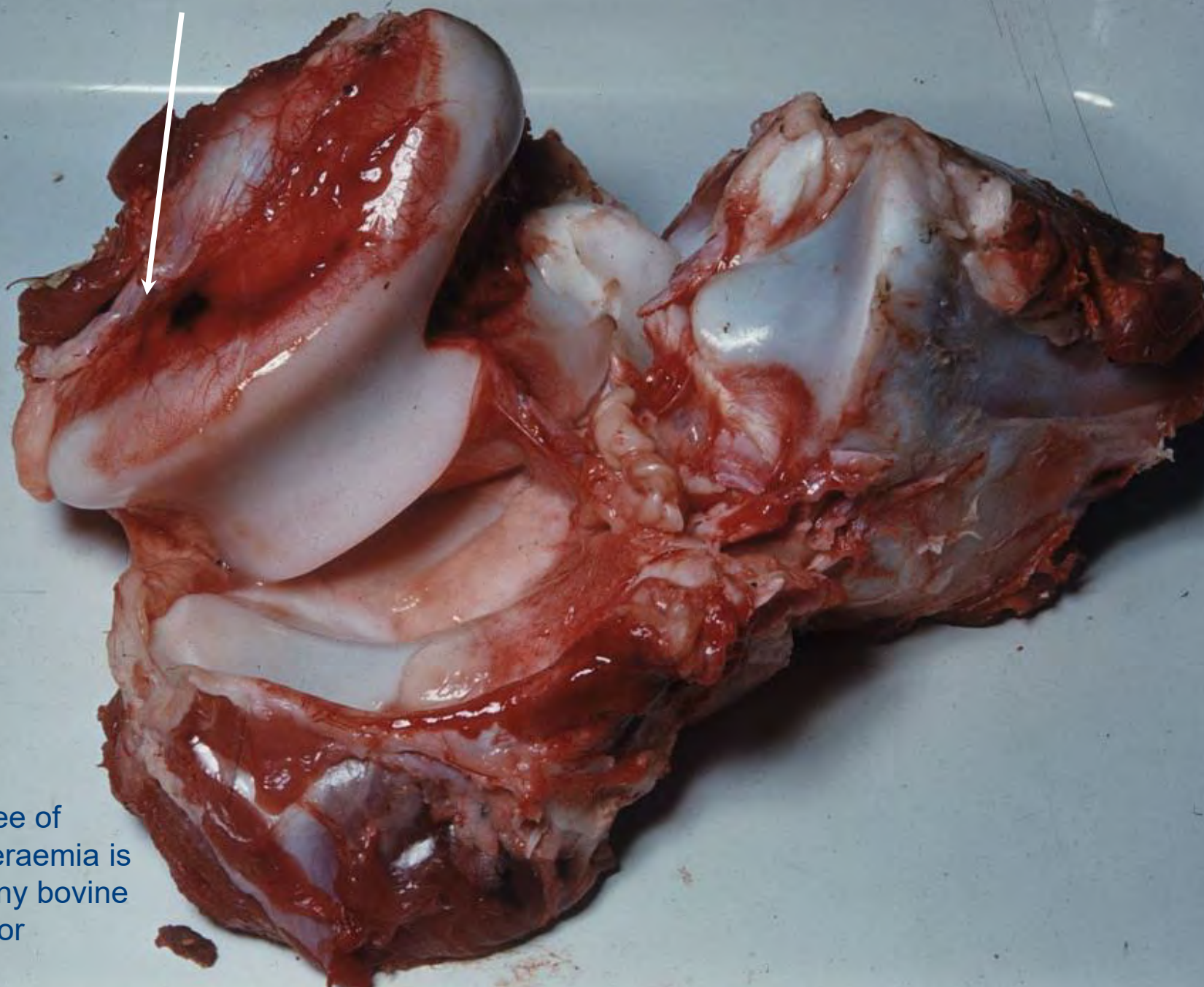


AN68/1378 Mycoplasma arthritis



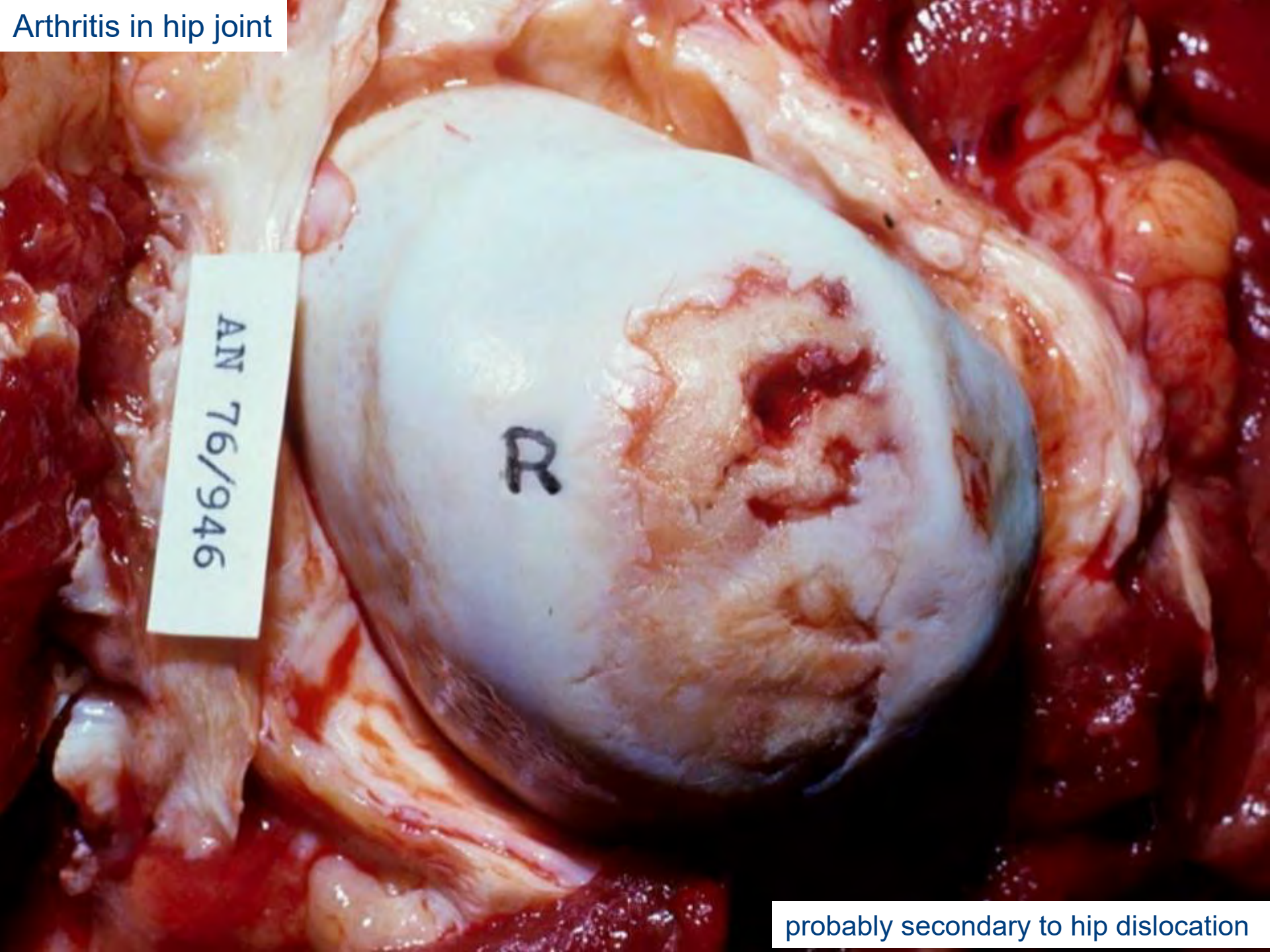
AN68/1378

SBE (chlamydophila) synovitis



But this degree of synovial hyperaemia is common in any bovine bacteraemia or toxæmia

Arthritis in hip joint



AN 76/946

R

probably secondary to hip dislocation

MN SH 352

Chronic osteoarthritis - bull



“Clog feet”; chronic laminitis *(photo courtesy A. Thompson)*



“Clog feet”; chronic laminitis (photo courtesy A. Thompson)



AN69/1193 Interdigital dermatitis

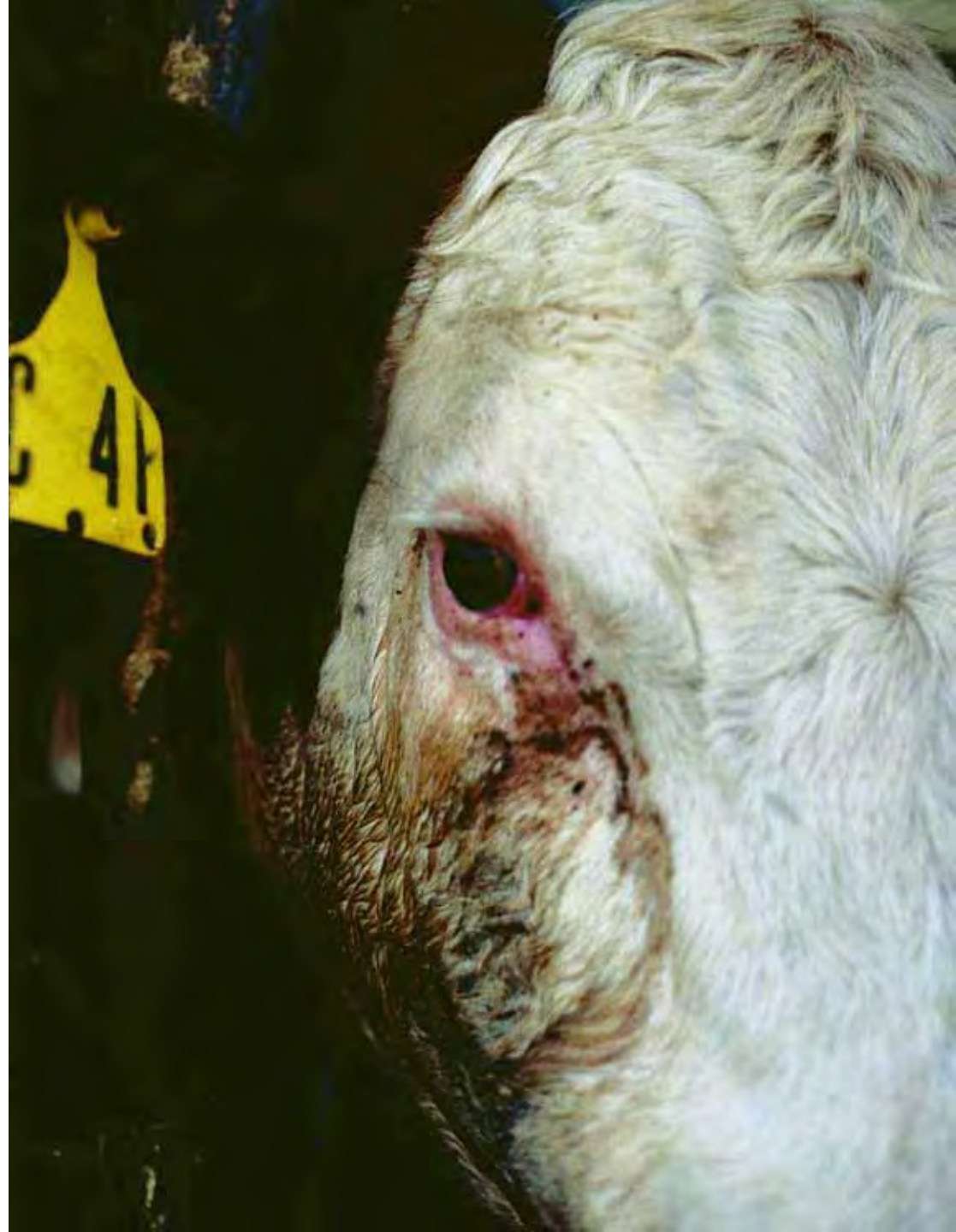


Vitamin A deficiency

AN8.2-3 "Rat tail"; suspect Vitamin A deficiency



AN8.2-B Excessive lacrimation
– suspect Vitamin A deficiency



Vitamin A deficiency – AN90/851,91/457,91/487,91/3360

- Long term feedlot cattle, 12000 head feedlot
- Illness and deaths in finisher cattle over 2 consecutive summers
- 2000 cattle affected; 220-300 days on feed
- Concomitant low tissue and serum Vitamin E

L click [VitA deficiency paper.pdf](#)



Industry &
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AN91/3360 Vitamin A/E deficiency

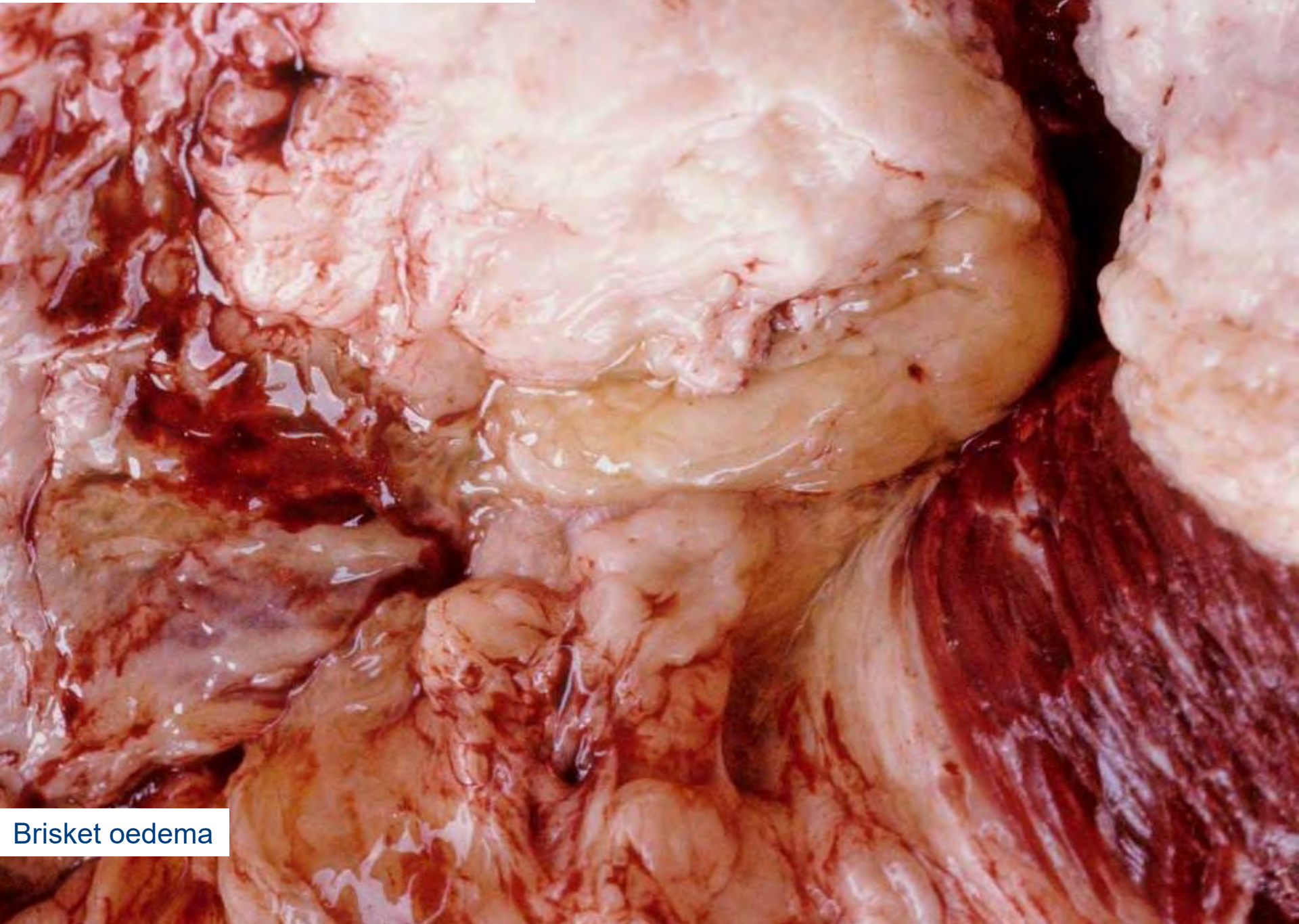


Drooling

Brisket oedema

Leg
Oedema

AN91/3360 Vitamin A/E deficiency



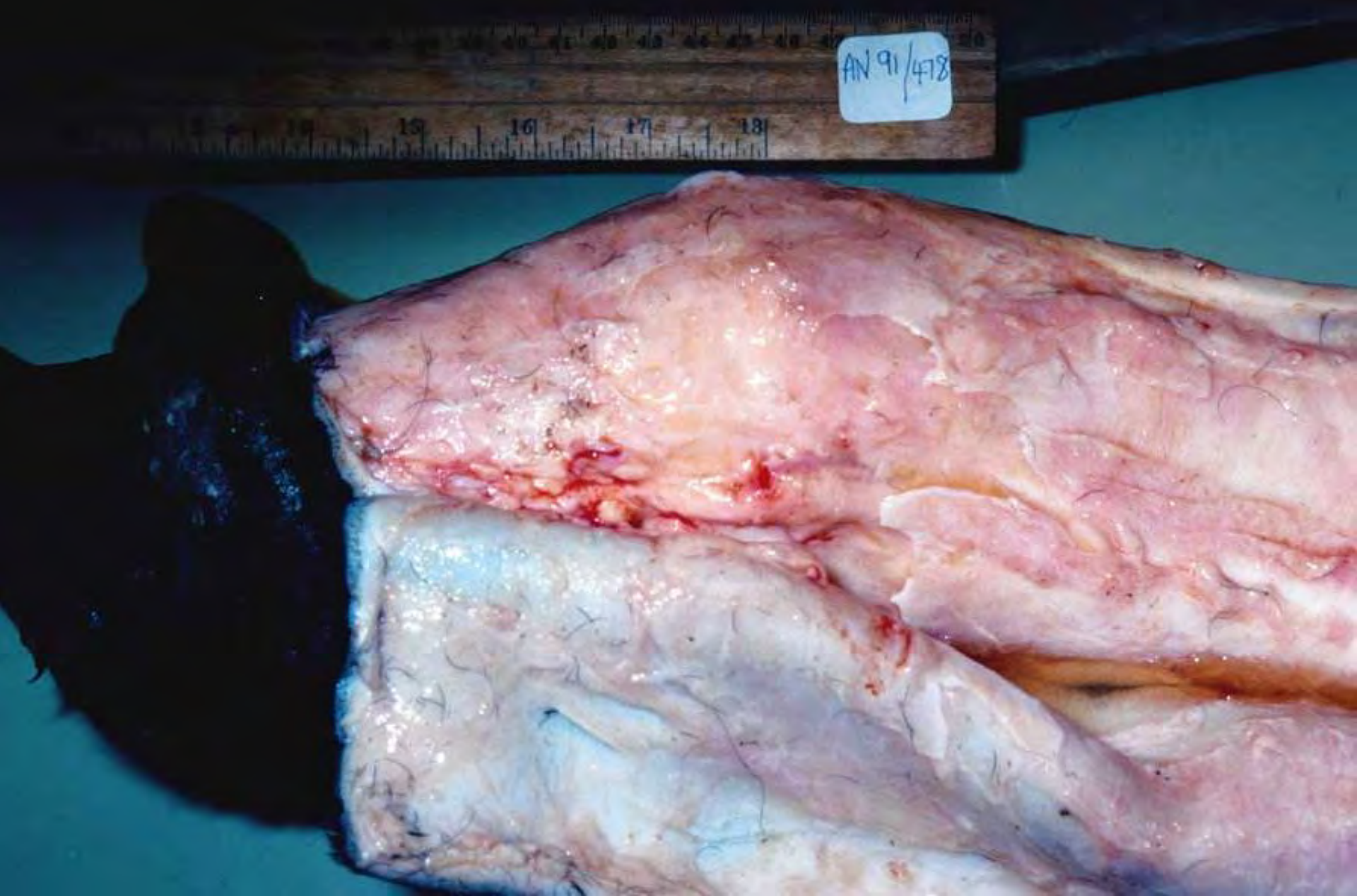
Brisket oedema

AN90/851 oedema of legs, brisket

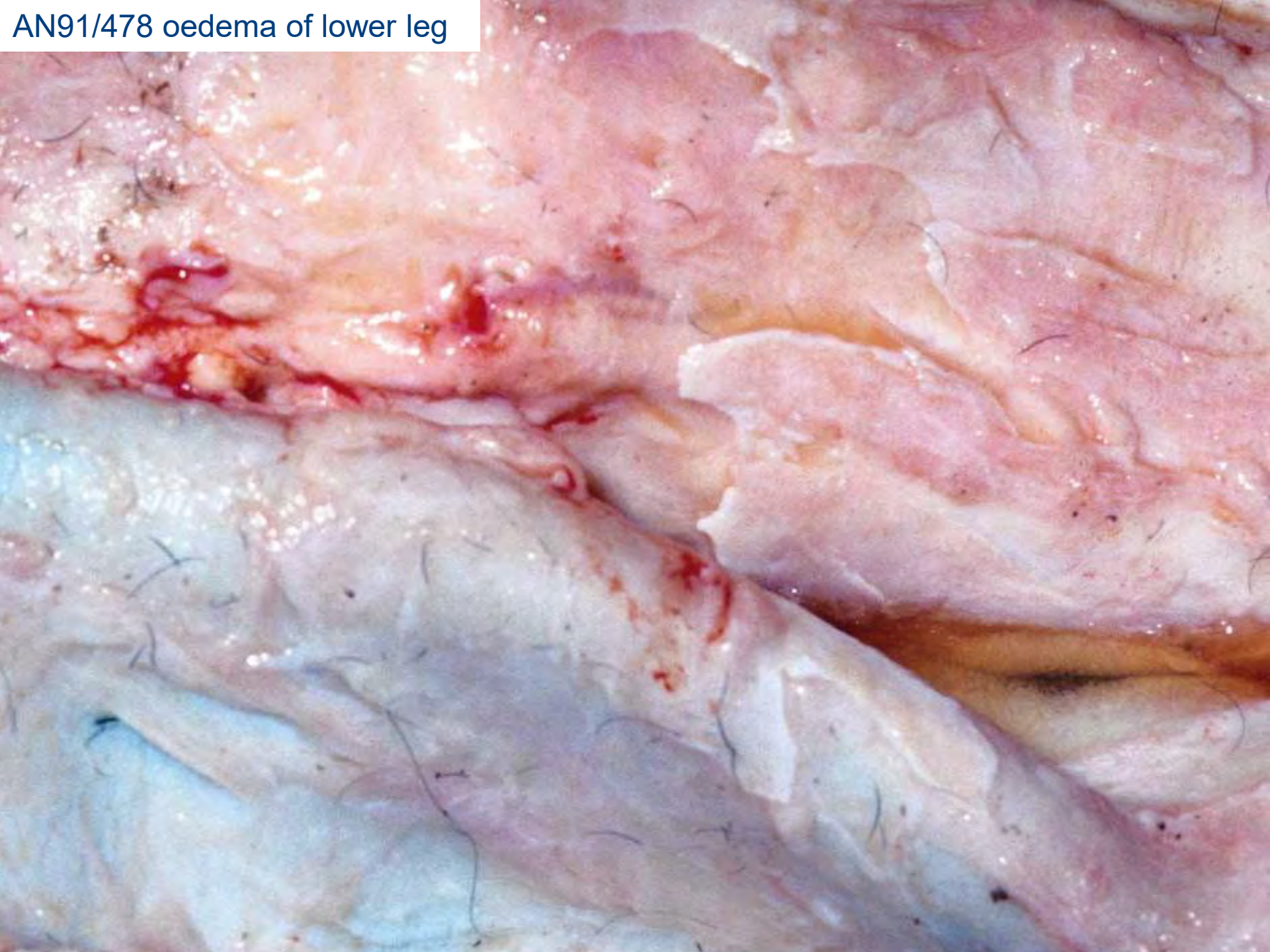


Oedema
fluid

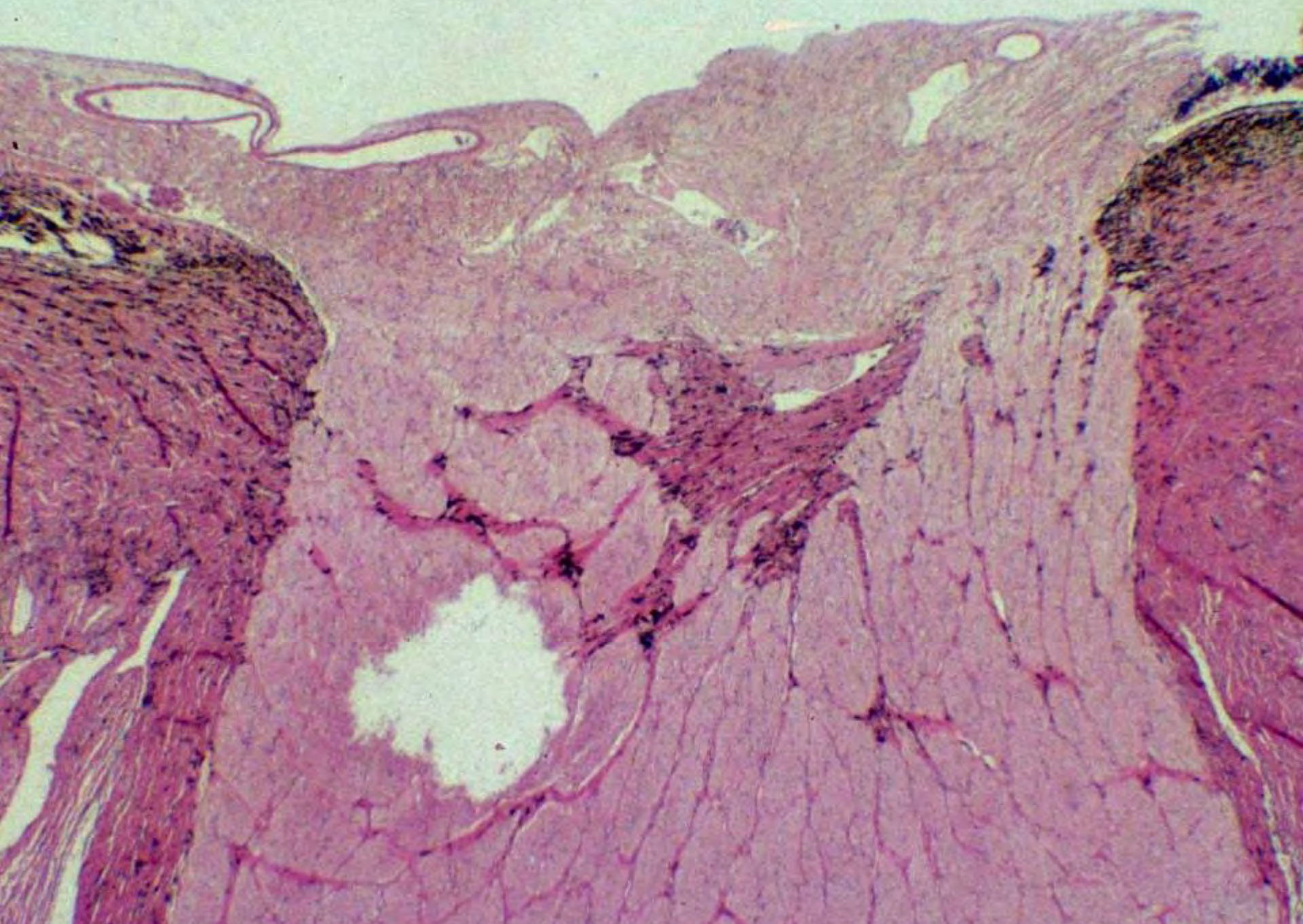
AN91/478 oedema of legs, brisket



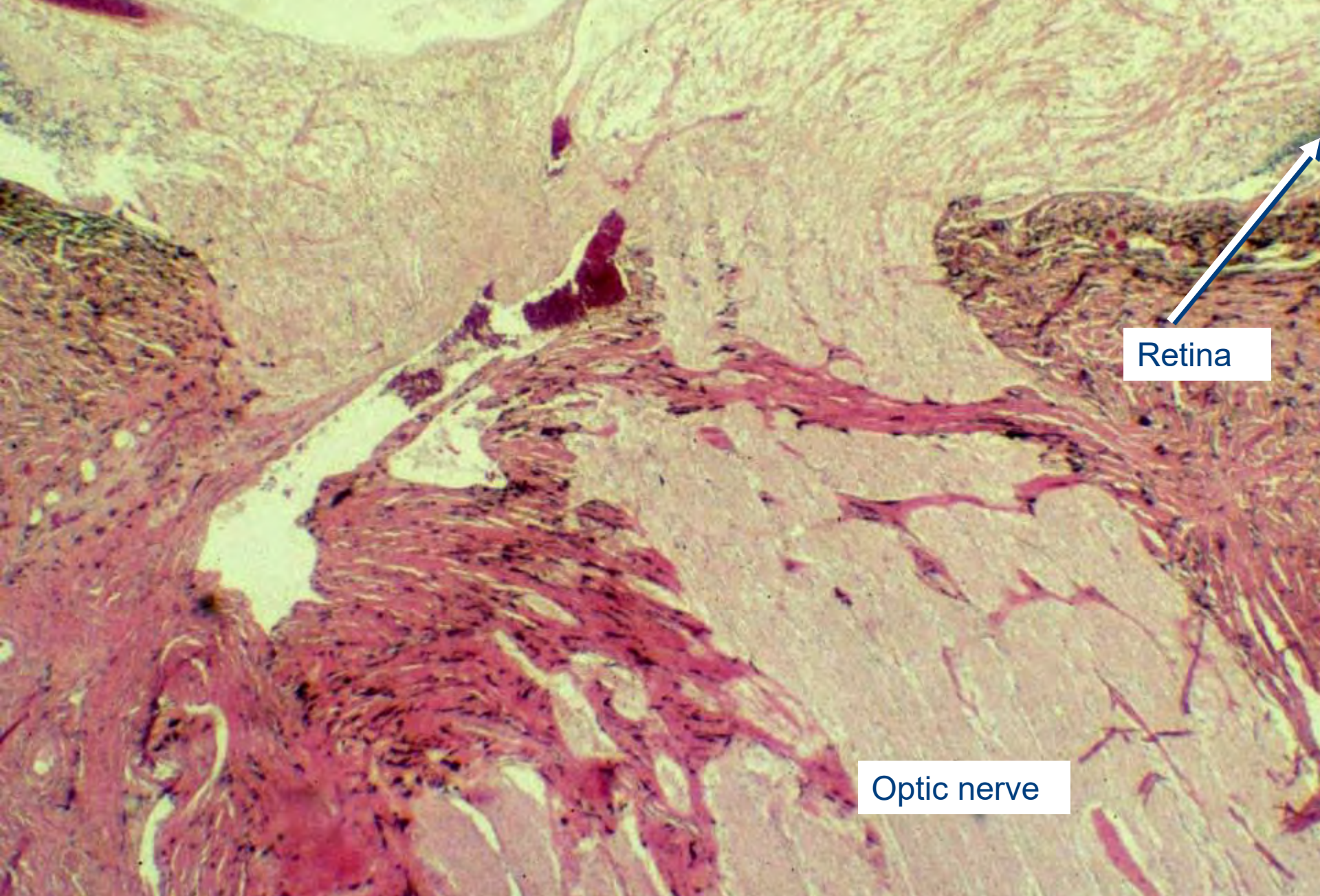
AN91/478 oedema of lower leg



AN91/946 Normal optic nerve and disc

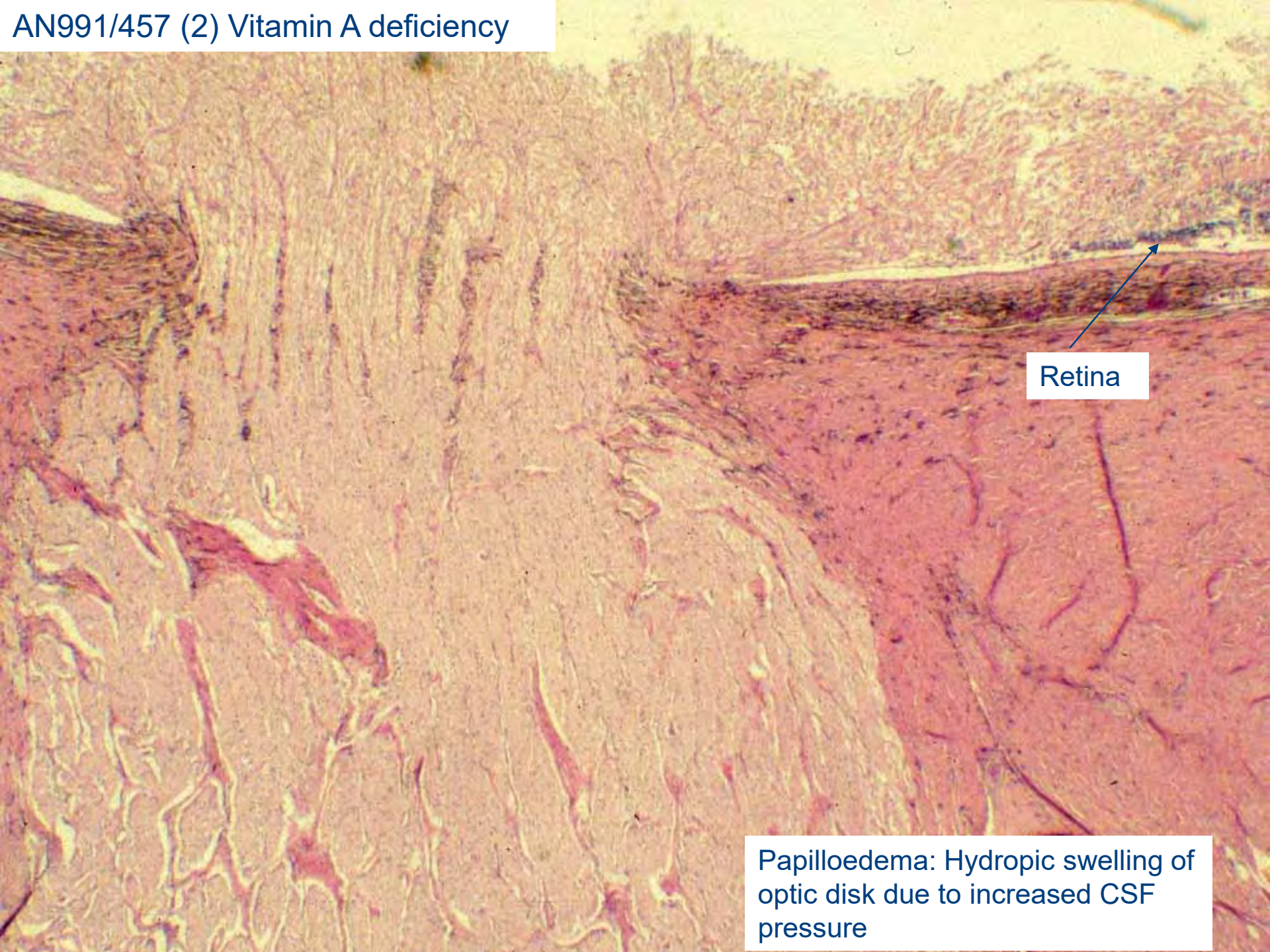


AN91/478 Papilloedema: hydroptic swelling of optic disk due to increased CSF pressure



Retina

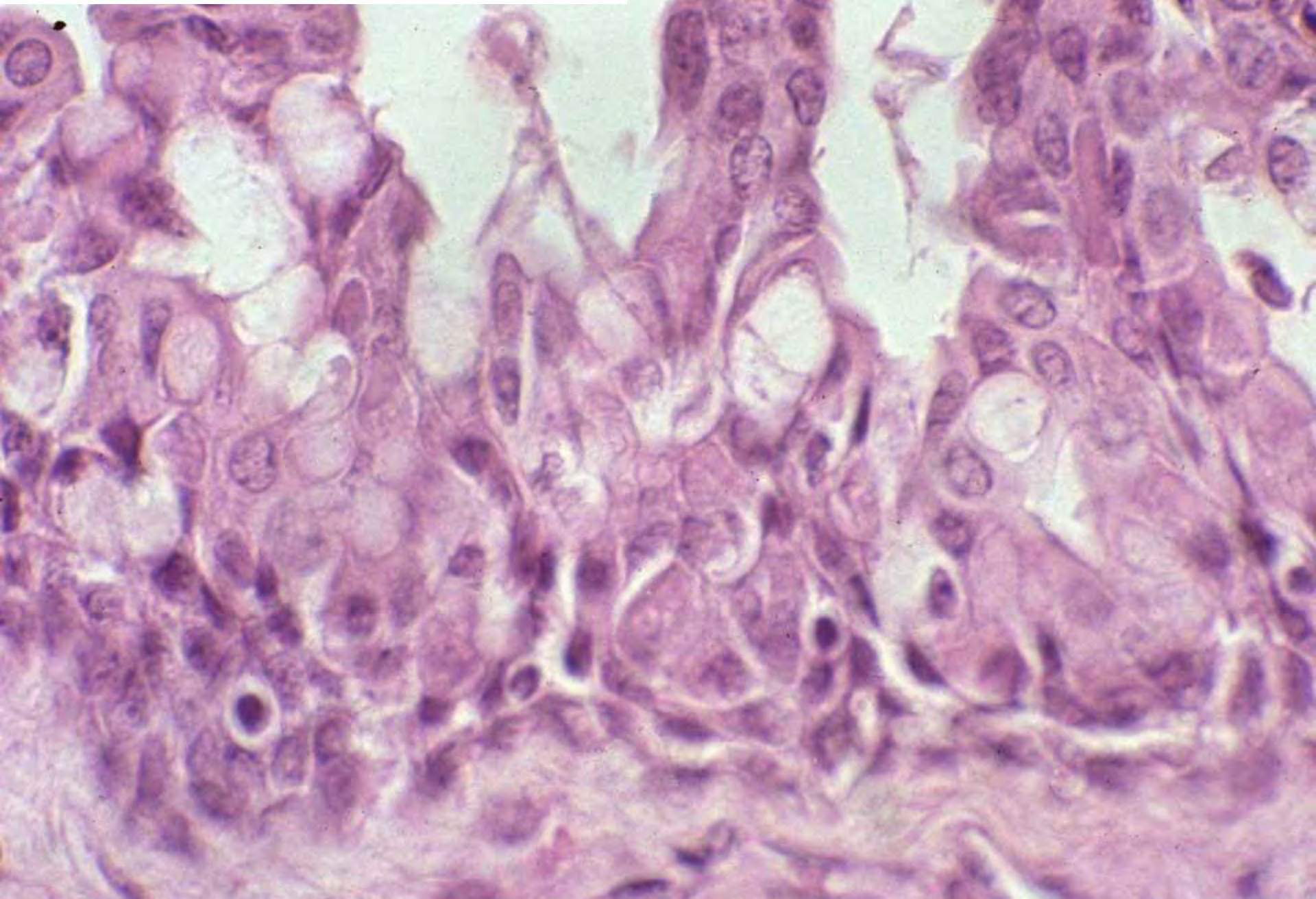
Optic nerve



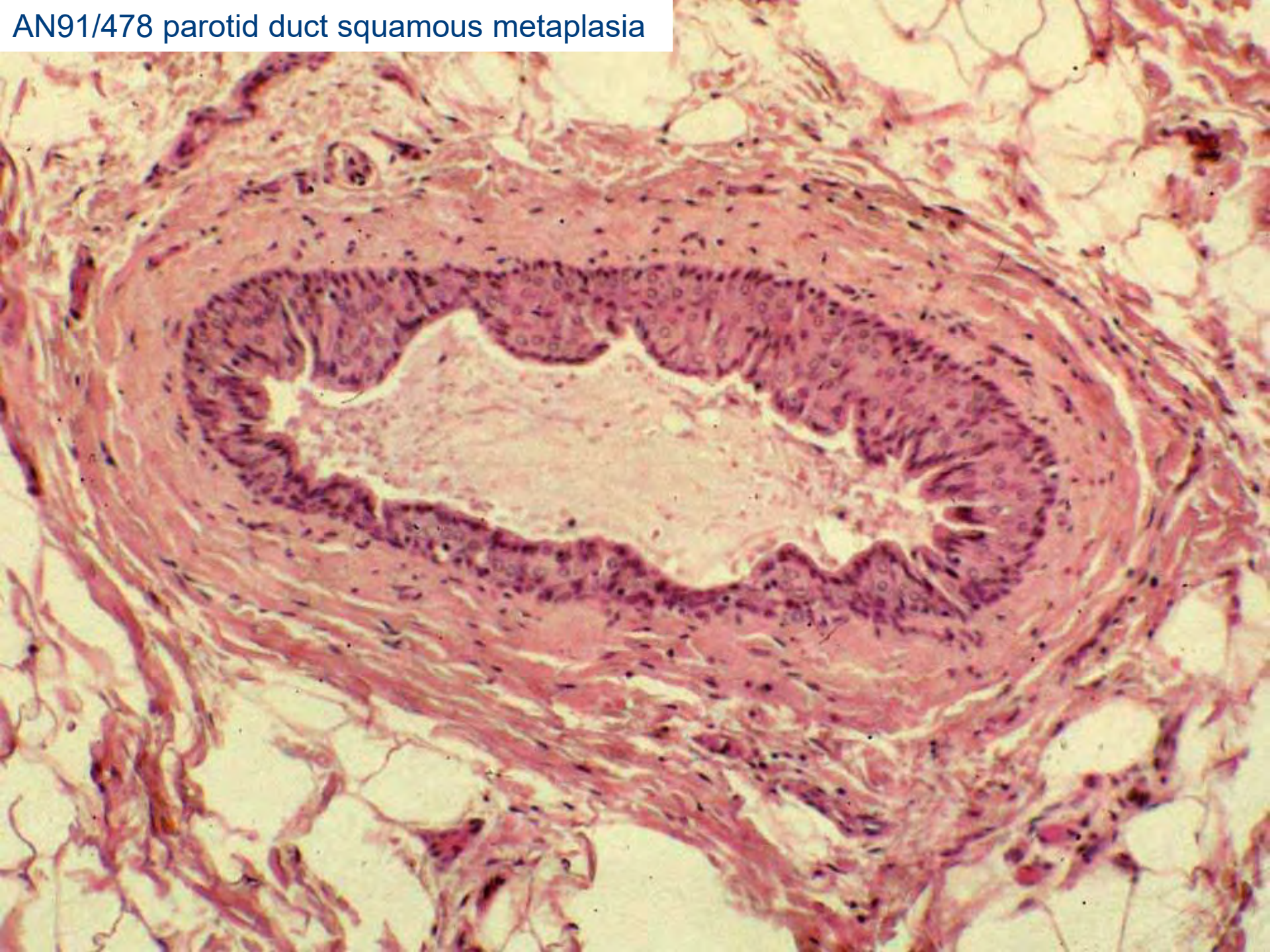
Retina

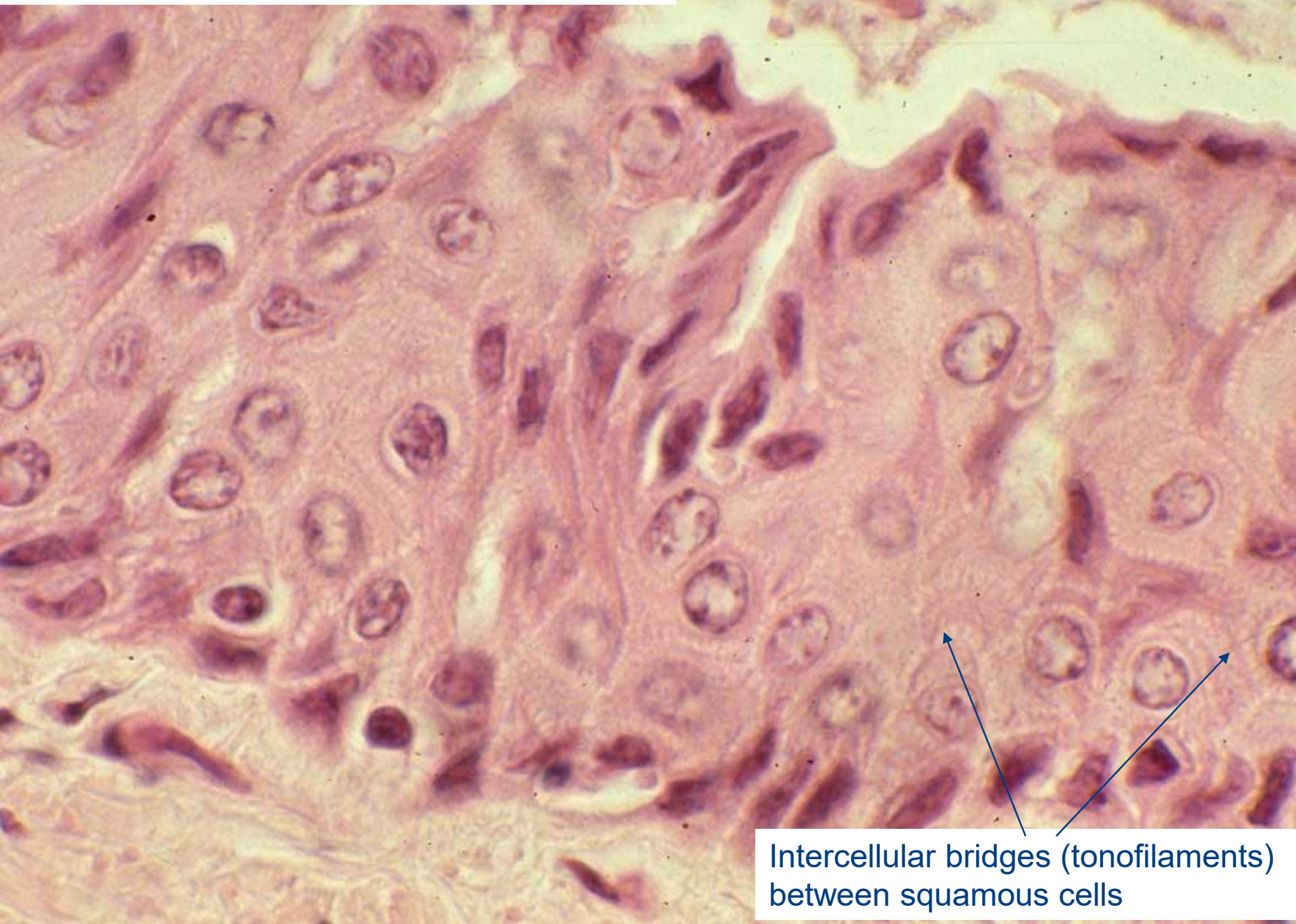
Papilloedema: Hydropic swelling of optic disk due to increased CSF pressure

AN90/796 Normal parotid salivary duct:
pseudostratified columnar epithelium



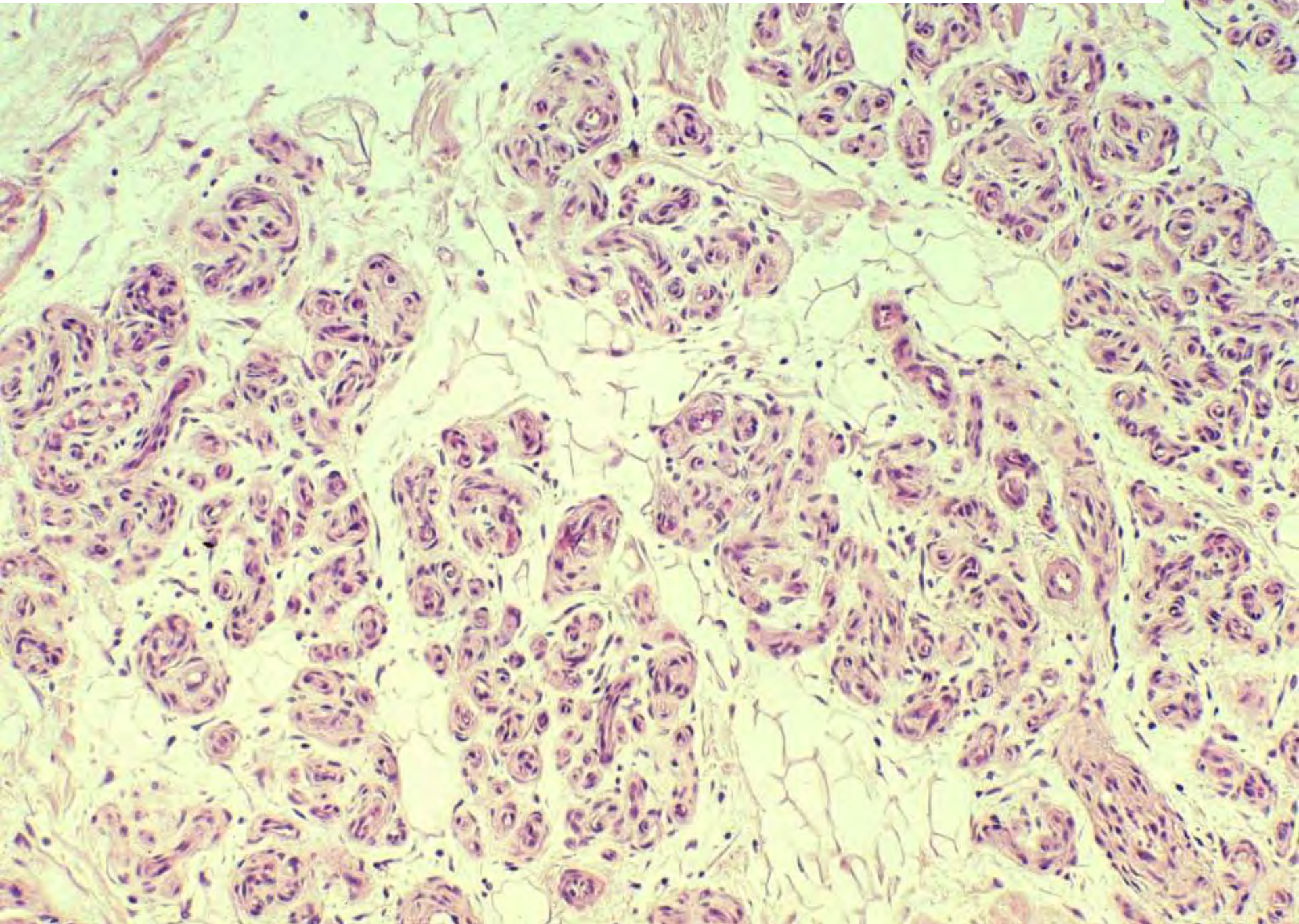
AN91/478 parotid duct squamous metaplasia

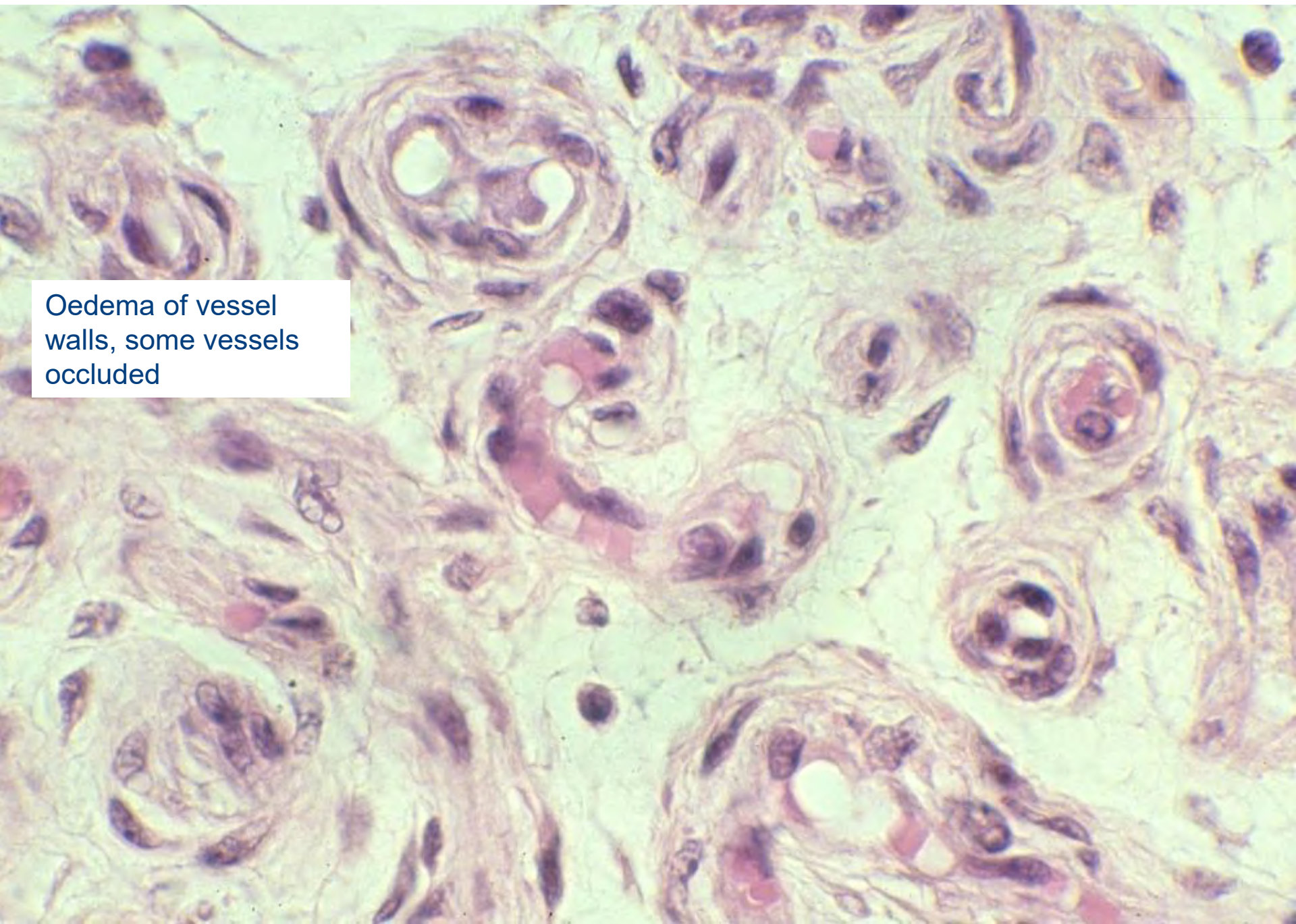




Intercellular bridges (tonofilaments) between squamous cells

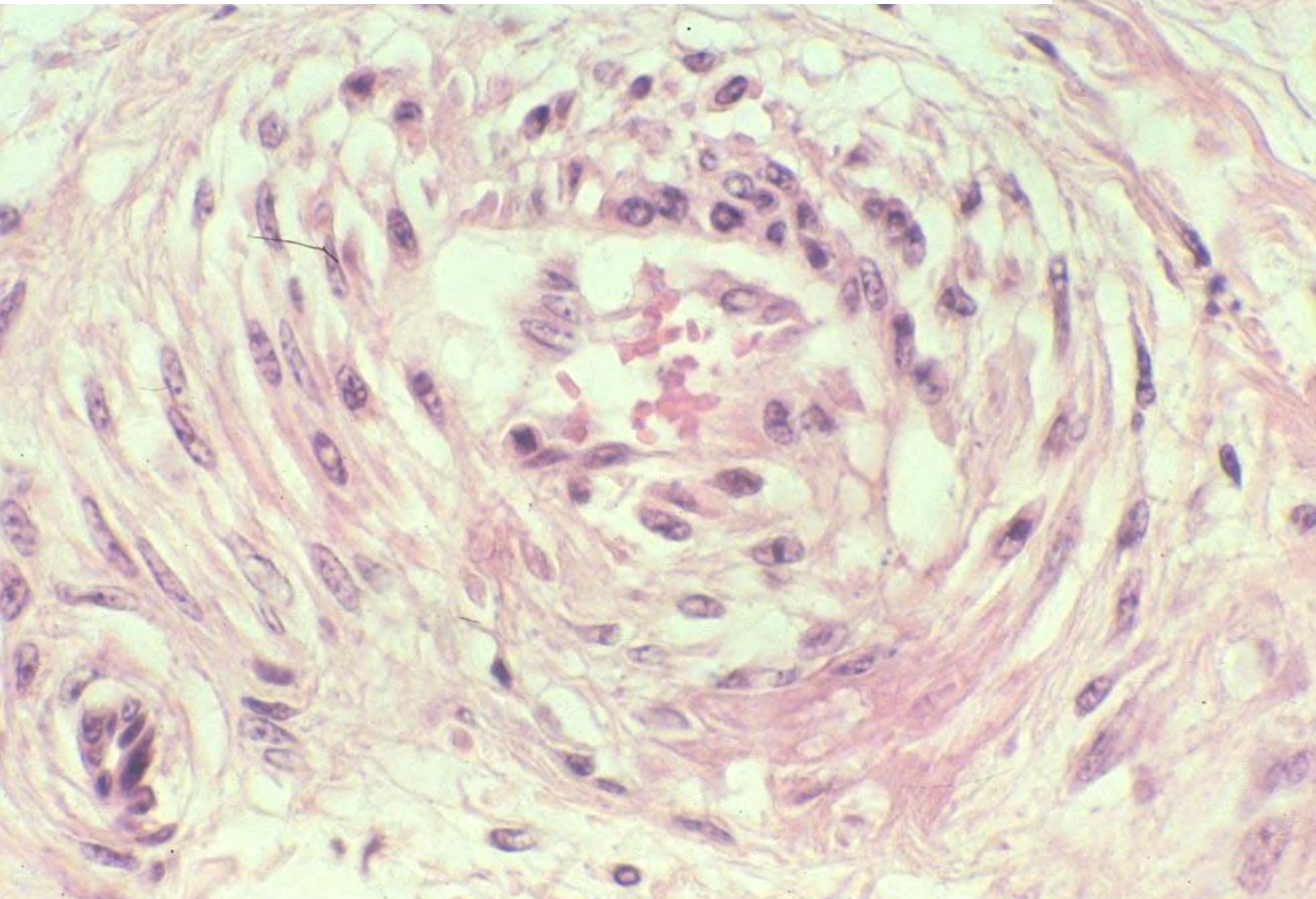
AN91/478 proliferating subcutaneous vessels lower leg; Vitamin A/E deficiency





Oedema of vessel walls, some vessels occluded

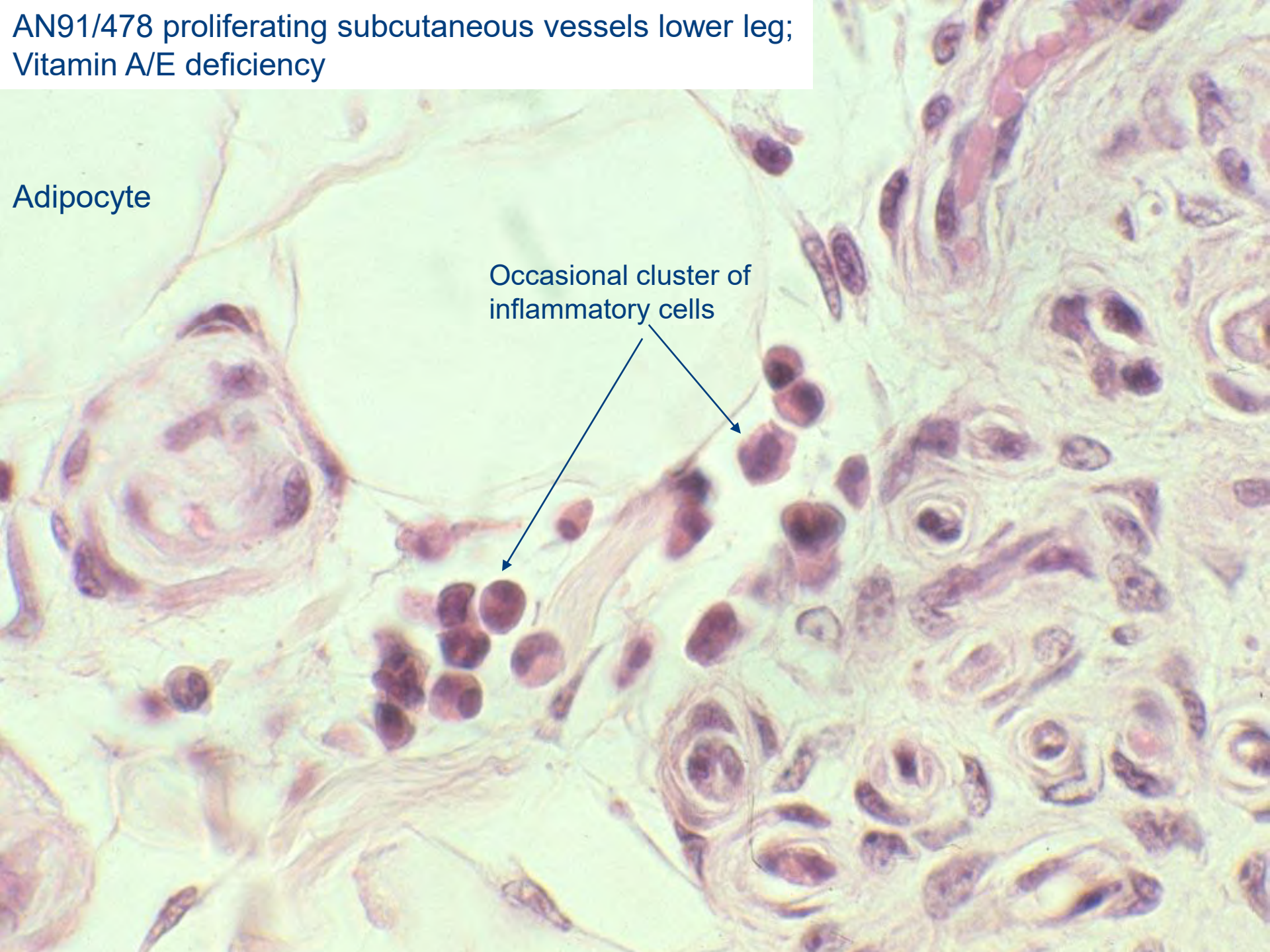
AN91/459(2) Oedema of arteriole wall and partial occlusion of lumen;
Vitamin A/E deficiency



AN91/478 proliferating subcutaneous vessels lower leg;
Vitamin A/E deficiency

Adipocyte

Occasional cluster of
inflammatory cells



Leg swelling microangiopathy without Vitamin A deficiency

- Late summer, early autumn
- Associated with low serum and tissue vitamin E levels
- Some response to Vitamin E but may not be primary cause (possibly oxidative damage? Fungal toxin? etc.??)

L click [Microangiopathy paper.pdf](#)



Industry &
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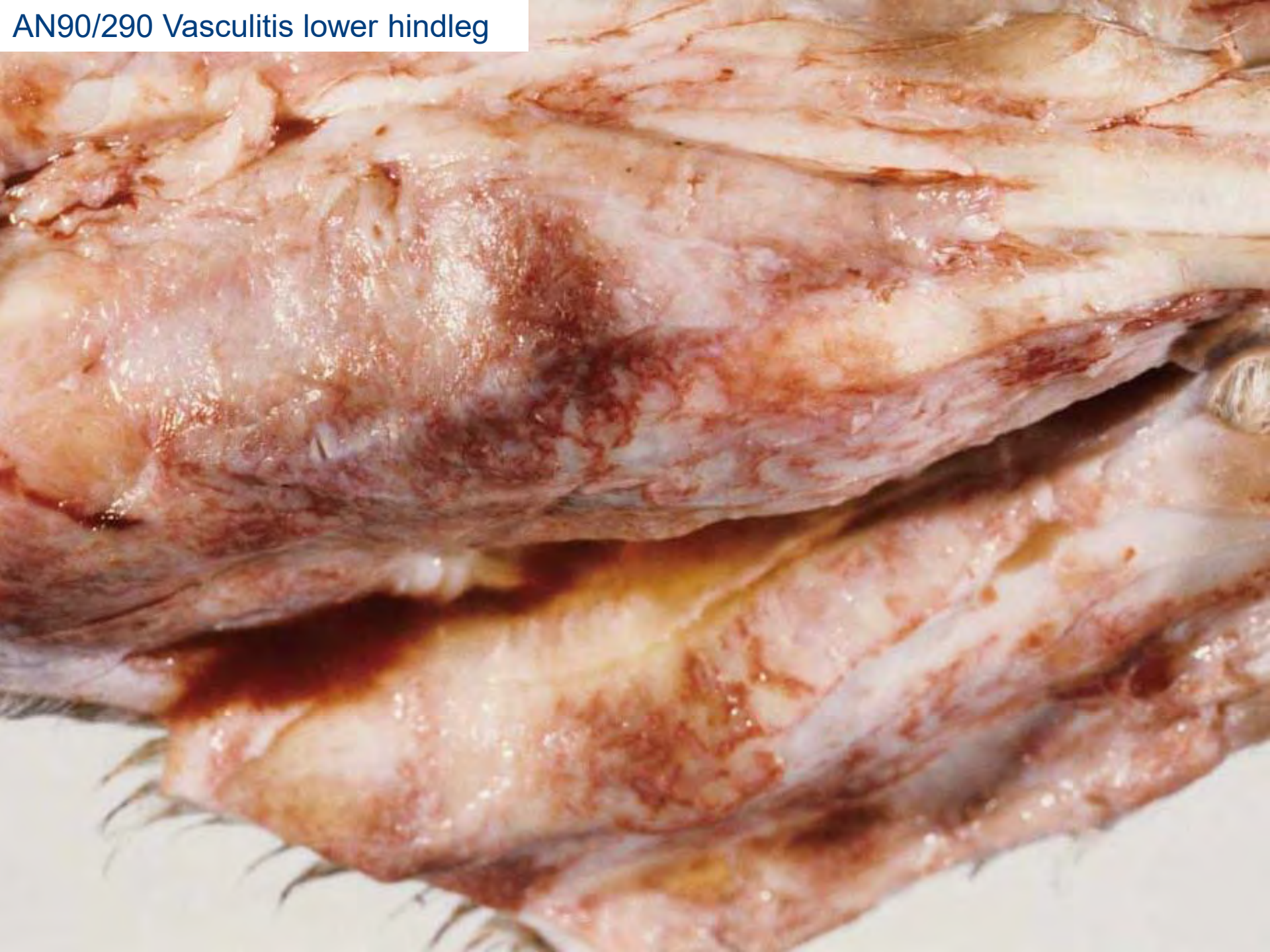


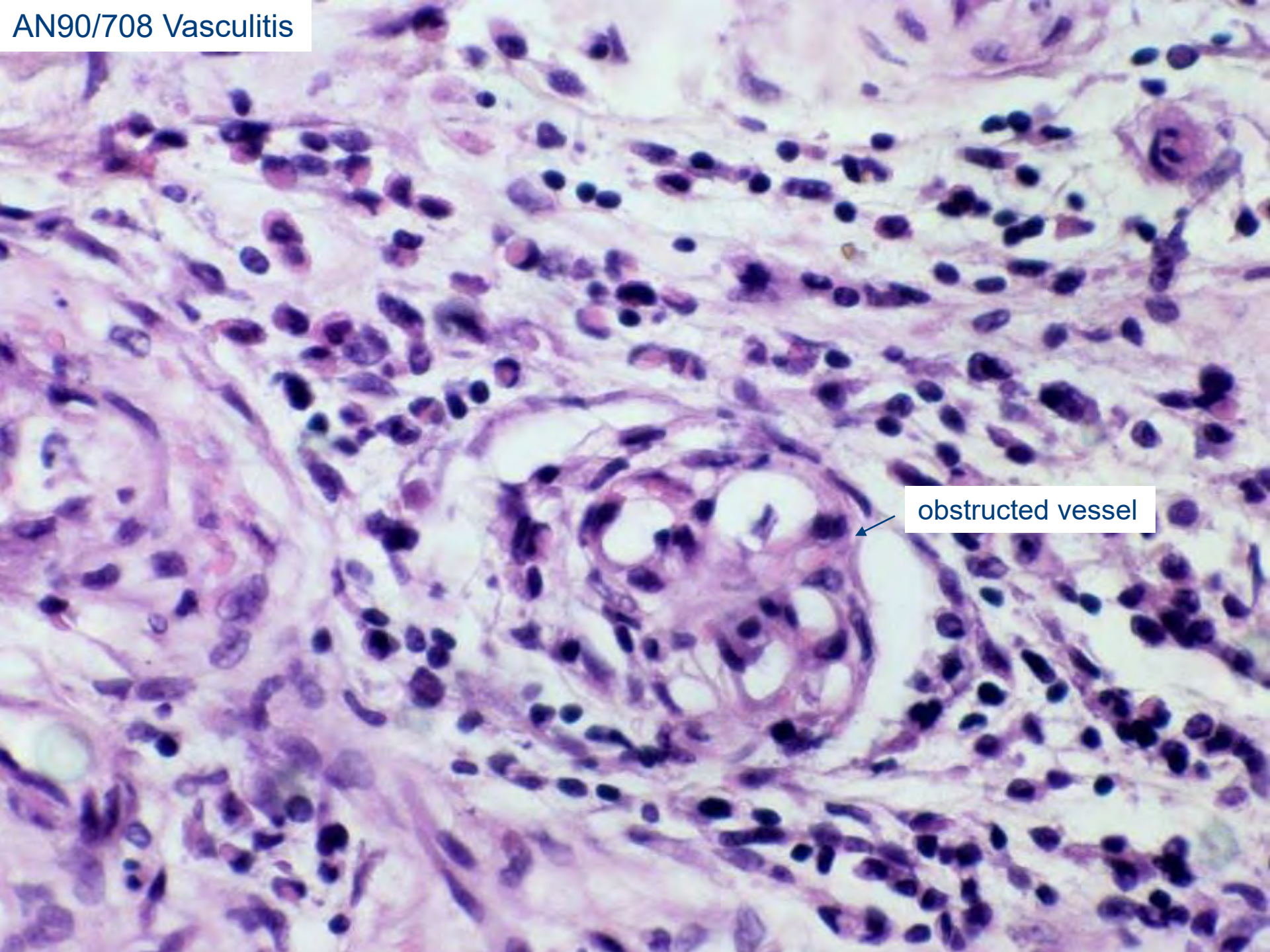
Oedema of skin of lower legs

AN90/290 Vasculitis



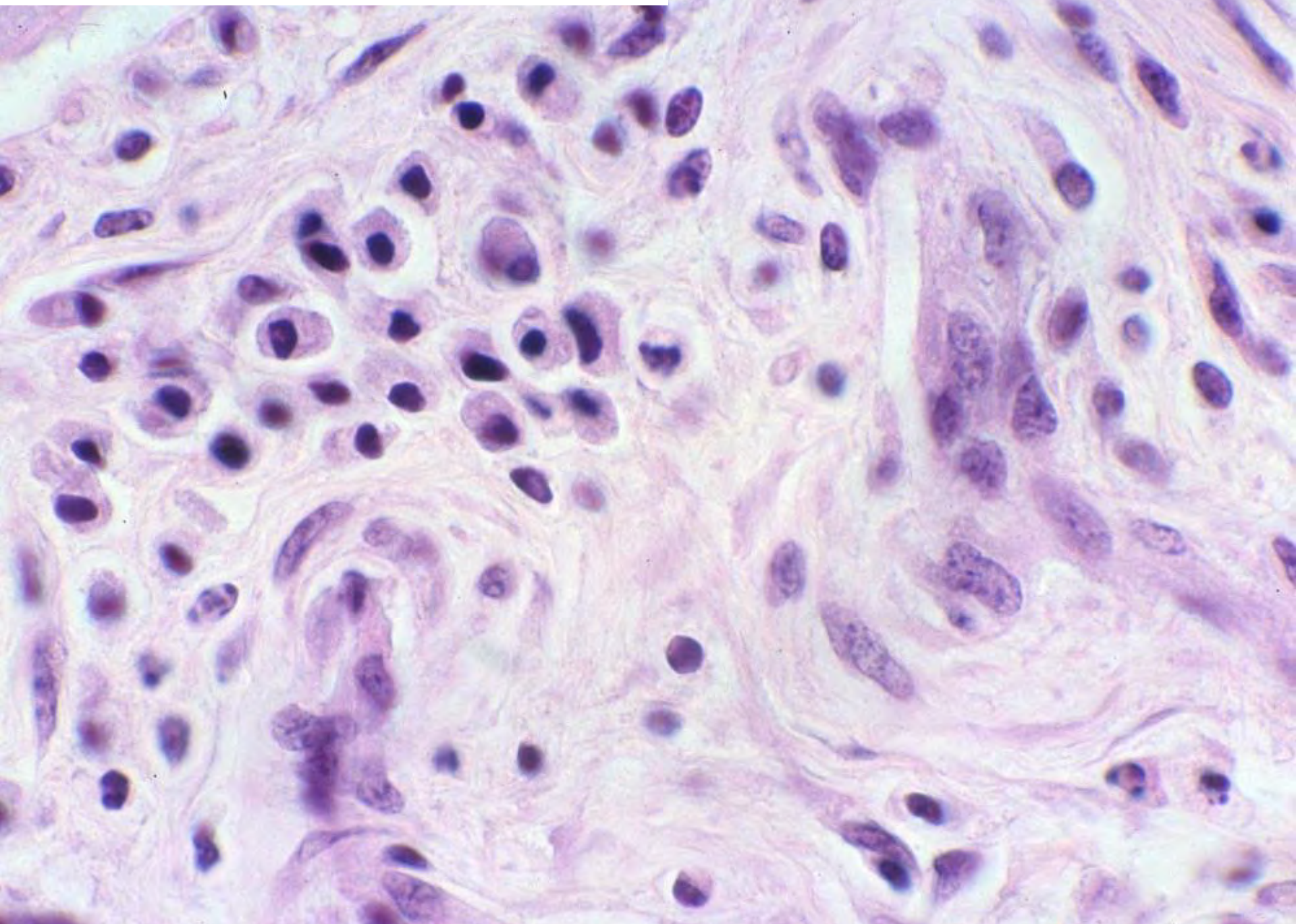
AN90/290 Vasculitis lower hindleg





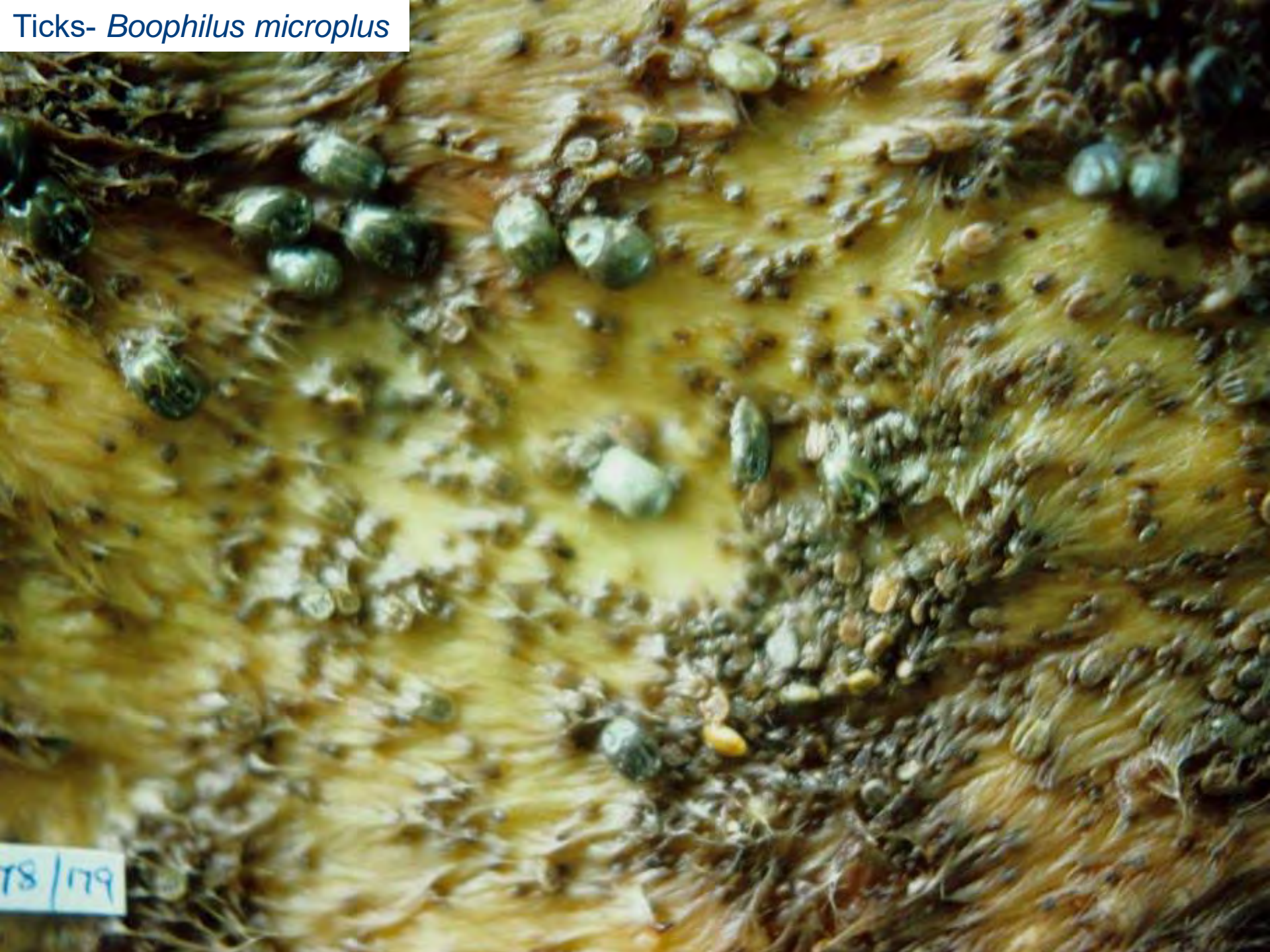
obstructed vessel

AN90/3964 Vasculitis, mononuclear infiltrate



Parasites

Ticks- *Boophilus microplus*

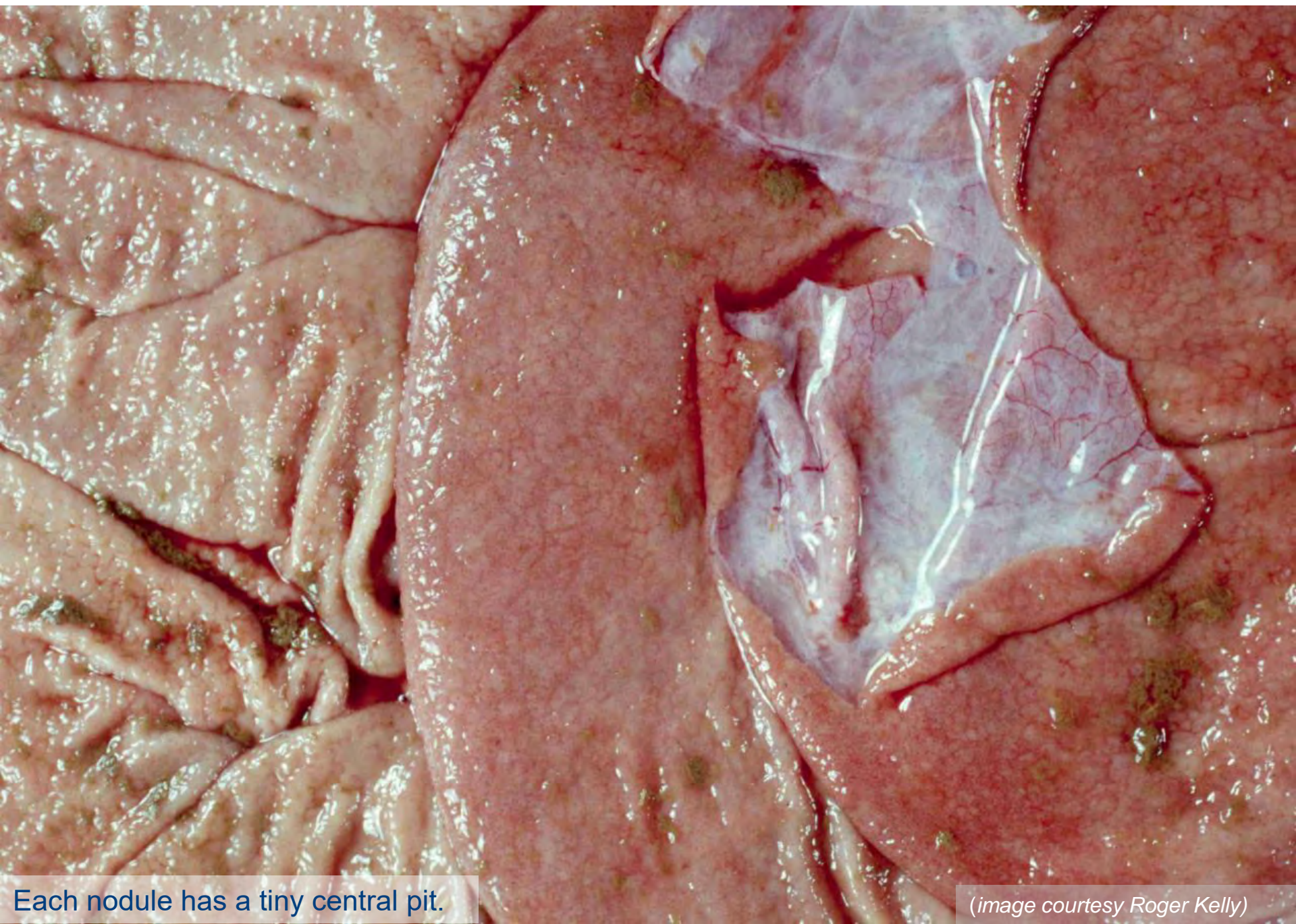


TS / 179

AN71-752 *Ostertagia* larvae in abomasal mucosal glands –
“Morroco leather” appearance



Hyperplastic abomasitis (ostertagiosis). Note the oedema of the incised ruga.



Each nodule has a tiny central pit.

(image courtesy Roger Kelly)

AN66/484 *Trichuris in caecum*



AN 66/484

Paramphistomes in reticulum

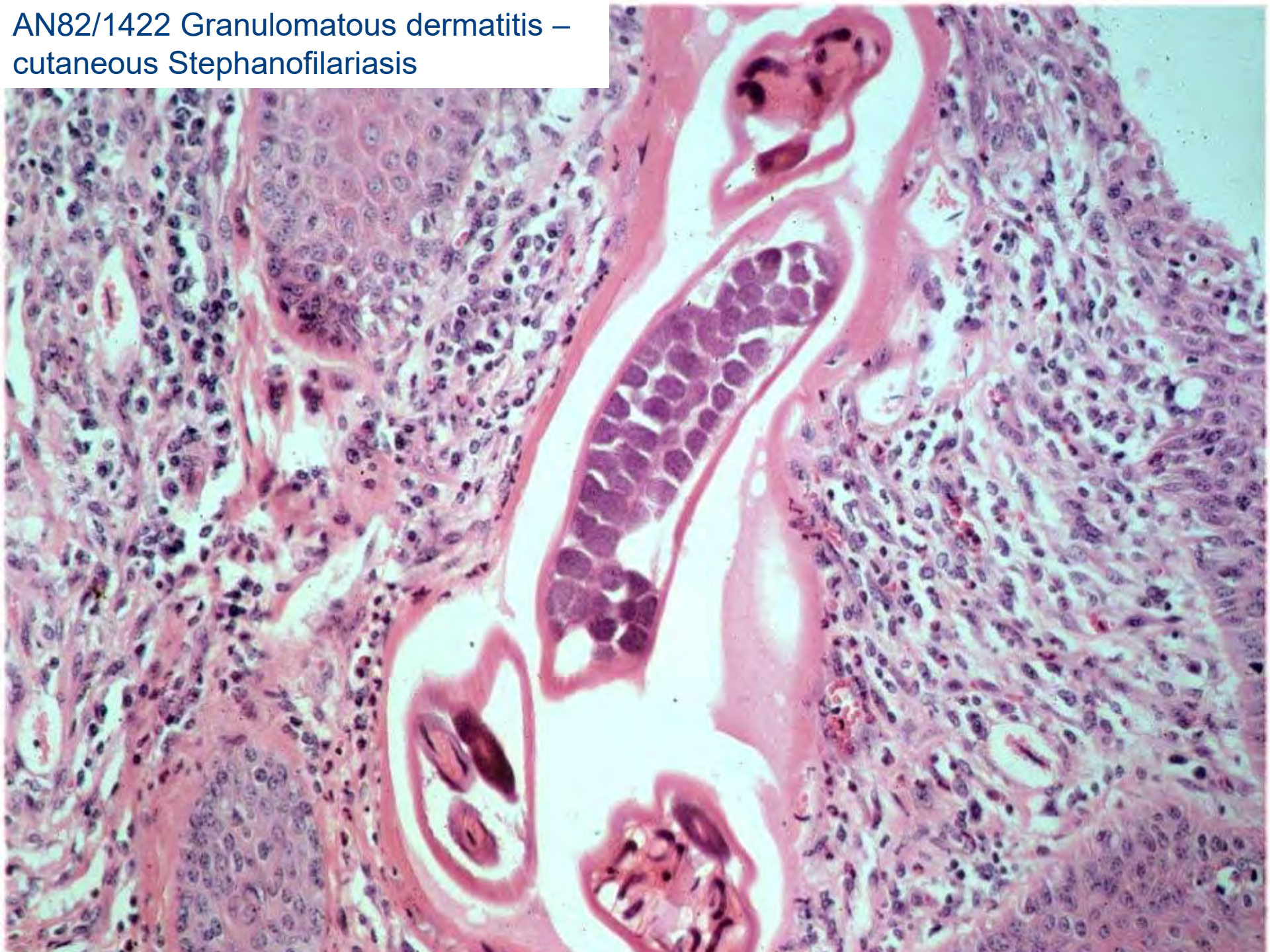


Brisket – *Onchocerca* sp.

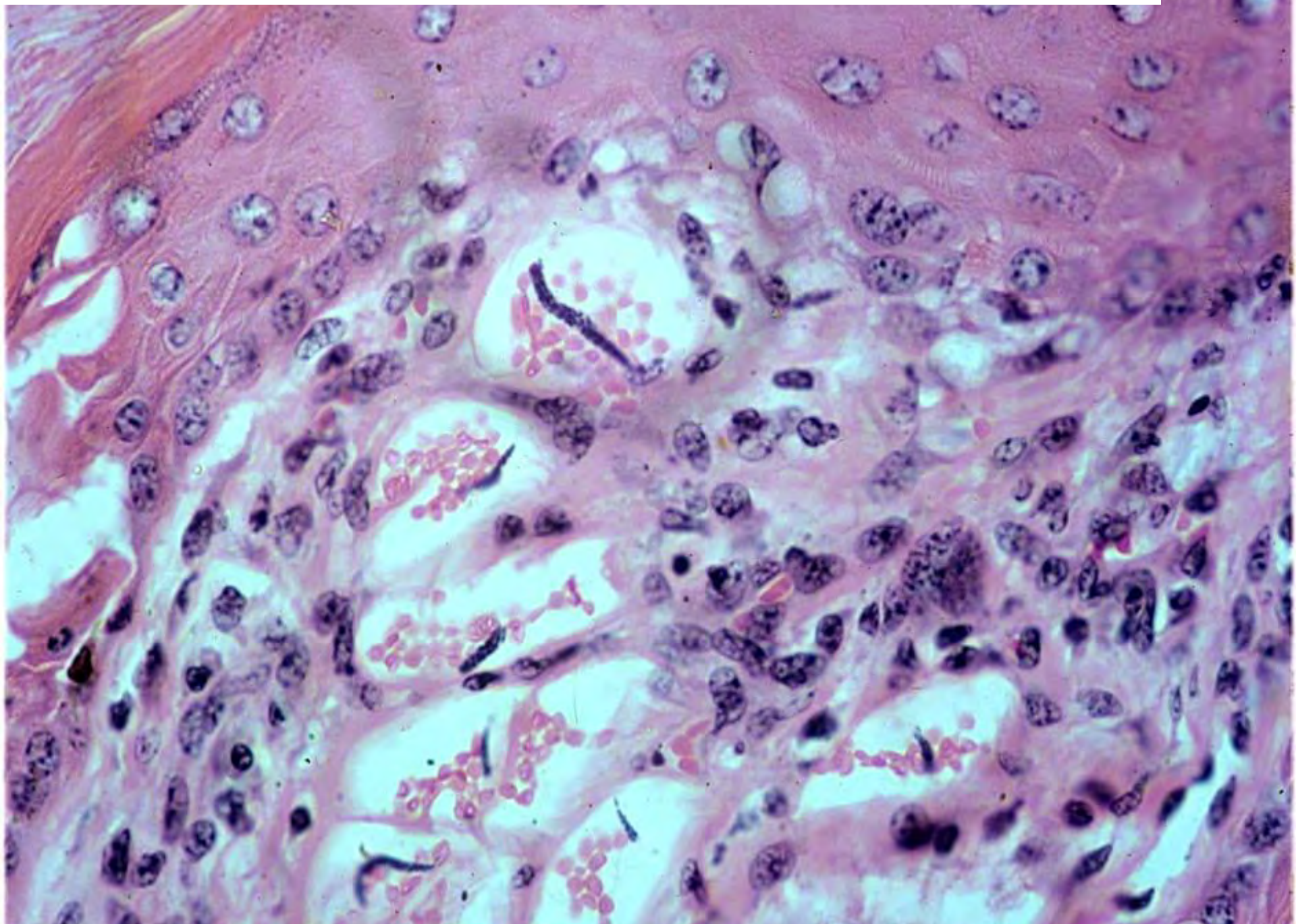


© 2005 DPI Victoria

AN82/1422 Granulomatous dermatitis – cutaneous Stephanofilariasis



AN82/1422 Cutaneous stephanofilariasis (microfilariae in superficial dermis)

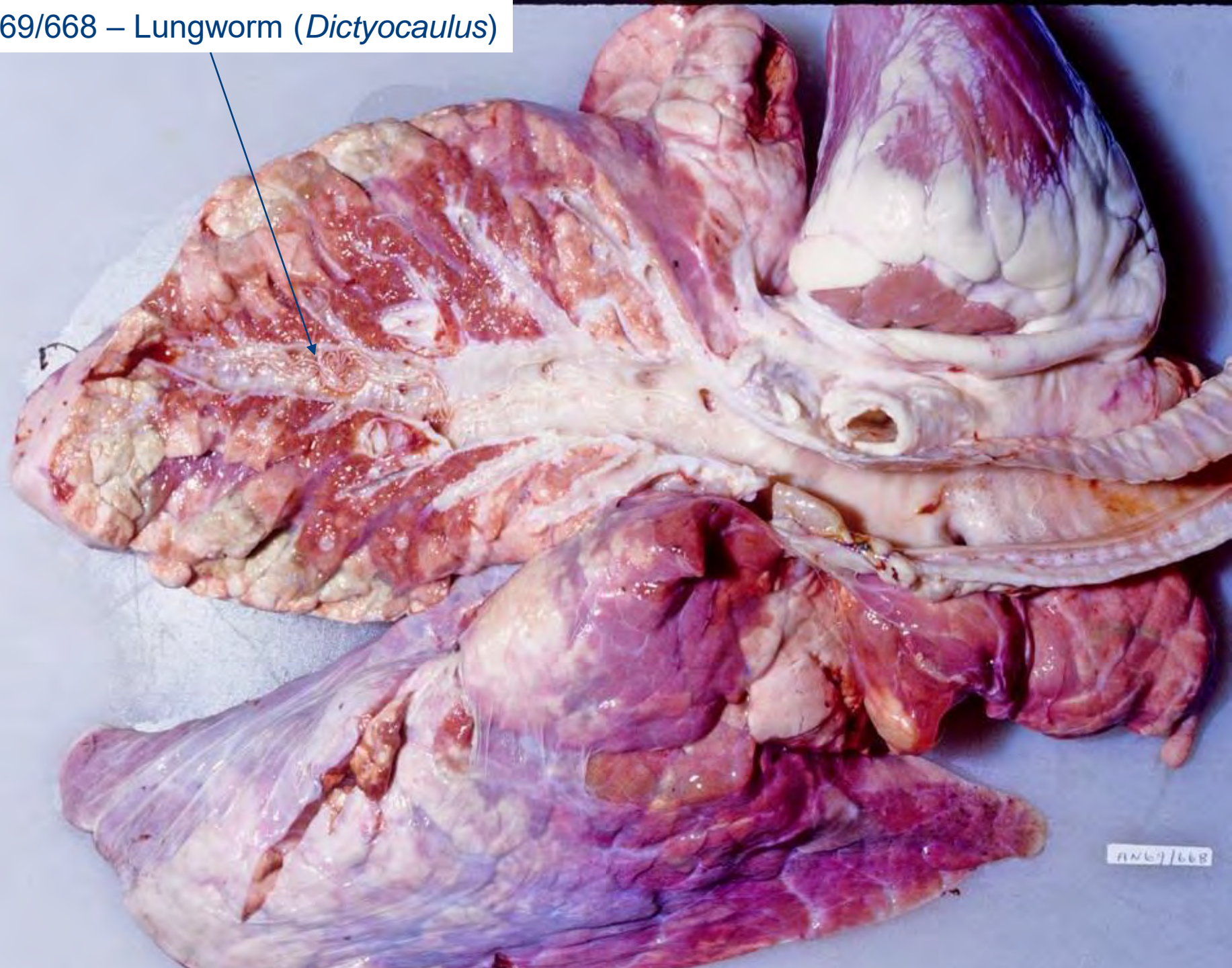


AN69/668 – Lungworm (*Dictyocaulus*)



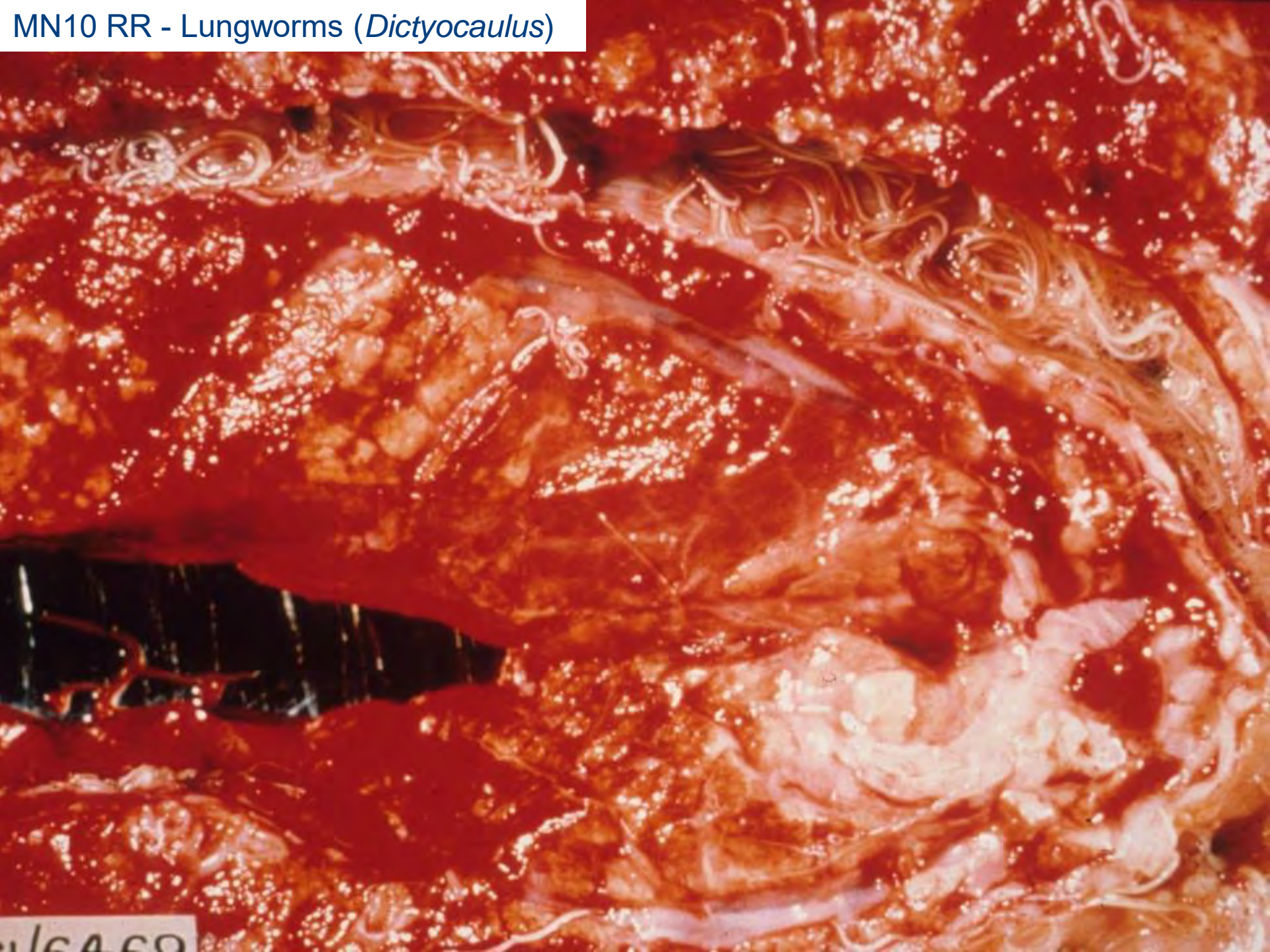
AN69/668

AN69/668 – Lungworm (*Dictyocaulus*)



899/678

MN10 RR - Lungworms (*Dictyocaulus*)



6469

AN93/62 Liver fluke. Marked thickening of bile ducts...



...always more severe in the left lobe

AN71/2487 Liver; degenerate hydatids

The intermediate stages of *Echinococcus granulosus* are always degenerate in cattle & become calcified



AN71/2487 Liver; degenerate hydatids

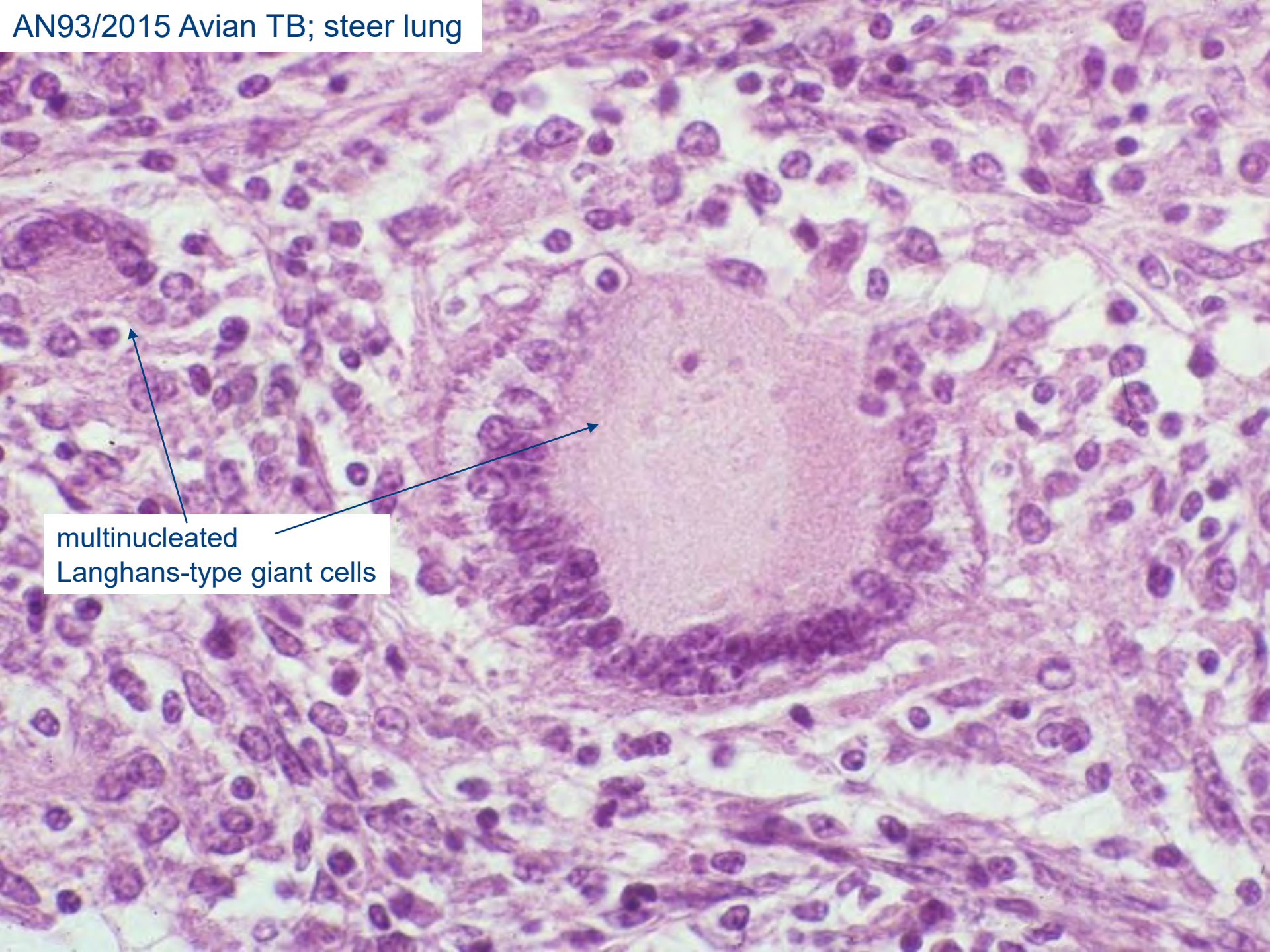


This liver also shows cholangitis due to fluke

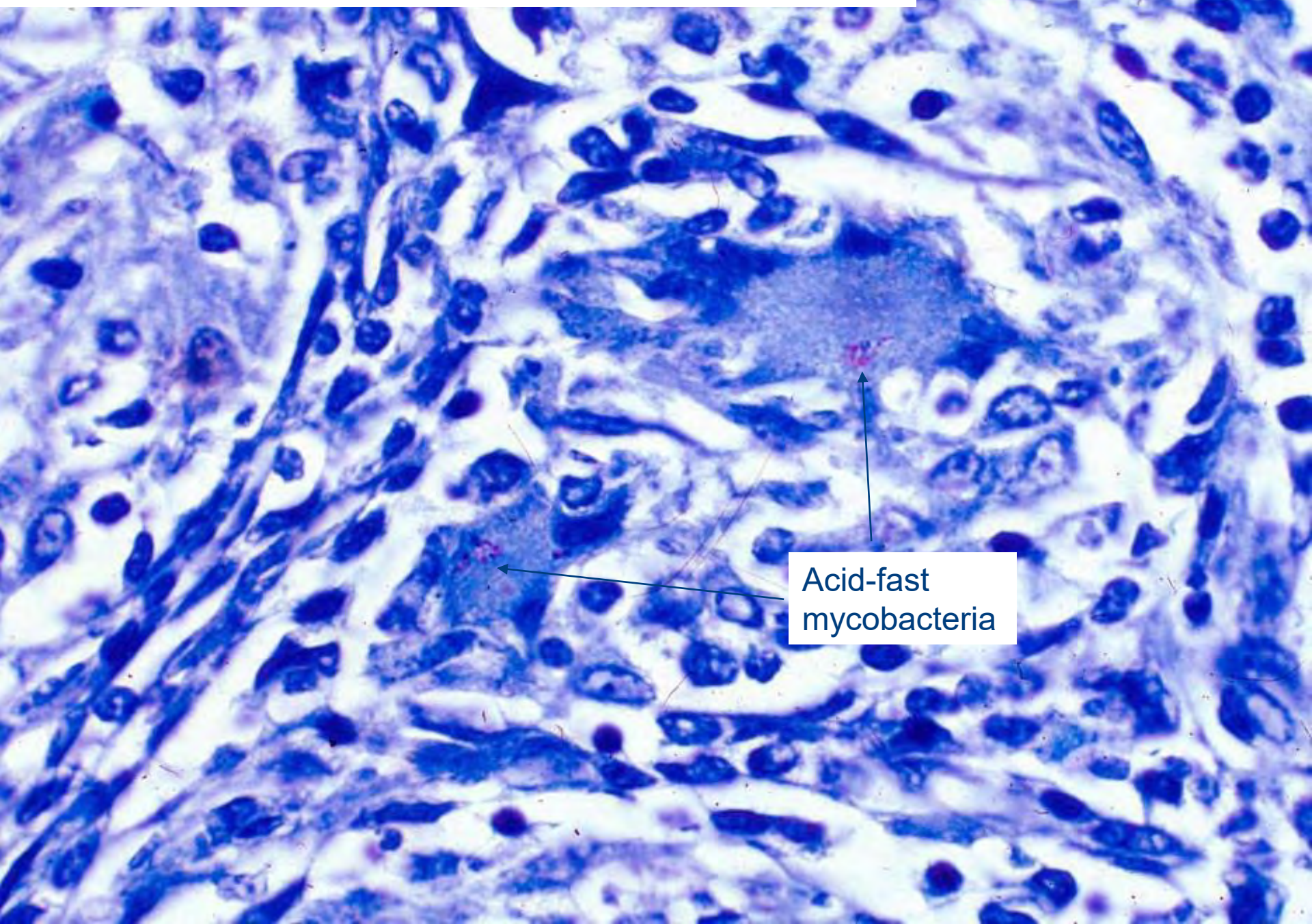
Tuberculosis

AN96/242 bovine TB; mediastinal lymph node. Caseating granulomatous lymphadenitis





multinucleated
Langhans-type giant cells



Acid-fast
mycobacteria

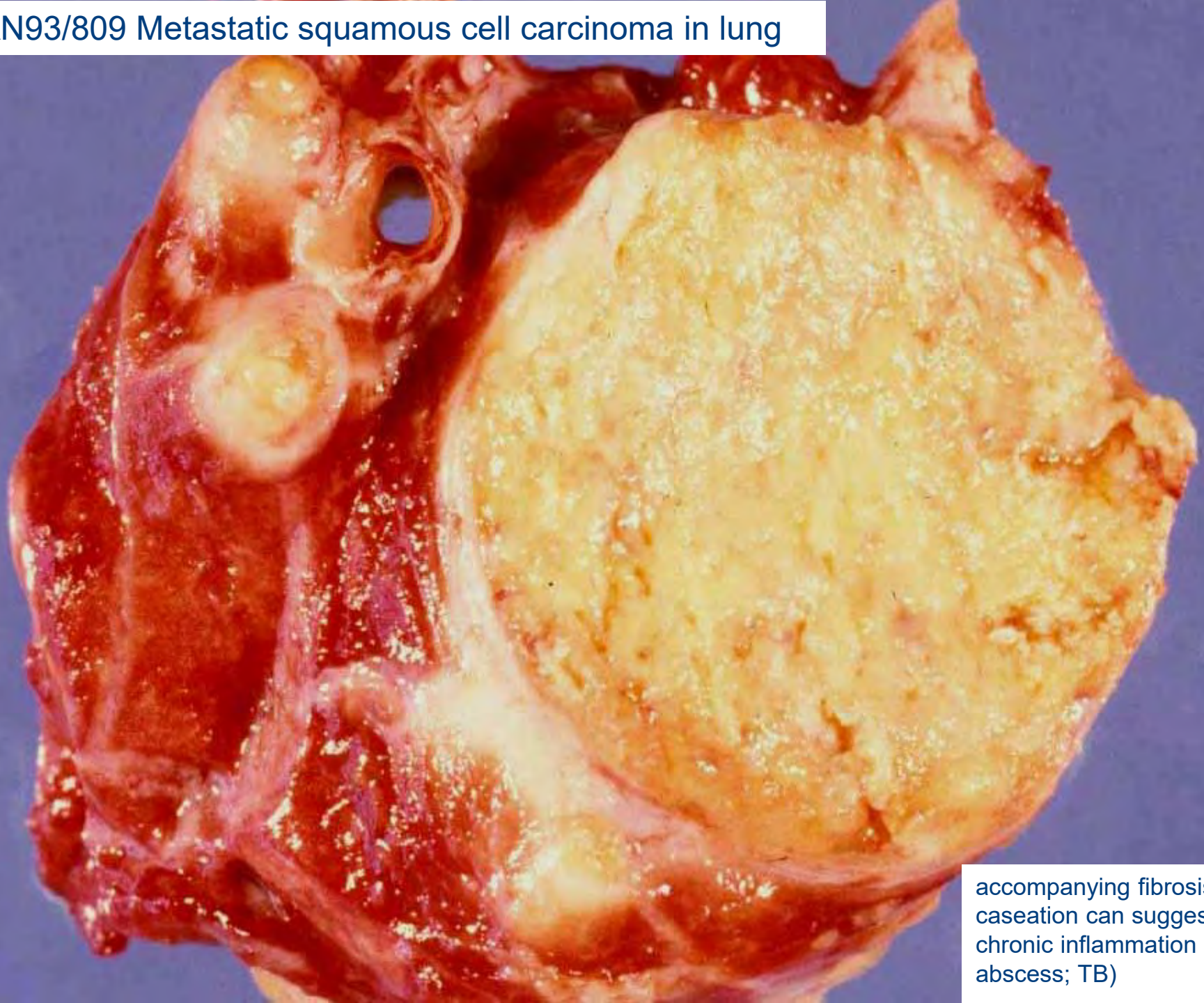
Neoplasms

UQ BV 220KP Hereford; bovine ocular squamous cell carcinoma



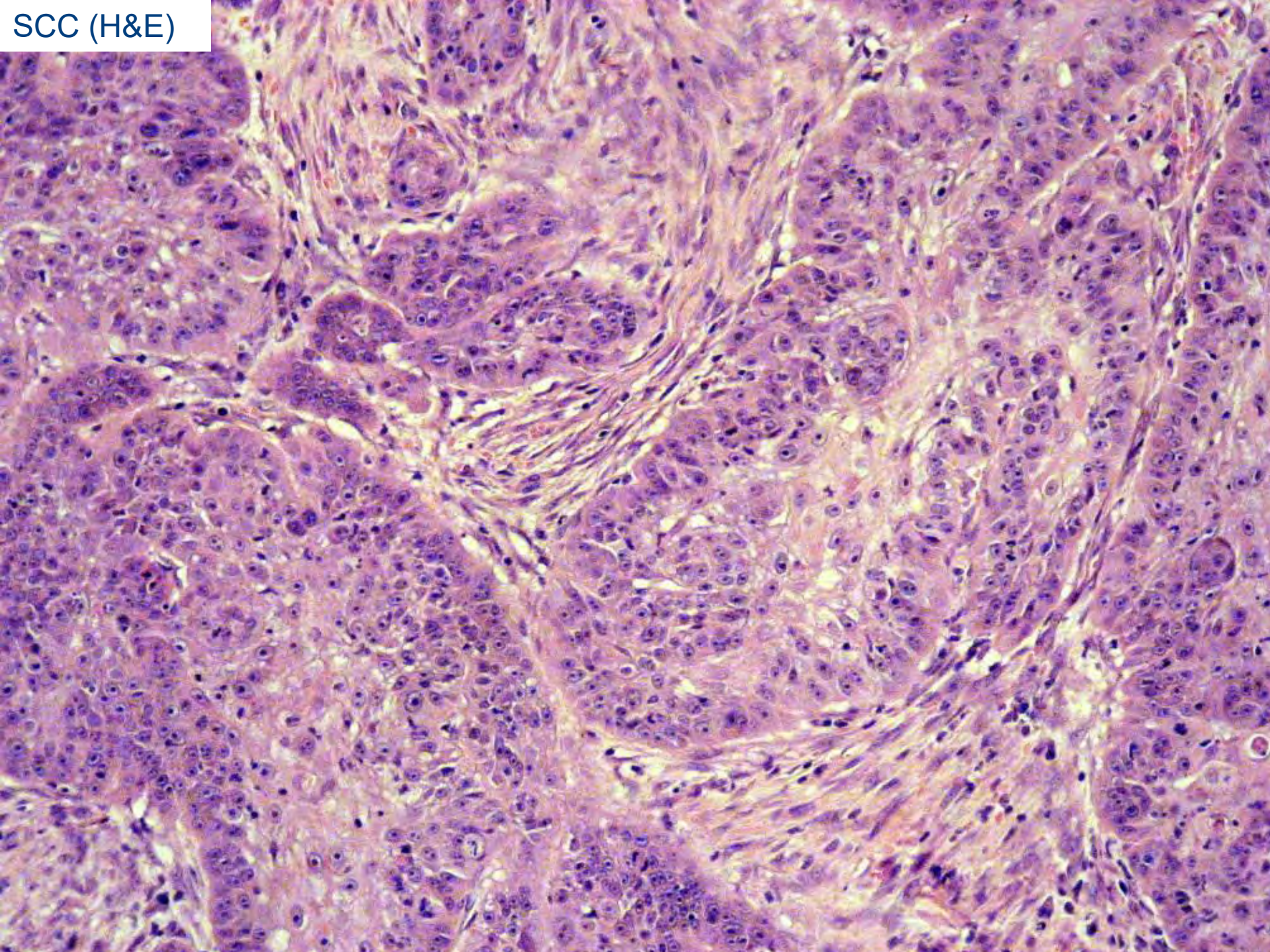
220 KP
22/4/82

AN93/809 Metastatic squamous cell carcinoma in lung

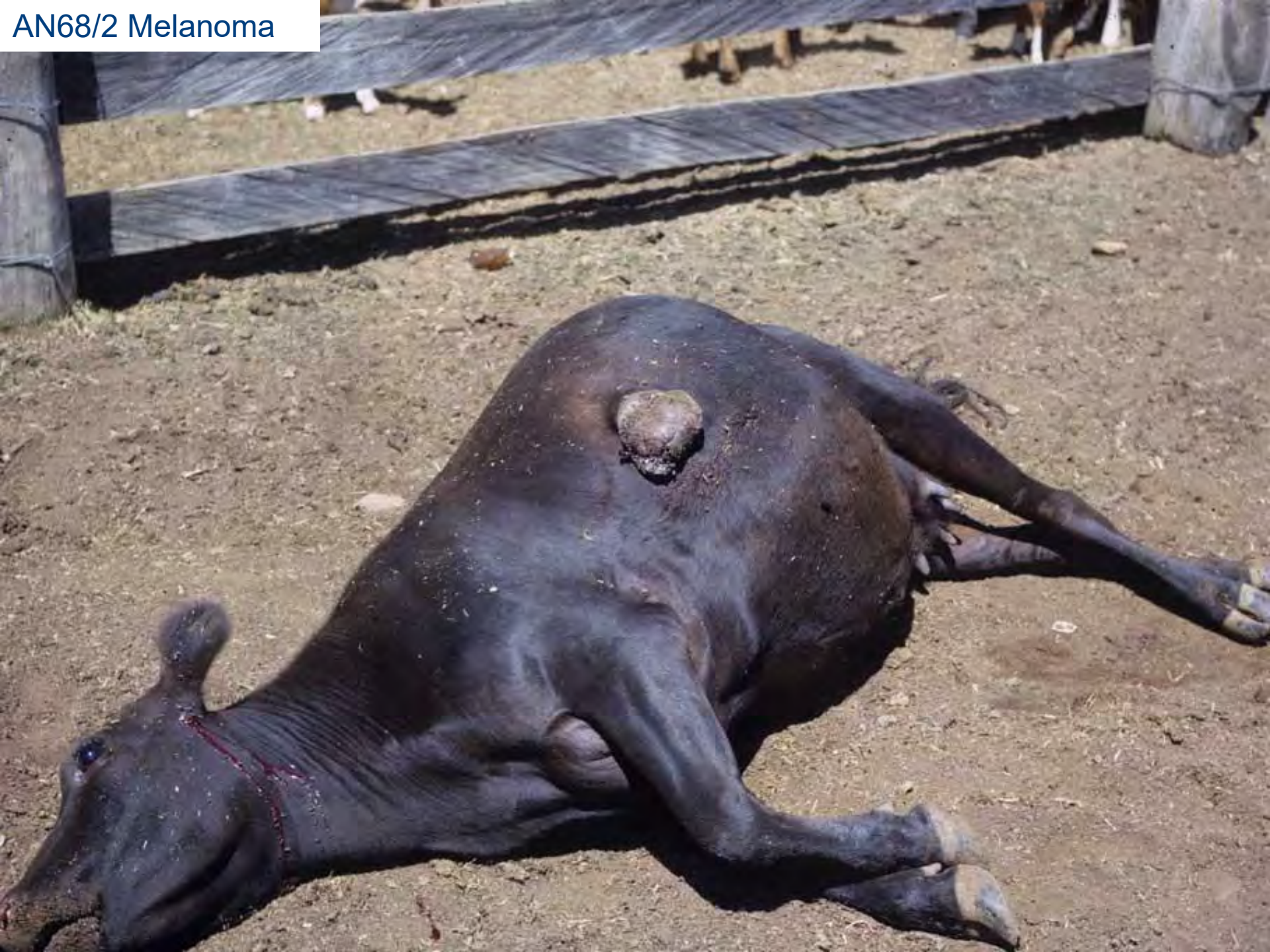


accompanying fibrosis and caseation can suggest chronic inflammation (d.d.: abscess; TB)

SCC (H&E)



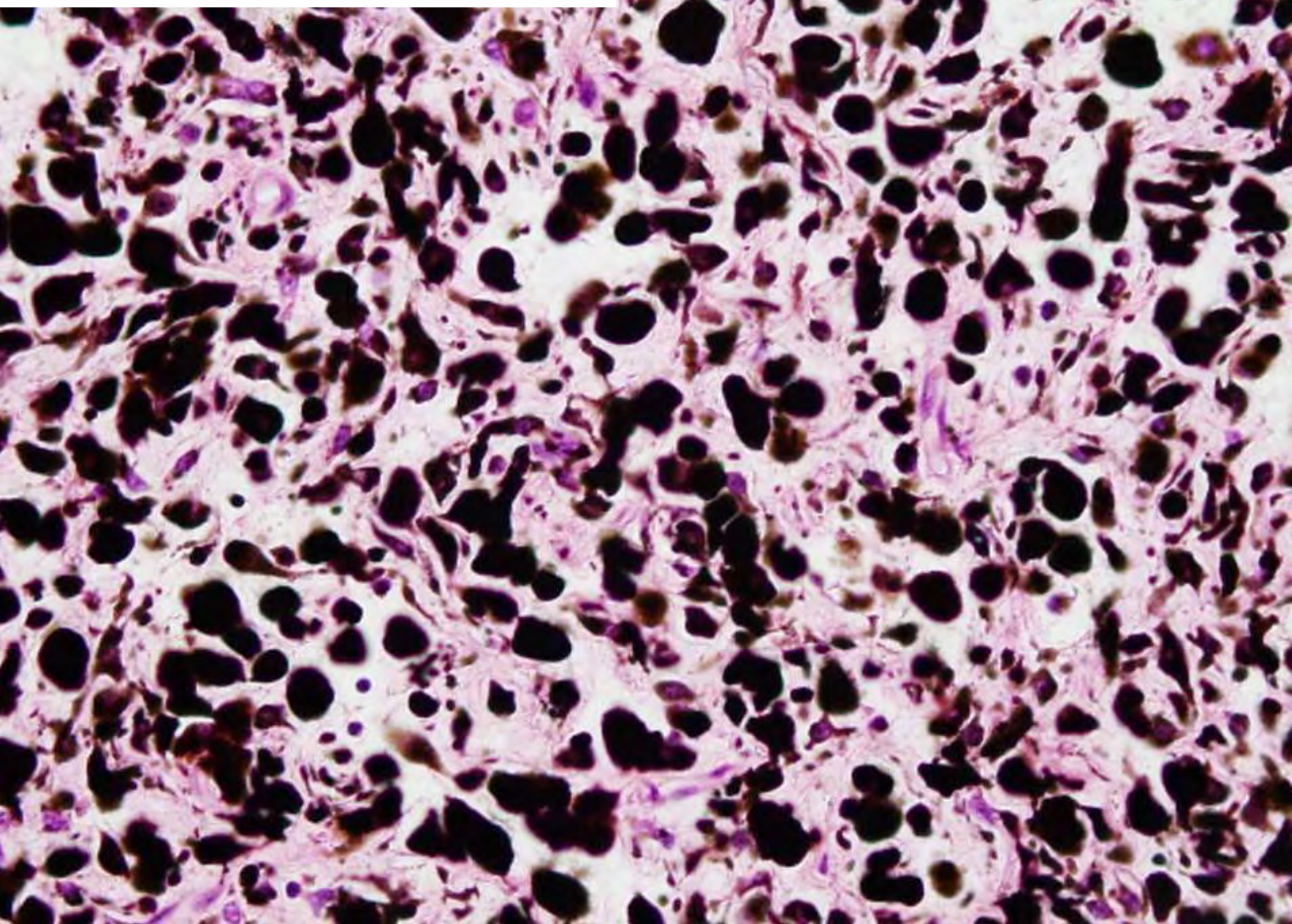
AN68/2 Melanoma

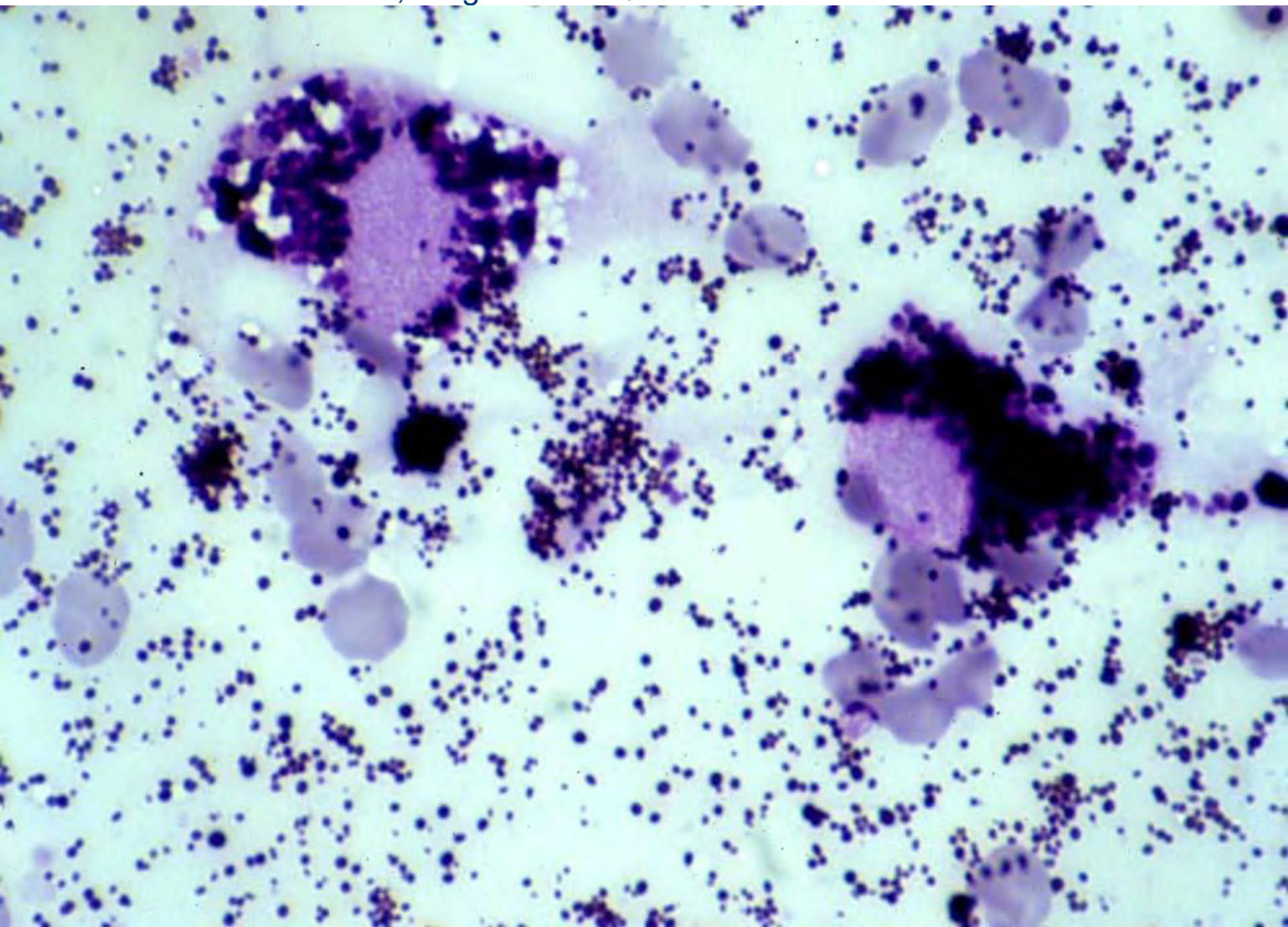


Melanoma in parotid lymph node



MN04/9314 Melanoma skin H & E stain





MN12 RR Enzootic Bovine Leucosis – tumours in kidney



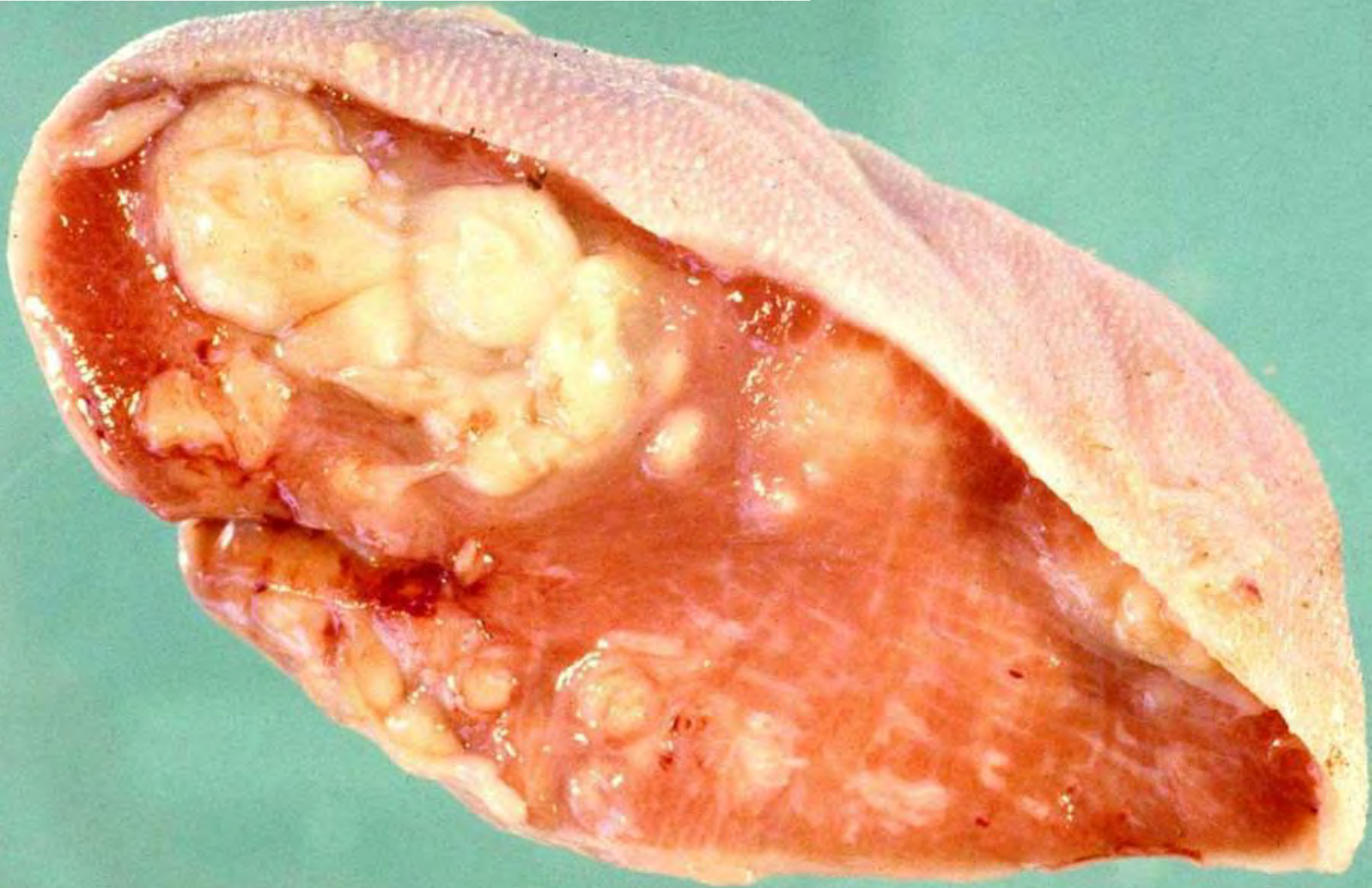
Diseases which may be seen at entry

Actinobacillosis (*Actinobacillus lignierisii*)



Multifocal granulomatous lymphangitis caused by *Actinobacillus lignierisii*

AN95/4214 Bovine tongue, section; actinobacillosis

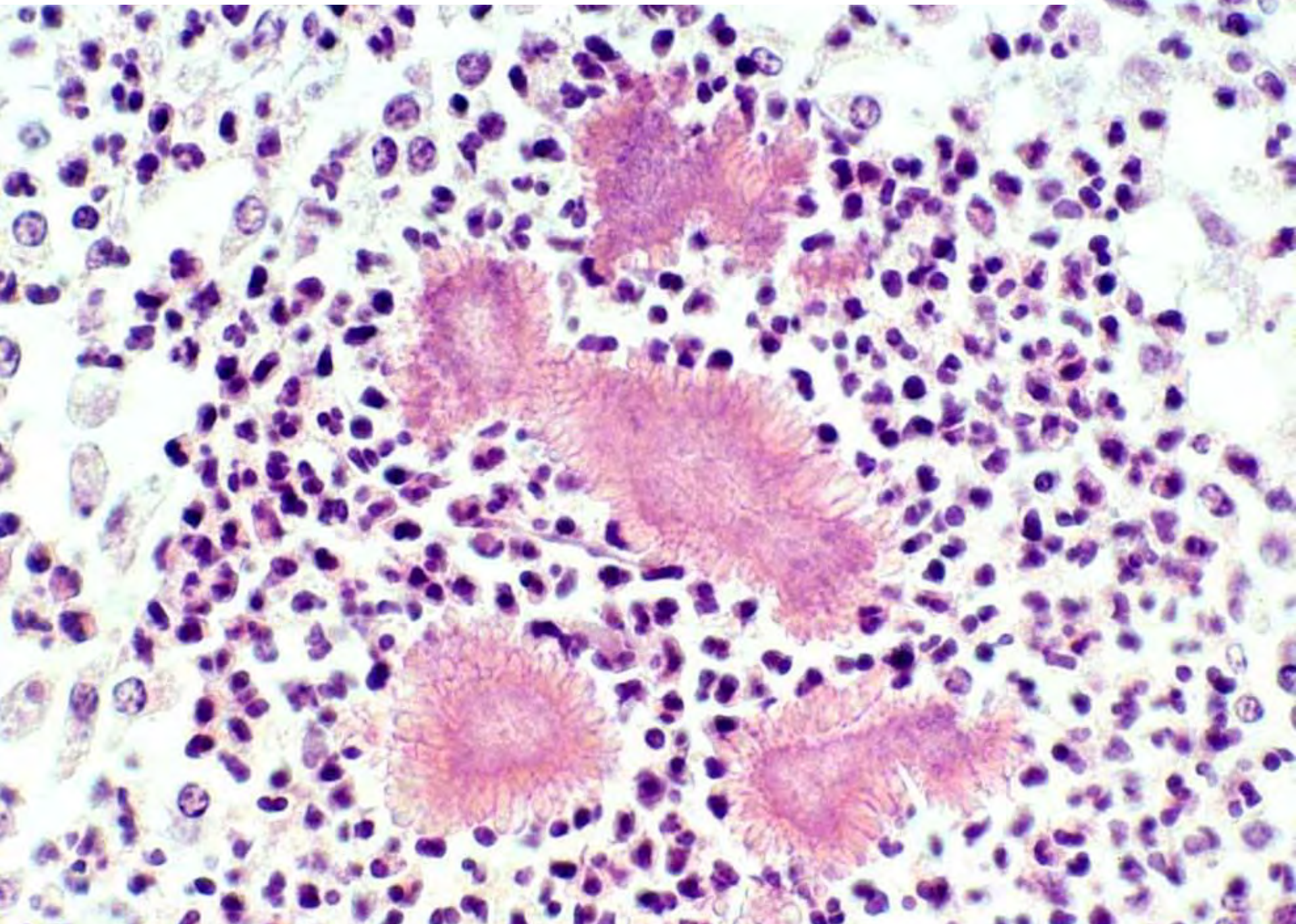


Multifocal granulomatous lymphangitis caused by *Actinobacillus lignierisii*

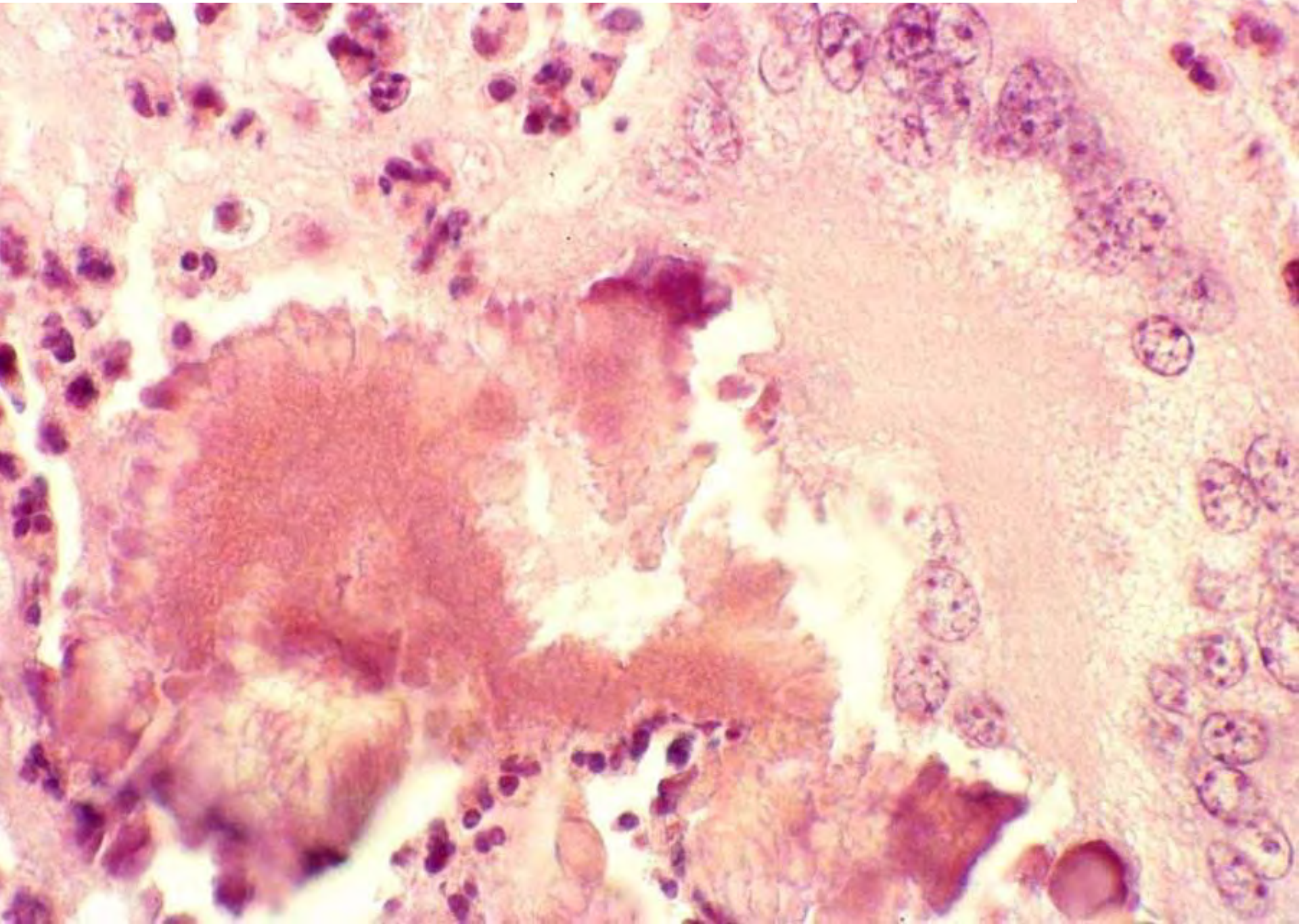
SH397 Actinobacillosis, lower jaw



SH796 Actinobacillosis tongue – club colonies in pyogranulomatous foci

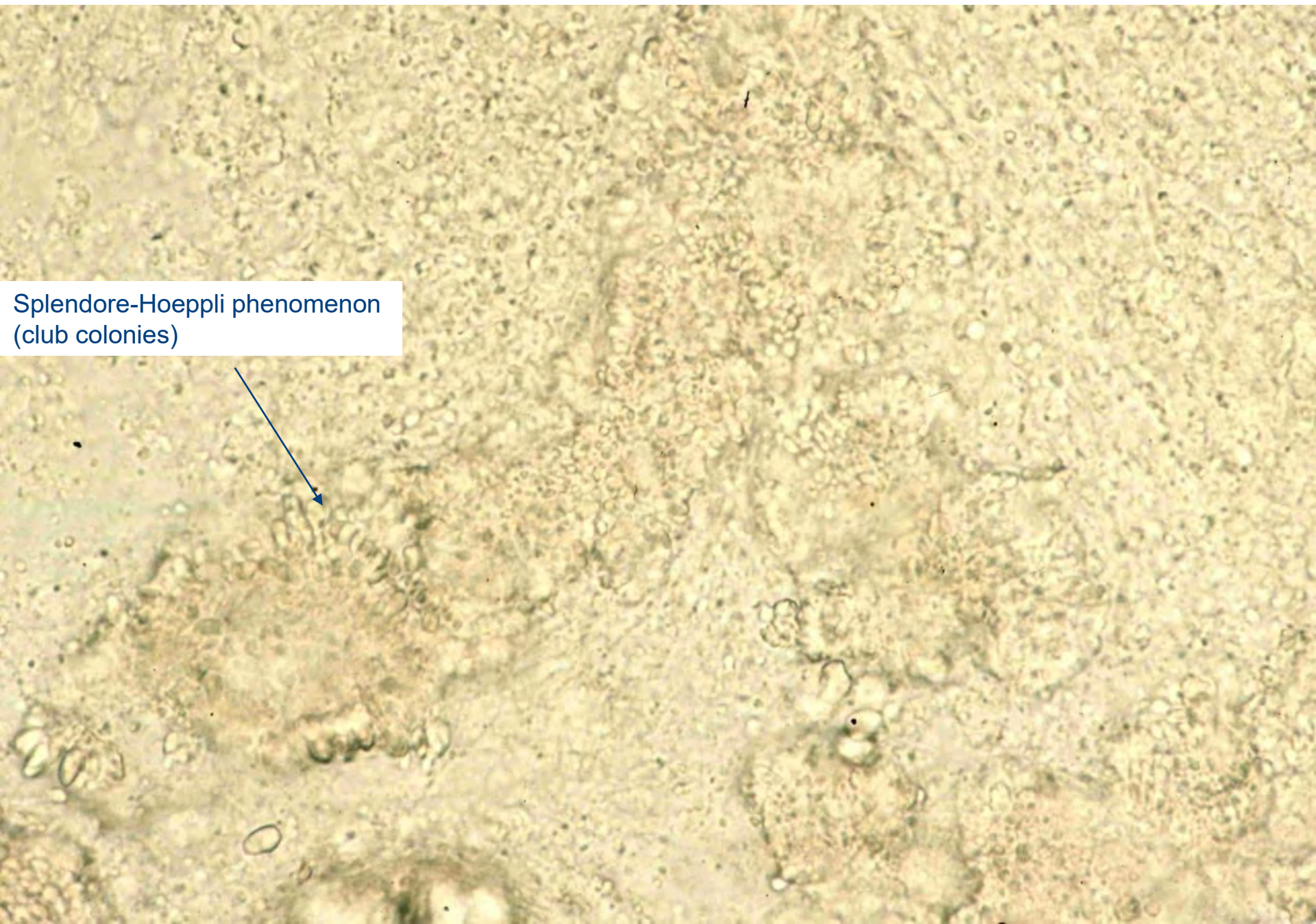


SH652 Actinobacillosis, tongue – club colonies in pyogranulomatous foci



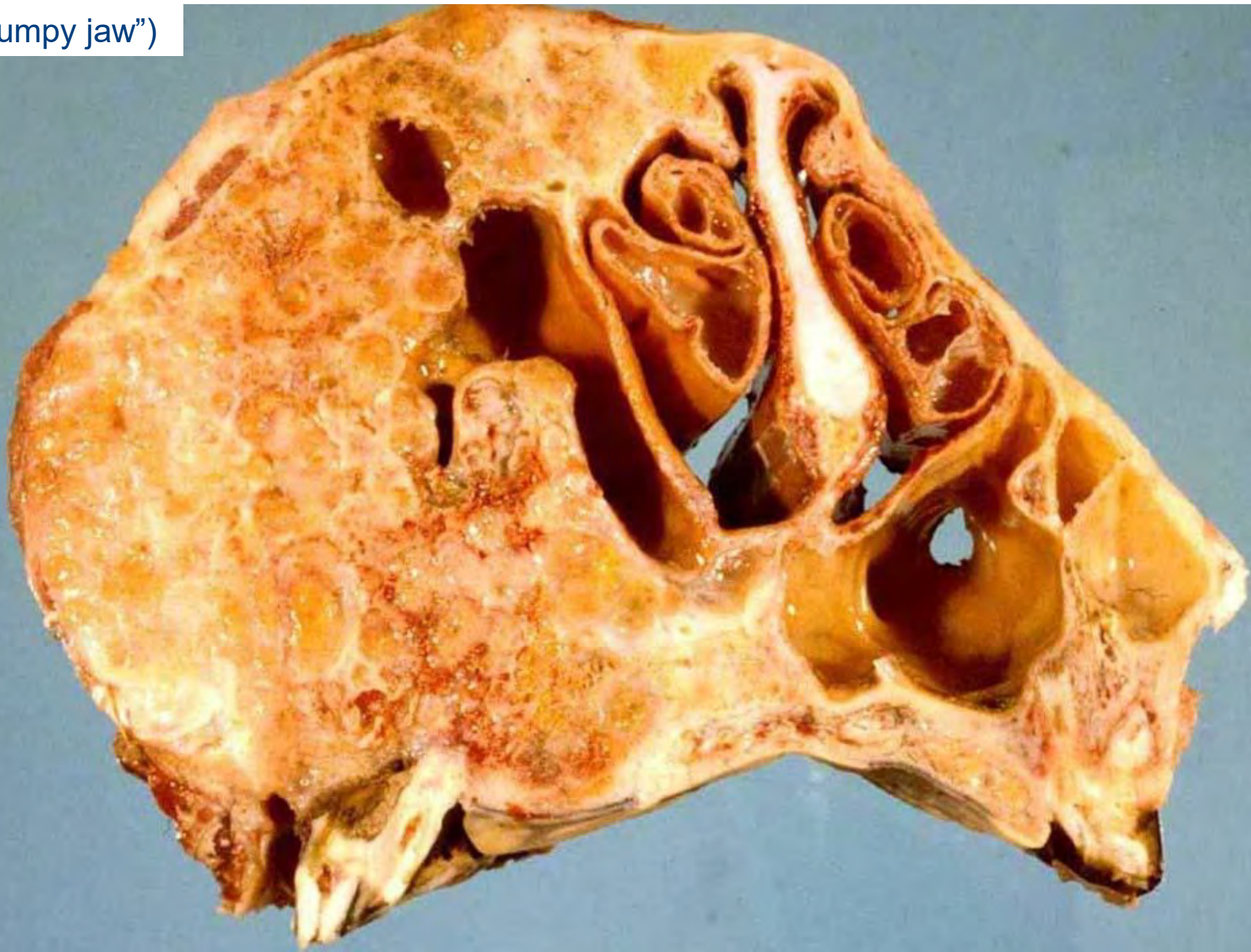
Unstained wet prep. of pus; bovine actinobacillosis

Splendore-Hoepli phenomenon
(club colonies)

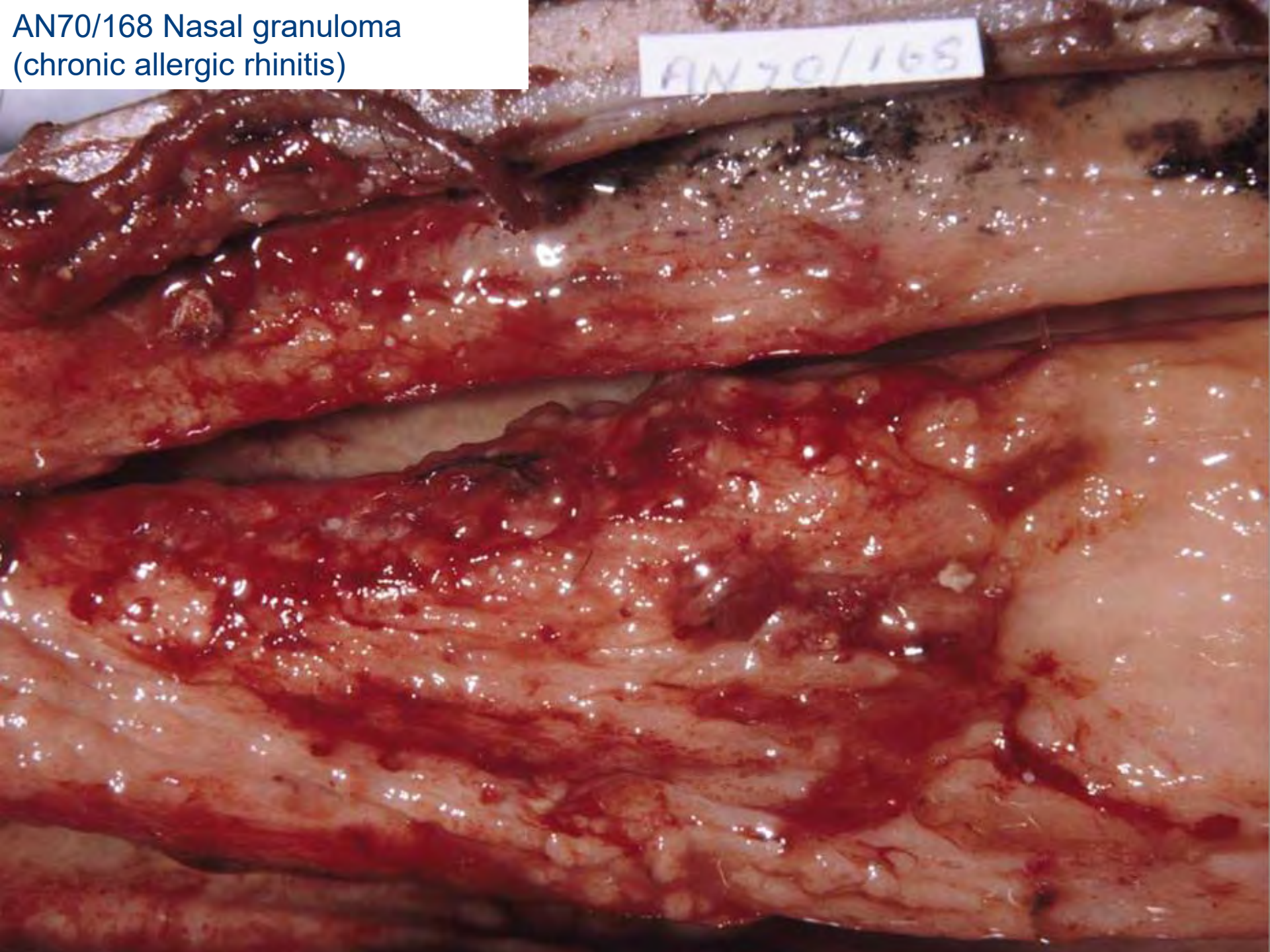


SH334 BN87/3057 Chronic maxillary osteomyelitis due to *Actinomyces bovis*

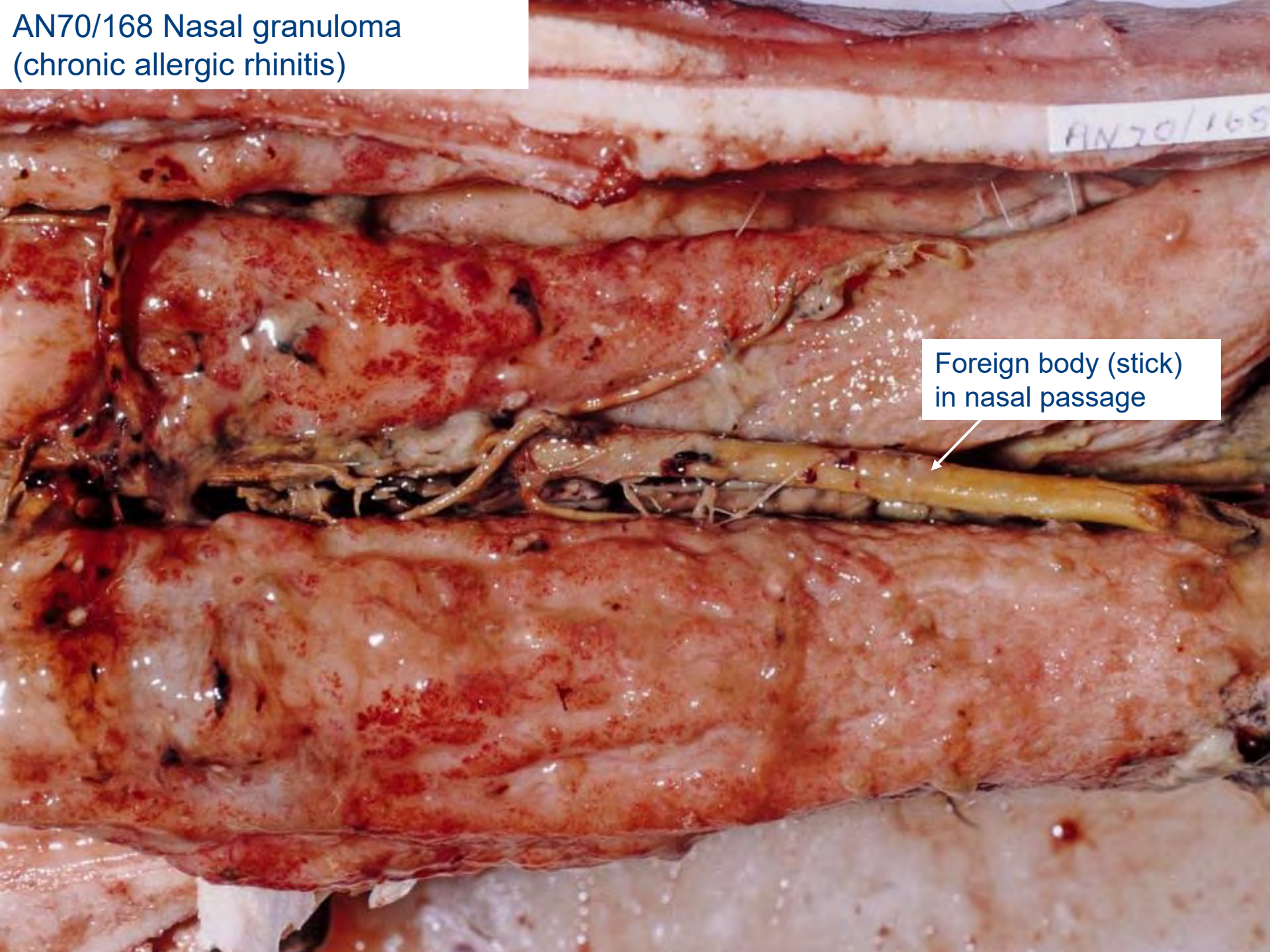
("Lumpy jaw")



AN70/168 Nasal granuloma
(chronic allergic rhinitis)



AN70/168 Nasal granuloma
(chronic allergic rhinitis)

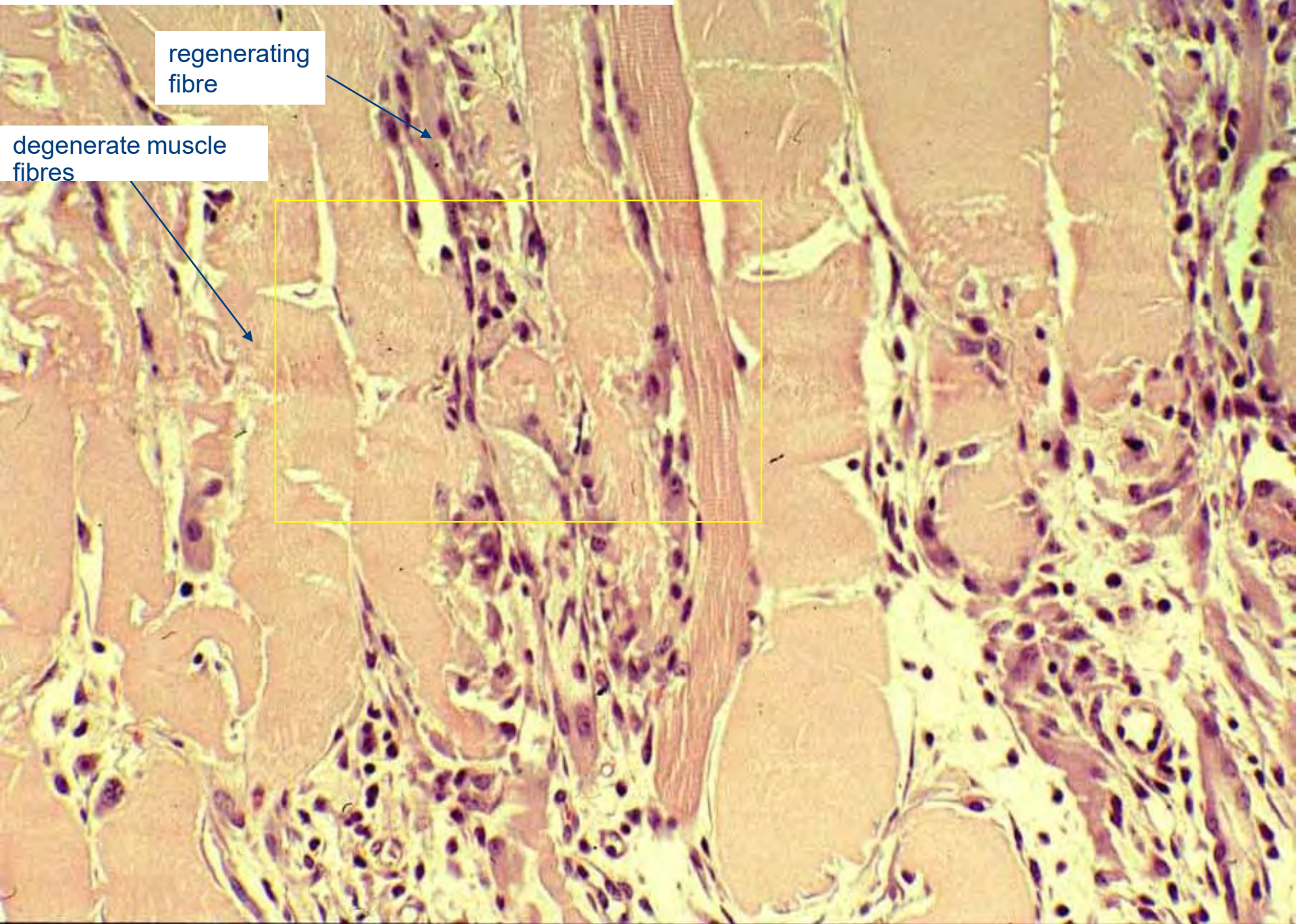


Foreign body (stick)
in nasal passage

Nutritional muscle degeneration

- **HISTORY:** 18 month-old Angus steer in feedlot; Quirindi NSW.
- Steer on feed for 7 days. Ill for maximum of 12 hours. Superficial muscle groups pale to white. Deep muscles pale to normal colour. No other abnormalities.
- **HISTOPATH:** Muscle: severe diffuse swelling and fragmentation of muscle fibres with intense macrophage activity and myofibre regeneration throughout.
-
- **CONCLUSION:** consistent with nutritional muscle degeneration (White Muscle Disease).

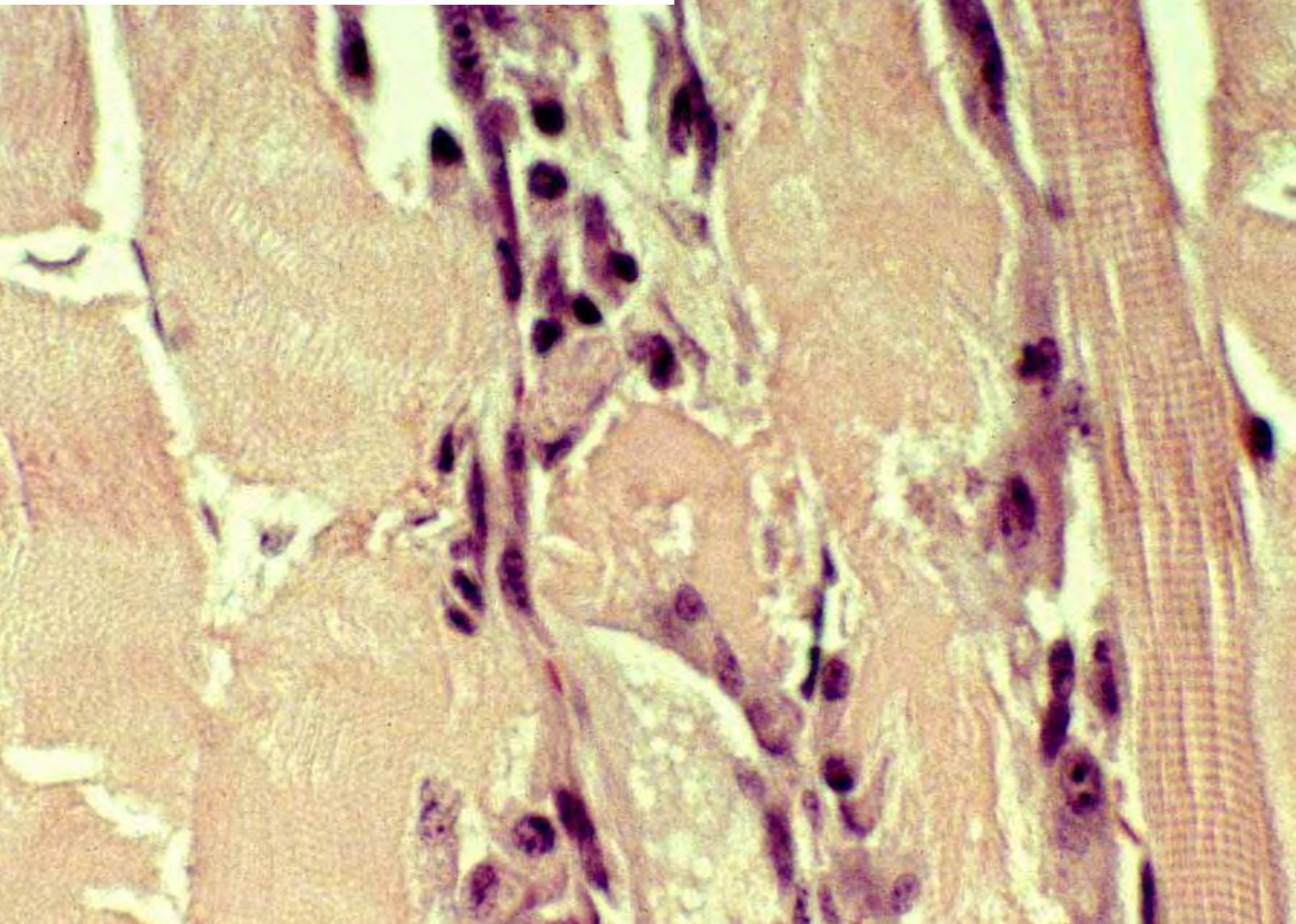
AN93/4584 Nutritional muscle degeneration



regenerating fibre

degenerate muscle fibres

AN93/4584 Nutritional muscle degeneration



Acknowledgments

The images are from numerous sources

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