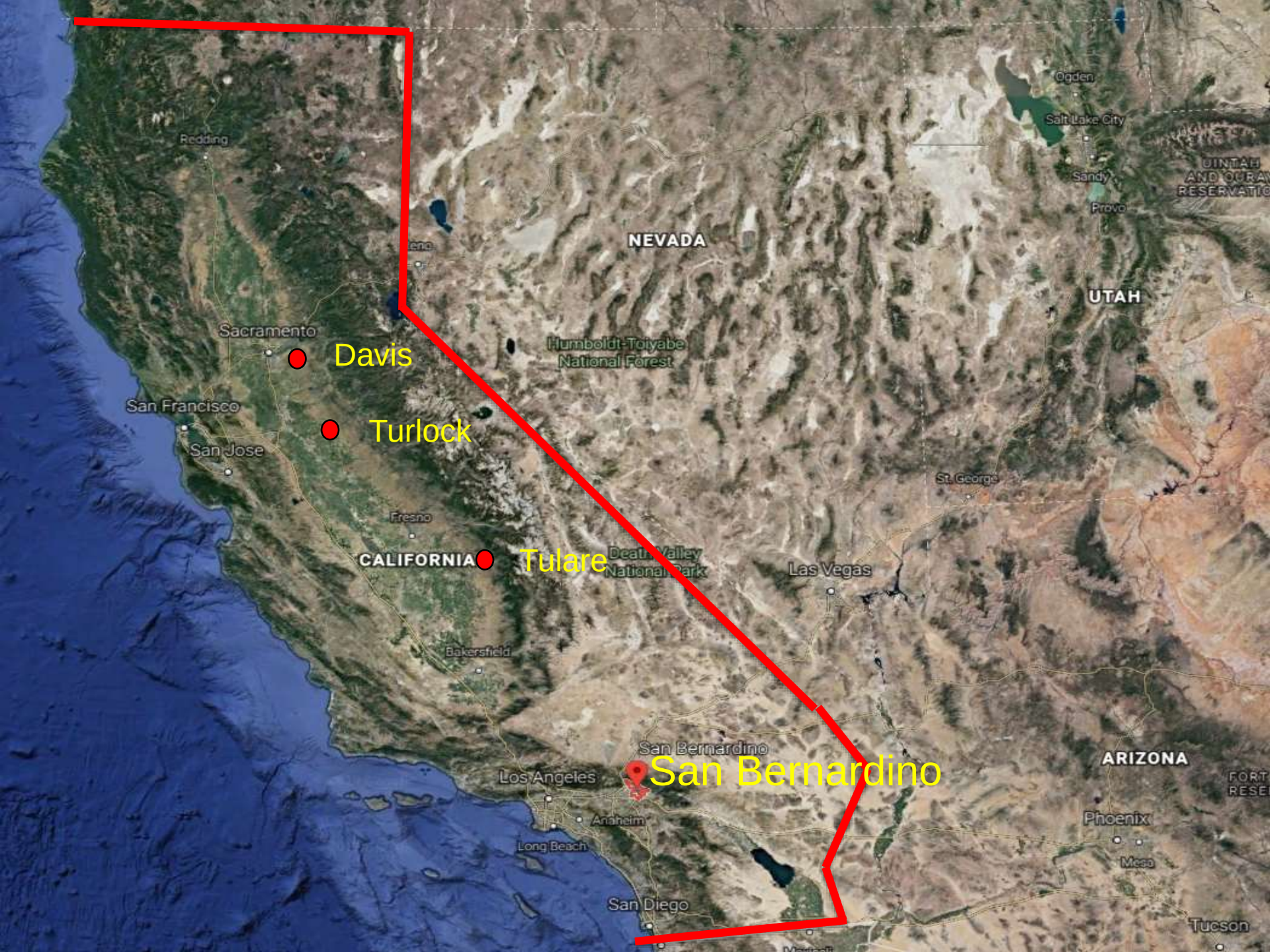
One health: a few stories

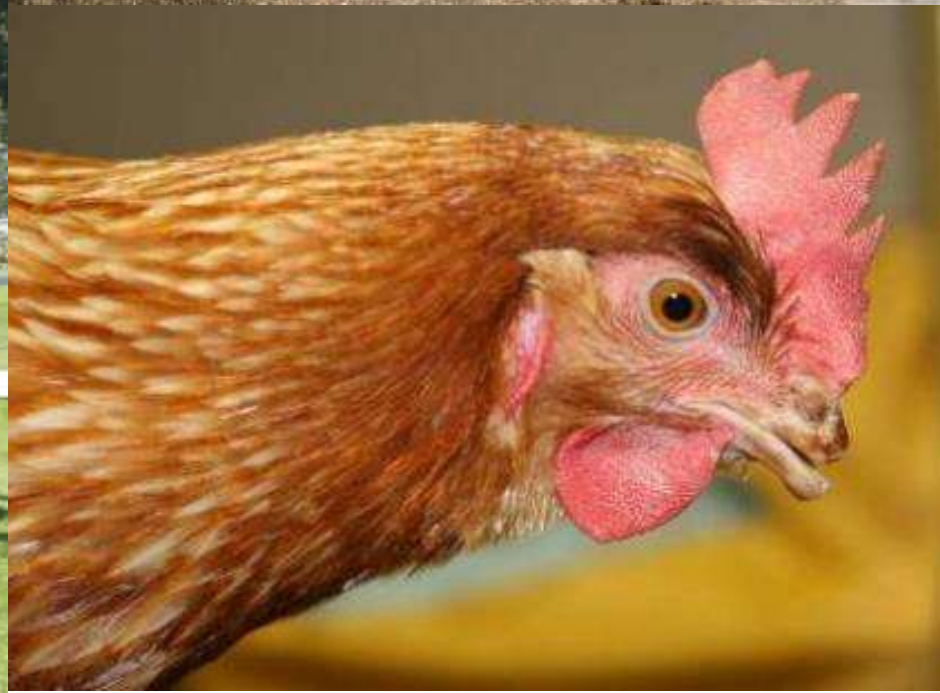
Francisco A. Uzal, **DVM, MSc, PhD, Dipl. ACVP**

California Animal Health and Food Safety Laboratory System, UCDavis


Davis
Turlock
Tulare
San Bernardino
NEVADA
UTAH
ARIZONA
CALIFORNIA
Sacramento
San Francisco
San Jose
Fresno
Bakersfield
Los Angeles
Anaheim
Long Beach
San Diego
Las Vegas
Phoenix
Tucson
Redding
Ogden
Salt Lake City
Sandy
Provo
St. George
Humboldt-Toiyabe National Forest


5WER002


Bill & Wags Inc.
Heavy Duty
Towing &
923-6100
ANIMAL
RECEIVING




S0410474

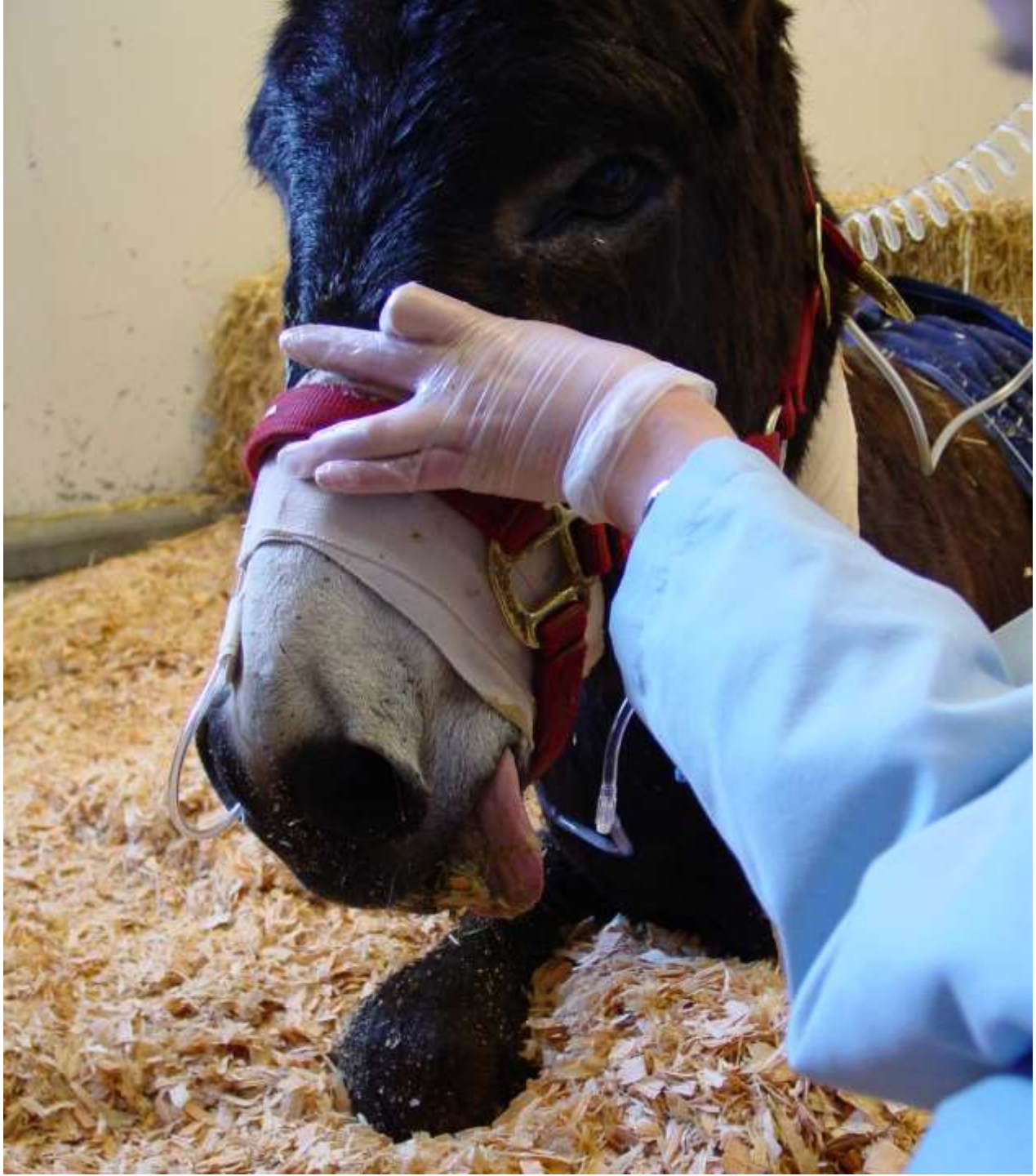
CASE 1

Multiple horses from several states

CLINICAL HISTORY

* Flaccid paralysis

* Fed alfalfa cubes same origin



POSTMORTEM FINDINGS

No gross changes, except……..

No microscopic lesions

your diagnosis…..?

ANCILLARY TEST RESULTS

* Bacterial cultures liver, lung, brain:	negative
* Salmonella spp. PCR (liver + intestine):	negative
* Rabies FAT (CNS pool):	negative
* EHV-1 PCR (CNS pool):	negative
* WNV PCR (CNS pool):	negative
* Equine protozoal myelitis (*S. neurona*) IHC (brain):	negative
* Heavy metal screen:	unremark
* Botulism toxins test	positive

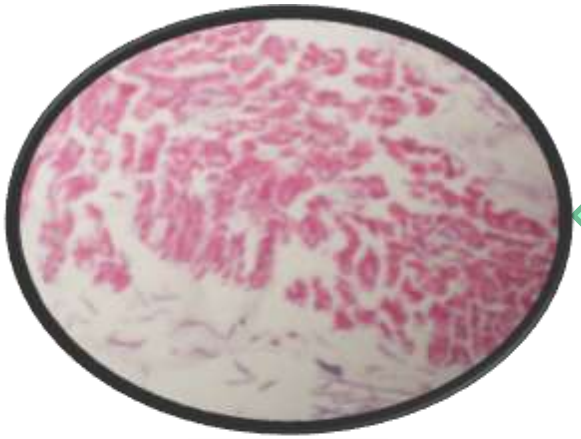
DIAGNOSIS

Botulism type C

Number of affected horses per state

Alfalfa Cubes

Alfalfa cubes additional testing



Food Microscopy – Animal Hairs (susp. Deer)

Next Generation Sequencing (NGS) PCR panel – *Capra hircus*

CCAACTCATATCAAAAC
AAATAATAAGTATTC

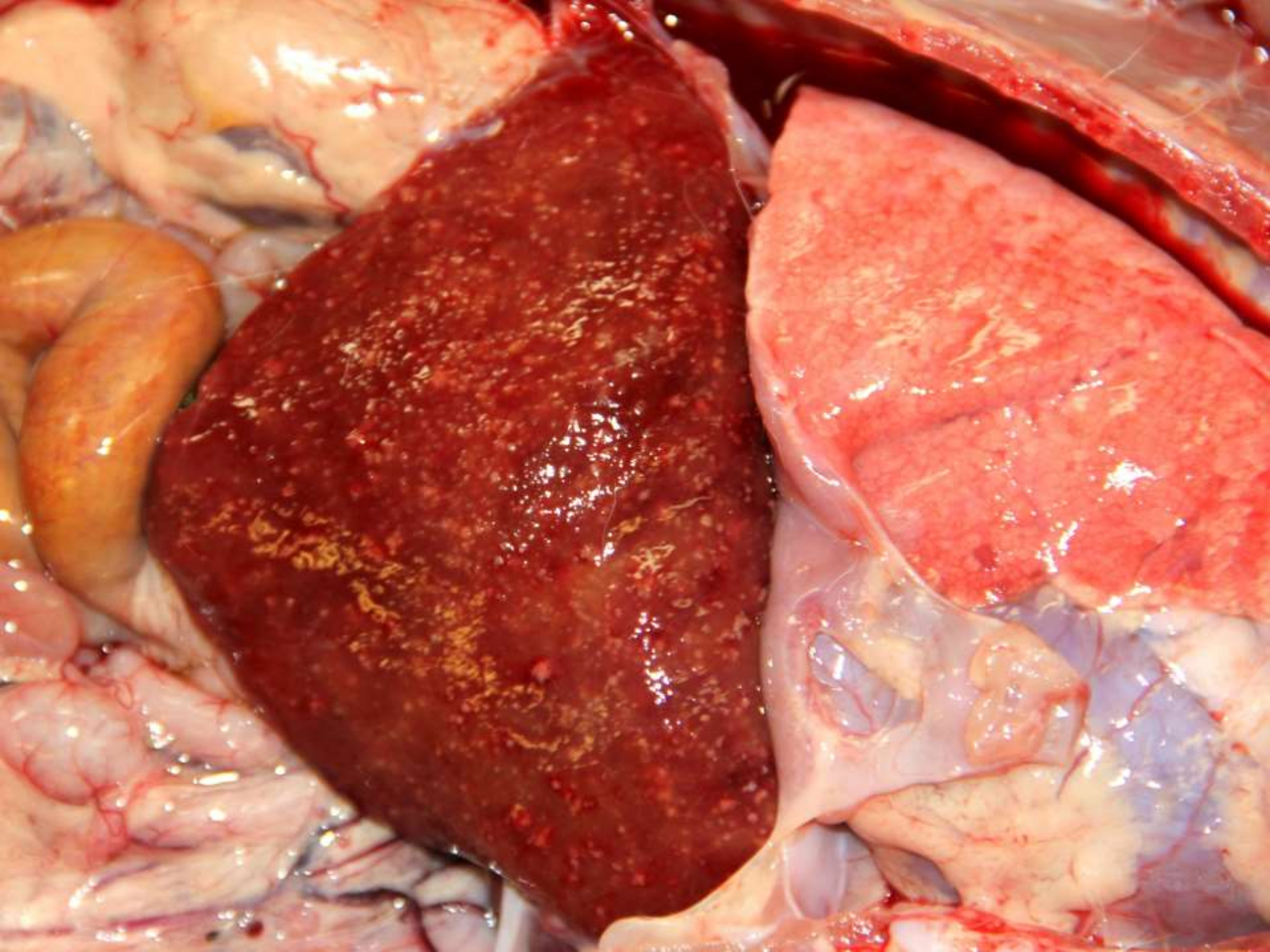
CASE 2

Newborn goat

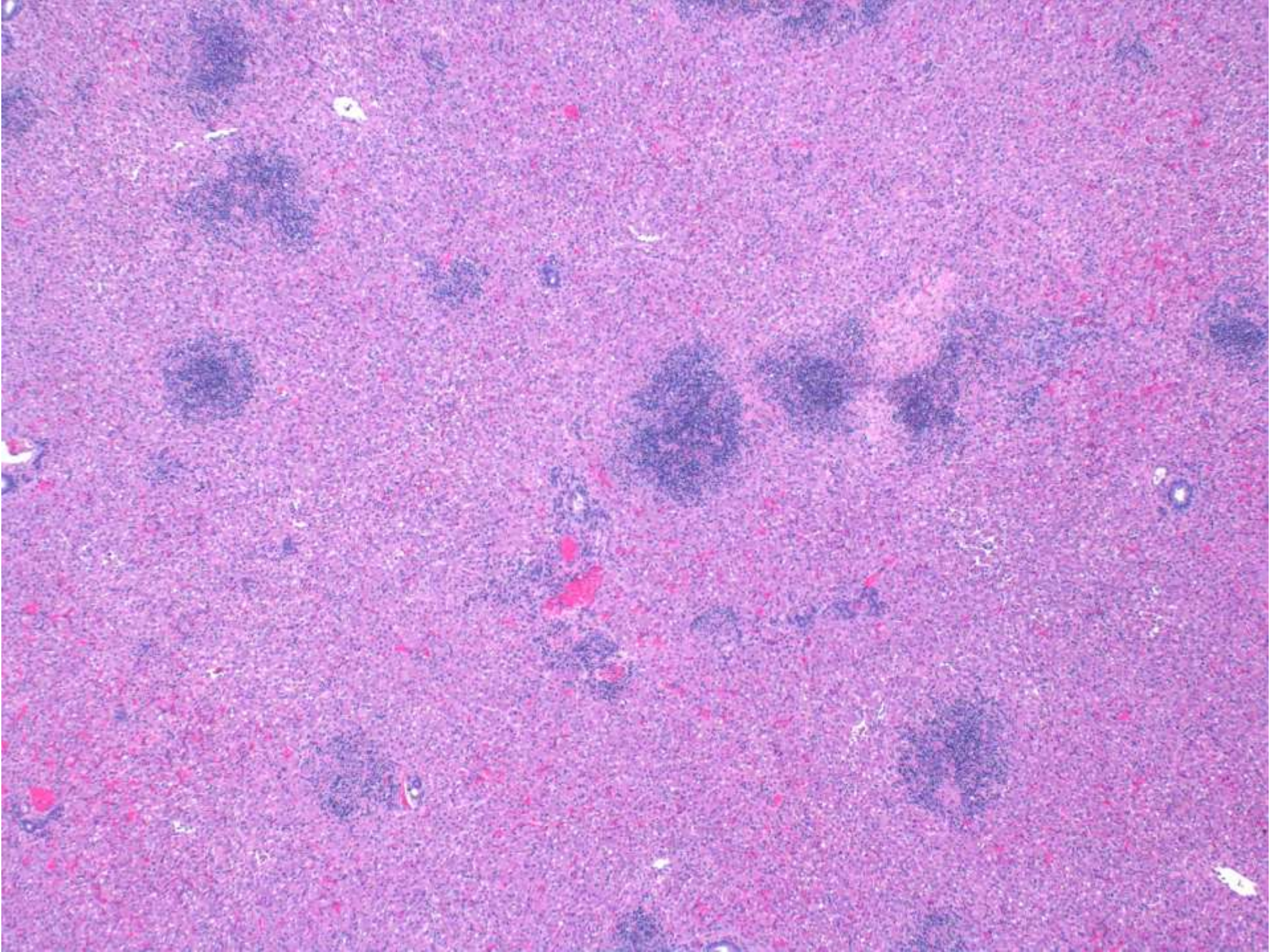
CLINICAL HISTORY

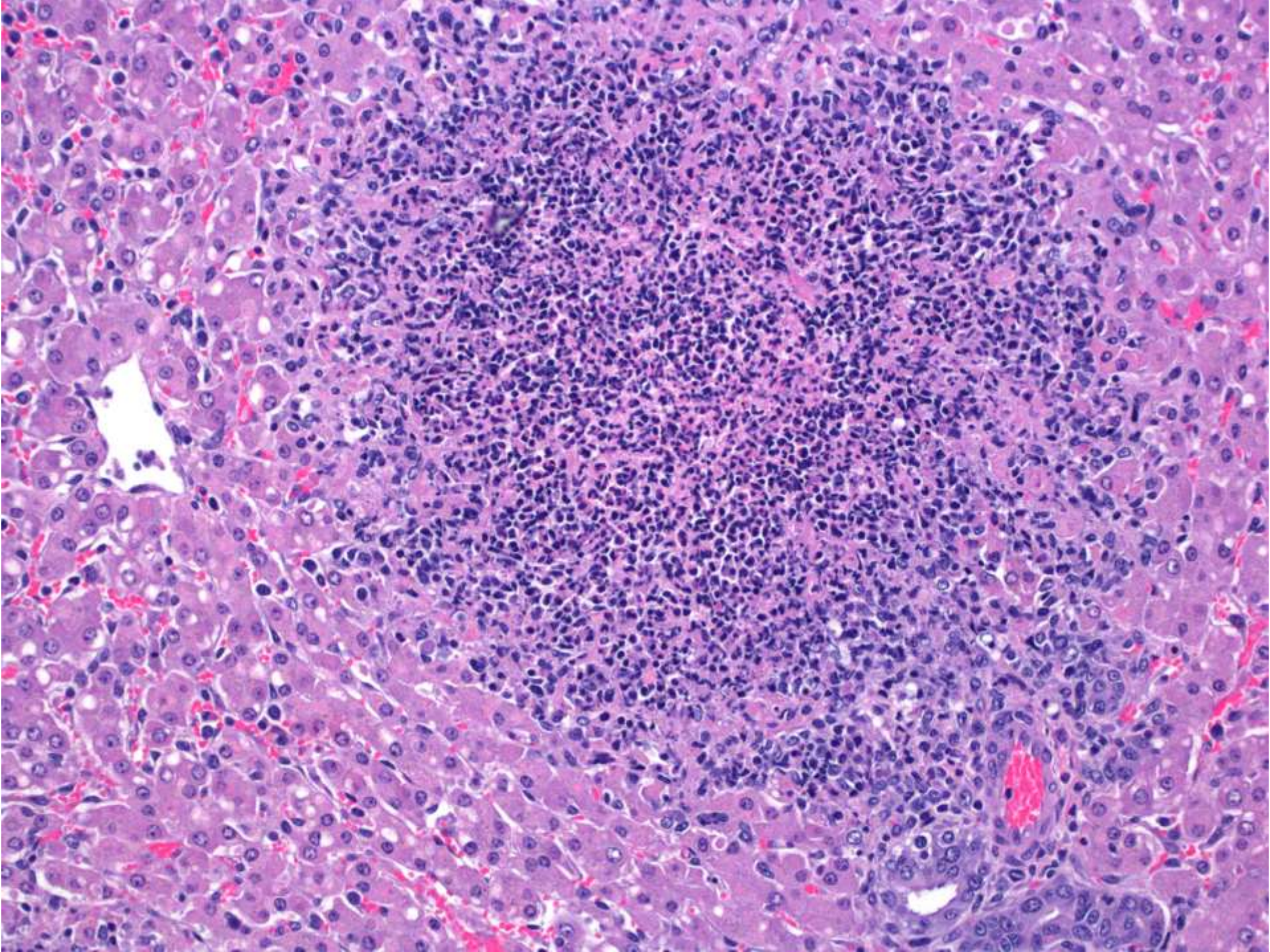
Unable to nurse
Fever
Lethargy
Death

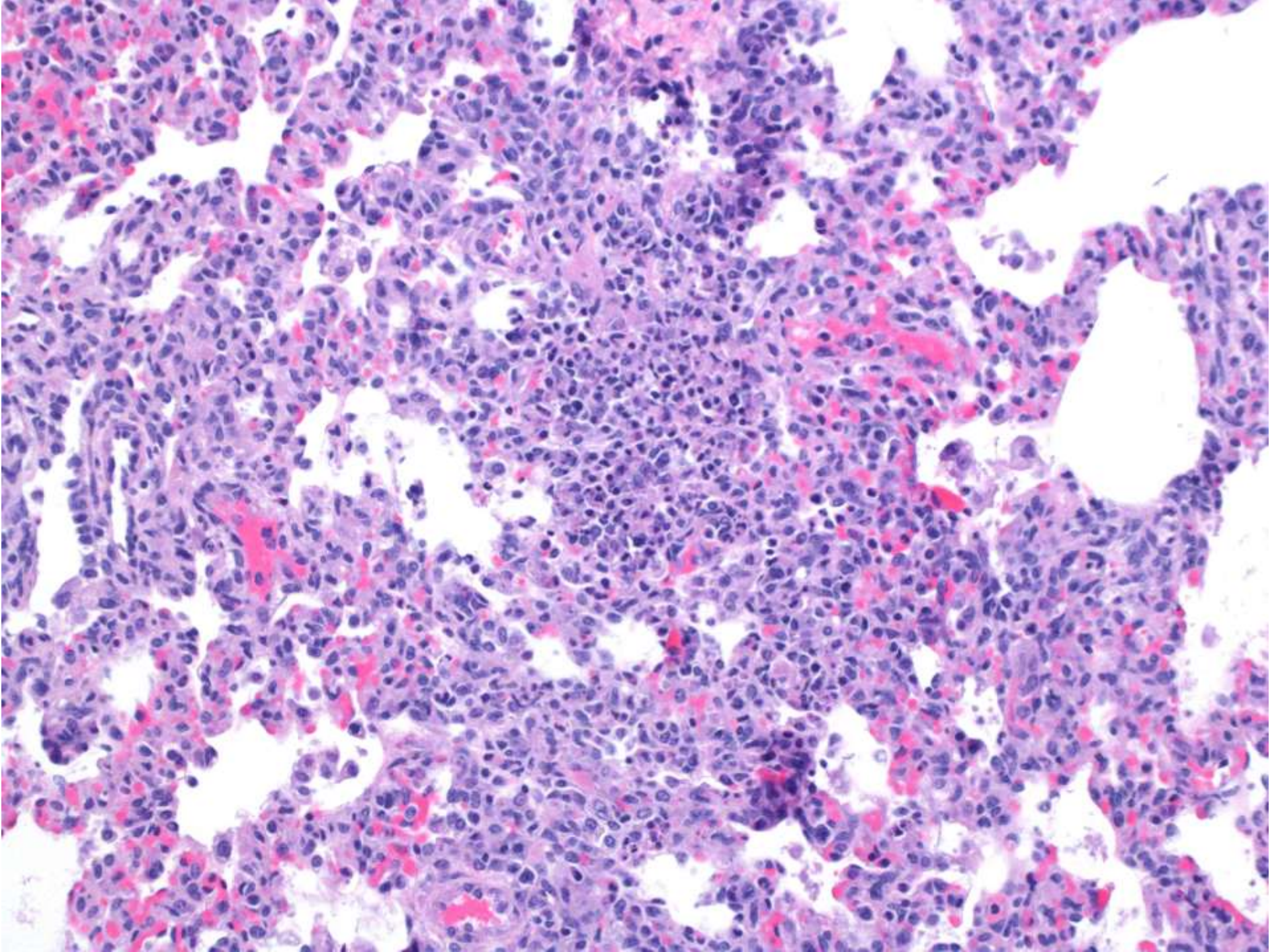
GROSS FINDINGS

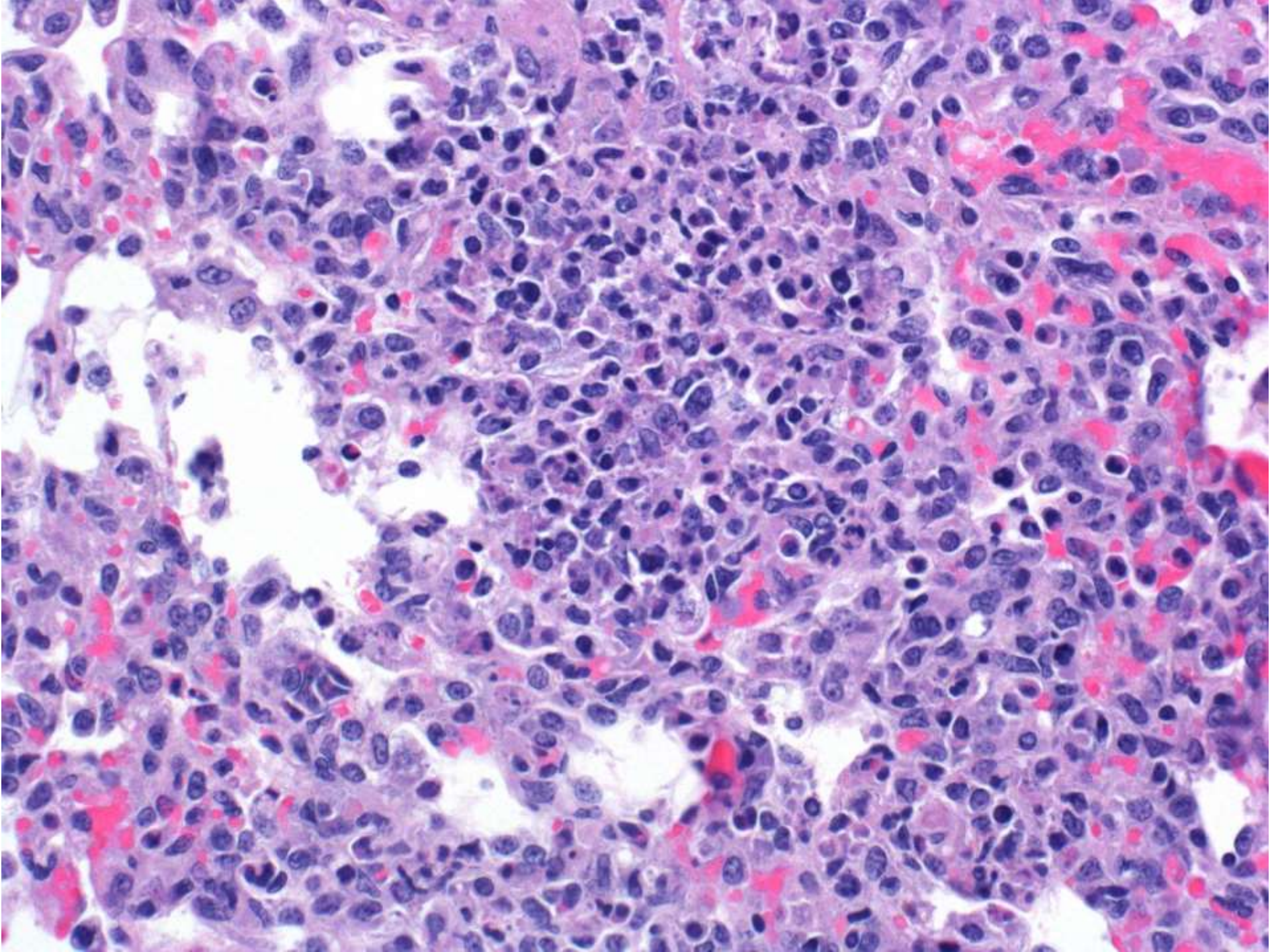


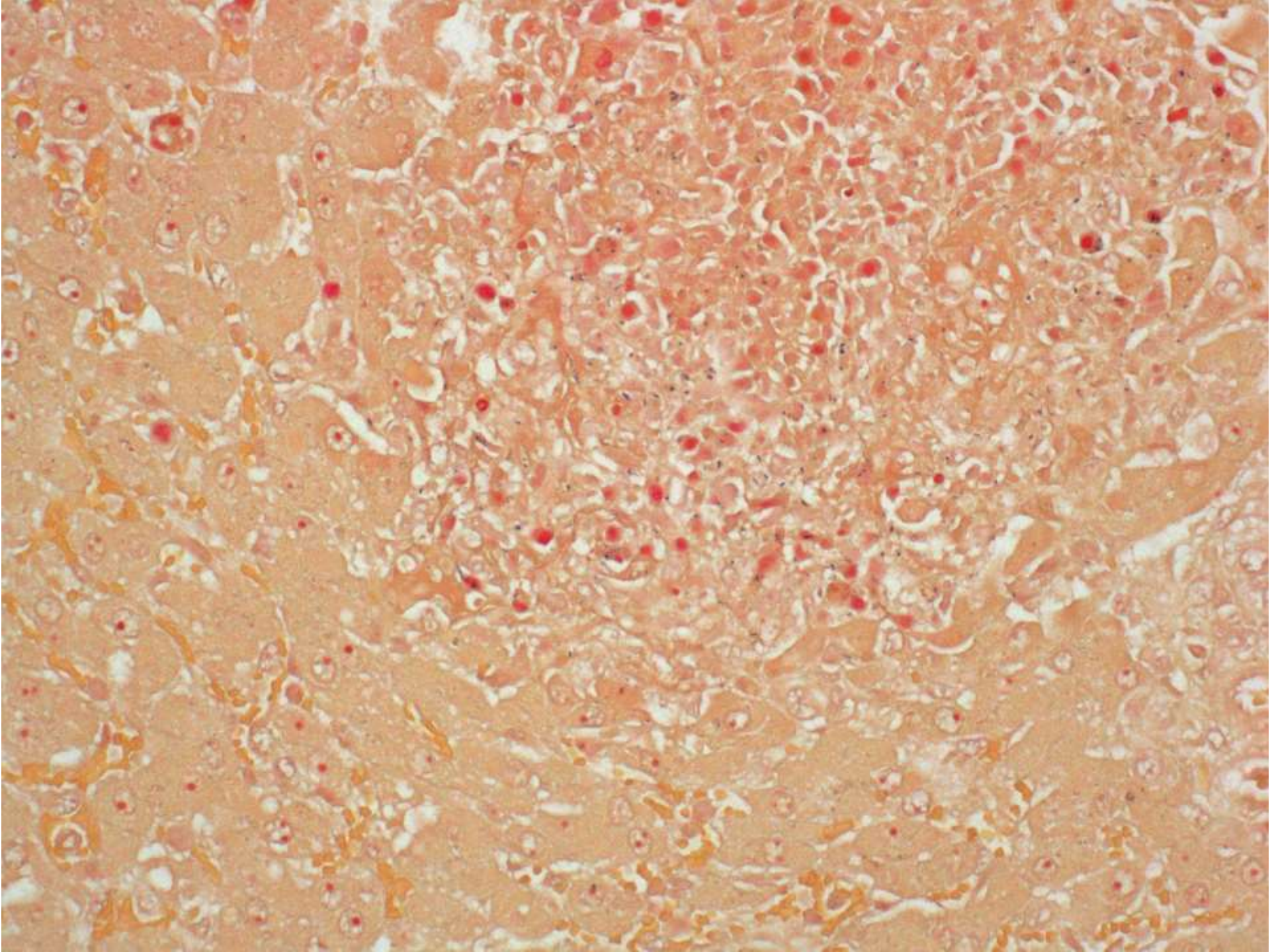
HISTOPATHOLOGY

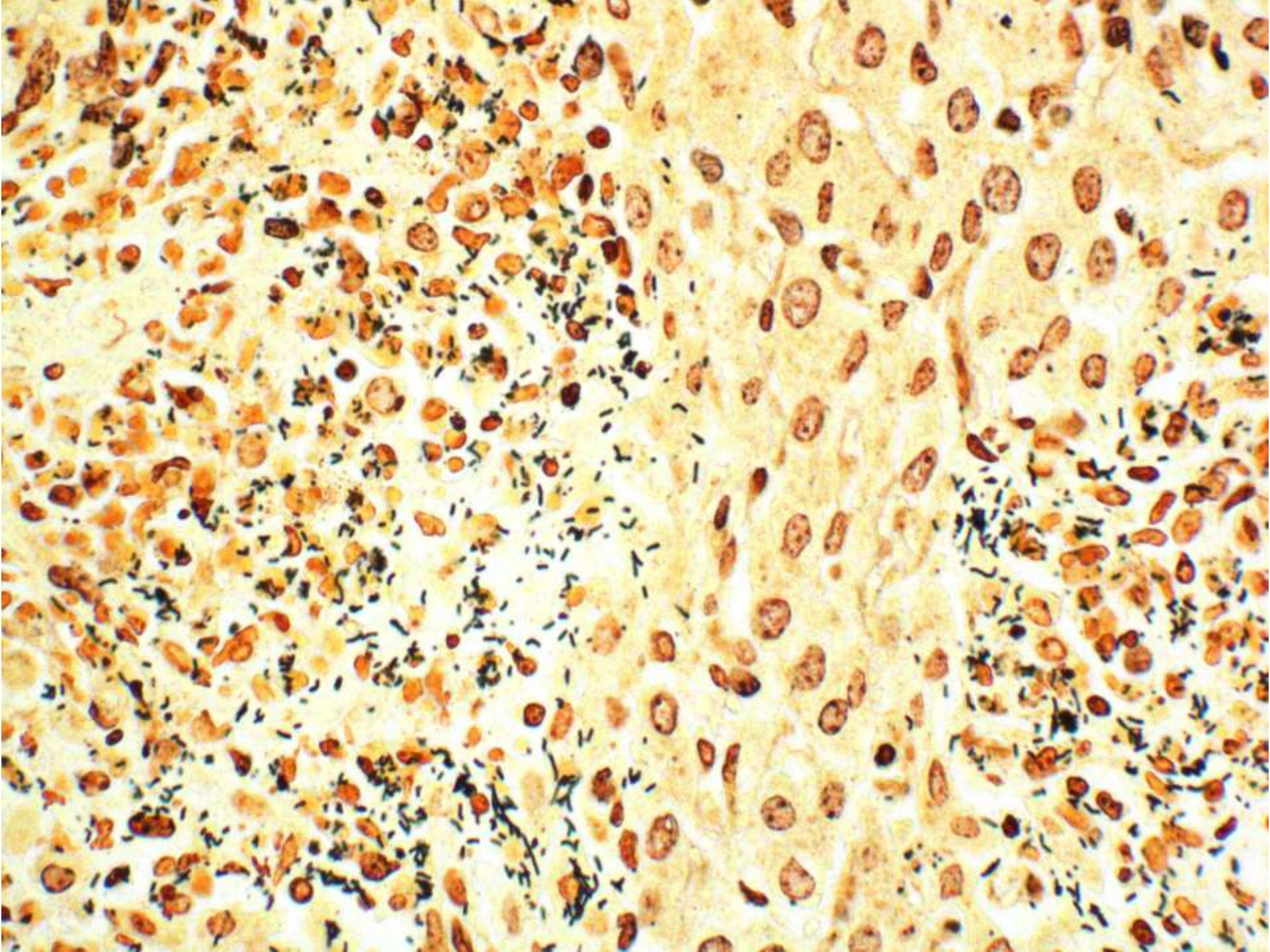










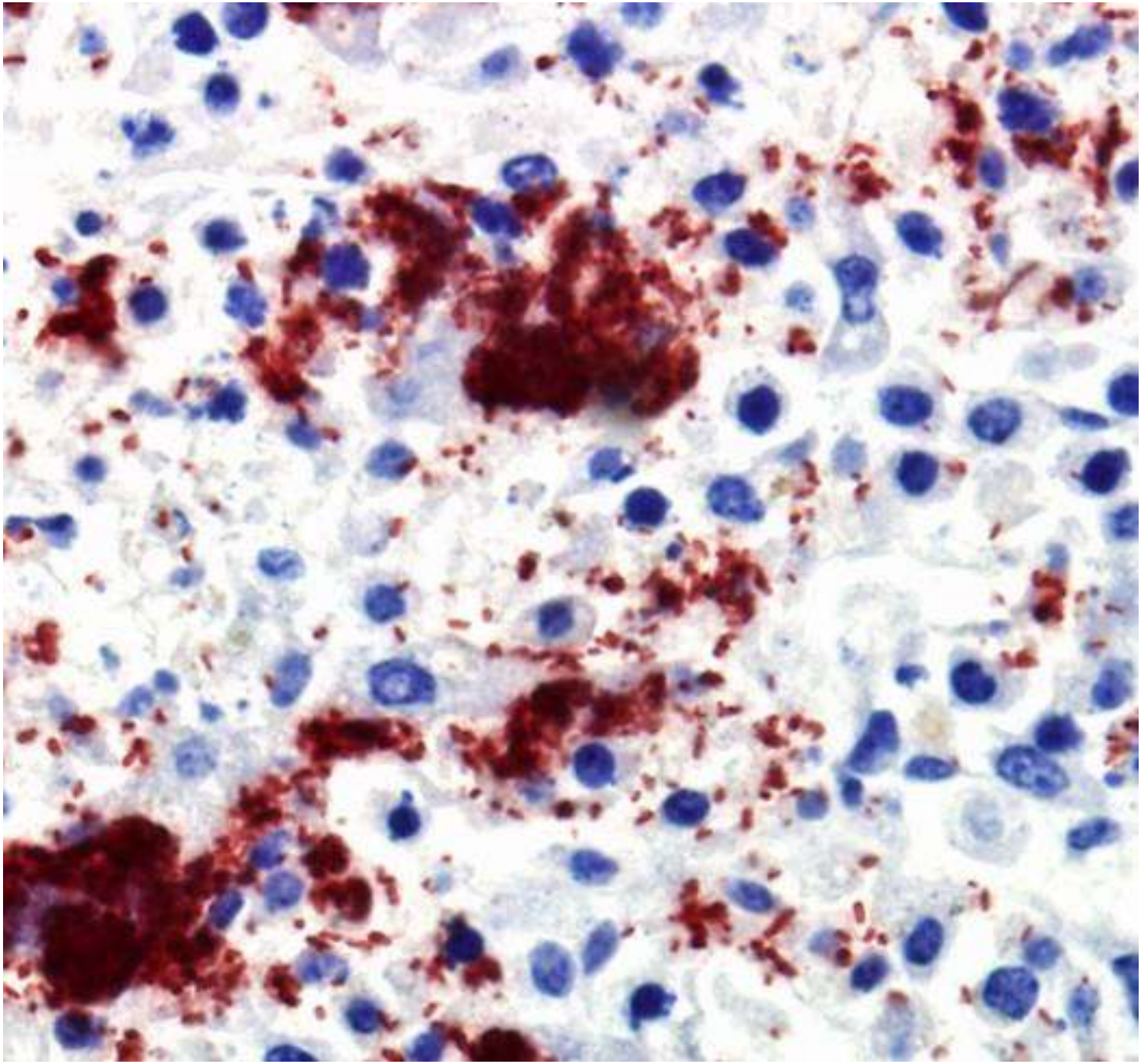


your diagnosis…..?

ANCILLARY TEST RESULTS

* *Yersinia* spp. PCR	NEG
* *Francisella* spp. PCR	NEG
* *Salmonella* spp. PCR (liver, intestine)	NEG
* Aerobic/anaerobic bacterial cultures (liver, lung)	NEG
* Cold enrichment culture (liver)	**POS***
* Heavy metal screen	UNRK
* IHC *Listeria* spp.	**POS**

* *Listeria monocytogenes* isolated (pure, rich culture)



DIAGNOSIS

Listeriosis

Listeria monocytogenes

Four syndromes in animals:

i) Encephalitis
ii) Abortion
iii) Septicemia
iv) Enteric

CASE 3

Multiple cows

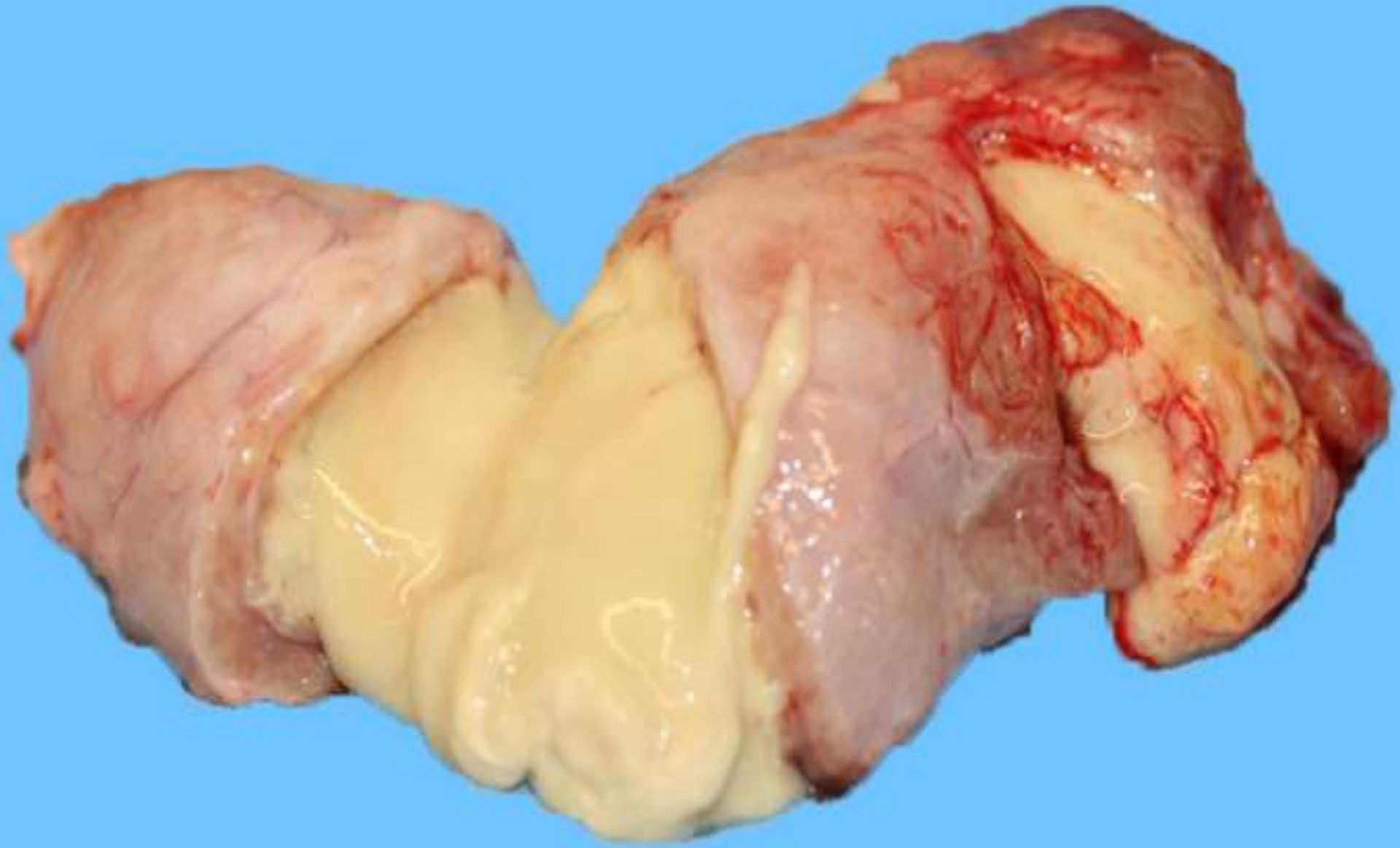
CLINICAL HISTORY

Multiple cows with granulomatous lesions

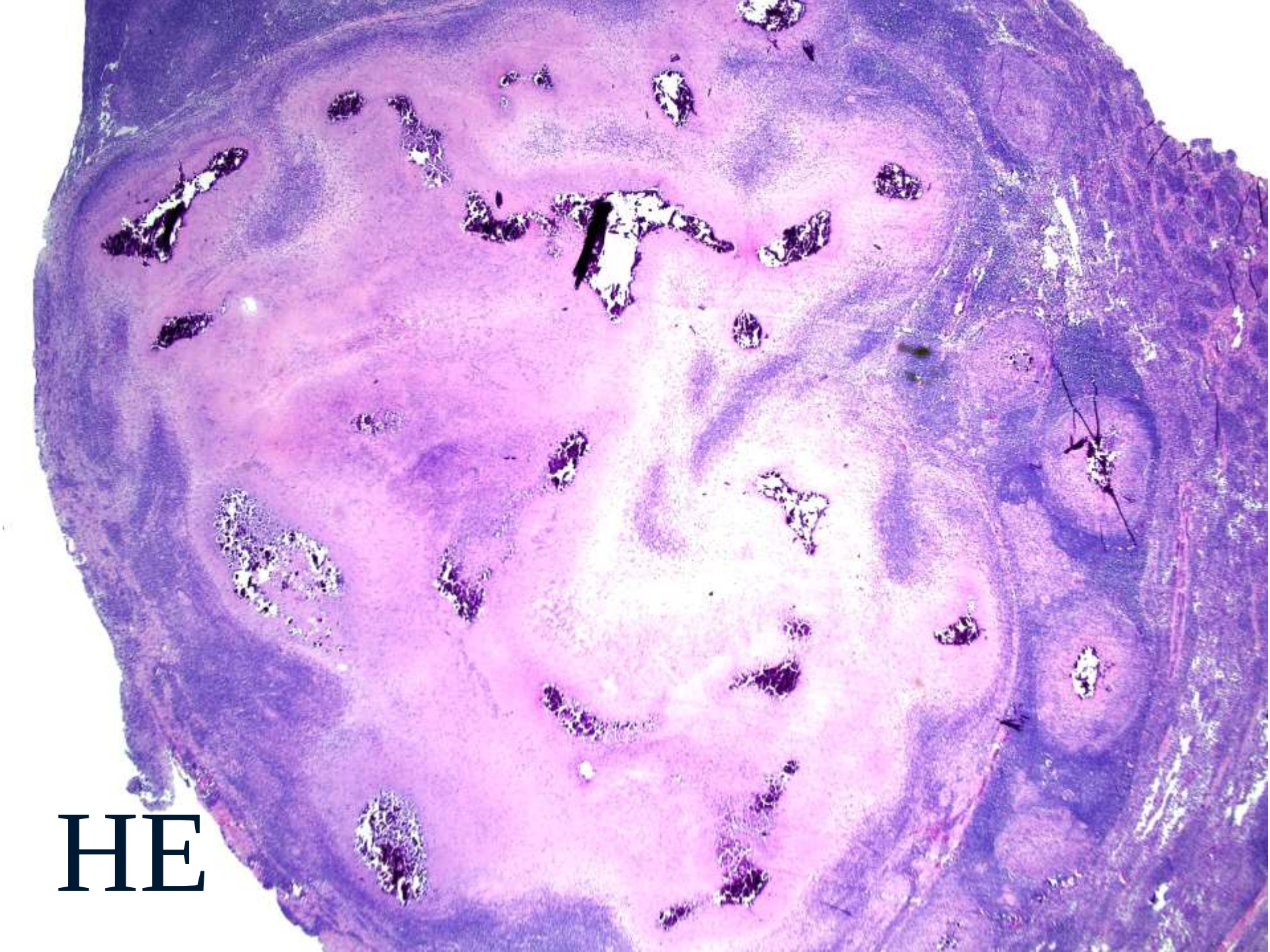
found in lymph nodes at slaughter

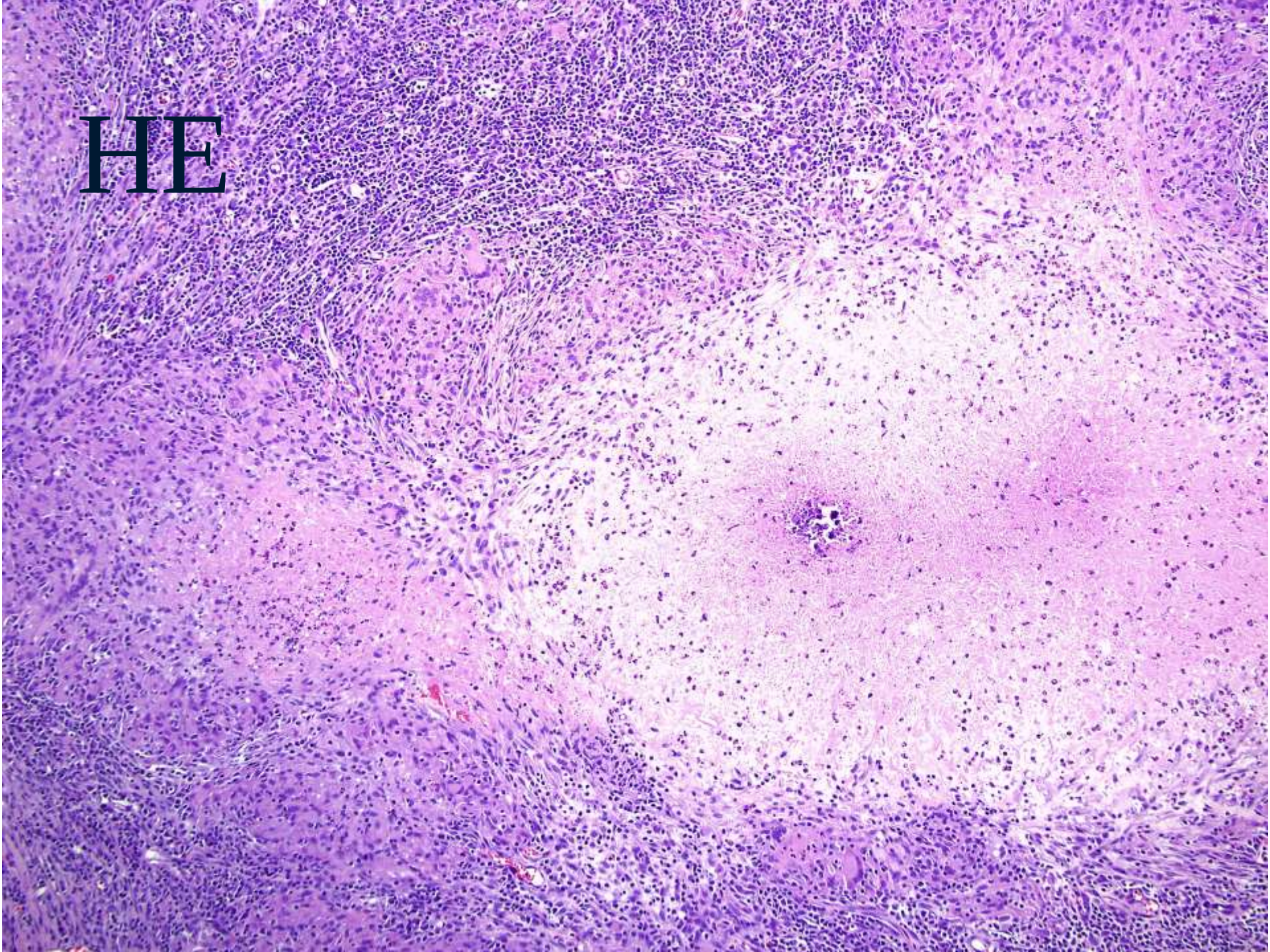
Contact with imported animal

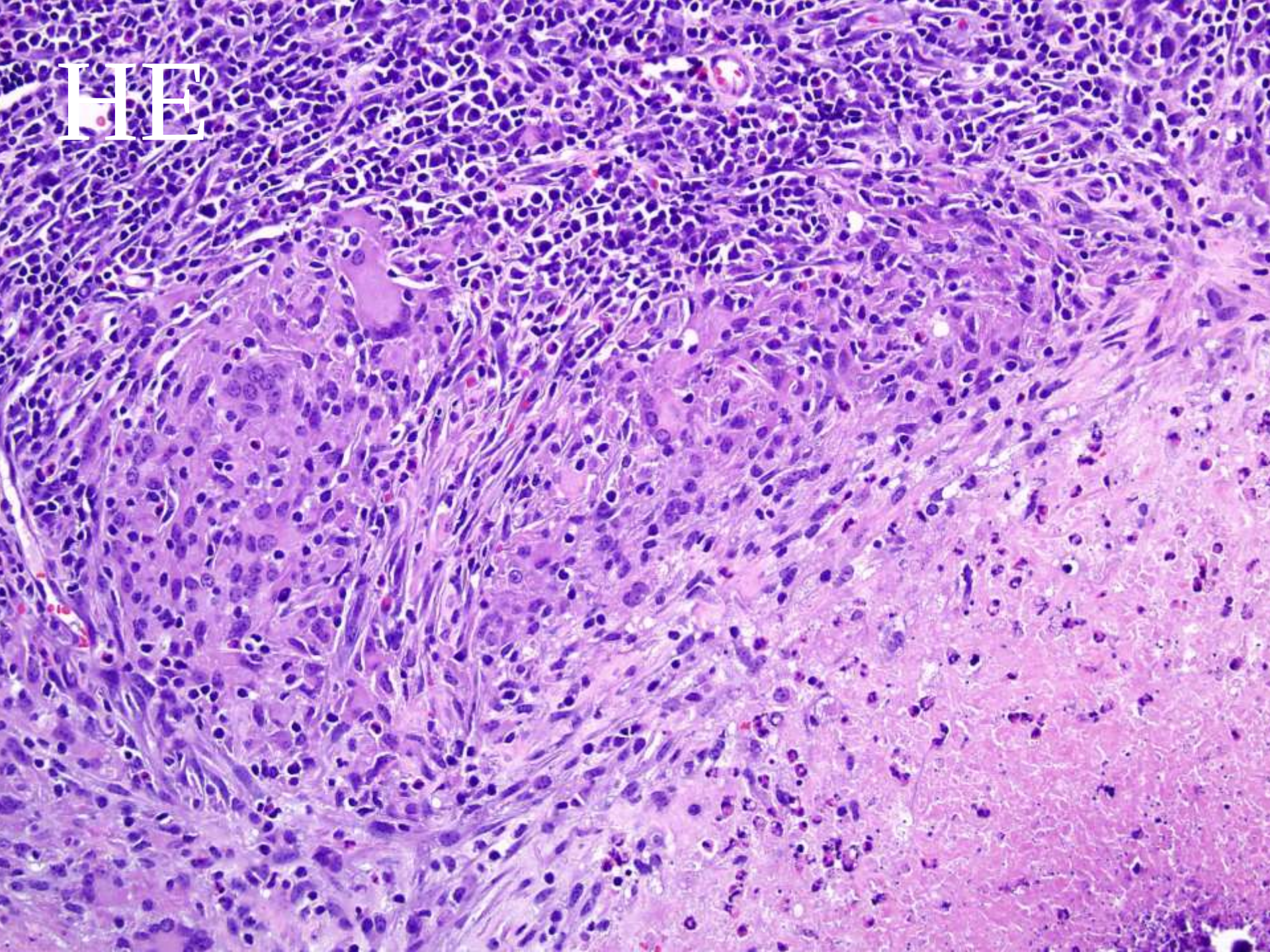
GROSS FINDINGS

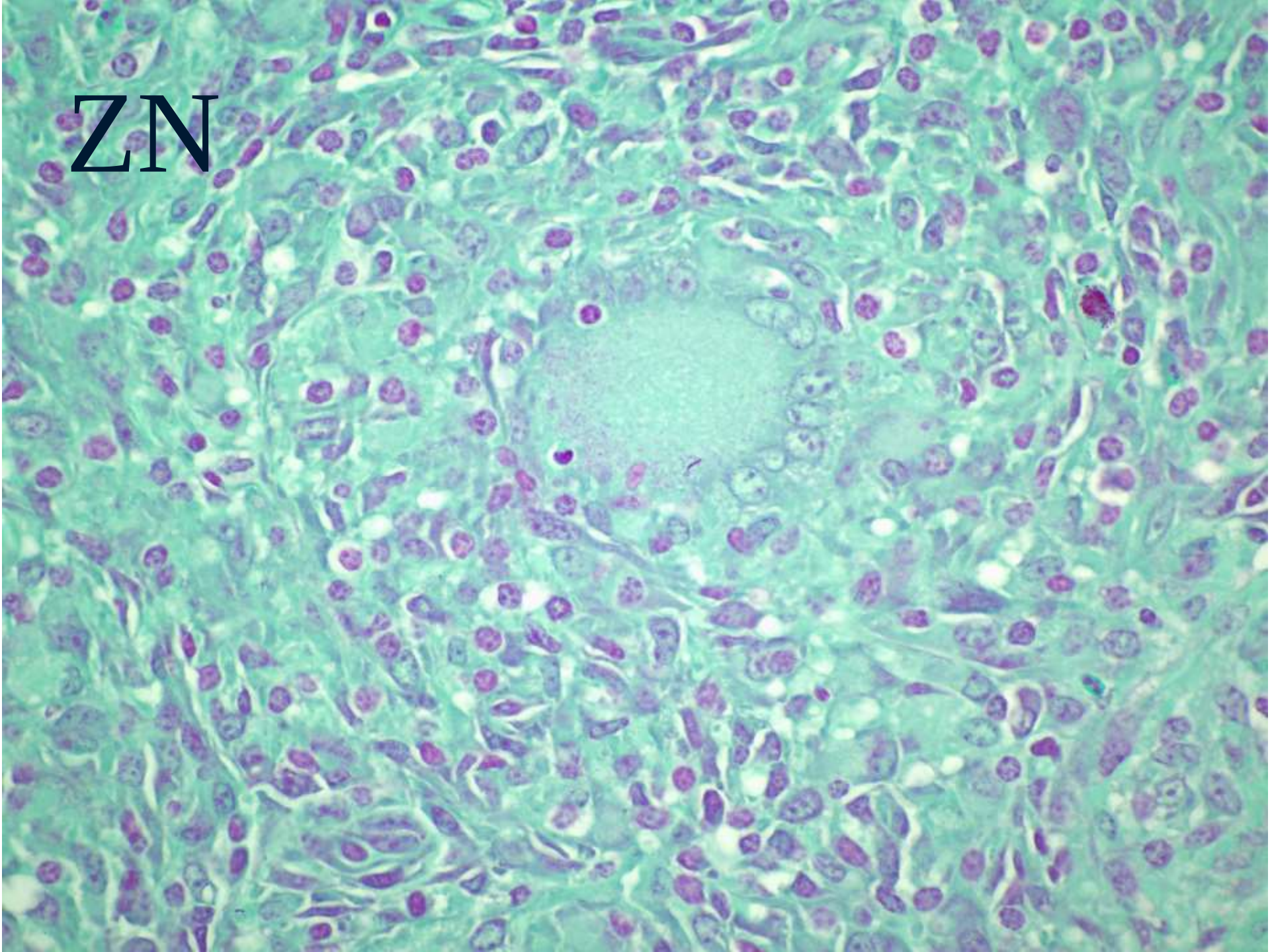


HISTOPATHOLOGY


HE


HE


HE


ZN

your diagnosis…..?

ANCILLARY TESTS

* *Mycobacterium tuberculosis* PCR	NEG
* *Mycobacterium avium* PCR	NEG
* *Mycobacterium bovis* PCR	**POS**
* *Mycobacterium* spp. Culture	**POS***

* *Mycobacterium bovis* isolated

DIAGNOSIS

Mycobacteriosis (*M. bovis*)

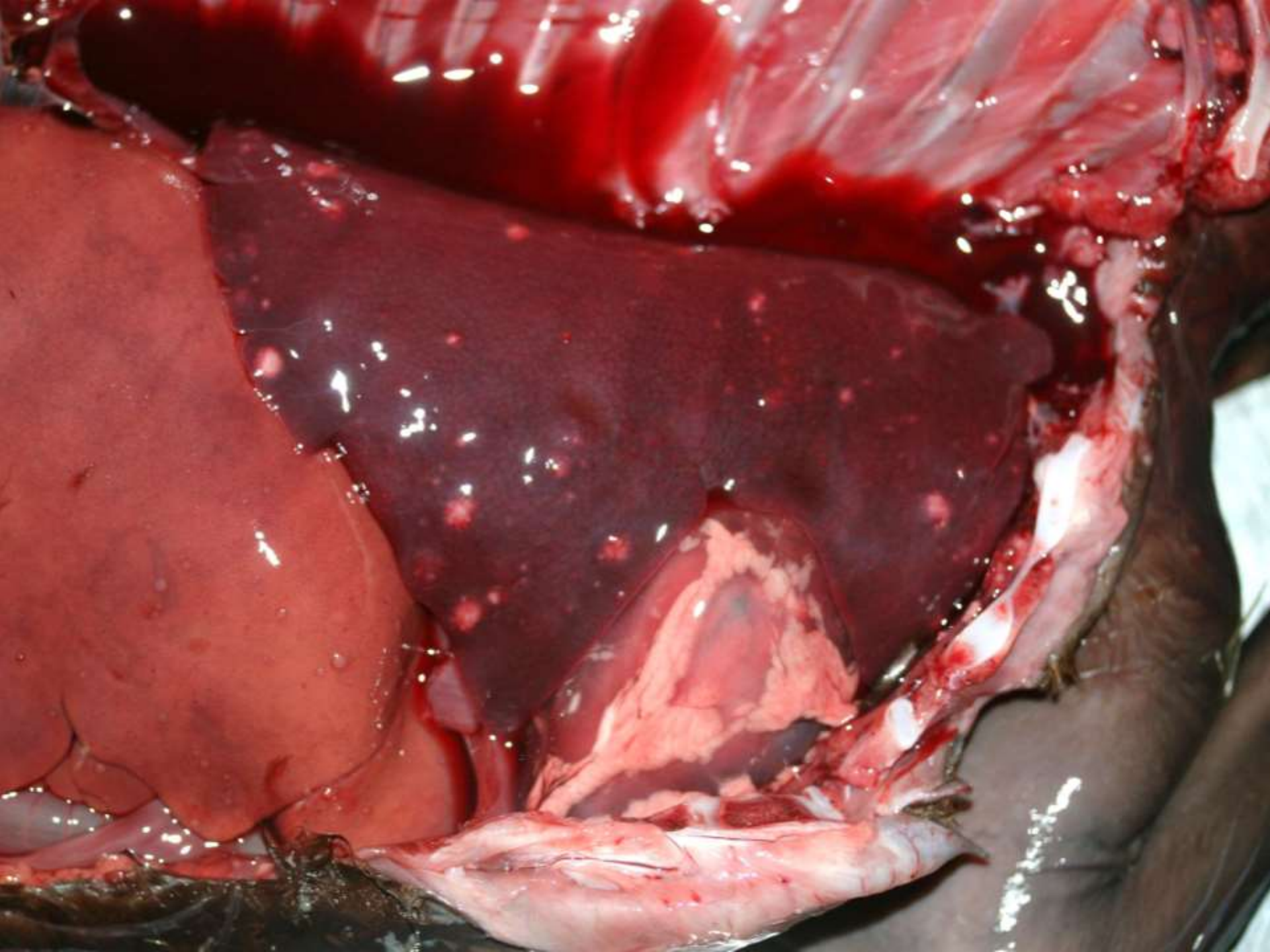
CASE 4

An alpaca fetus and placenta

CLINICAL HISTORY

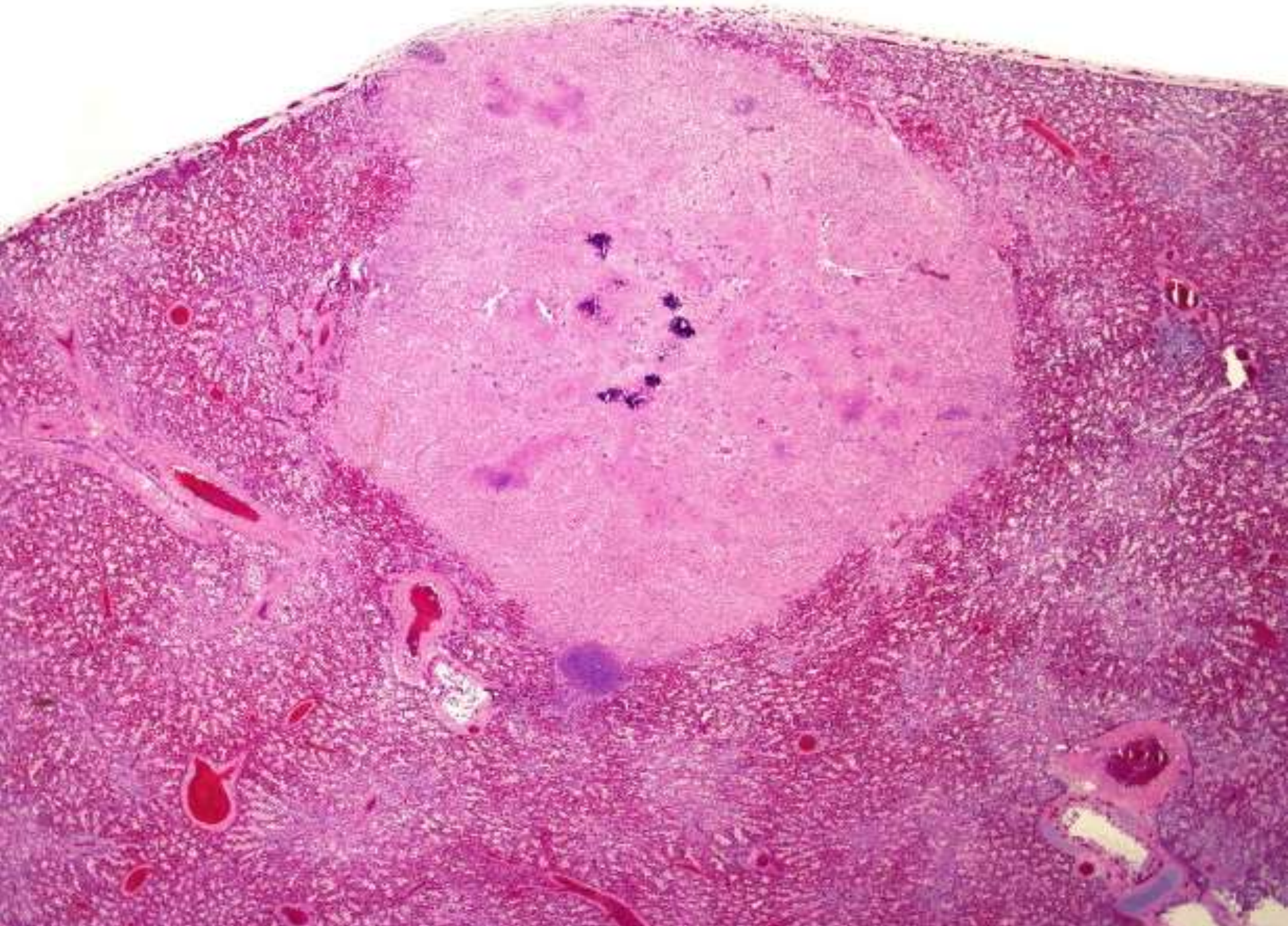
Near term abortion

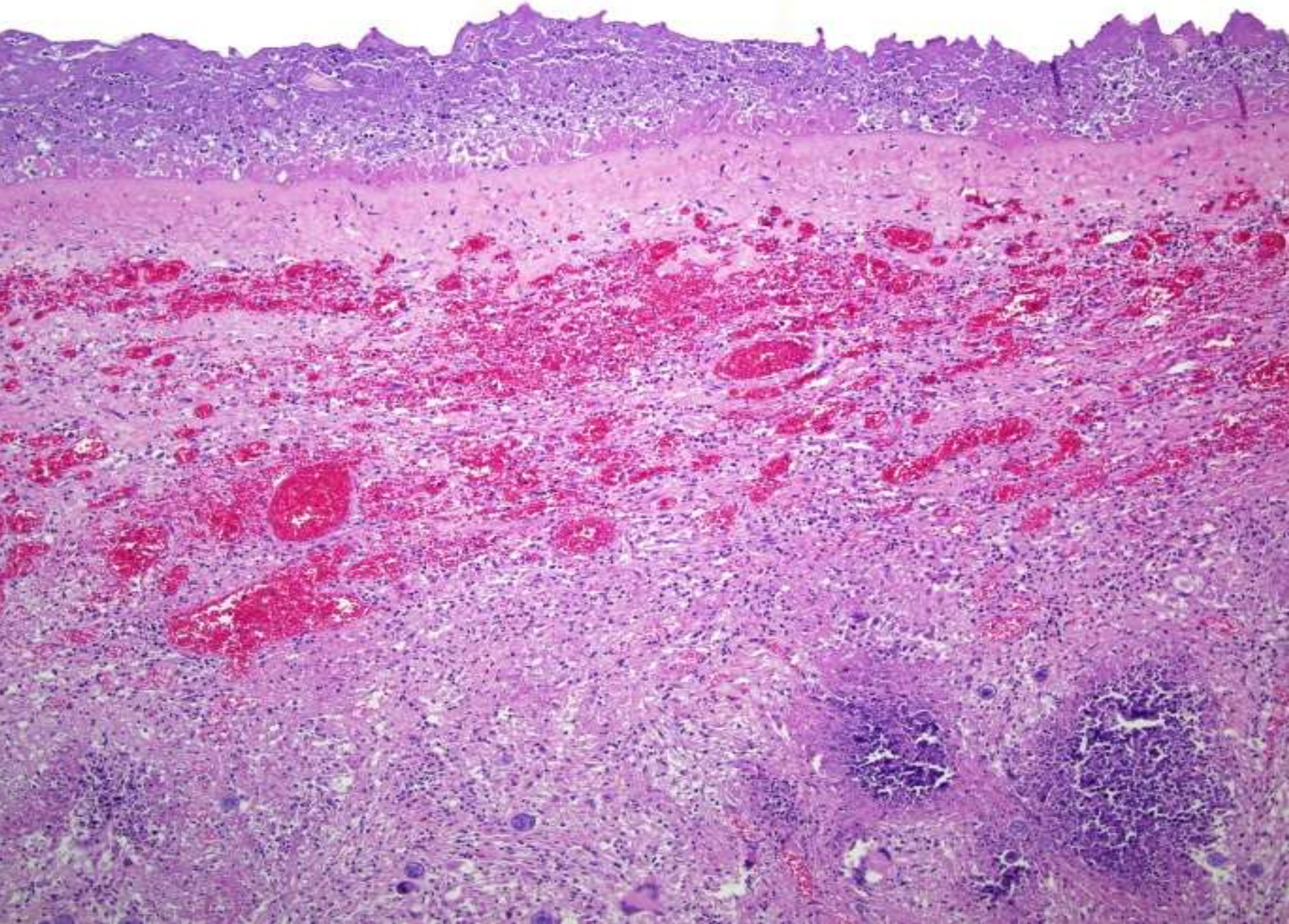
GROSS FINDINGS

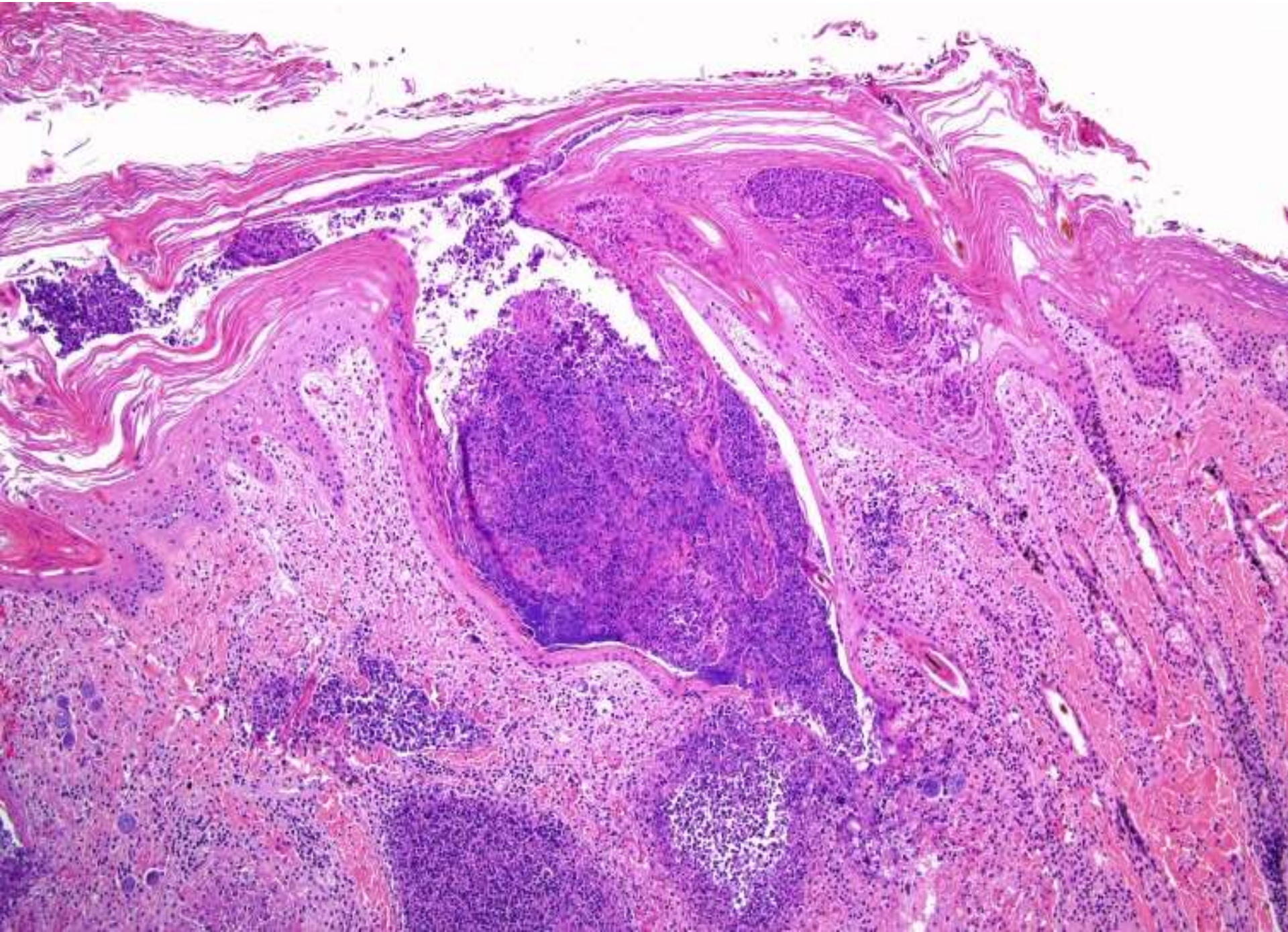


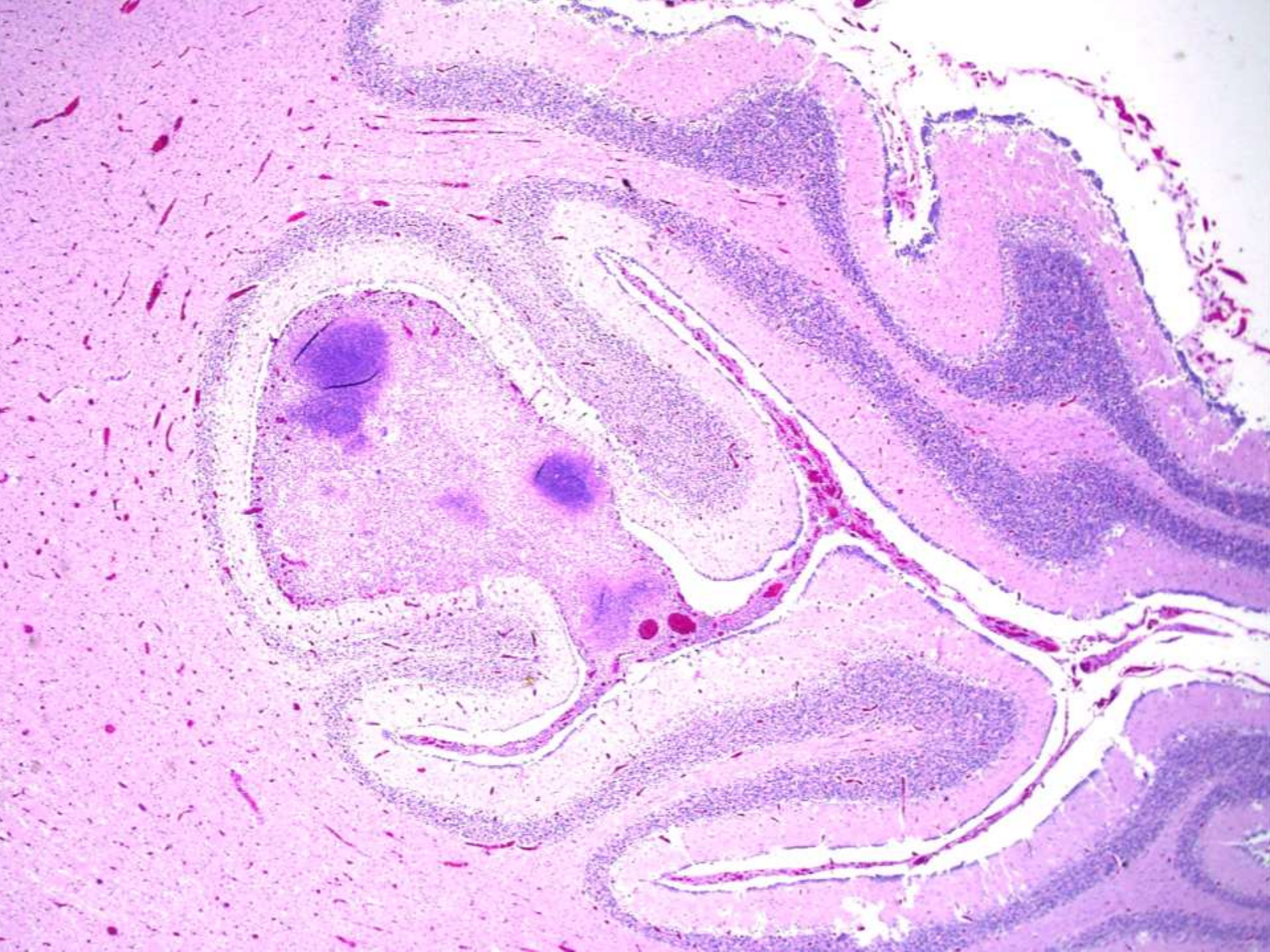
Dam euthanized and necropsied

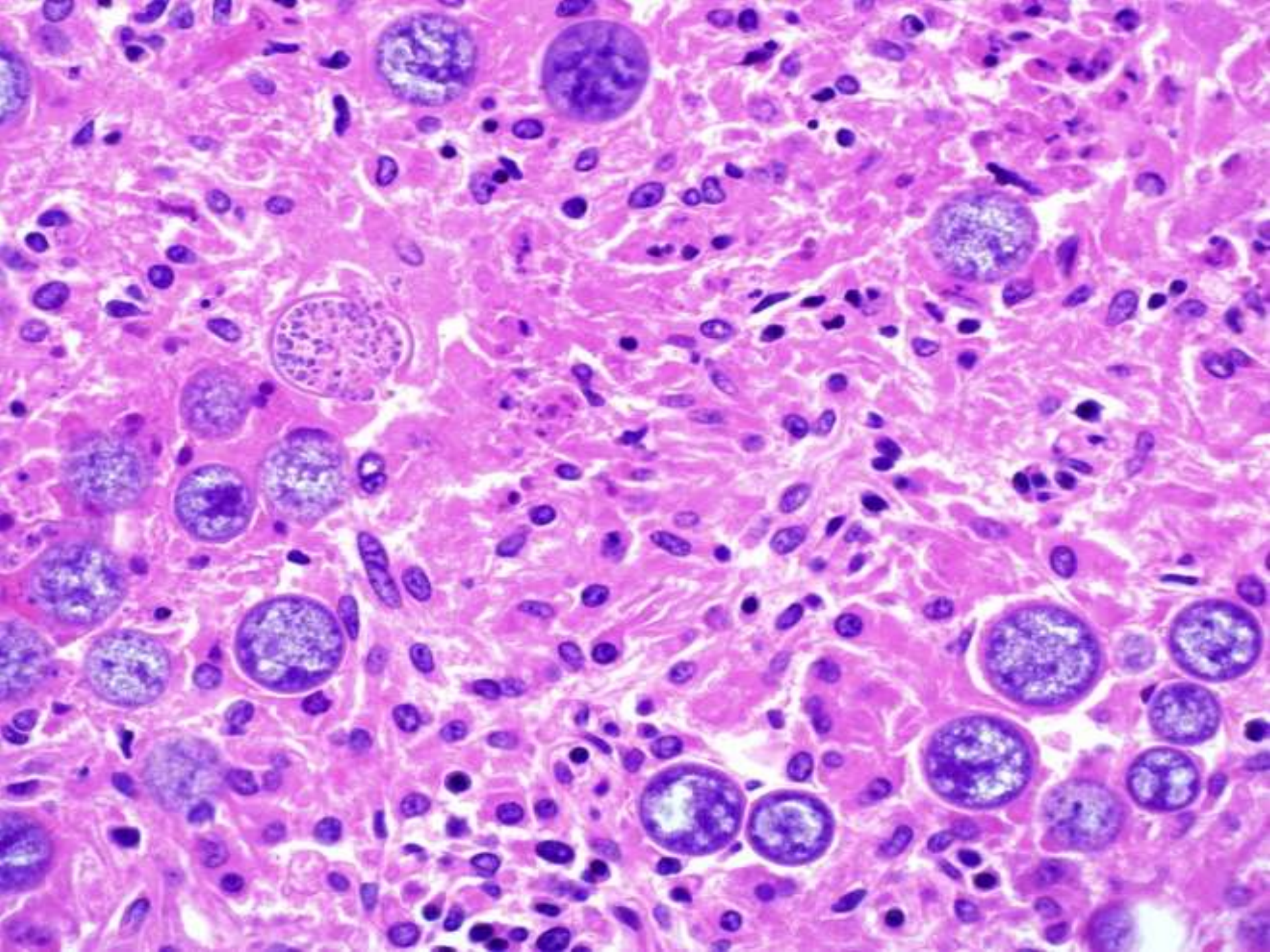
HISTOPATHOLOGY

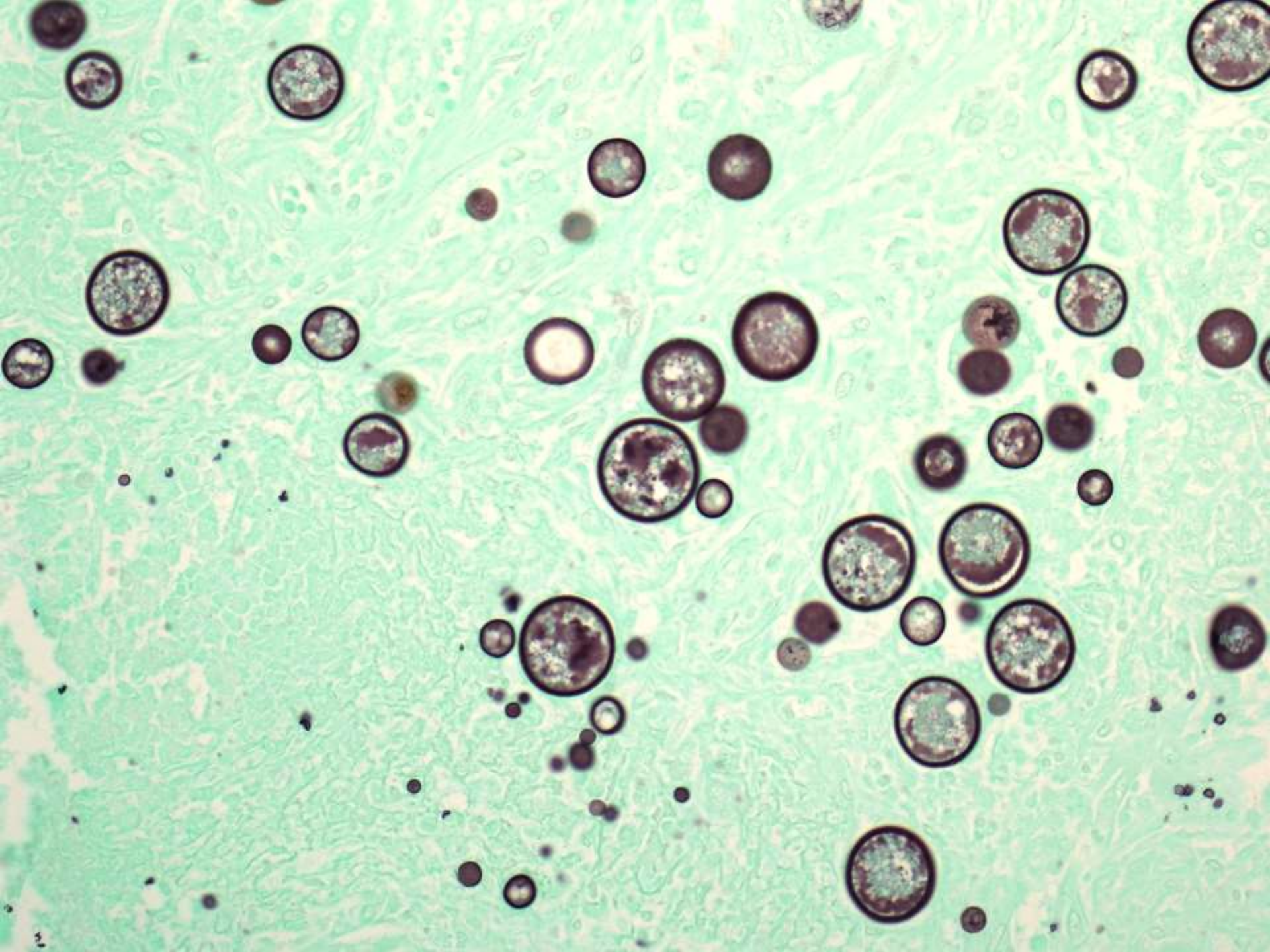












your diagnosis…..?

ANCILLARY TEST RESULTS

Fetus

* *Coccidioides* spp. PCR (fetal liver, lung)	NEG

Dam

* Serology:

-Coccidioidomycosis	**POS**
-Blue tongue	**POS**
-BVD (1 & 2)	NEG
-EHV-1	NEG
-Leptospira	NEG
-Toxoplasmosis	NEG
-Brucellosis	NEG

DIAGNOSIS

Coccidioidomycosis (Valley fever)

C. immitis

C. posadasii

Coccidioides immitis (CDC select agent)

CASE 5

Multiple dairy cows

CLINICAL HISTORY

Flaccid paralysis
Death

POSTMORTEM FINDINGS

No gross/microscopic abnormalities

your diagnosis…..?

ANCILLARY TESTS RESULTS

* Bacterial cultures liver, lung, brain:	negative
* Salmonella spp. PCR (liver + intestine):	negative
* Rabies FAT (CNS pool):	negative
* BHV-1 PCR (CNS pool):	negative
* WNV PCR (CNS pool):	negative
* Heavy metal screen:	unremark
* Botulism toxins test	positive

DIAGNOSIS

Botulism type D

Phosphorus deficiency:

PICA

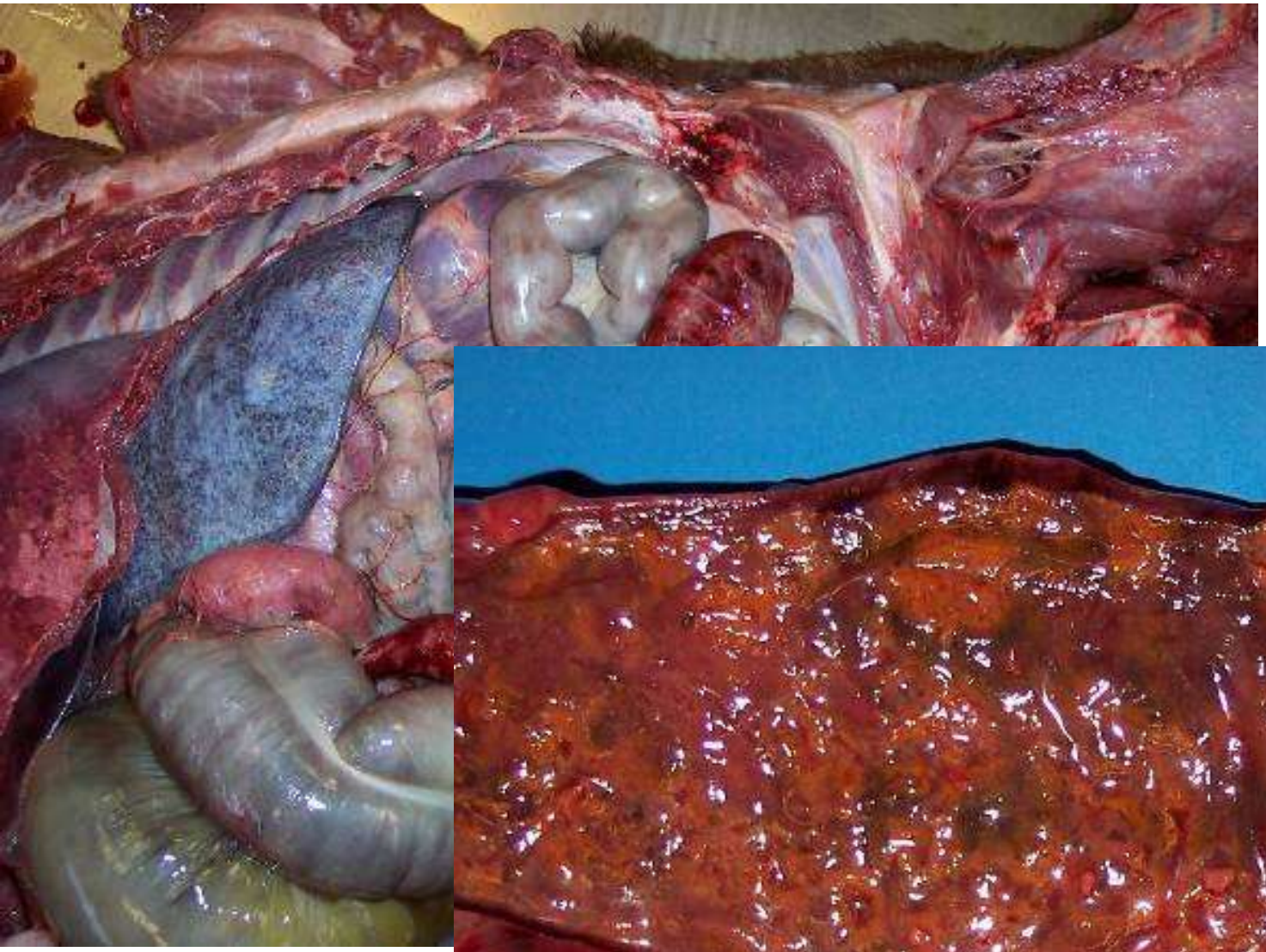
CASE 6

Newborn foal

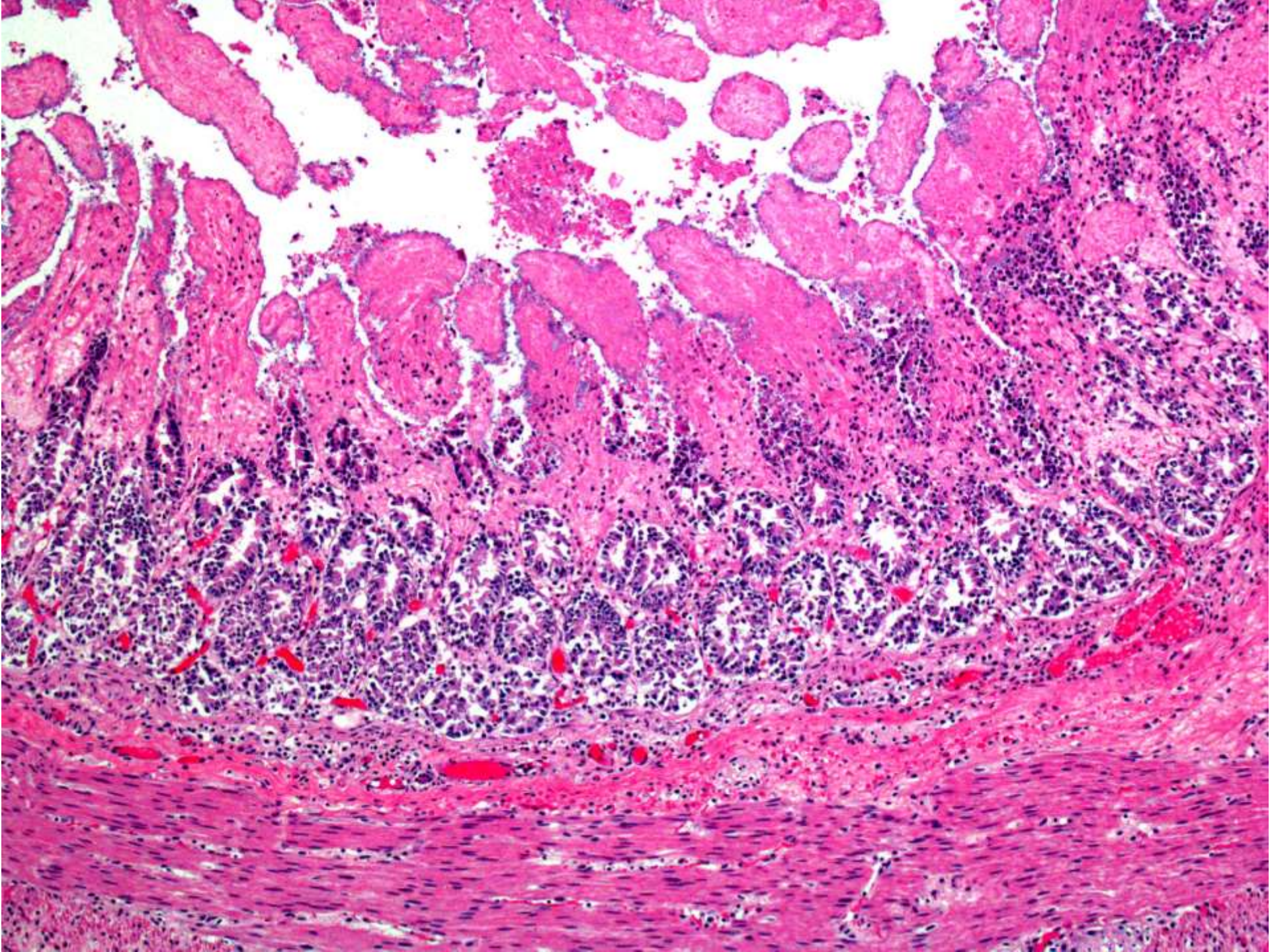
CLINICAL HISTORY

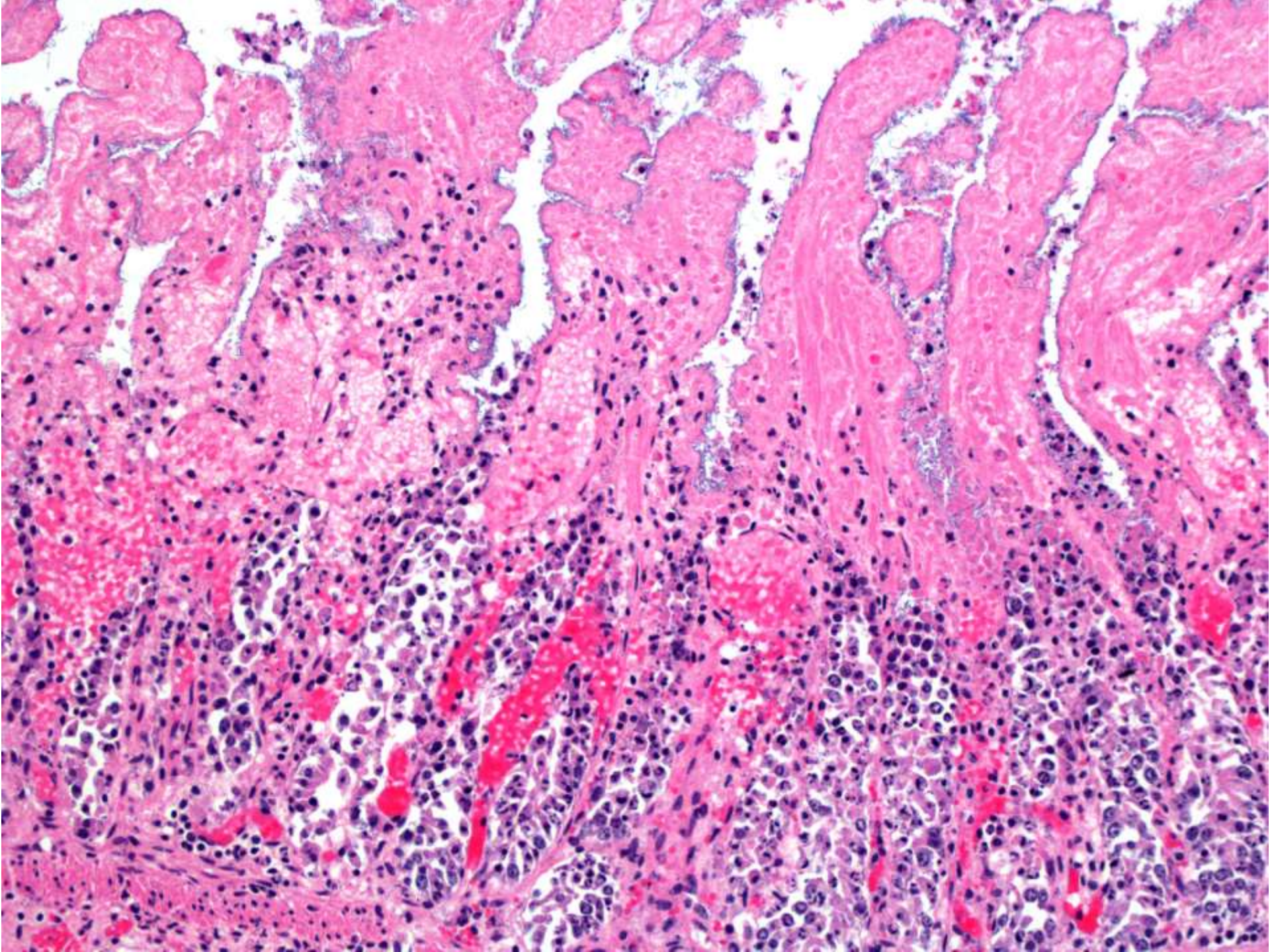
* Acute bloody diarrhea
* Fever

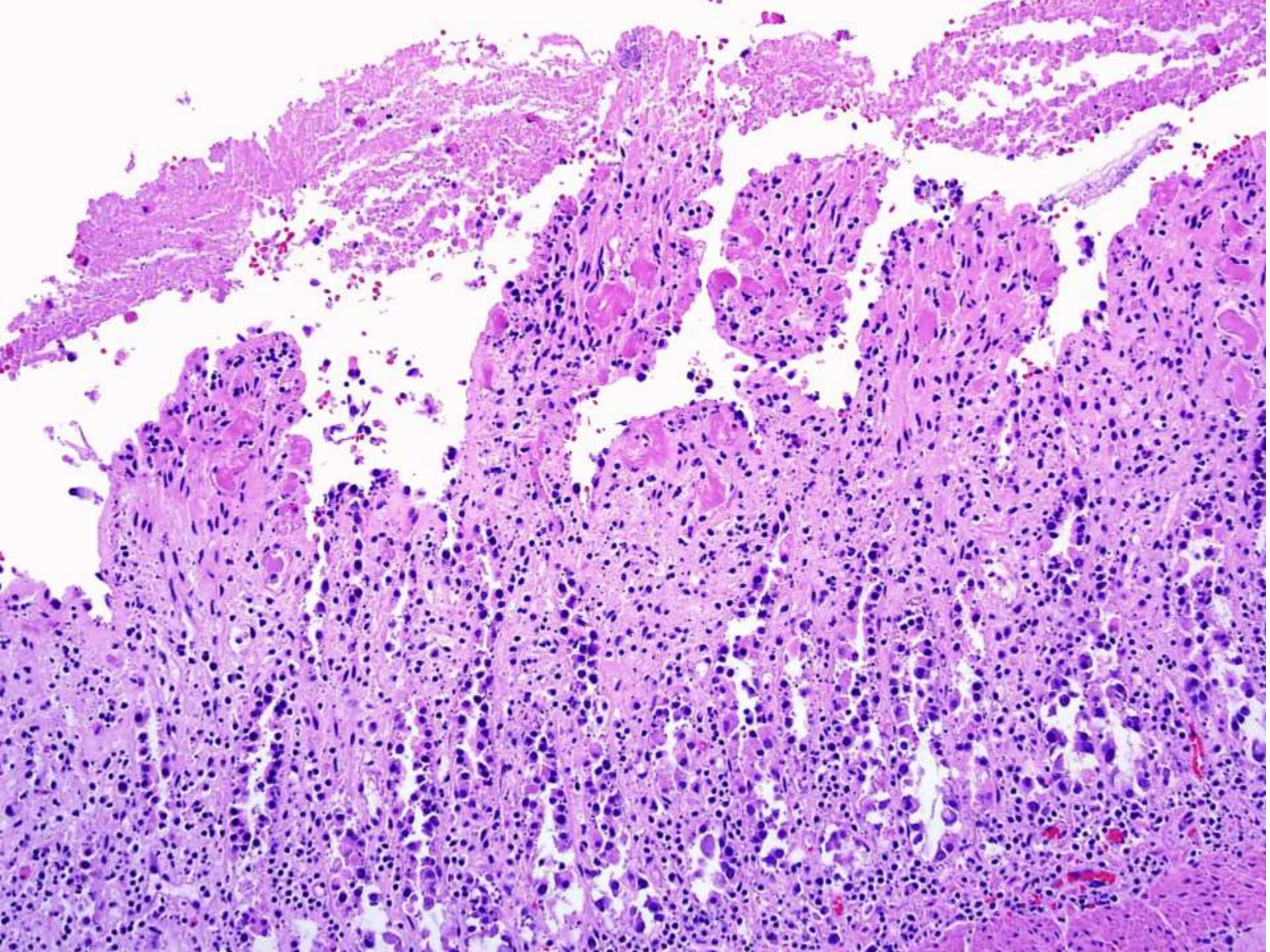
GROSS FINDINGS



HISTOPATHOLOGY







your diagnosis…..?

ANCILLARY TEST RESULTS

* Bacterial culture (aerobic/anaerobic; liver, SI, colon)	**POS***
* Salmonella spp. PCR (liver, si, colon)	NEG
* *C. difficile* culture (si, colon)	NEG
* *C. perfringens* toxins ELISA (alpha, beta, epsilon)	**POS****
* *C. difficile* toxins ELISA (A, B)	NEG

* *Clostridium perfringens* type C isolated (si, colon; rich)

* alpha and beta toxins detected

DIAGNOSIS

Necrotic enteritis by *Clostridium perfringens* type C (enteritis necroticans)

The 2018 *C. perfringens* toxin-based typing scheme (Rood et al, 2018)

Toxinotype	α-toxin (cpa)	β-toxin (cpb)	ε-toxin (etx)	ι-toxin (itx)	CPE (cpe)	NetB (netB)
A	+	-	-	-	-	-
B	+	+	+	-	-	-
C	+	+	-	-	+/-	-
D	+	-	+	-	+/-	-
E	+	-	-	+	+/-	-
F	+	-	-	-	+	-
G	+	-	-	-	-	+

Beta toxin

* pore forming

* NECROTIZING

* VERY sensitive to trypsin

Due to this……

1-Intestinal trypsin: natural defense against type C disease

2-Type C disease:

-neonates

-pancreatic disease

-trypsin inhibitors

(sweet potato; soybean)

Clostridium perfringens type C

1-enteritis necroticans: humans
2-enterotoxemias: animals

1960s

The pigbel story……


Russia
Mongolia
South Korea
Japan
China
Kyrgyzstan
Nepal
India
Thailand
Vietnam
Philippines
HI
Malaysia
Indonesia
Papua New Guinea
NT
QLD
Australia
WA
SA
NSW
VIC
TAS
New Zealand


Vietnam
Malaysia
Indonesia
Papua New Guinea
NT
QLD
Australia
WA
SA
NSW
VIC
TAS
New Zealand

Photo: Greg Lawrance

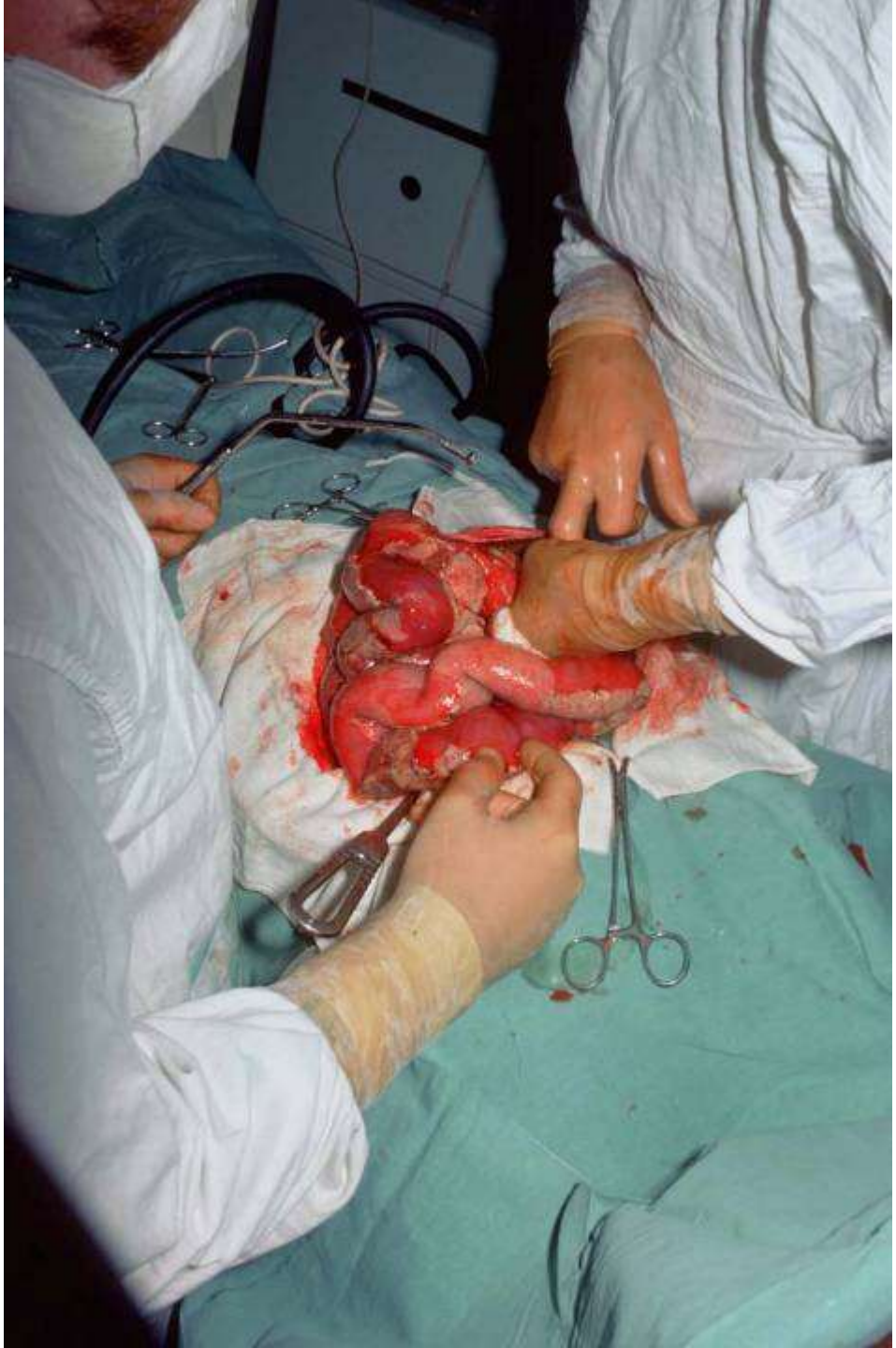


Photo: Greg Lawrance

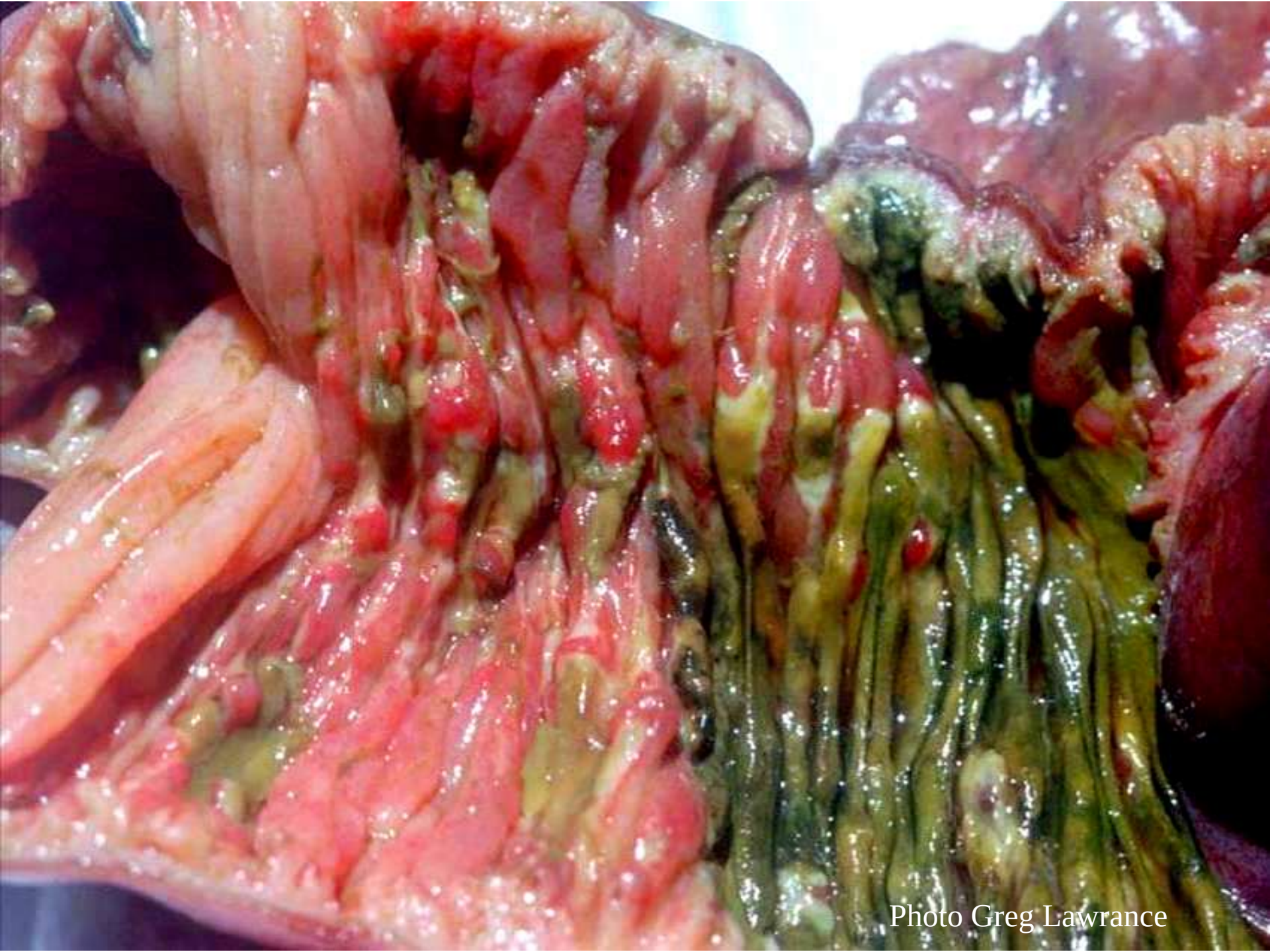


Photo Greg Lawrance

Frequent carrier of
C. perfringens type C

Photo Greg Lawrance

Fecal contamination of meat

Photo: Greg Lawrance


Sweet potatoes:
Trypsin inhibitor
Photo Greg Lawrance

Thank you!!!