Pathological Findings

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Few post-mortem studies have been reported in *P. vivax*.

Reports of severe vivax malaria have been confined to case reports and small case series.

Clark, H. and Tomlinson,W. **(1949)** The pathologic anatomy ofmalaria.
In Malariology (Boyd, M., ed.), pp. 874–903, WB Saunders

Billings, F. and Post, W. **(1915)** Fatal malaria due to the tertian parasite. Trans. Chicago Path. Soc. 9, 209–215

Bruetsch, W. **(1932)** The histopathology of therapeutic (tertian) malaria. Am. J. Psychiatry 12, 19–65

Parasitemias in vivax malaria rarely exceed 2% of circulating RBCs, and high parasite burdens are not a feature of severe disease.

Blood Smear:

Date	Time	per 1,000 RBC	per 200 WBC
08/06/90	07.00	3Av	Av+6Sv
	19.00	2Av	Av+3Sv
09/06/90	07.00		4Av
	19.00		1Av/slide
10/06/90	07.00		0
	19.00		0
11/06/90	07.00		0

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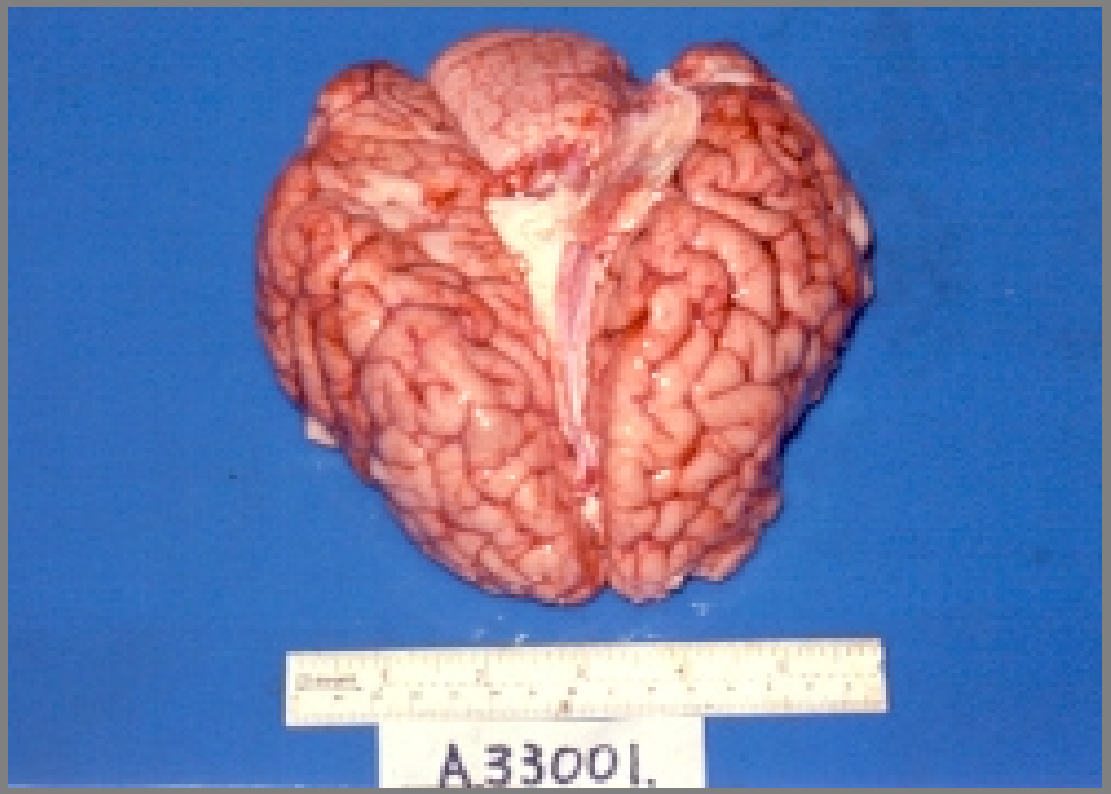
Do cytoadherence phenomena occur in *P. vivax* infections?

Autopsy

Gross findings:

- **External:** Maculopapular rash of both legs, anterior chest wall, right arm, nose, malar region, back; no jaundice

- **Internal:** Liver 2 FB below RCM; spleen 3 FB below LCM



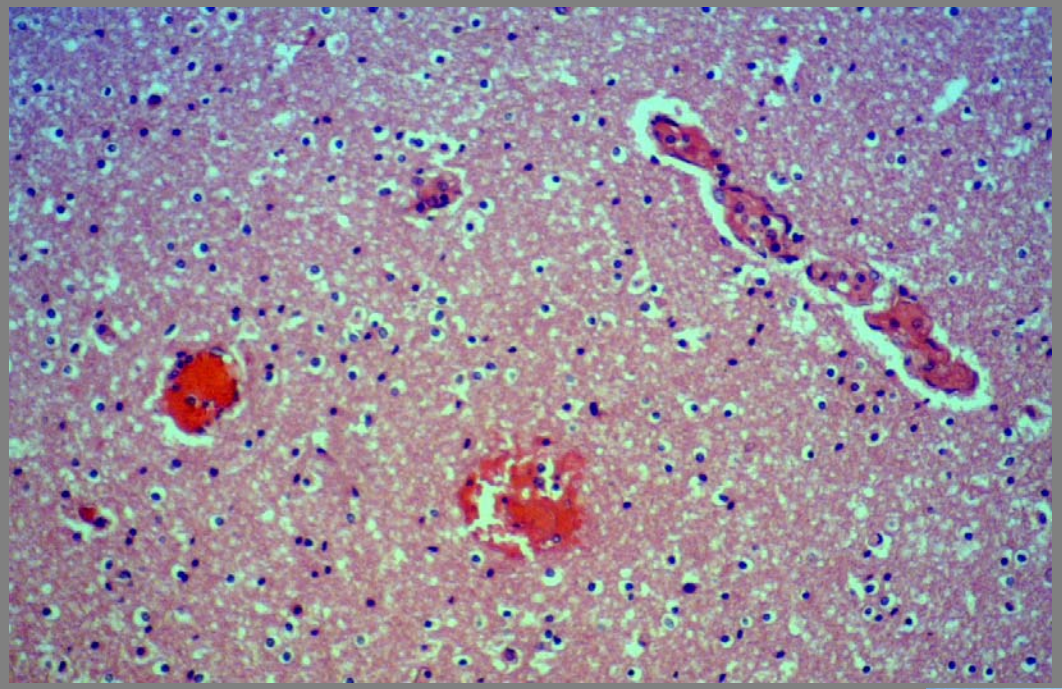
Brain:

- 920 gm; congested

- Shallow gyri and sulci

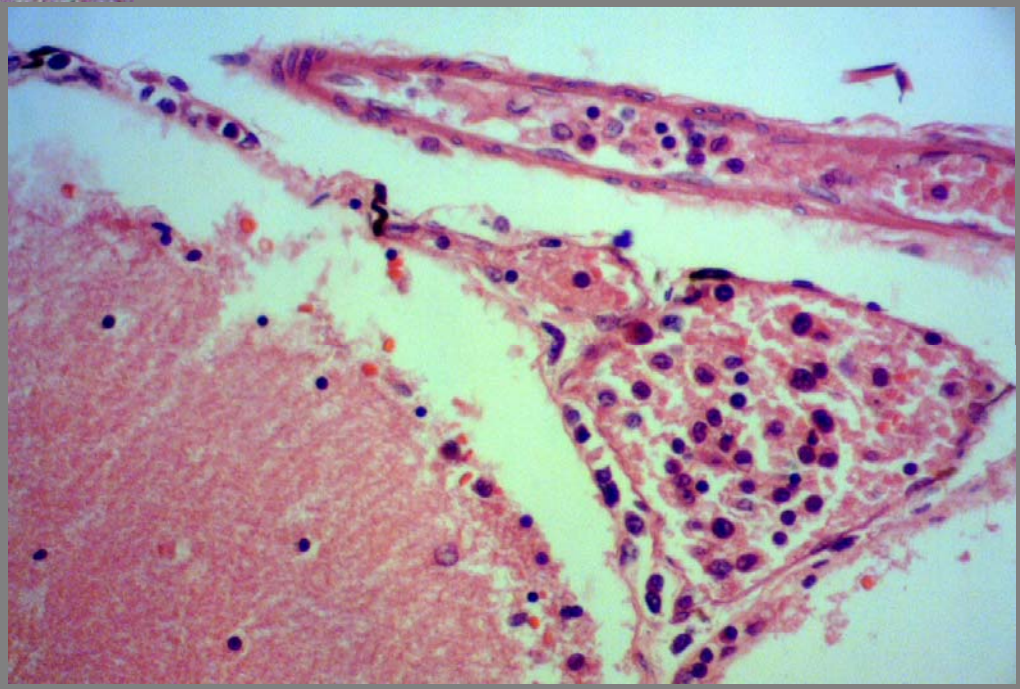
- Adhesion of meninges to the bone of the skull (marked thickened)

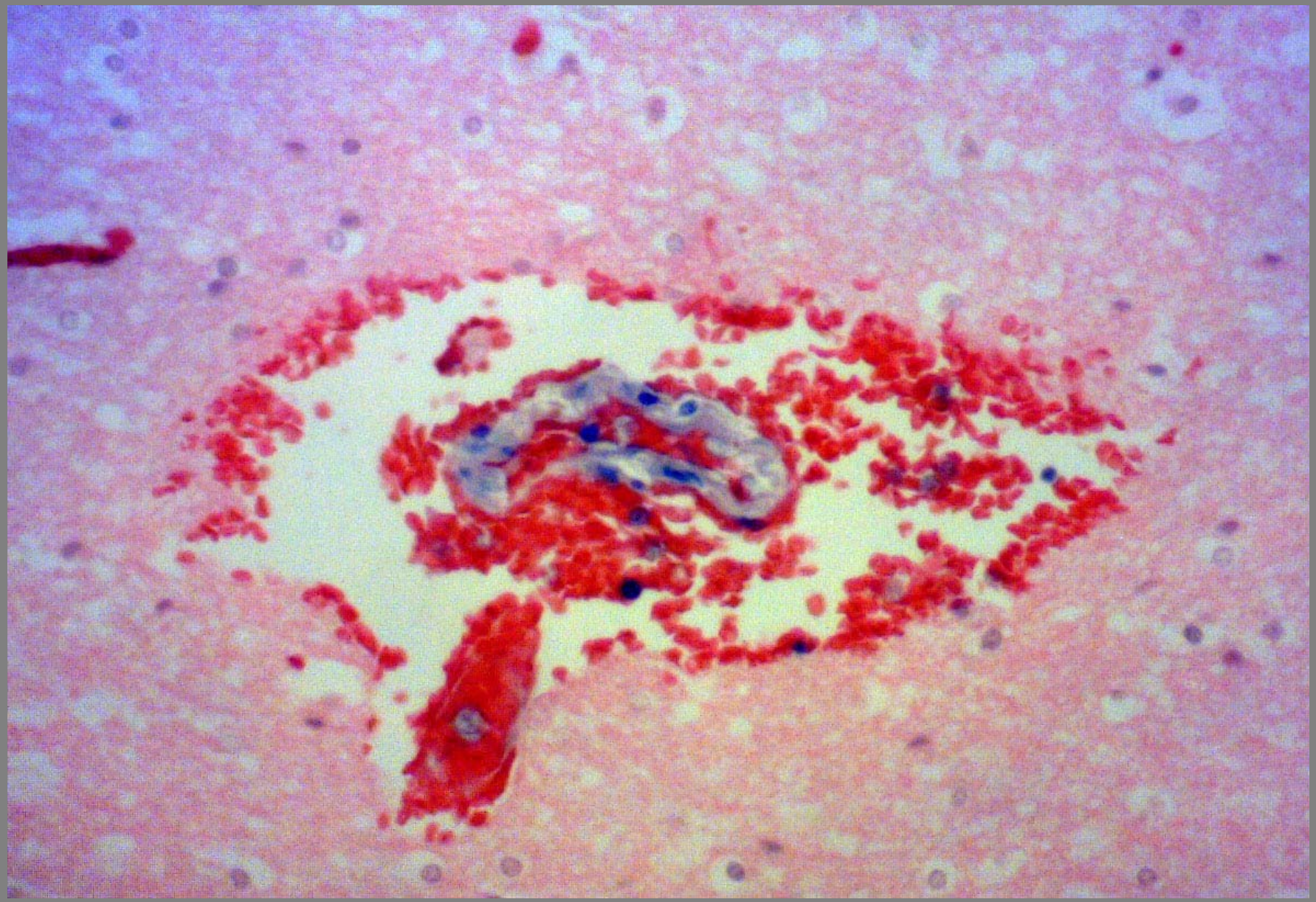
Brain and Meninges



Congestion,
few diapedesis

Chronic meningites
(mononuclear and
plasma cells)

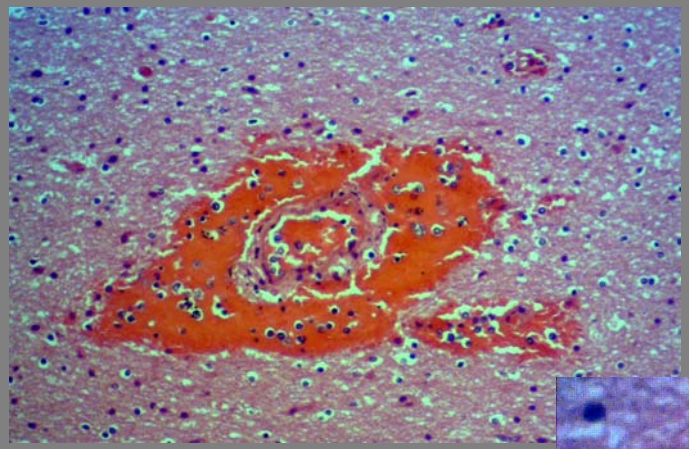


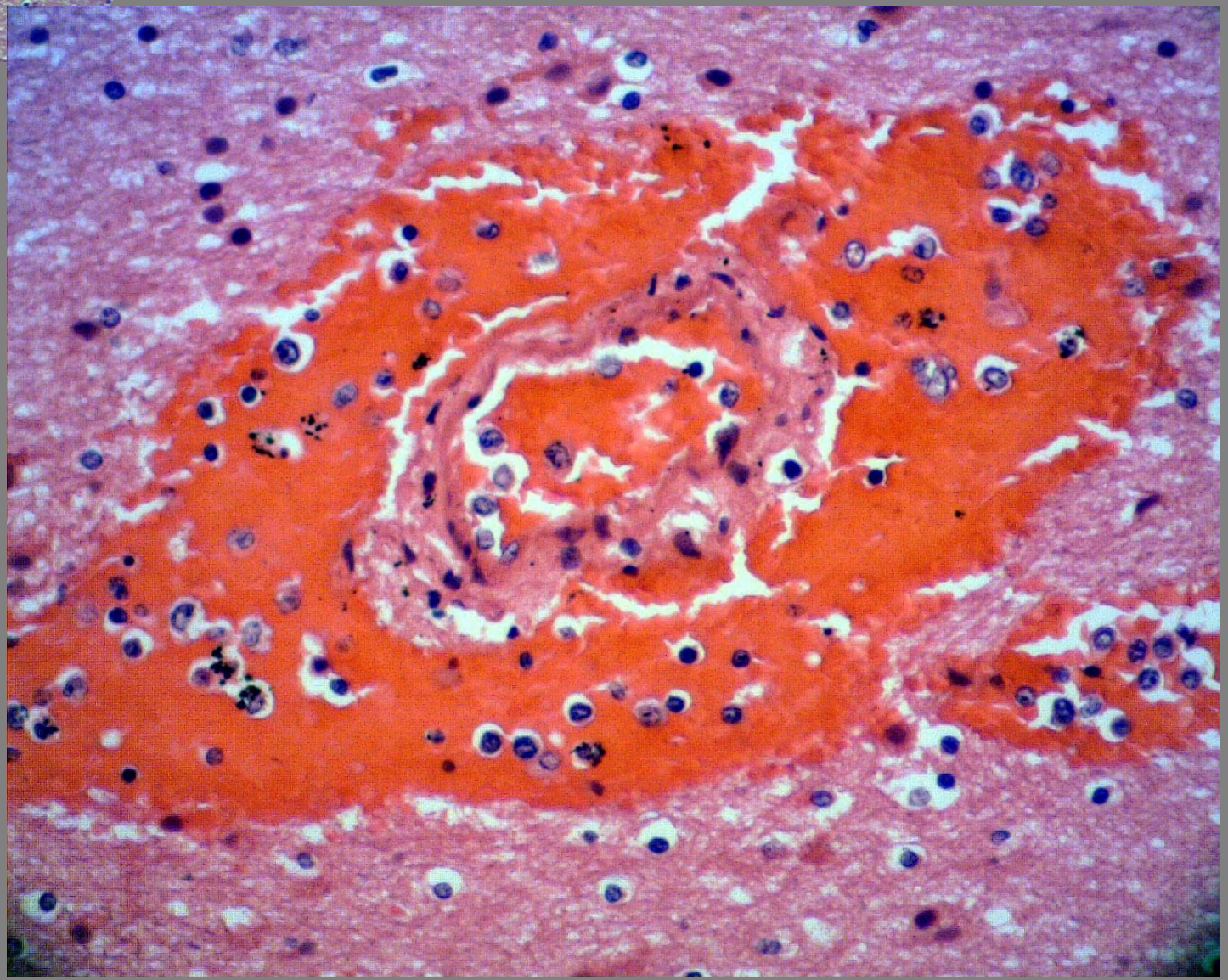


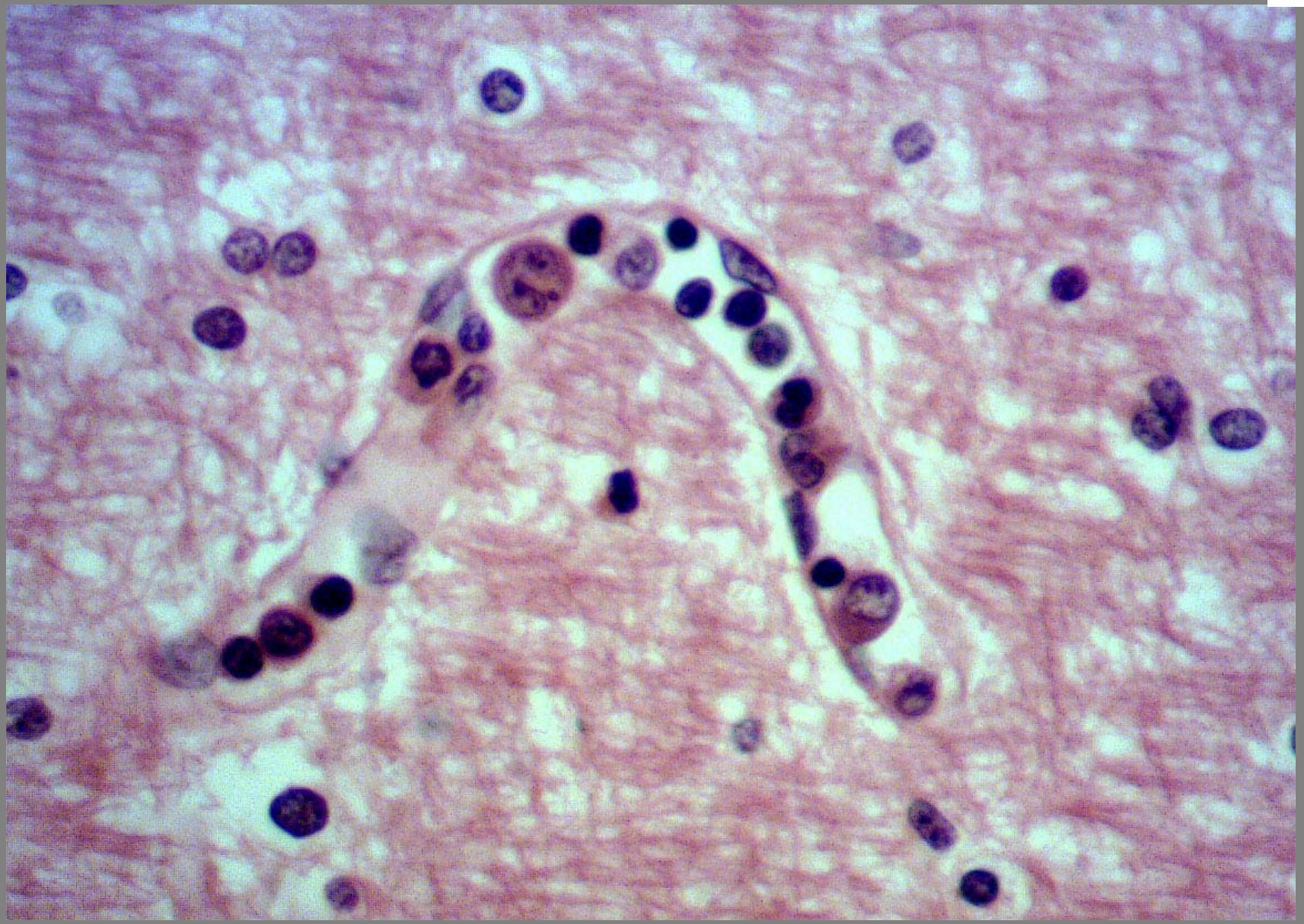
Cerebrum

Few petechial haemorrhage,
few diapedesis

Ring Haemorrhage



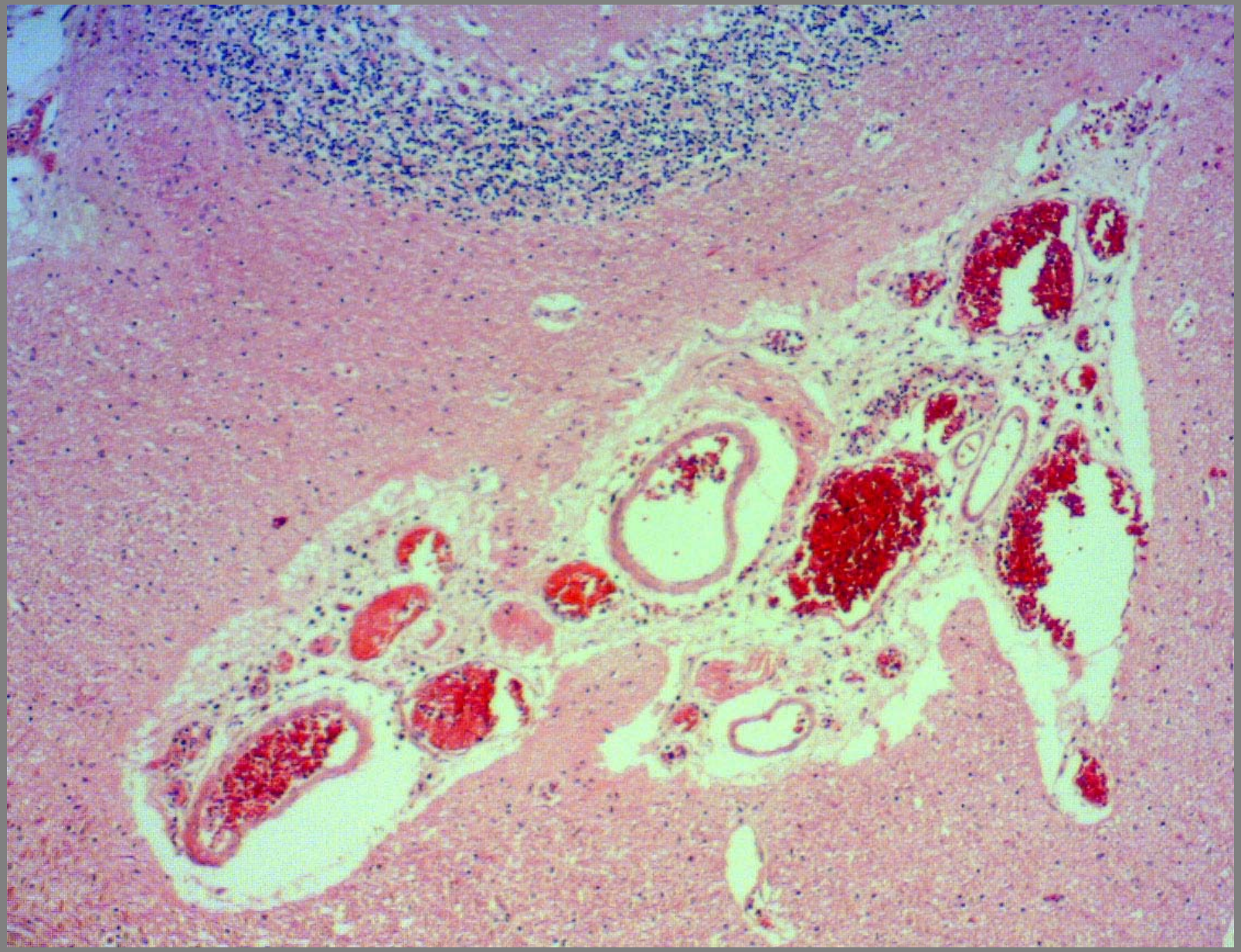




Cerebrum: Mononuclear cells in venules,
some contain dark-brown pigment

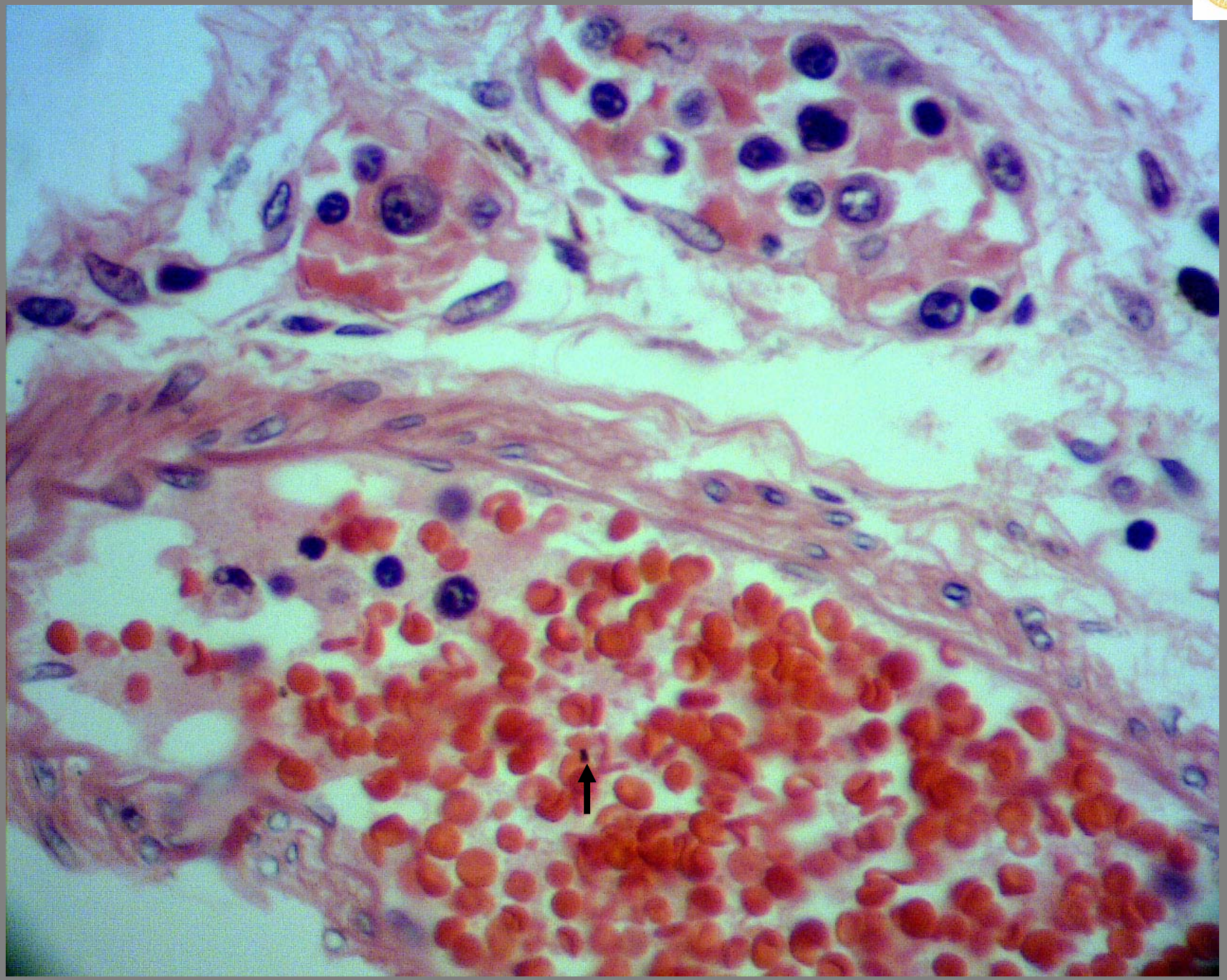
Cerebrum: Endothelial cell and pigment

Cerebellum

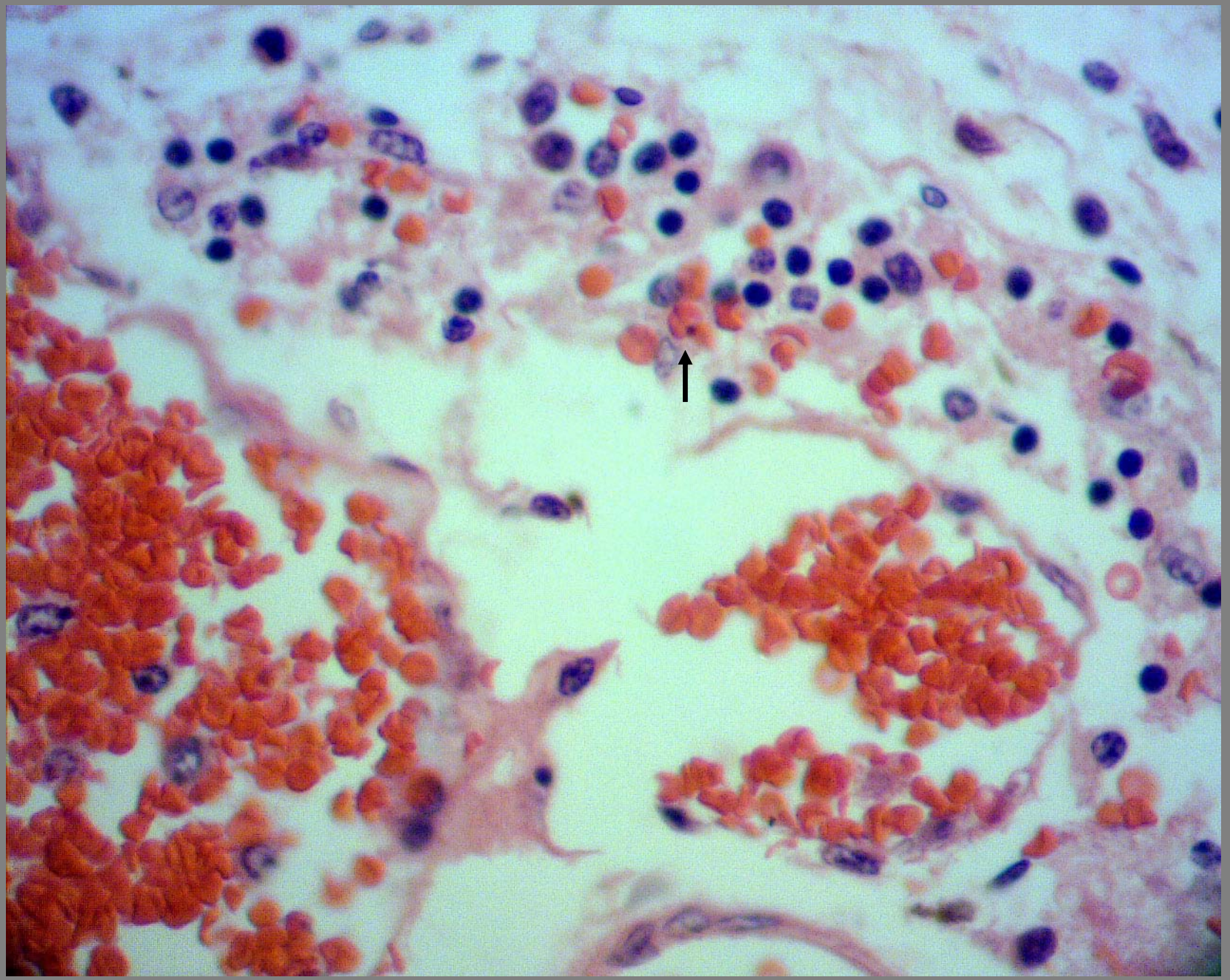


Congestion, Chronic meningites

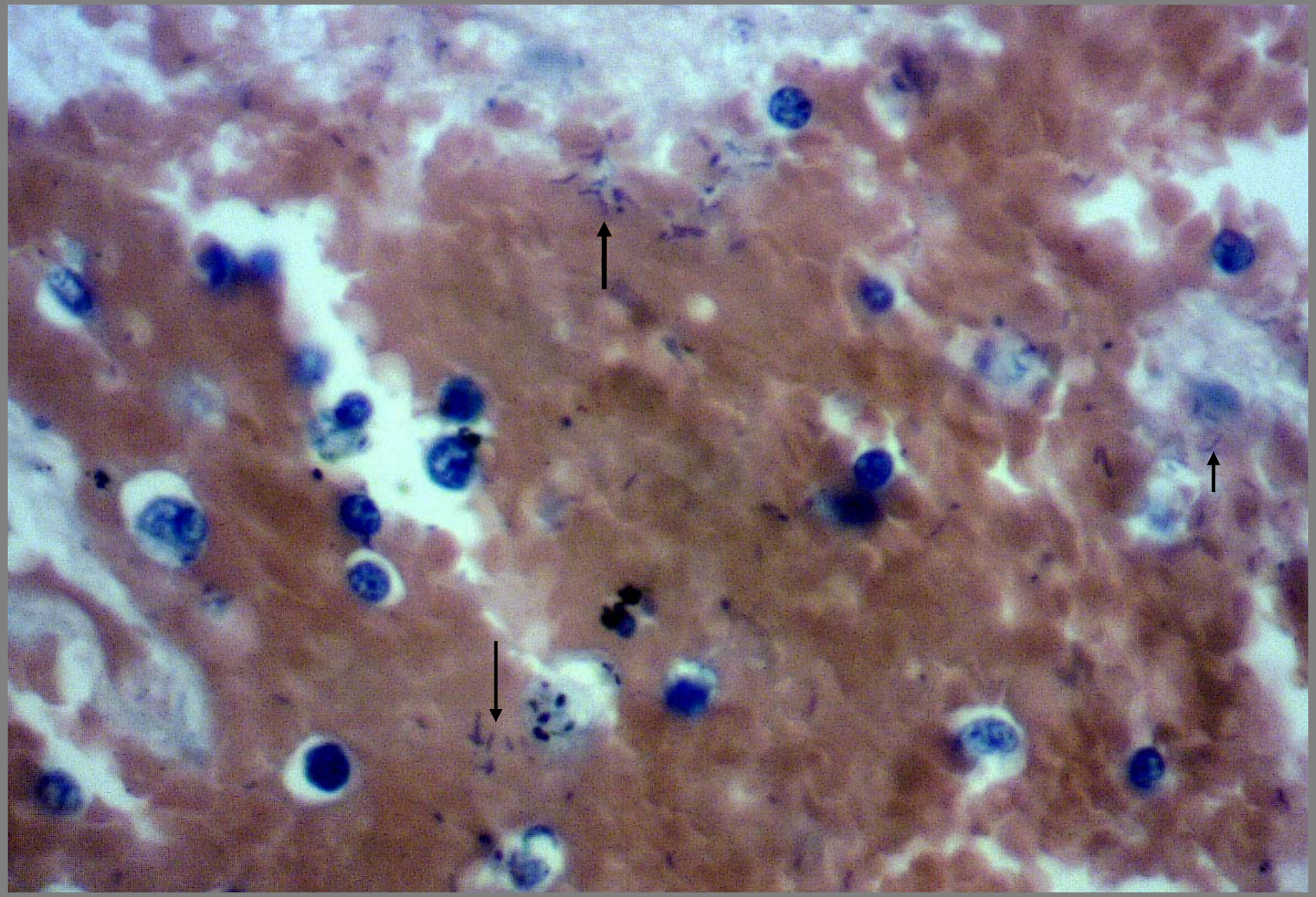
Cerebellum



Meninges: Vascular congestion, PRBC



Cerebellum, Meninges: PRBC



Brain

Giemsa’s stain, showing methylene blue stained bacilli

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Heart:

- Not remarkable

Blood vessels:

- Petechial hemorrhage of tunica adventitia of thoracic aorta

Lungs:

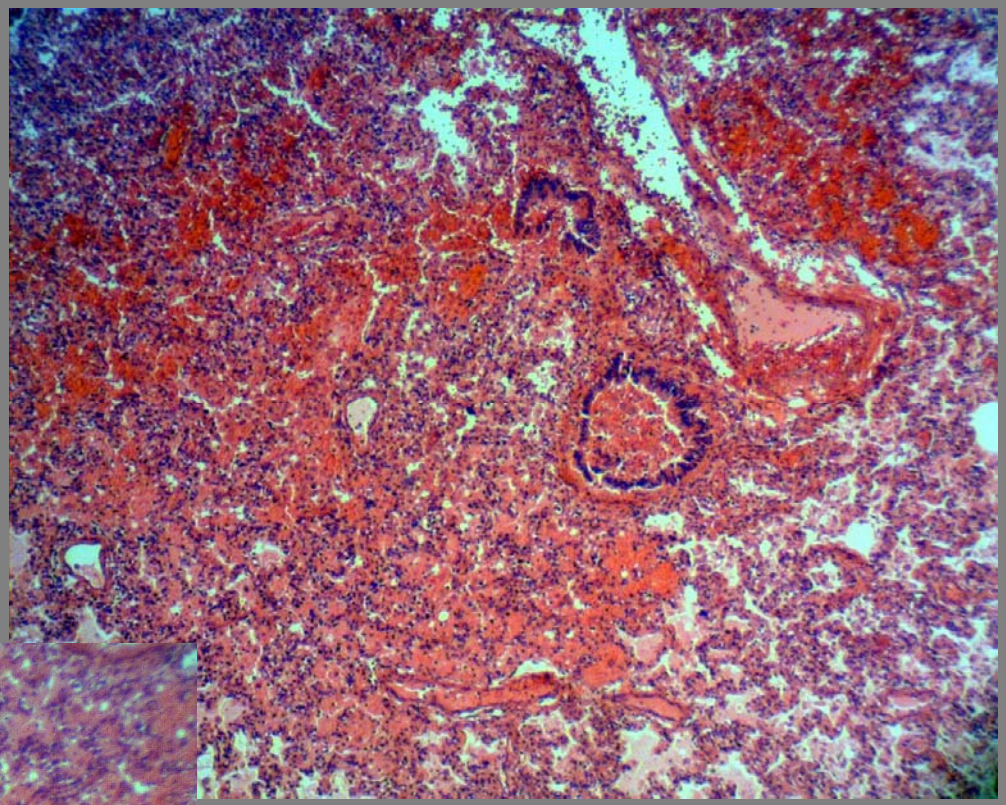
- **Right 120 gm; left 100 gm**
- **Petechial hemorrhage of visceral pleura (both)**
- **Right and left lower lobe interstitial pneumonitis**

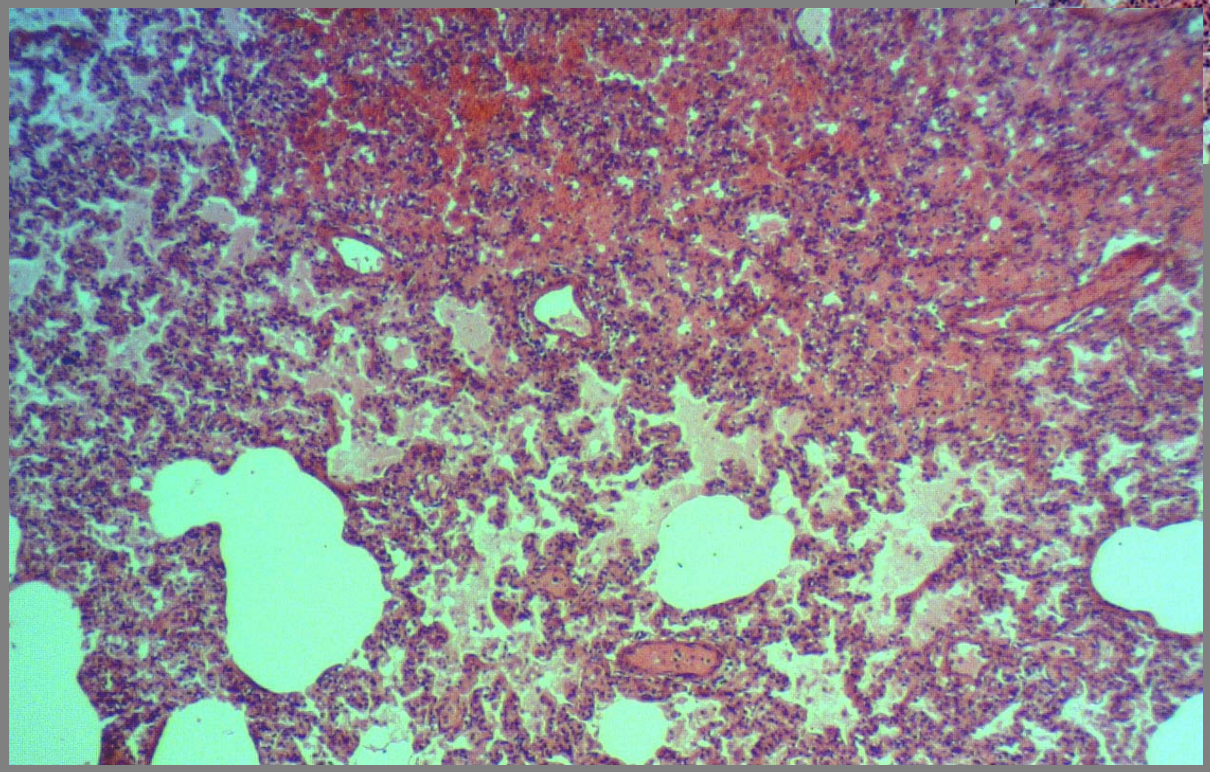
Lung

Marked congestion,

Interstitial pneumonia

Pulmonary oedema





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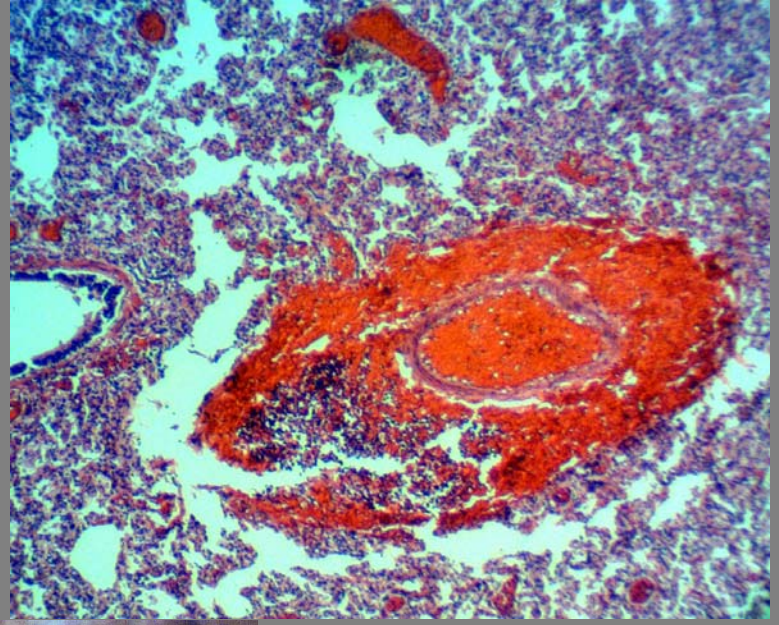
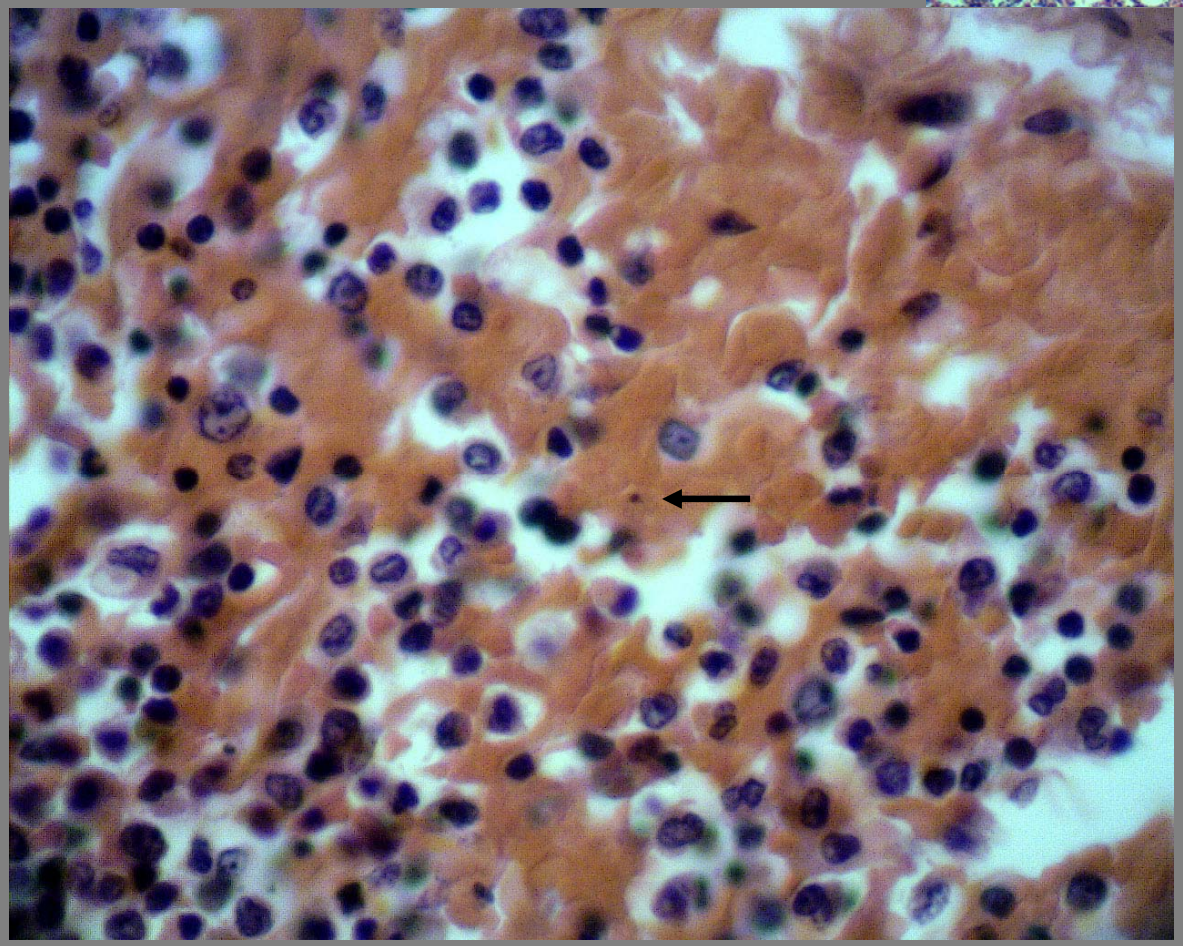
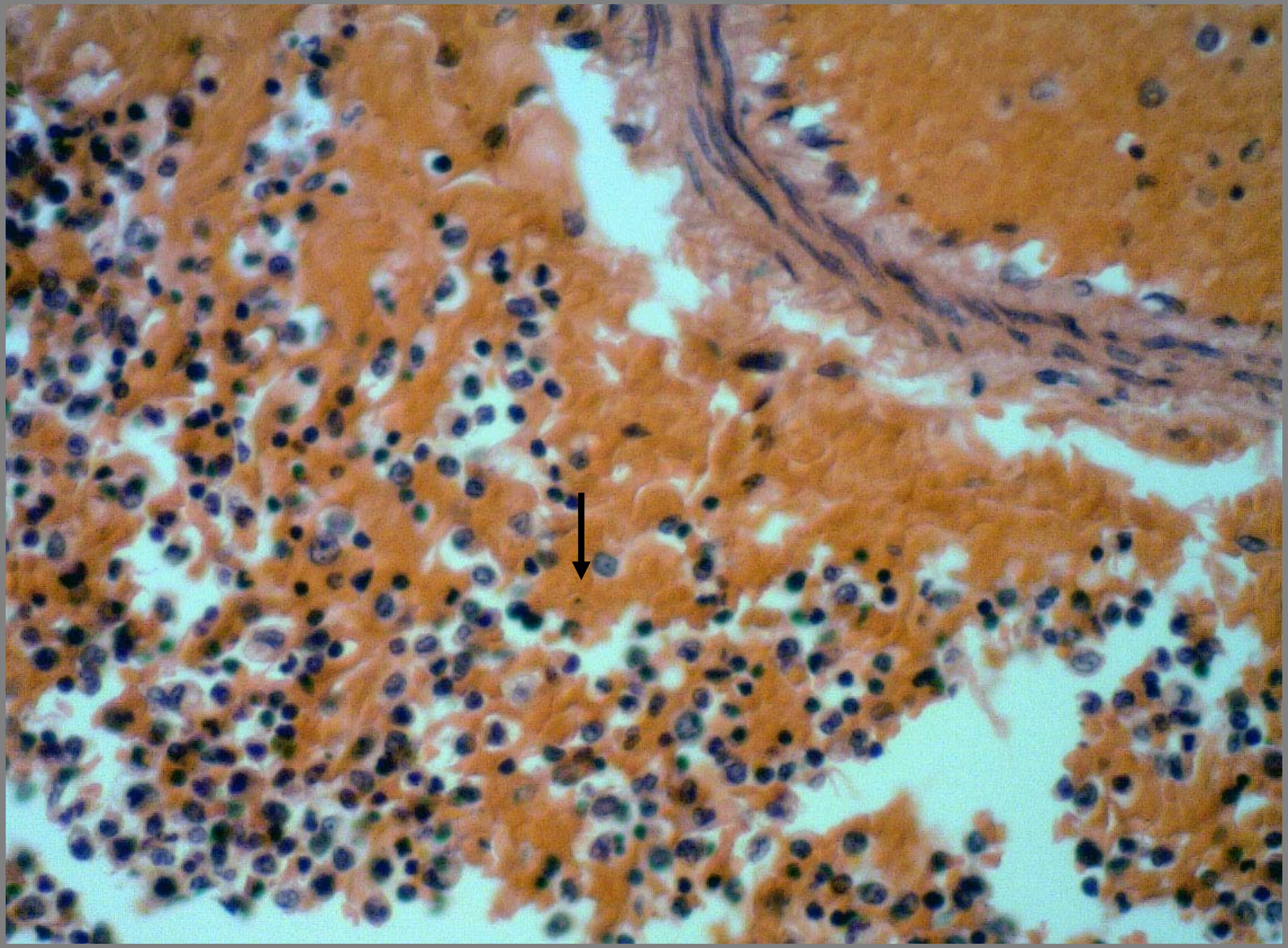
focal intraalveolar haemorrhage





PRBC



- **Liver:**

  - 430 gm; congested; dilatation of superficial bile ducts

Marked enlargement

Liver

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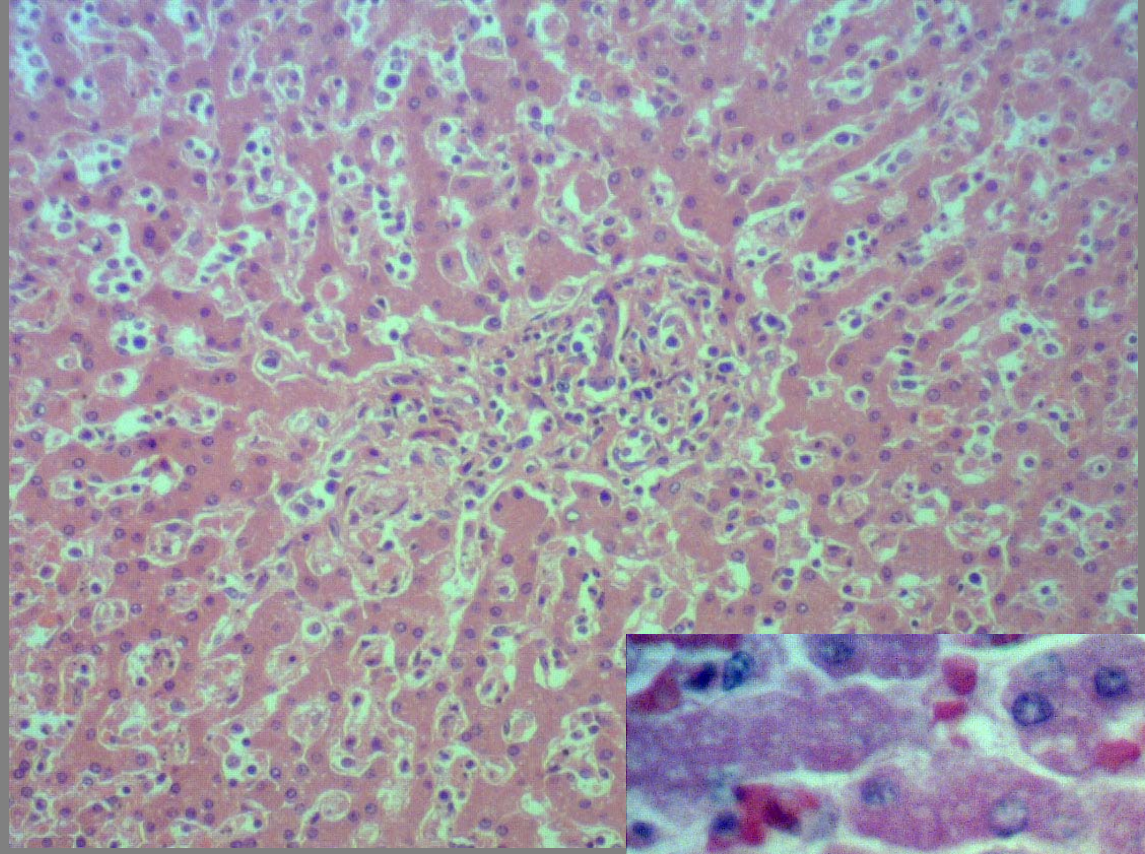
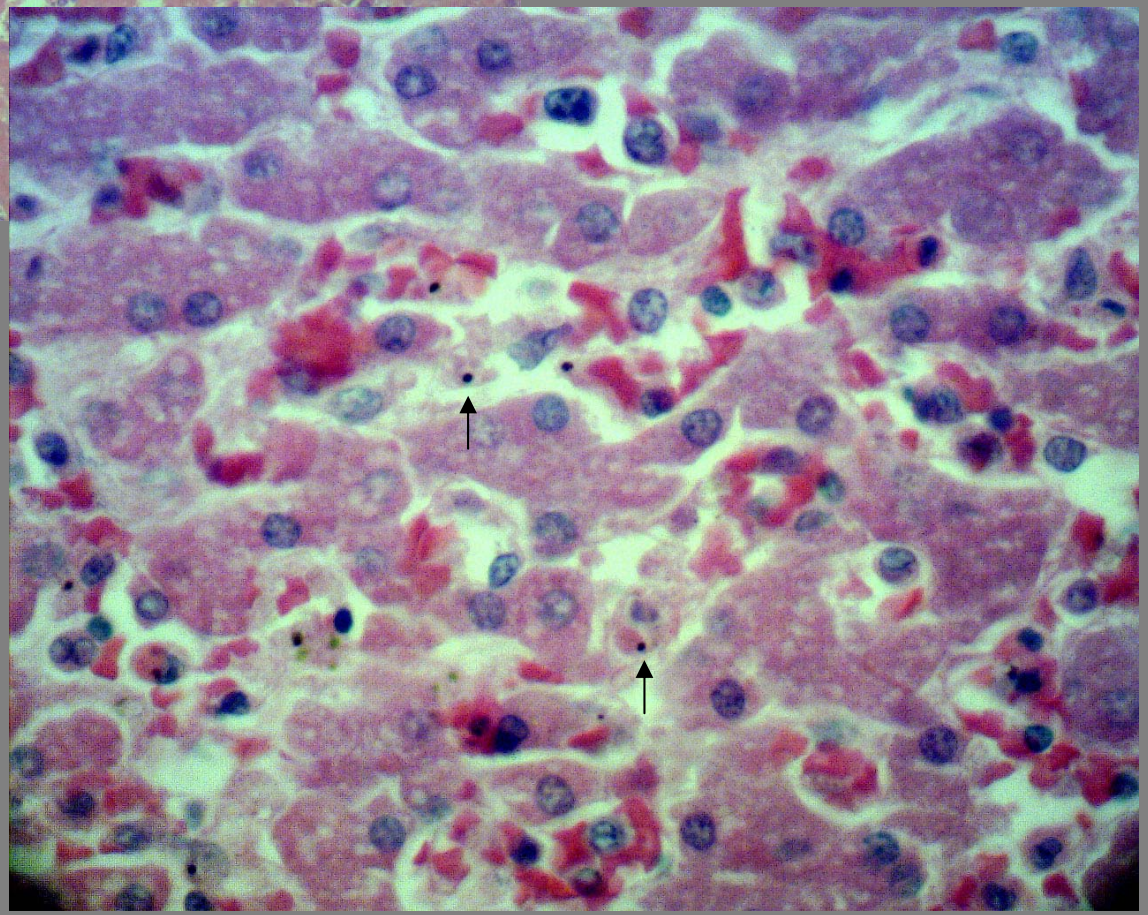


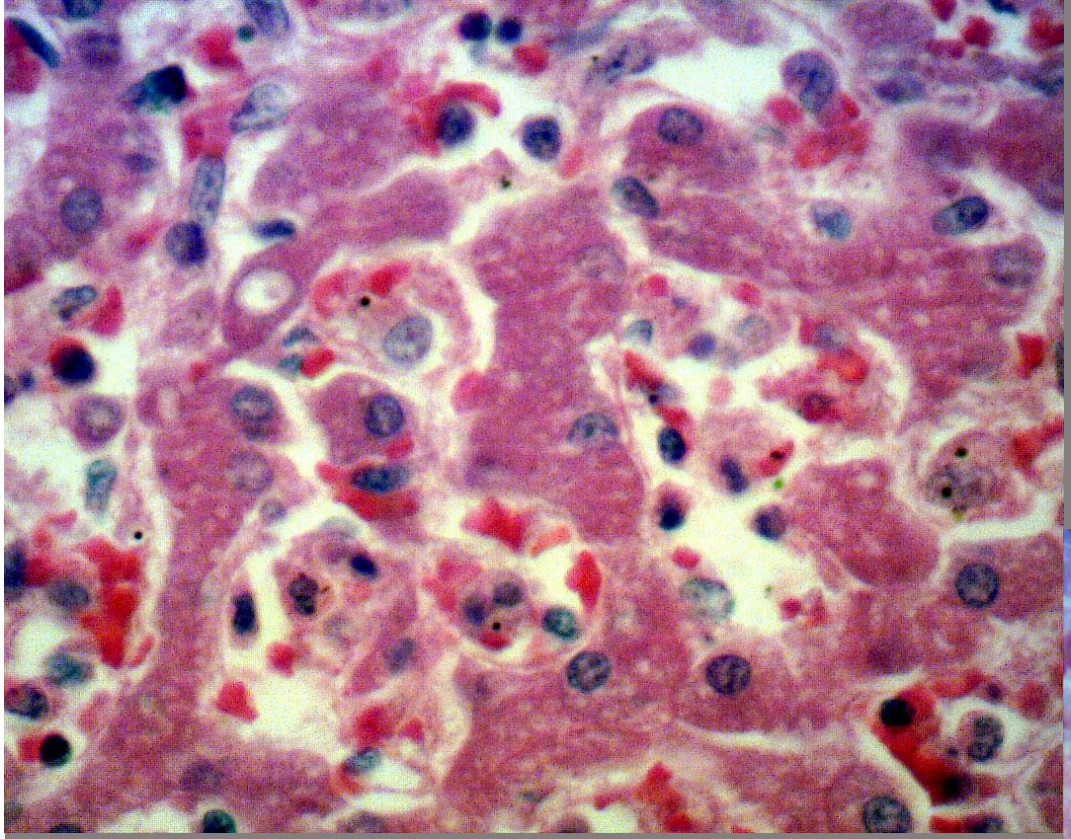
Typhoid nodule

H&E stain



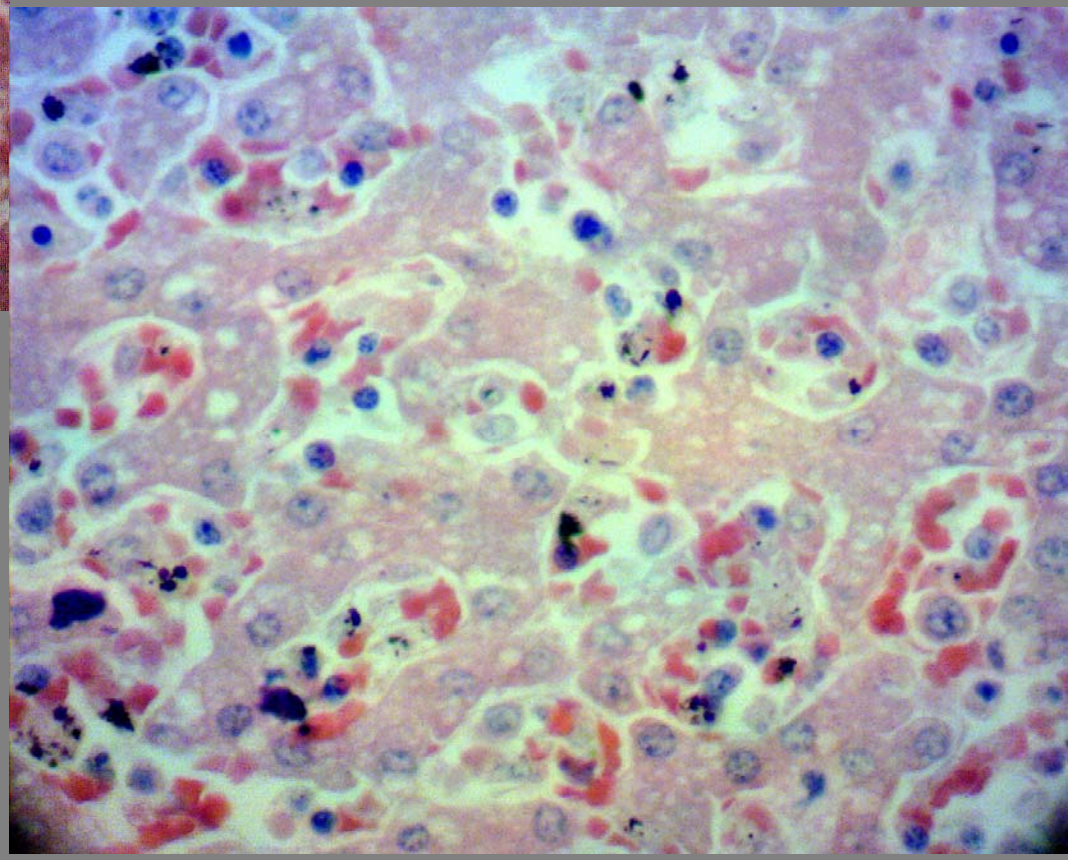
PRBC

Thomas's stain



H&E stain

Giemsa’s stain



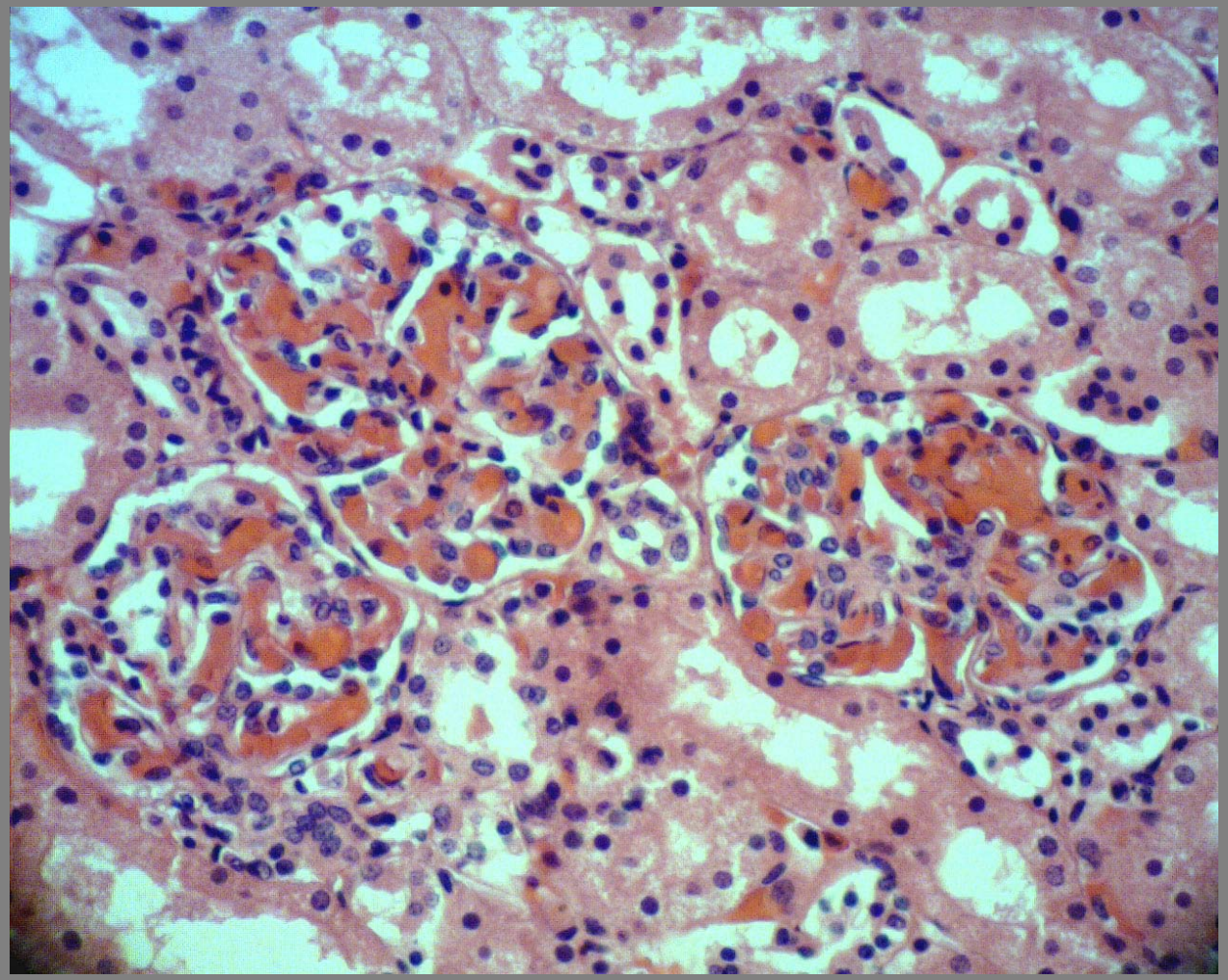
Liver Kuppfer’s cells contain dark brown pigment, PRBC

- **Kidney:**

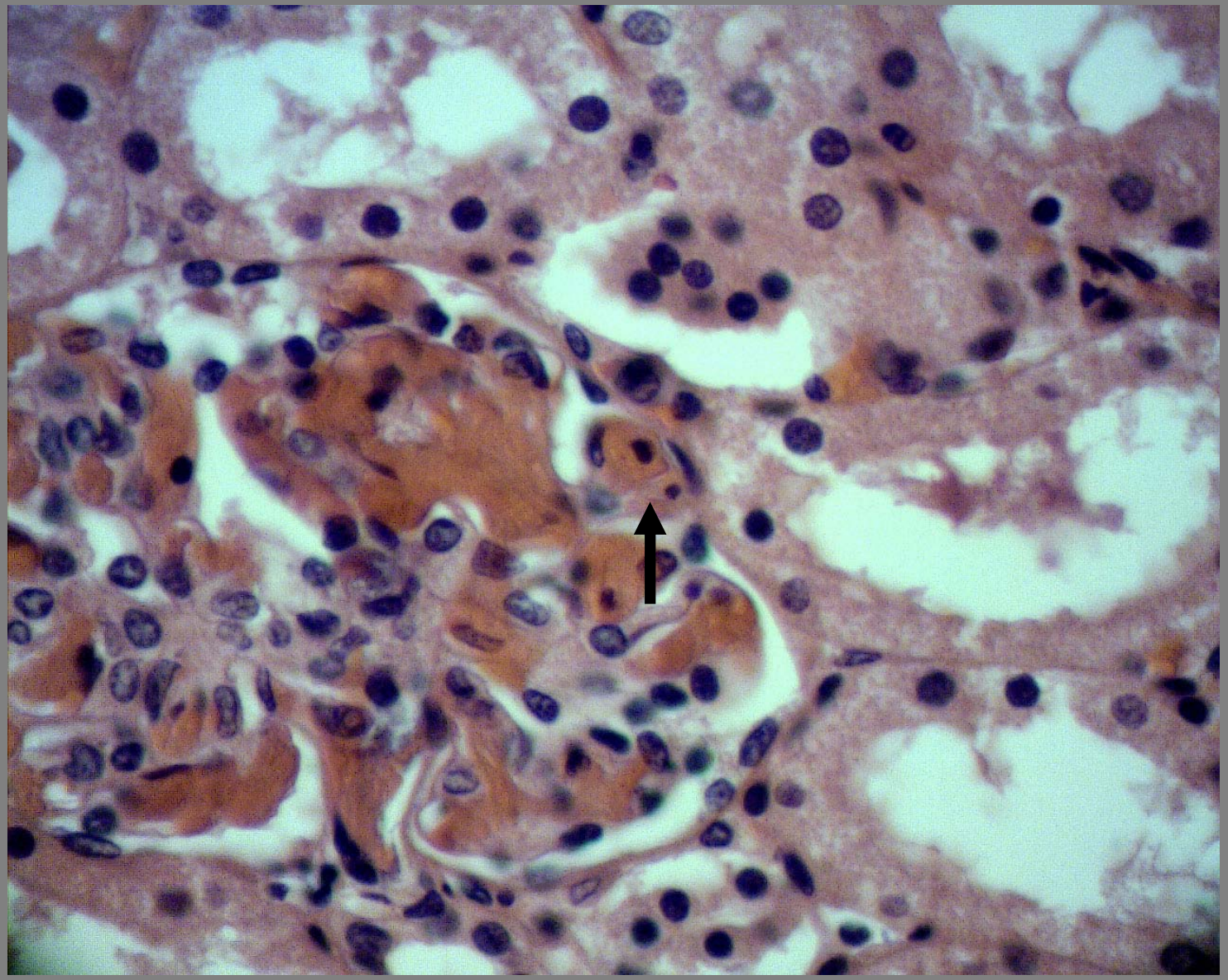
  - Right 50 gm; left 50 gm; congested (both)

  - Petechial hemorrhage of right minor and major calices

Marked glomerular congestion

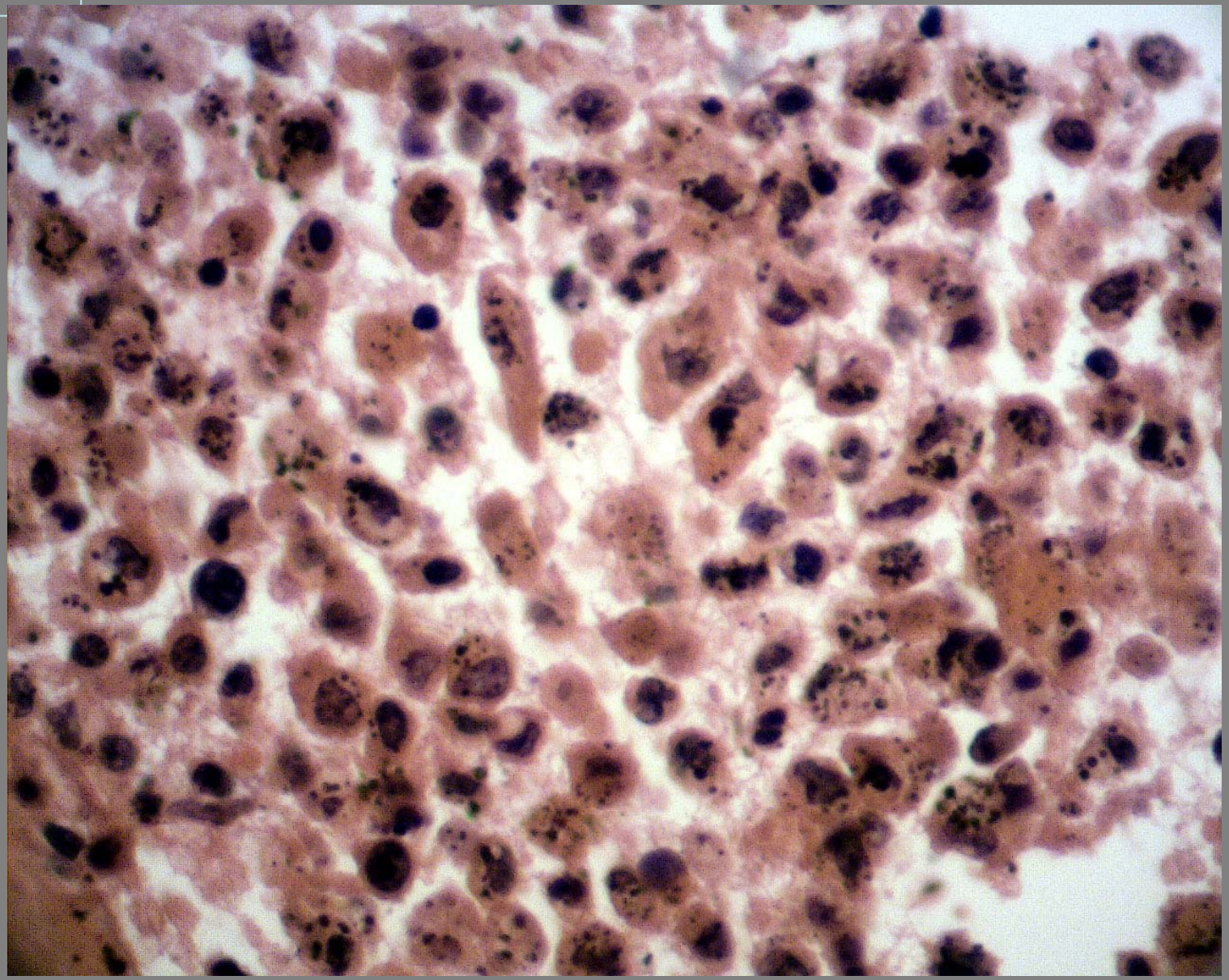


Kidney



Marked glomerular congestion Parasitized red blood cell

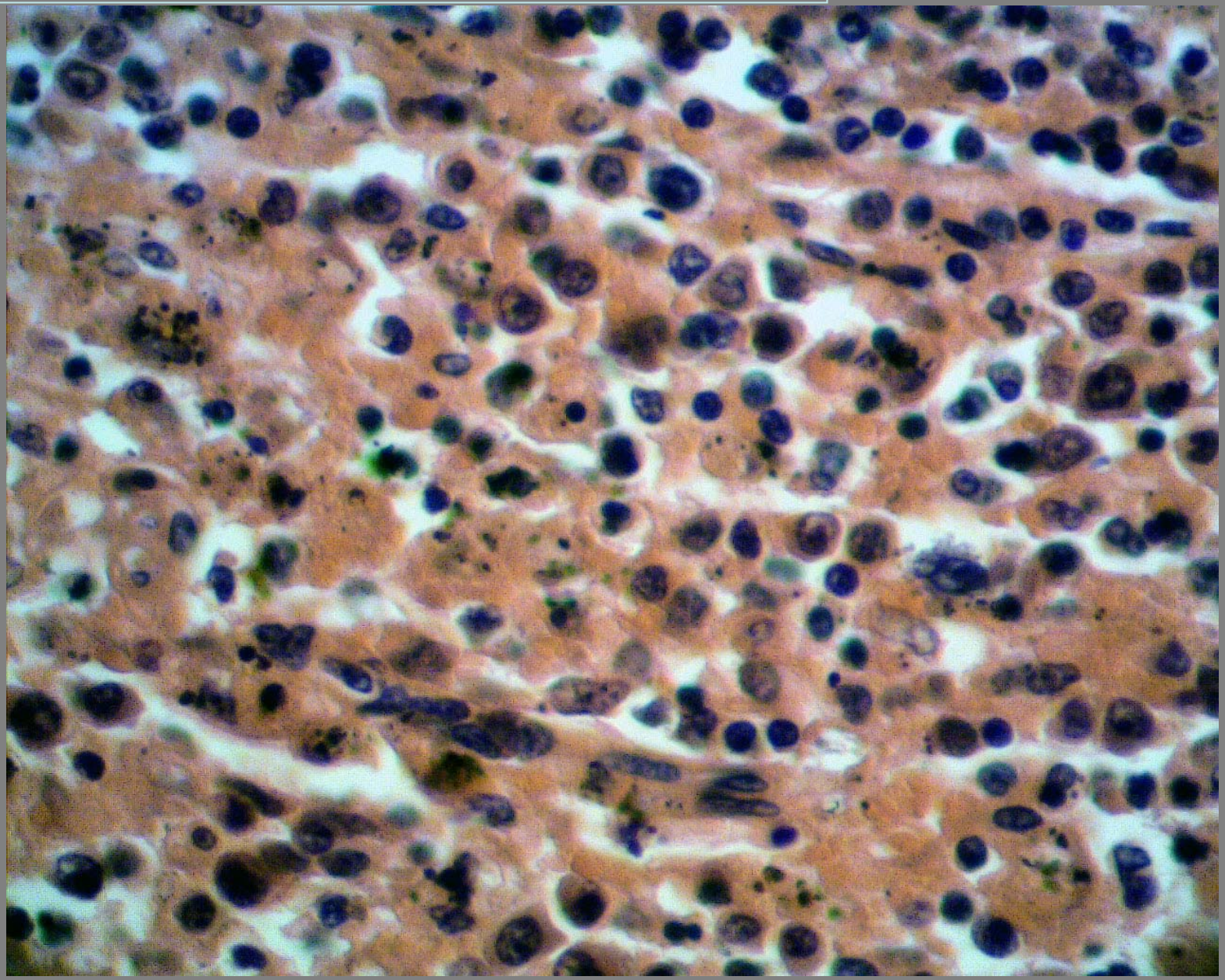
Spleen



Taylor's stain

Marked congestion,
Macrophages-laden dark-brown pigment

Peripancreatic lymph node

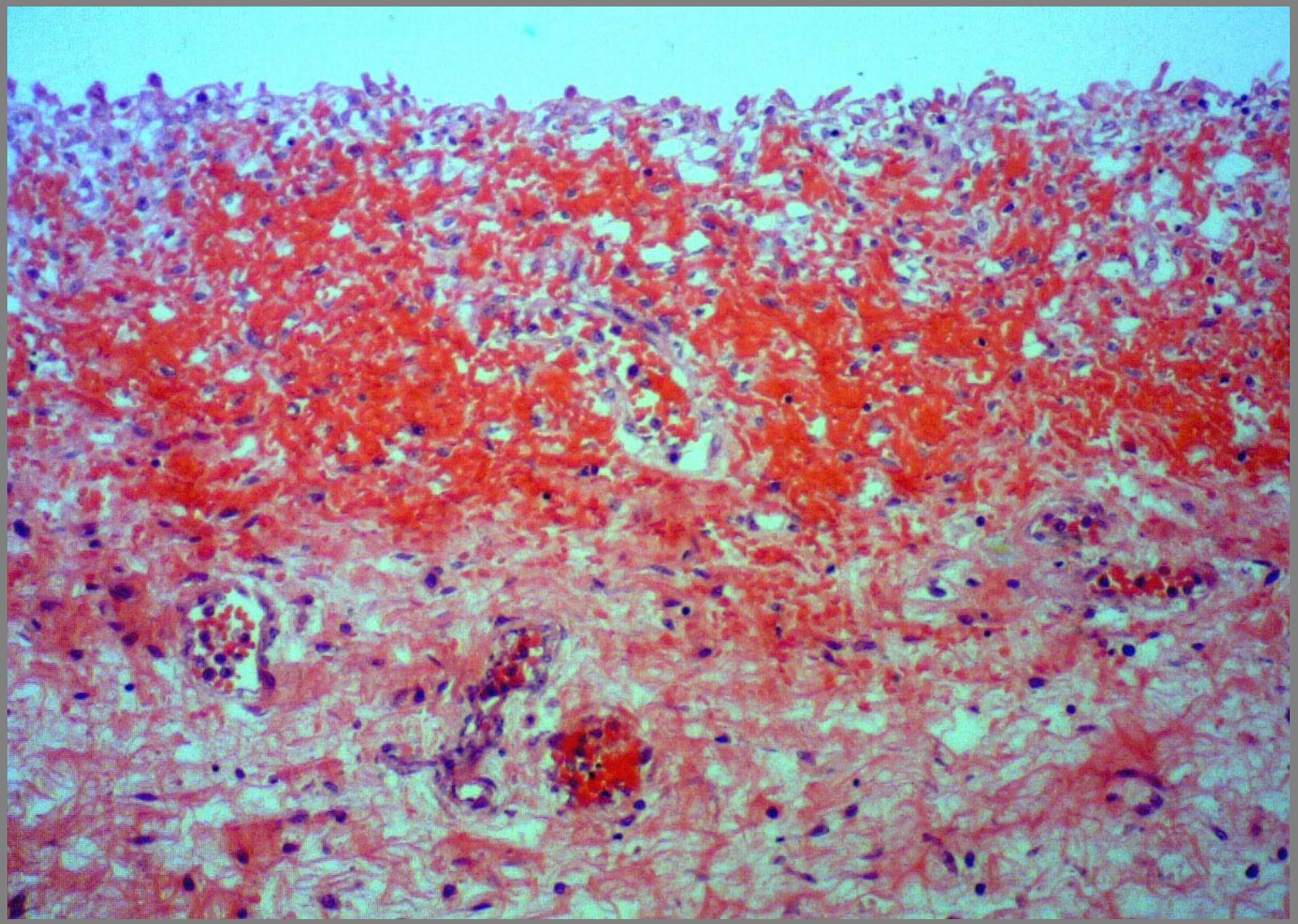


PRBC

Marked congestion, numerous dark-brown pigment macrophages

Urinary bladder

Haemorrhagic cystitis



Post Mortem Specimens

- **Left bronchus:**
  - **numerous growth of Salmonella group B**
  - **α-Streptococci not pneumococci**
  - **numerous growth of Streptococcus group B**

- **Right bronchus:**
  - **as the above**
  - **numerous growth of *Acinetobacter sp.***

- **Urine:**
  - **Salmonella group B**

Stool Culture

Salmonella group B

Pathological Diagnosis

- *Plasmodium vivax* malaria
- Chronic meningitis
- Marked congestion of kidneys with petechial haemorhage of calicies
- Interstitial pneumonitis
- Hemorrhagic cystitis
- Sepsis with Salmonella group B isolated

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What is/are the possible cause(s) of death ?

Plasmodium vivax

and/or

Salmonellosis

Larger
modern autopsy series,
including
immunohistochemistry,
electronmicroscopy and
clinical correlates,
are awaited.

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