# Approach to the diagnosis of an appendicular mass in a degu (*Octodon degus*)


Virginie Piccicuto

2nd-year resident in Veterinary Pathology

National Veterinary School of Alfort (France)


SFAPV
Société Française
d'Anatomie Pathologique Vétérinaire

EnvA
École nationale vétérinaire d'Alfort

# Introduction

- **Degus** (Jekl, 2011)
  - Diurnal rodents, herbivorous
  - Living in groups
  - Life span : 3-4 years (wild) / 5-9 years (captivity)
- **Pet and animal models for research**
- **Common diseases** (Jekl, 2011)
  - Malocclusion
  - Barbering and chewing-induced alopecia
  - Lens cataract
  - Low incidence of neoplasia

# Case history

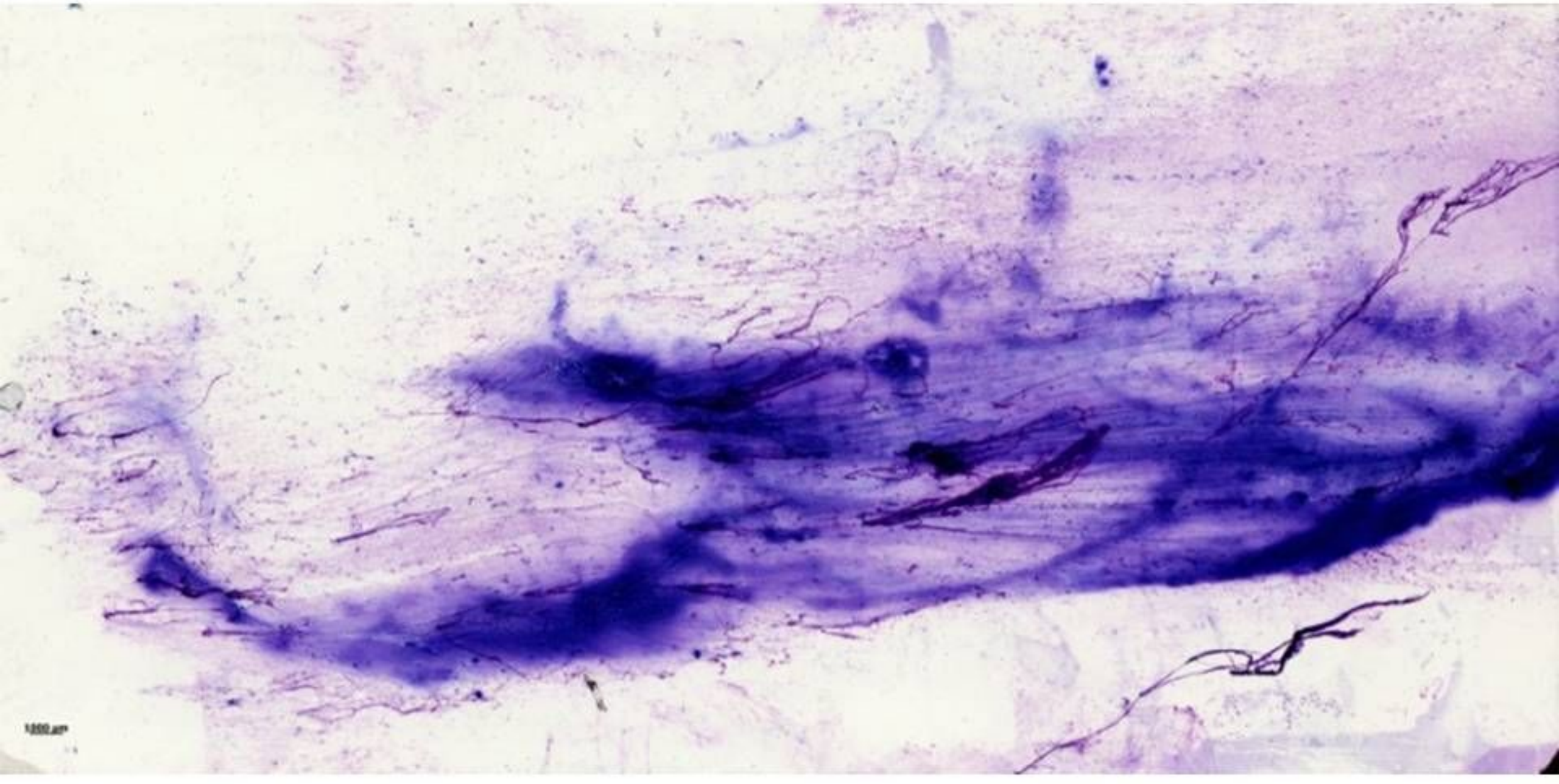
- « Sushi »
  - Degu
  - Female
  - 6 yo
- At presentation
  - Good body condition
  - Mass on right forelimb
    - Centered on elbow
    - 2,5 x 3 x 4 cm
    - Soft
    - Irregular, ulcerated
    - Rather well circumscribed but looks infiltrative

# Complementary exams

- **Radiographs (ENVA report)**
  - Rather well circumscribed but looks infiltrative
  - Tissular density
  - No bone reaction
  - Precise anatomical origin unknown
- **Cytology (Fine Needle Aspiration FNA)**

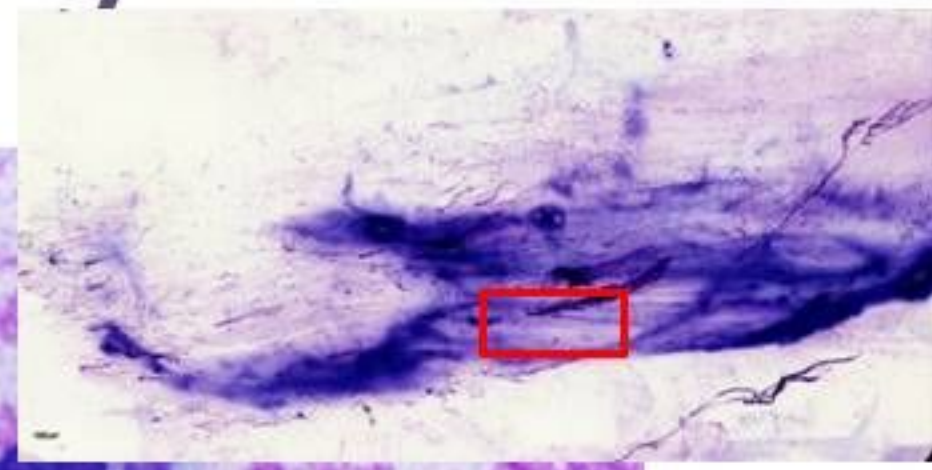
# Cytology (FNA)

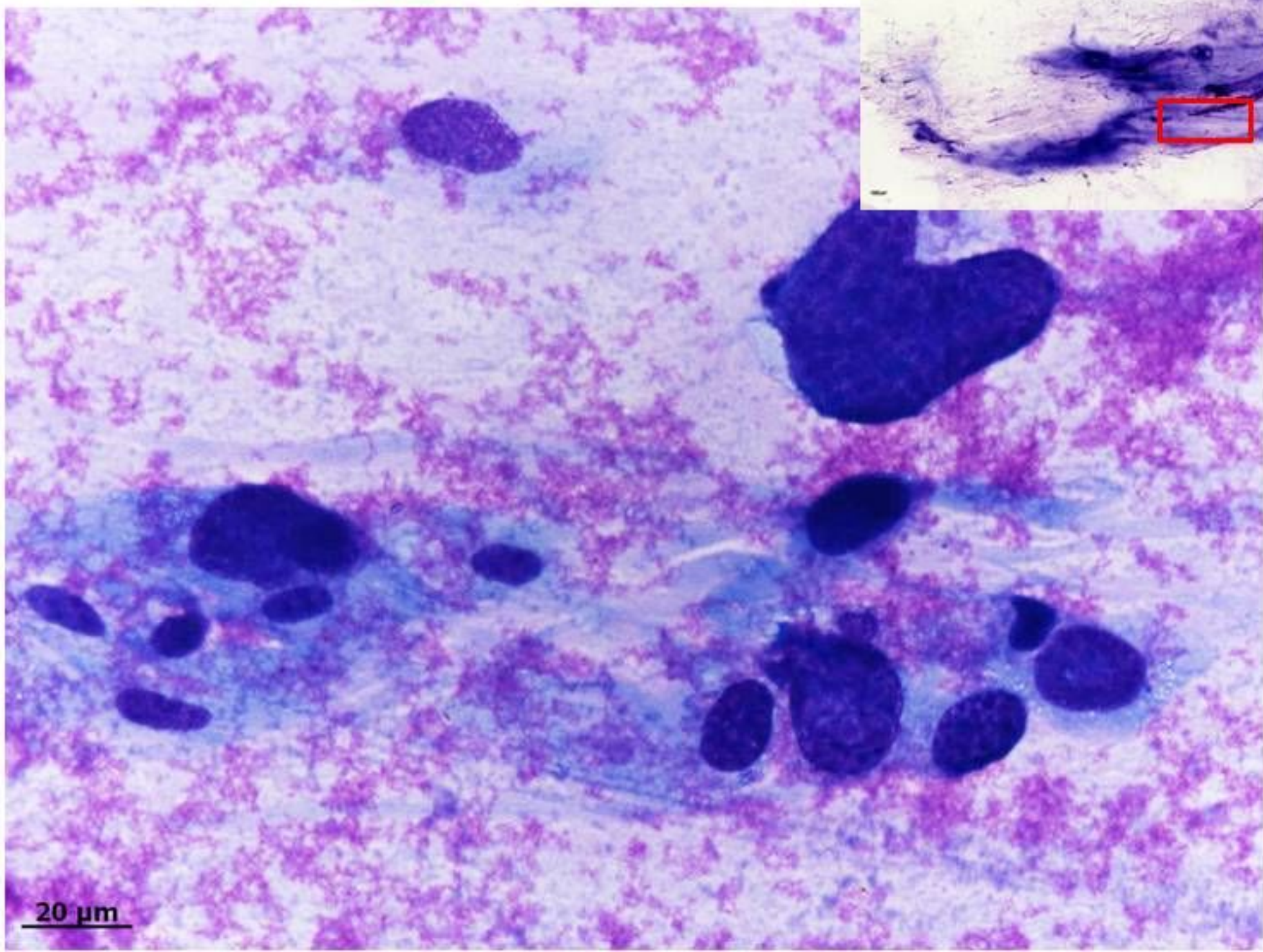
May-Grünwald-Giemsa



# Cytology (FNA)

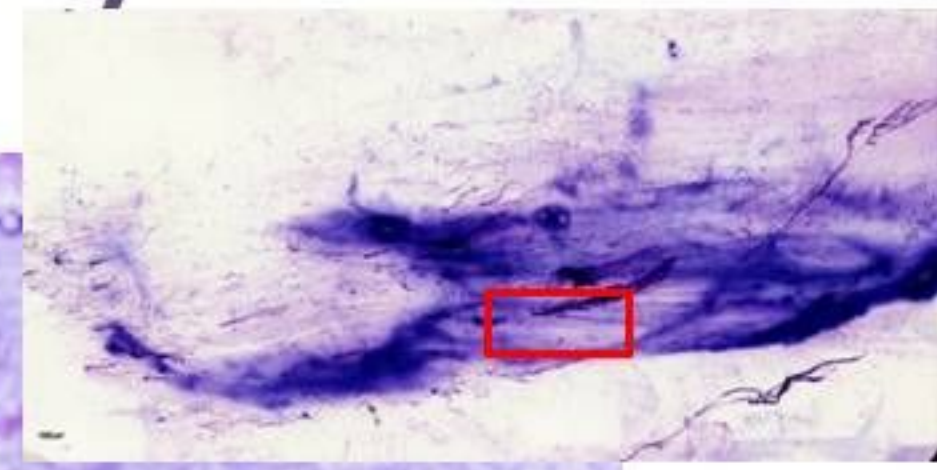
May-Grünwald-Giemsa

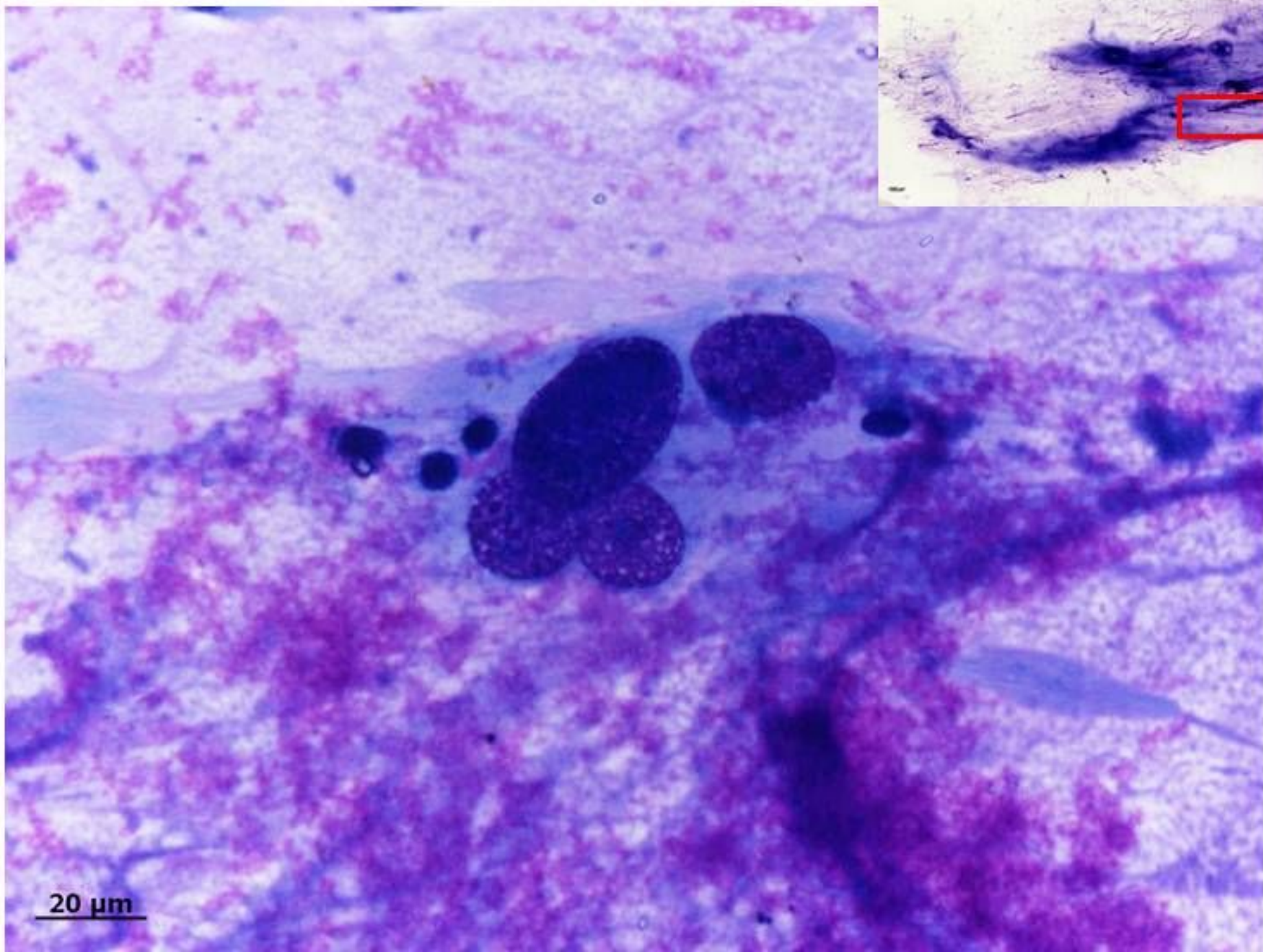




# Cytology (FNA)

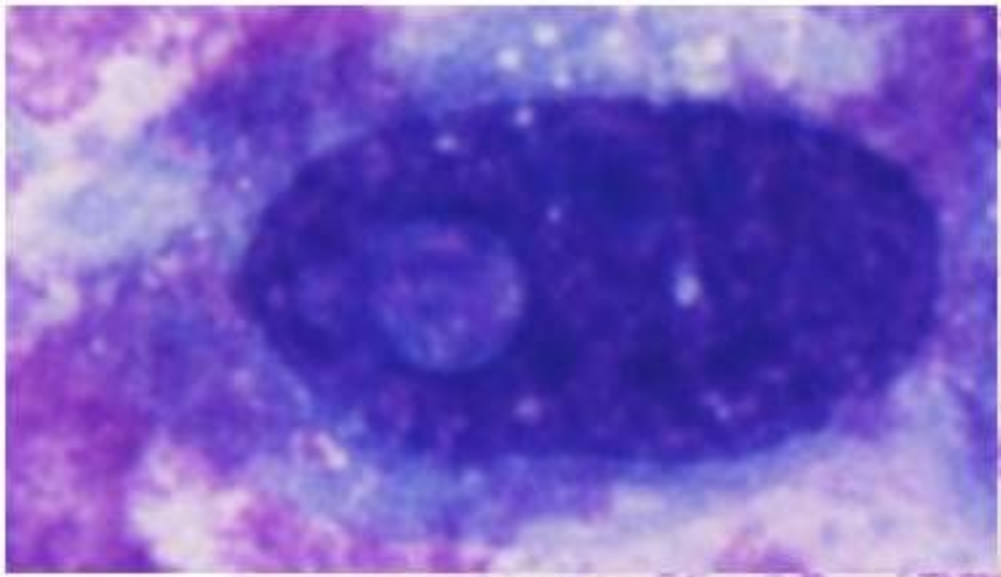
May-Grünwald-Giemsa

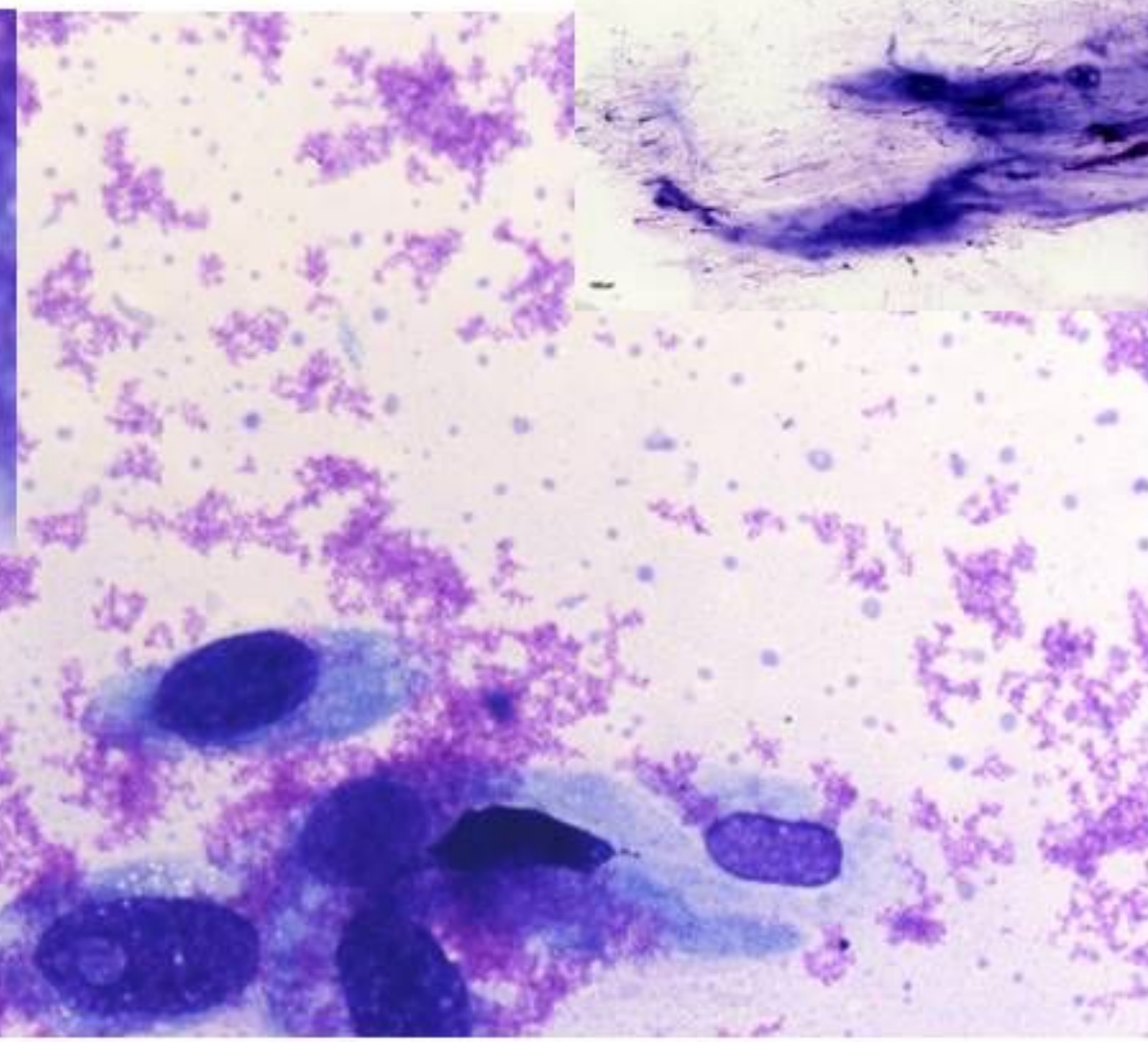


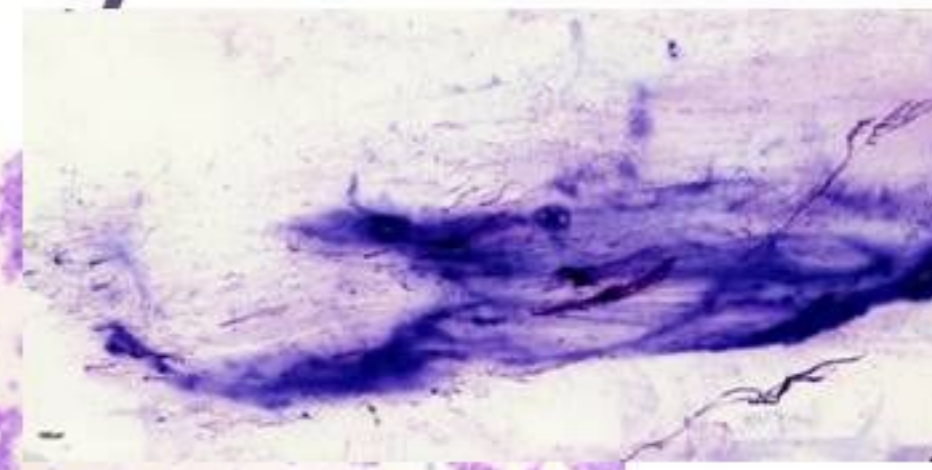


# Cytology (FNA)

May-Grünwald-Giemsa

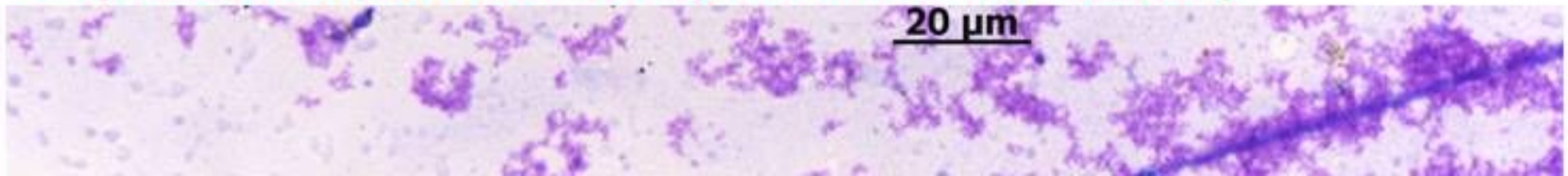






**Spindle cell tumor with myxoid component and severe atypias**

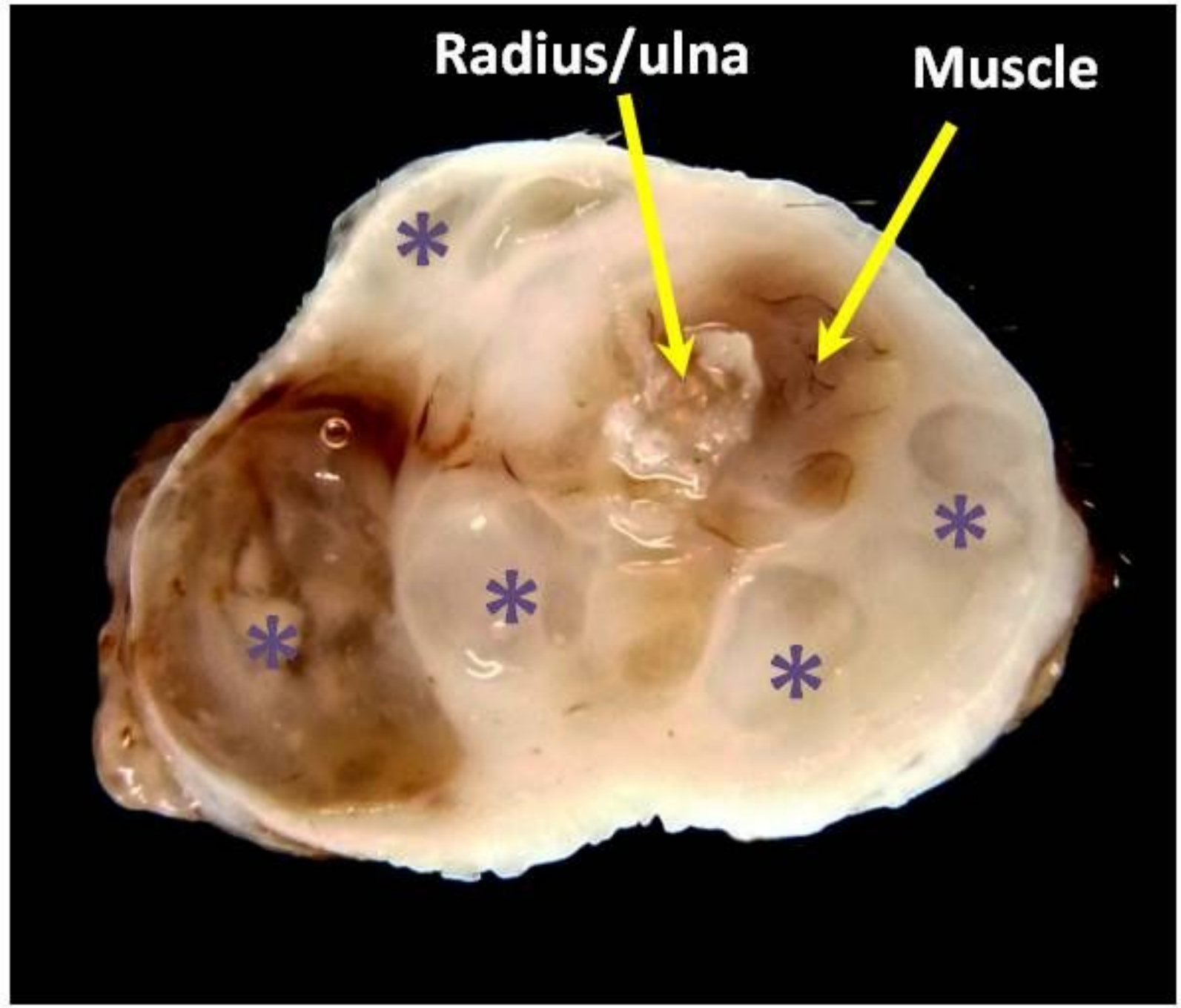
**➔ Cytologically malignant myxoid tumor (sarcoma)**



# Immediate follow-up

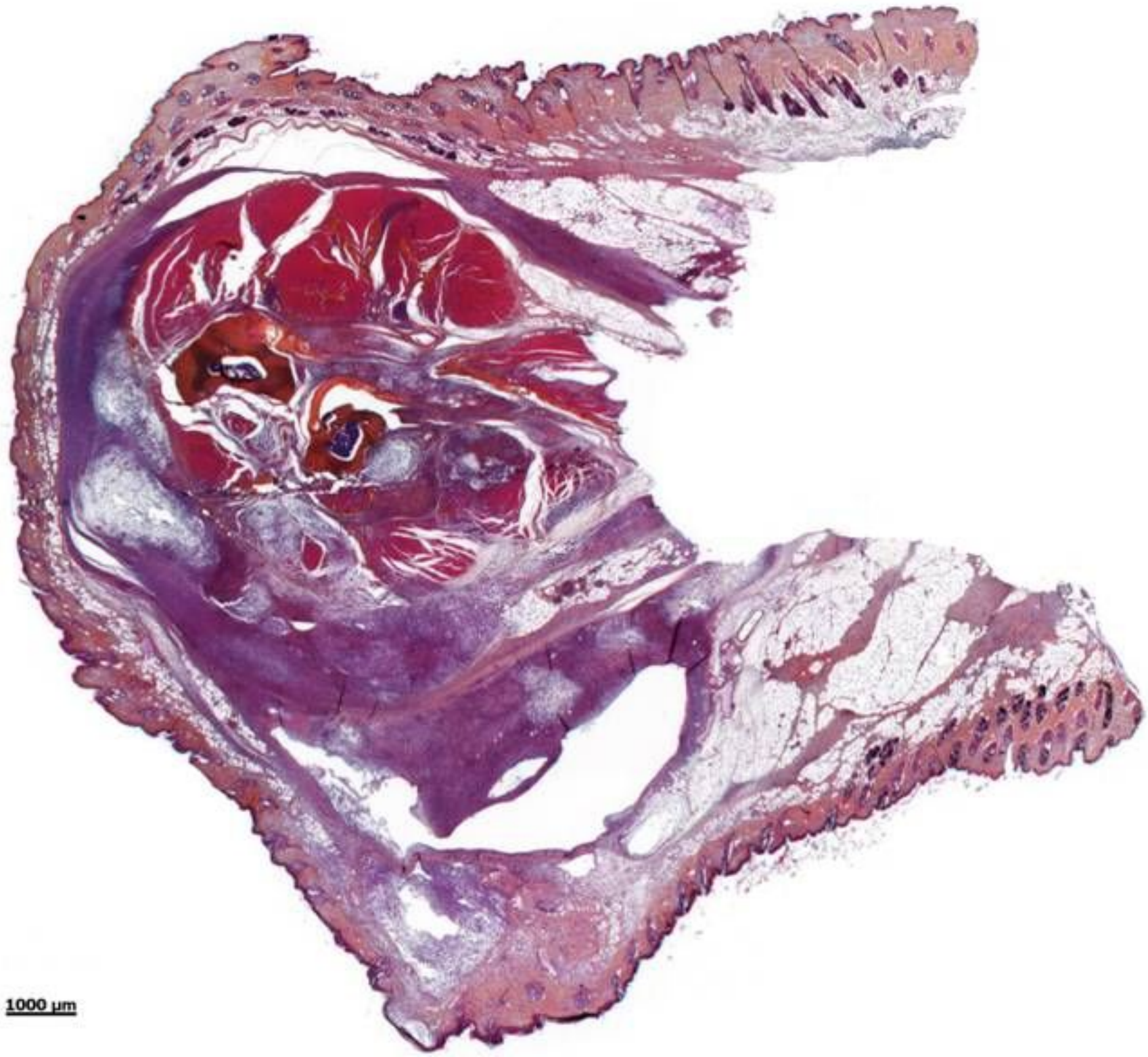
- **Medical treatment**
  - Local desinfection and NSAIDs (Metacam®)
- **Surgical treatment**
  - Amputation elected
  - Bradychardia and death during intervention
- **Necropsy**
  - Declined by owners
- **Histopathology**
  - Amputated limb submitted

# Gross examination

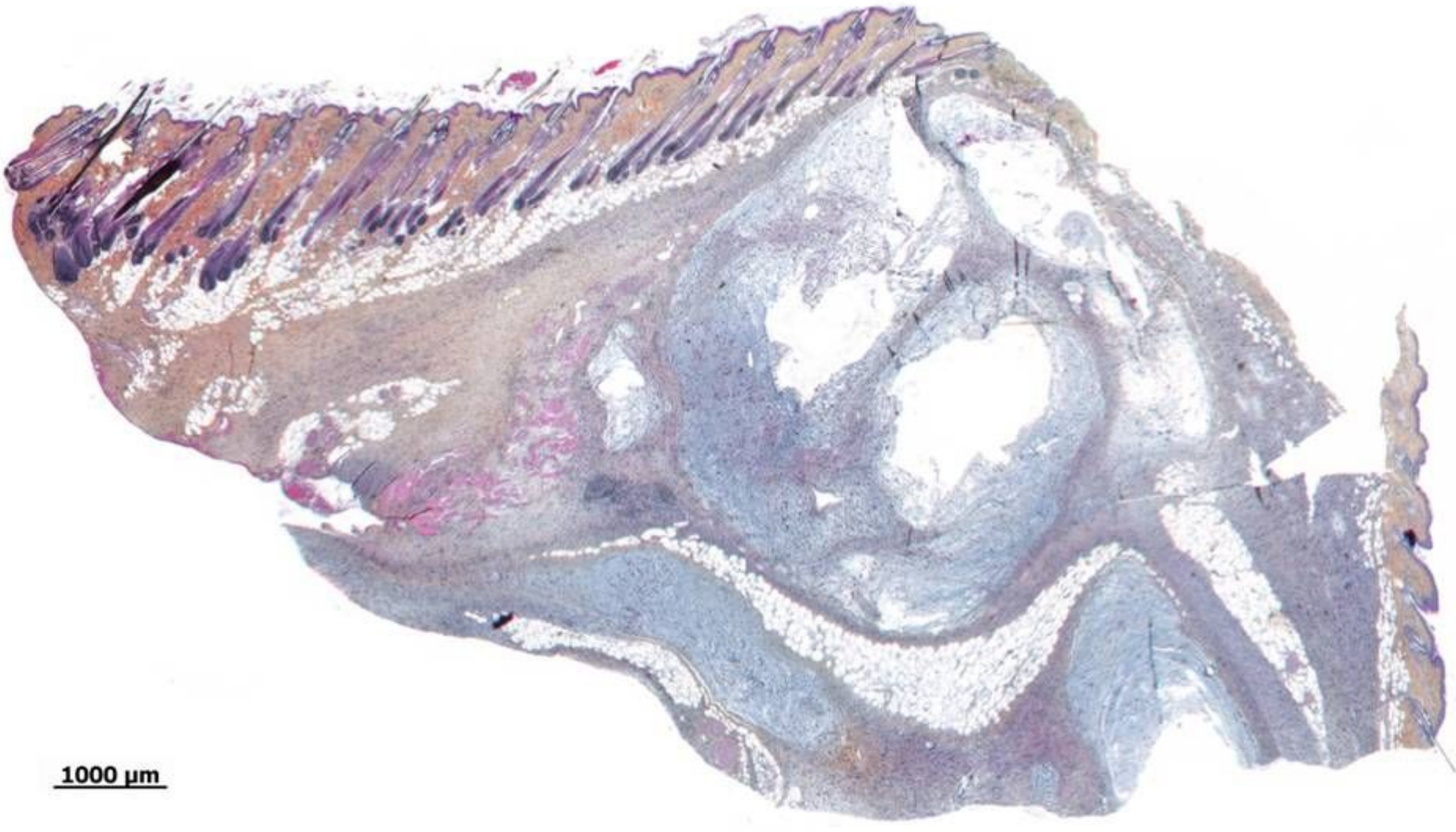



Scale bar : 2 cm

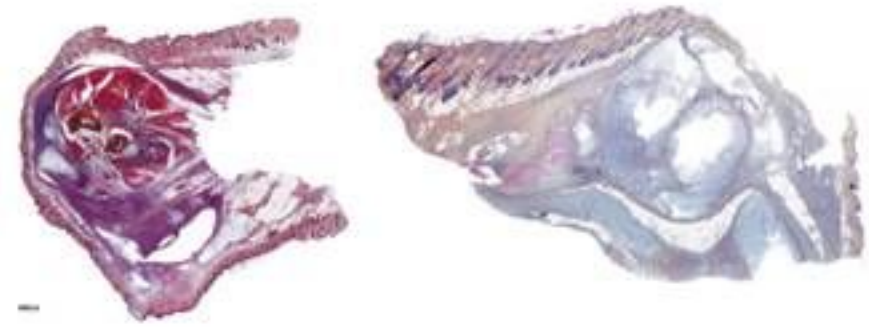
# Histopathology

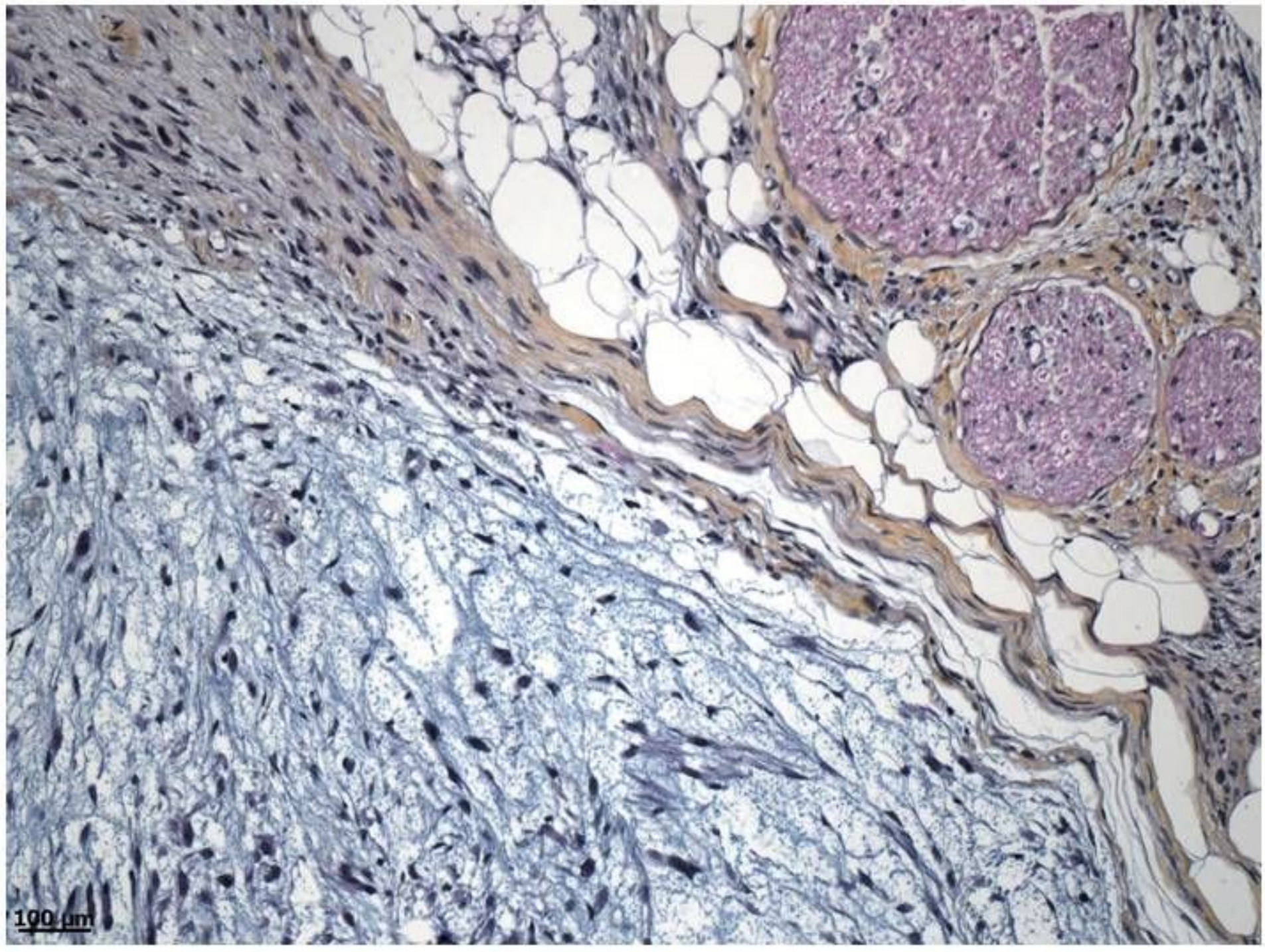


# Histopathology

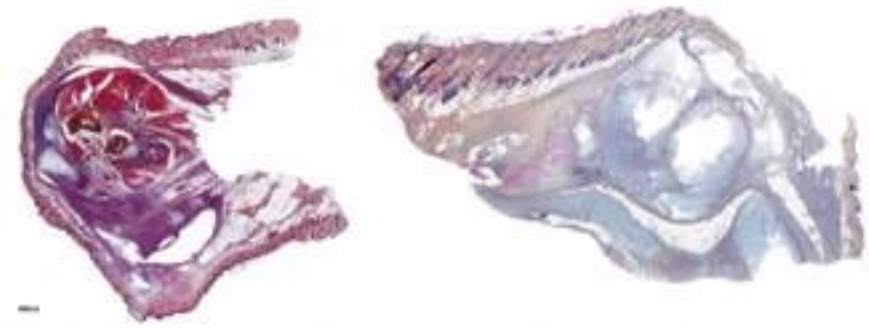


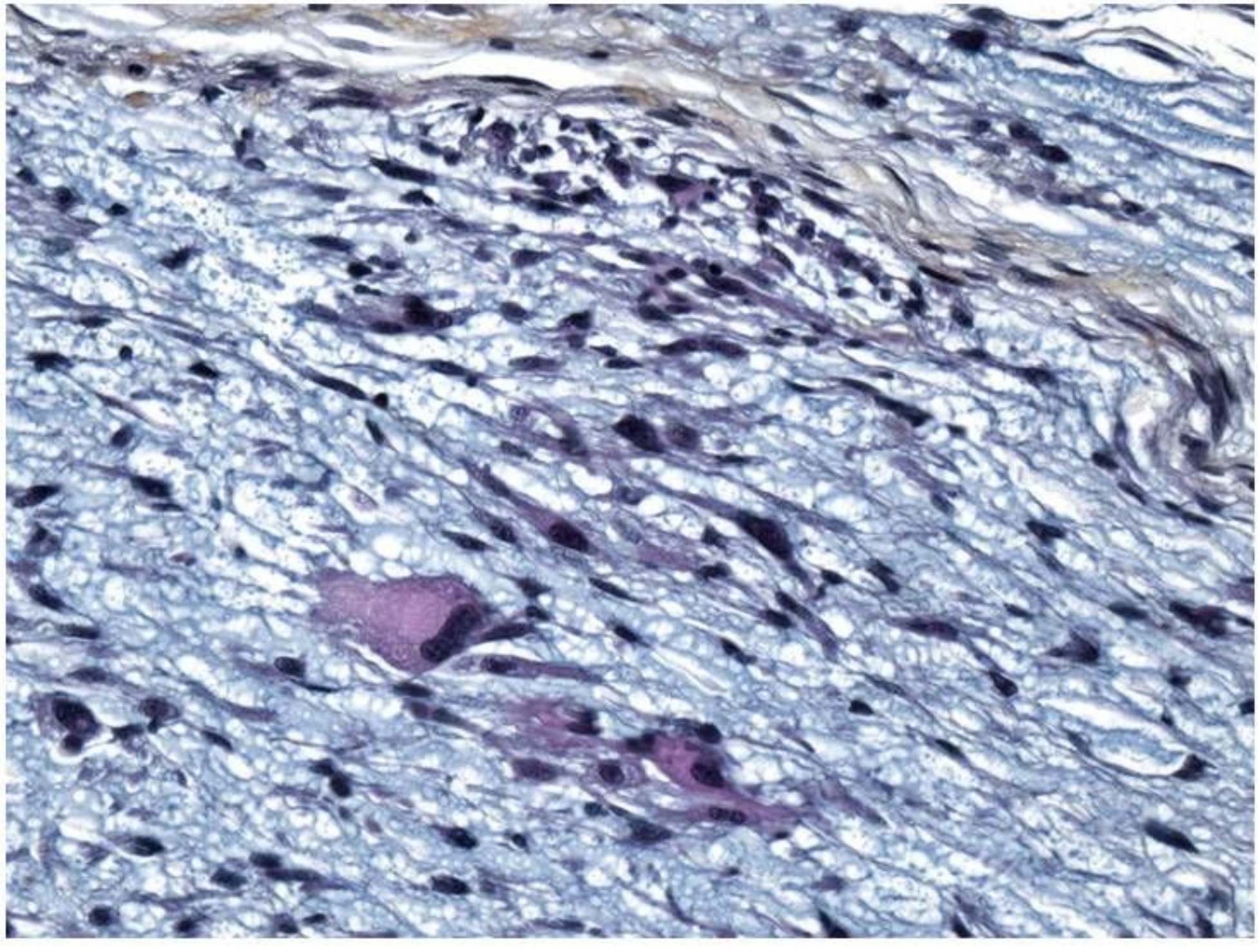
# Histopathology



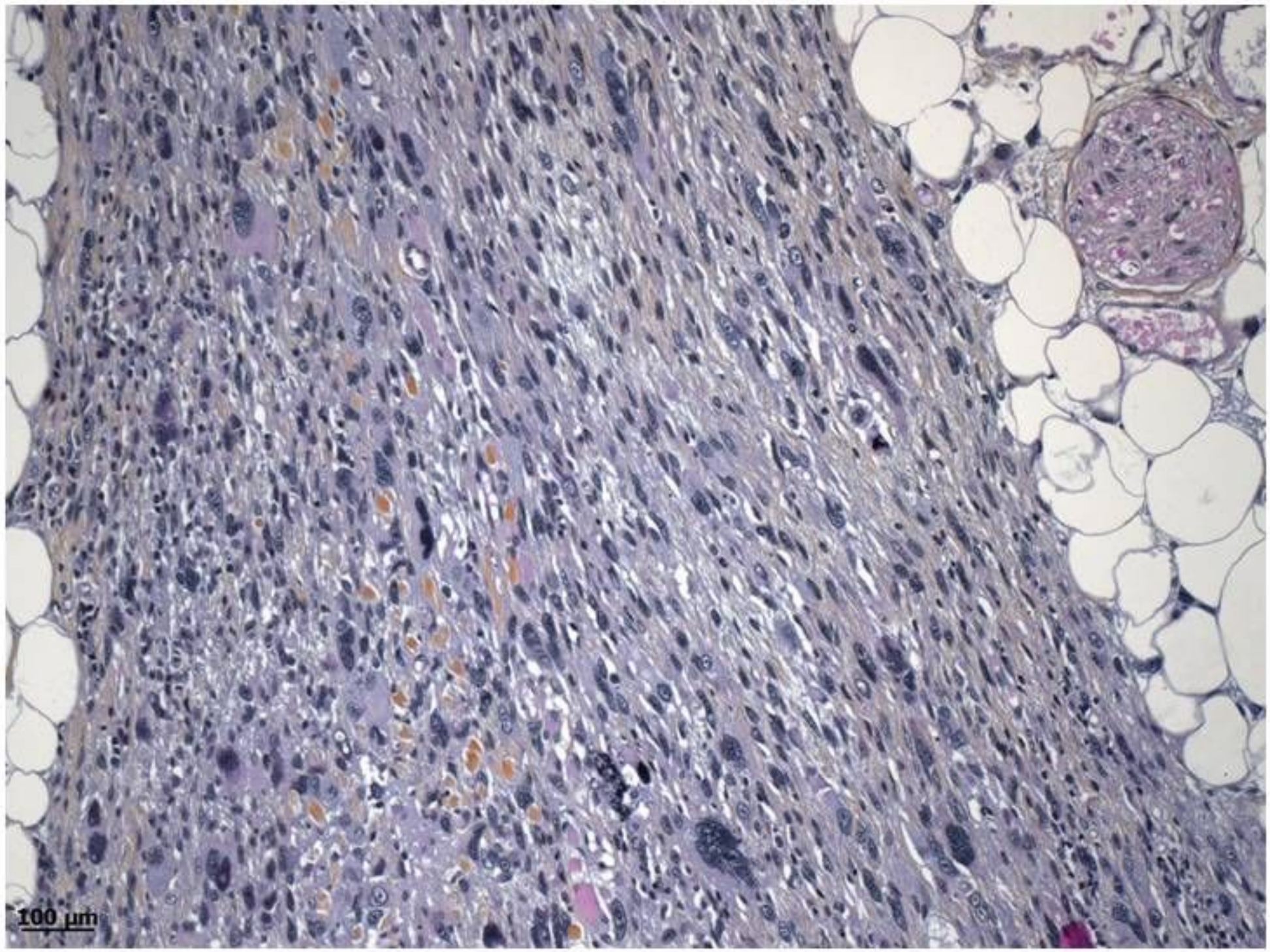


# Histopathology

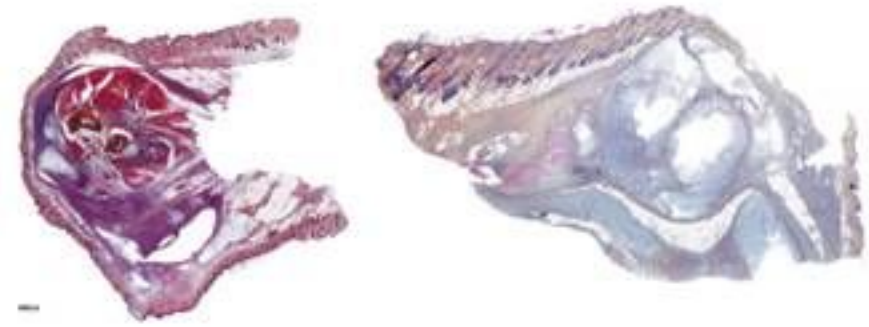


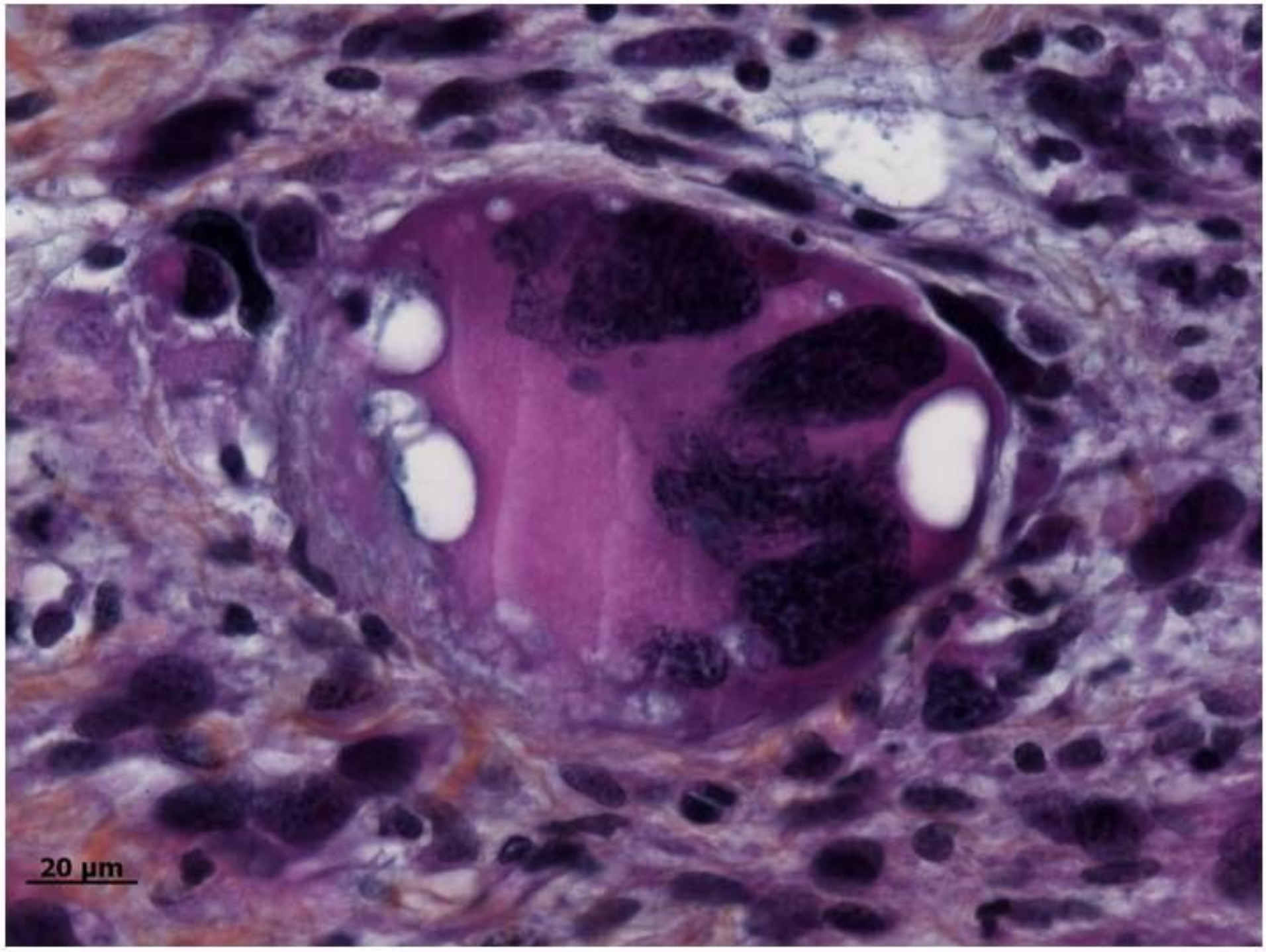


# Histopathology

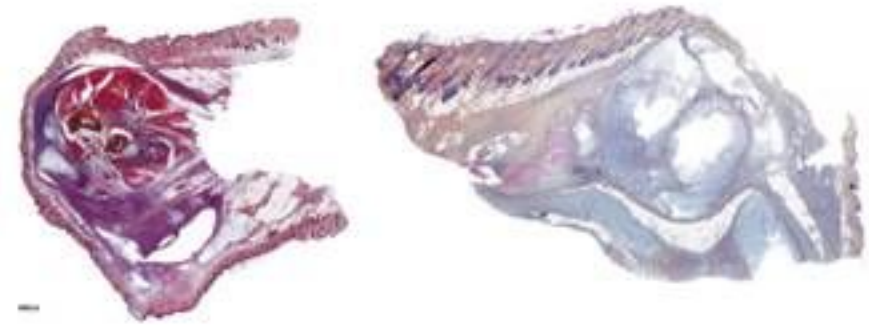


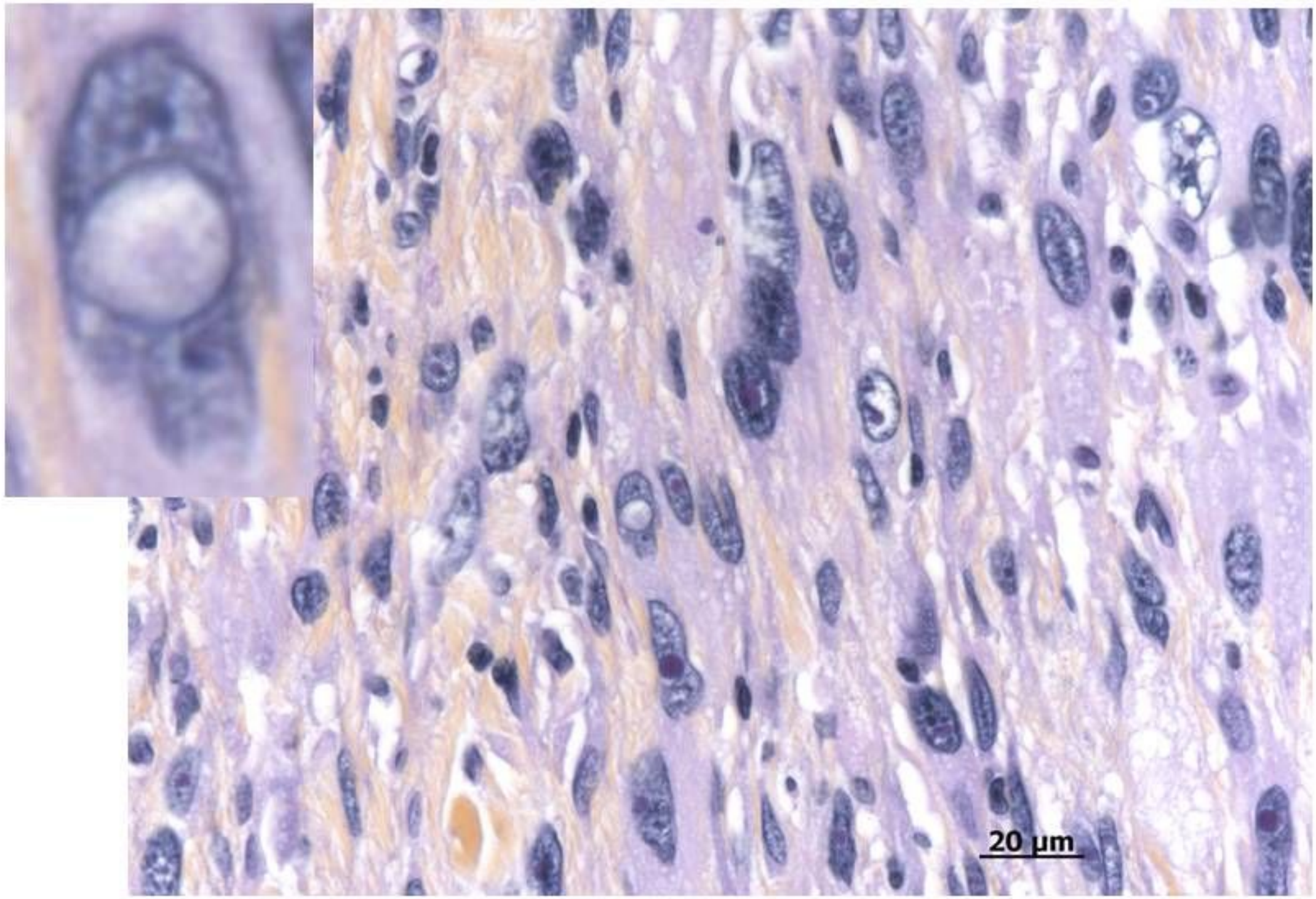
# Histopathology



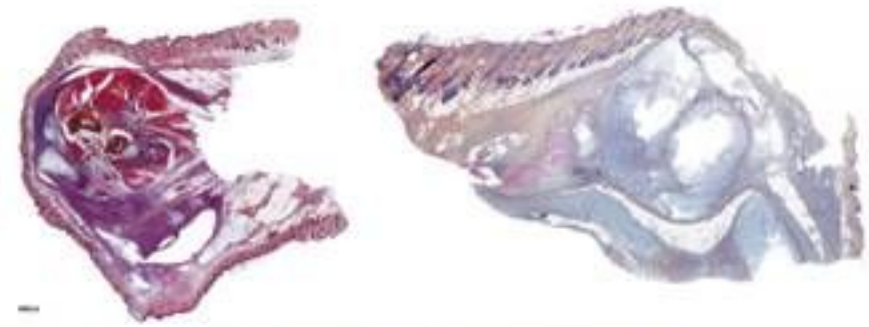


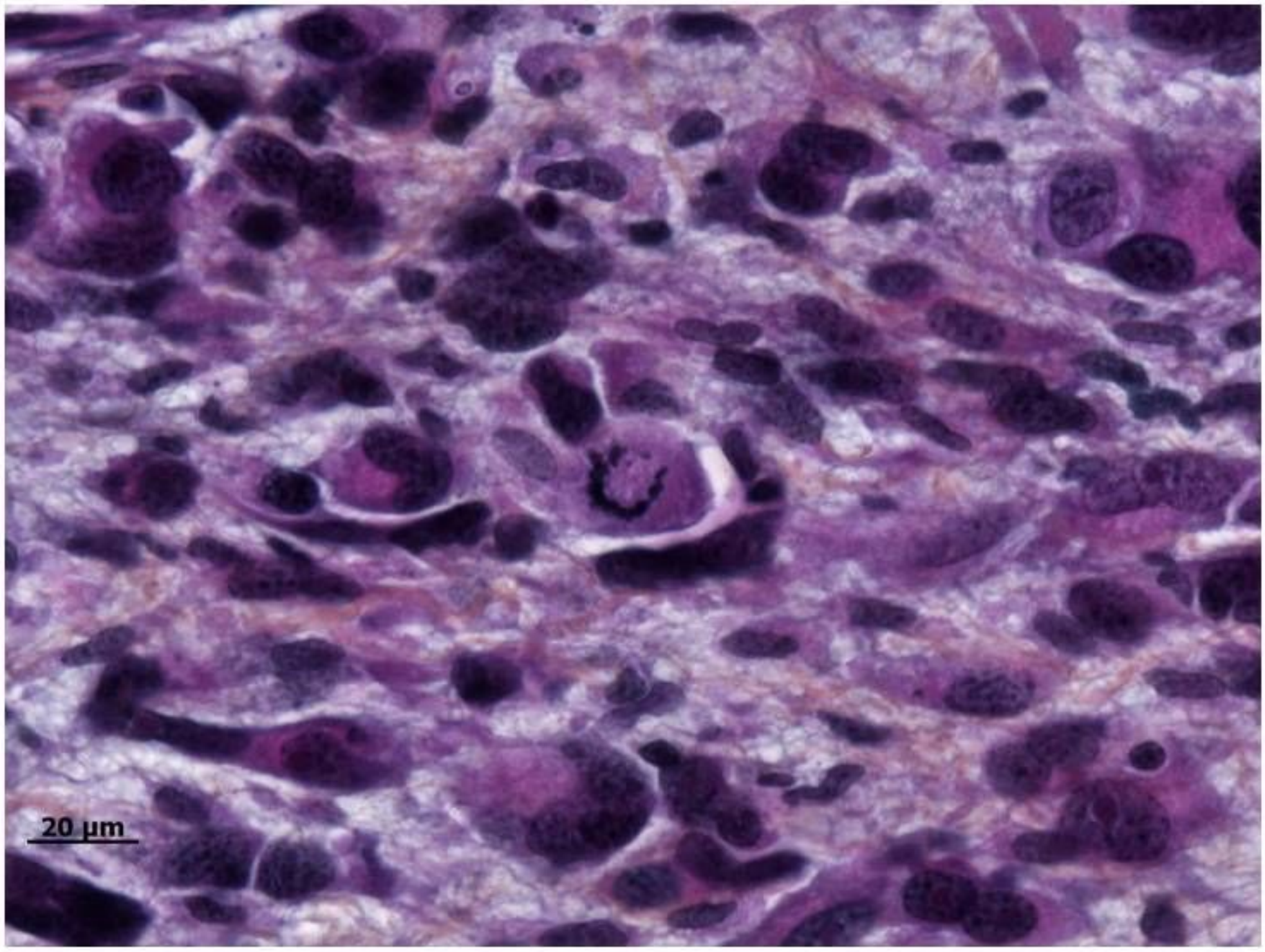
# Histopathology





# Histopathology





# Main histopathological findings

- Subcutaneous soft tissue tumor
- **Invasive**
- **Myxoid** stroma with pseudocysts
- **Pleomorphic** round to spindled cells
- Discrete to large cytoplasmic **vacuoles**
- Severe cytonuclear **atypias**

- **Myxoid sarcoma**

# Differential diagnoses

- **Many tumors can have a myxoid stroma**
- **Main differential diagnosis for this tumor**
  - Myxosarcoma **MS**
  - Liposarcoma, myxoid type **LS**
  - Malignant peripheral nerve sheath tumor **MPNST**
  - Rhabdomyosarcoma **RS**
  - Anaplastic carcinoma **AK**
  - (Hemangiopericytoma in dogs)

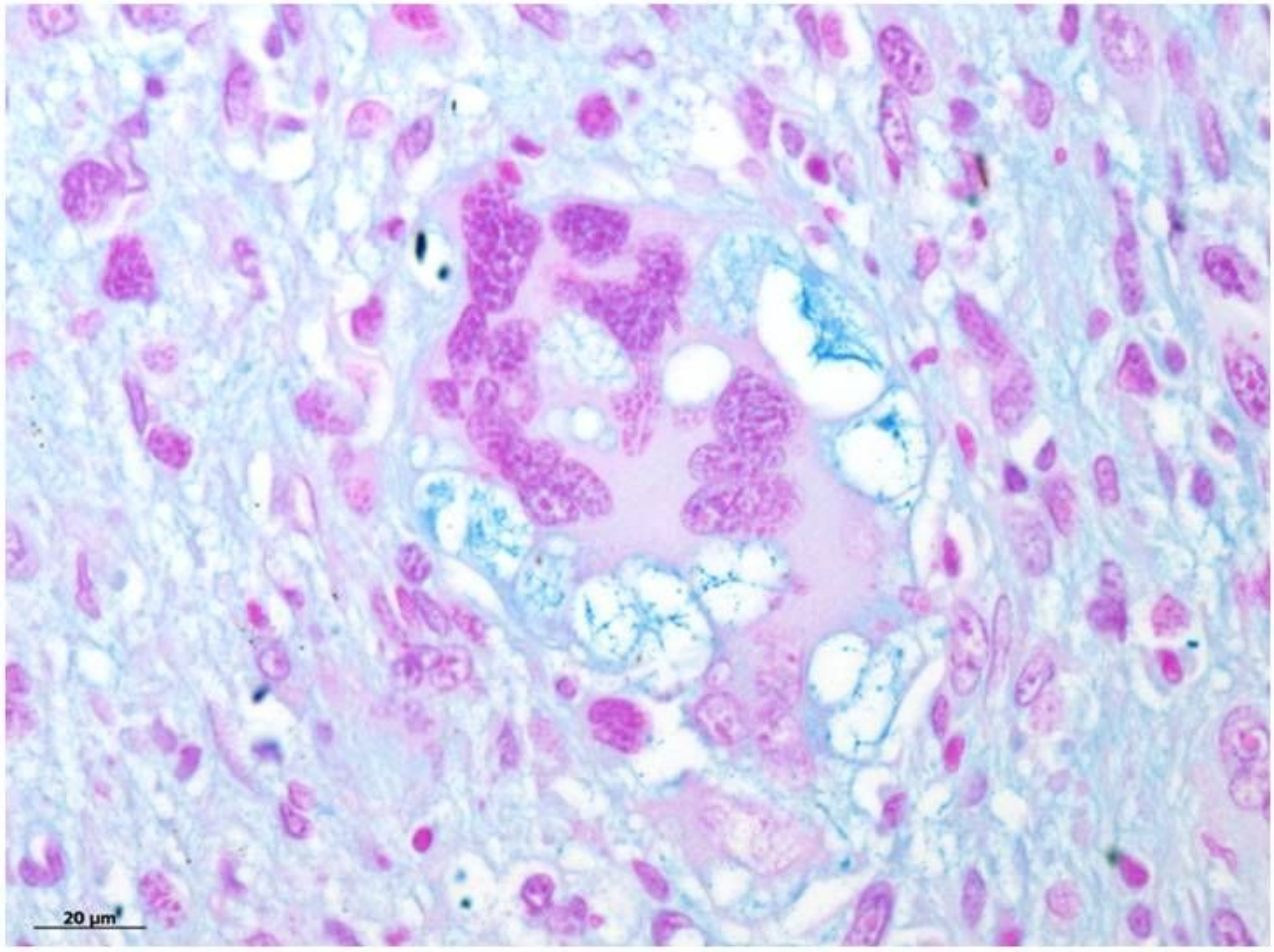
# Special stains

- **Stroma and vacuoles**

| STAIN | INDICATION |
|---|---|
| **Alcian blue** | Acid Mucopolysaccharids (MPS) |
| **Periodic Acid-Schiff (PAS)** | Glycogen, MPS and glycoprotein |
| **Oil red O** | Lipids |

# Alcian blue

# Alcian blue



# Special stains

- **Stroma and vacuoles**

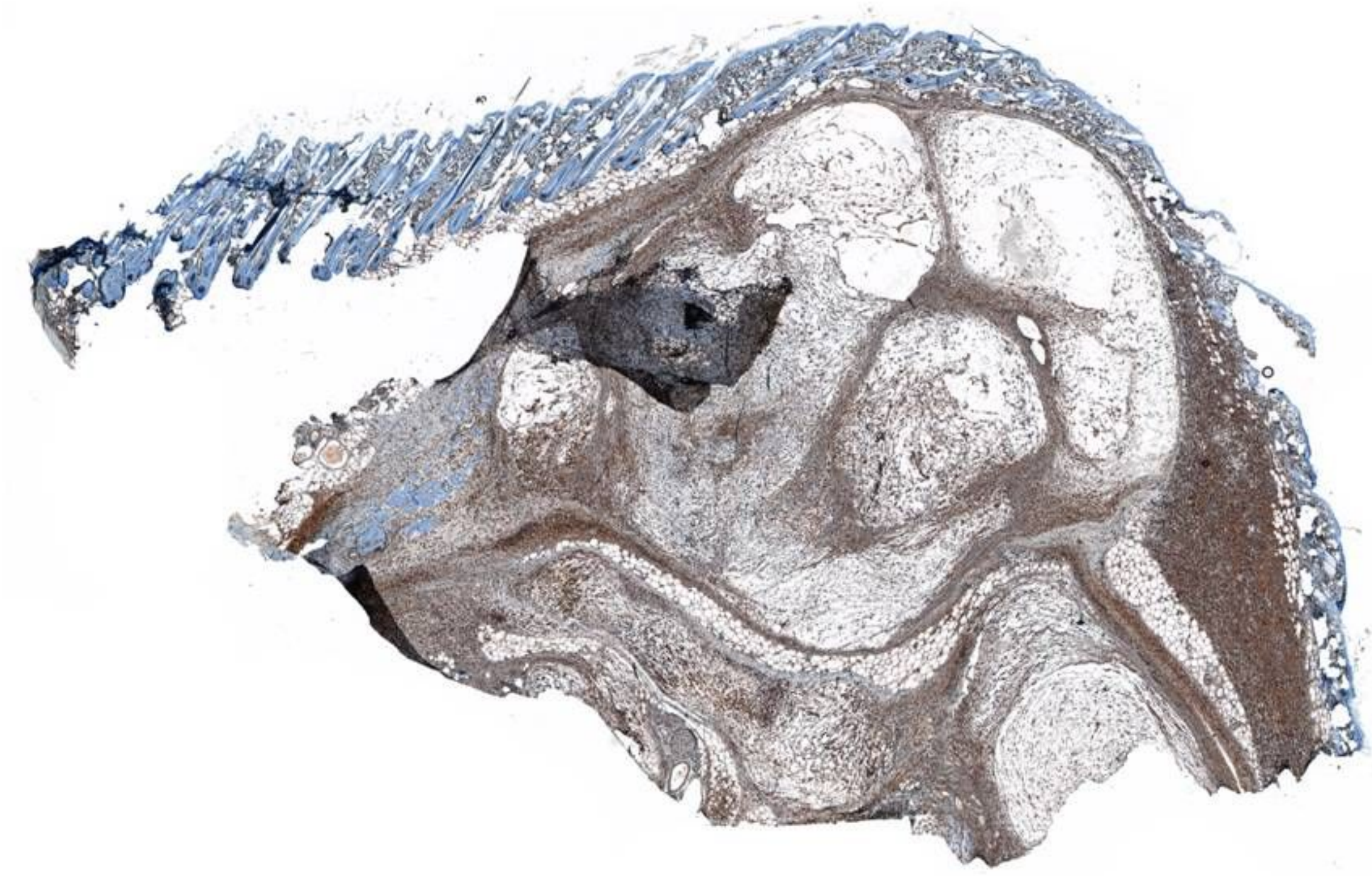
| STAIN | INDICATION | RESULTS |
|---|---|---|
| **Alcian blue** | Acid Mucopolysaccharids (MPS) | **Positive** |
| **Periodic Acid-Schiff (PAS)** | Glycogen, MPS and glycoprotein | Negative |
| **Oil red O** | Lipids | Negative |

# Immunohistochemistry

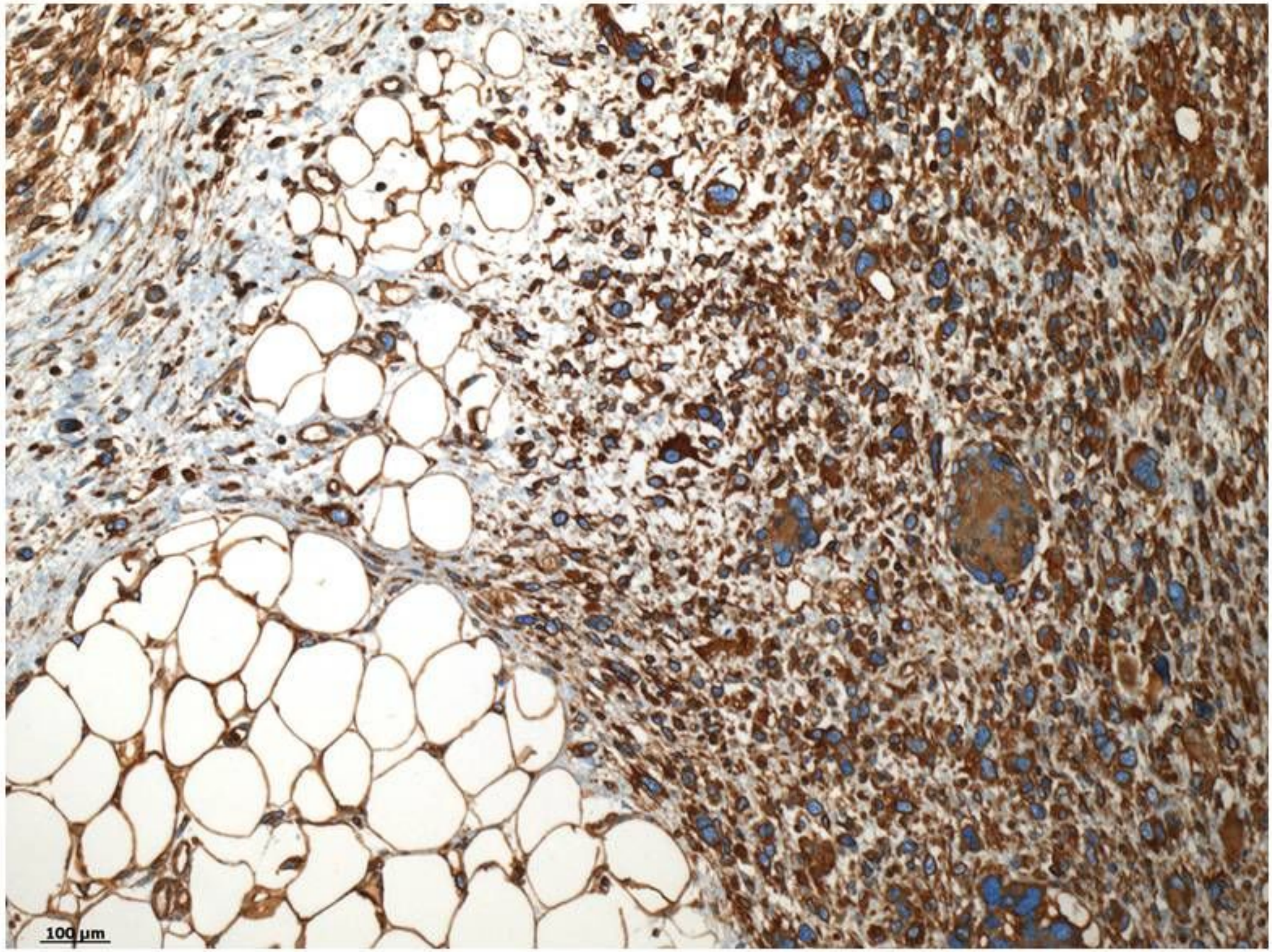
- **Cells**

| ANTIBODY | TARGET |
|---|---|
| **Vimentin**<br>Monoclonal mouse clone V9 (DakoCytomation) | Mesenchymal cells |
| **S100 Protein**<br>Polyclonal rabbit clone Ab (Thermo scientific) | Schwann cells, melanocytes<br>Adipocytes, MPNST, LPS |
| **Desmin**<br>Monoclonal mouse clone D33 Ab-1 (Thermo scientific) | Rhabdomyocytes, RMS |
| **Cytokeratin**<br>Monoclonal mouse clone AE1 and AE3 (Chemicon) | Epithelial cells |

# Vimentin



# Vimentin



# Immunohistochemistry

- **Cells**

| ANTIBODY | TARGET | RESULT |
|---|---|---|
| **Vimentin** | Mesenchymal cells | **Strong diffuse cytoplasmic positivity** |
| **S100 Protein** | Schwann cells, melanocytes Adipocytes, MPNST, LPS | Negative |
| **Desmin** | Rhabdomyocytes, RMS | Negative |
| **Cytokeratin** | Epithelial cells | Negative |

# Summary

- **Malignant myxoid** tumor
- **Alcian-B +** stroma
- **Pleomorphic** cells with **Alcian-B + vacuoles**
- **Vimentin +** with no other specific marker

- **Myxosarcoma**

# Discussion

- **Neoplasia in degu**
  - Murphy, J. C. et al., Spontaneous lesions in the degu, in *Symposium of Comparative Pathology of Zoo Animals*, 1979, p. 437-444
    - 7 tumors (189 animals) : lipoma, cervical lymphosarcoma, hepatoma, hepatocellular carcinoma, spleen hemangioma, bronchioalveolar carcinoma, renal transitional cell carcinoma and renal choristoma
  - JEKL V. et al., Diseases in pet degus : a retrospective study in 300 animals, in *Journal of Small Animal Practice*, 2011, vol 52, p. 107-112
    - 6 tumors (300 animals) : fibrosarcoma, vaginal leiomyoma, vaginal leiomyosarcoma, melanoma, **myxosarcoma** and malignant histiocytoma

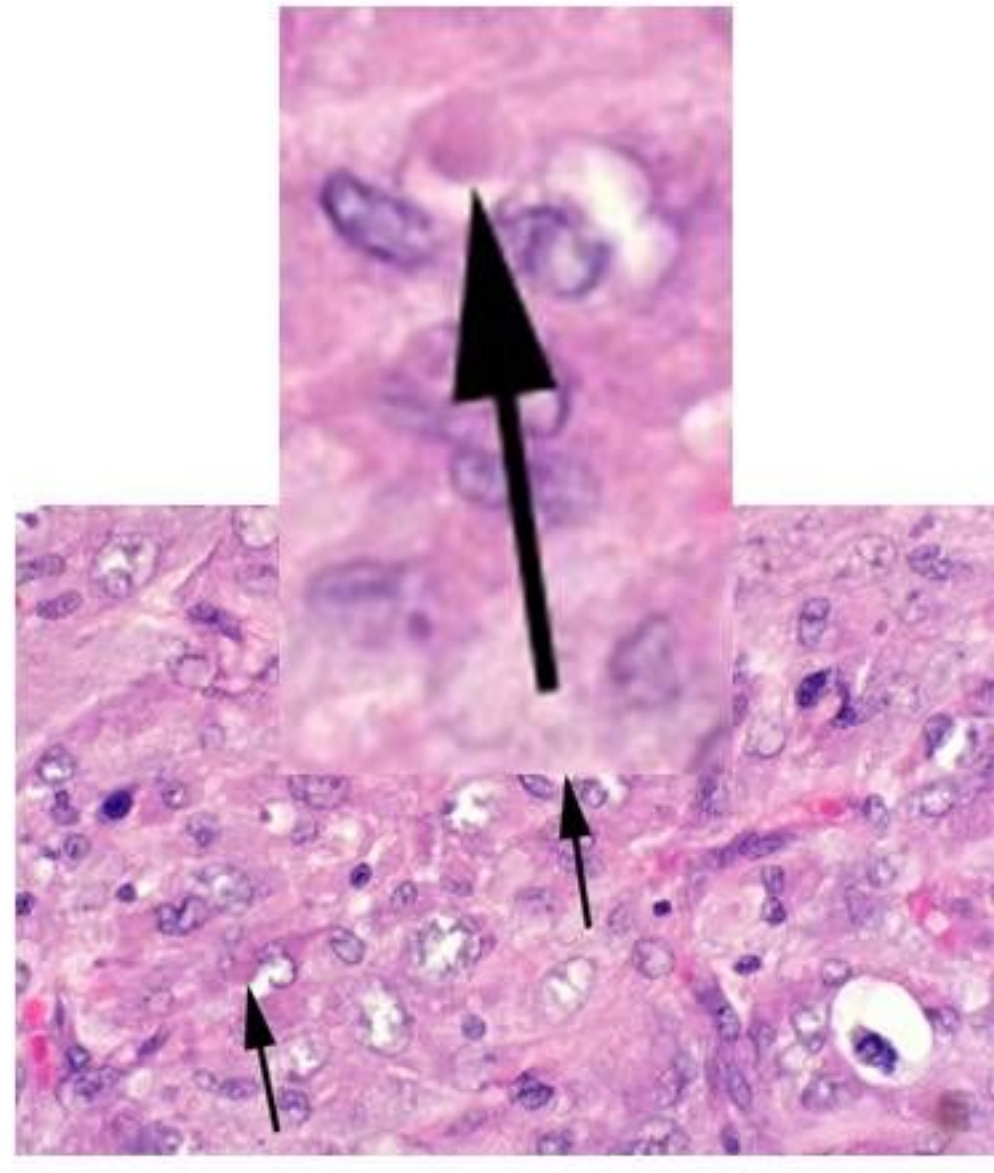
# Discussion

- **Myxosarcoma in degu** (Jekl, 2011)
- **Myxosarcoma in other animals** (Cagnini, 2011)

–Dog
–Cat
–Cattle
–Rabbit
–Syrian hamster
–Tiger
–Birds
–Deer
–Ferret
–European hedgedog

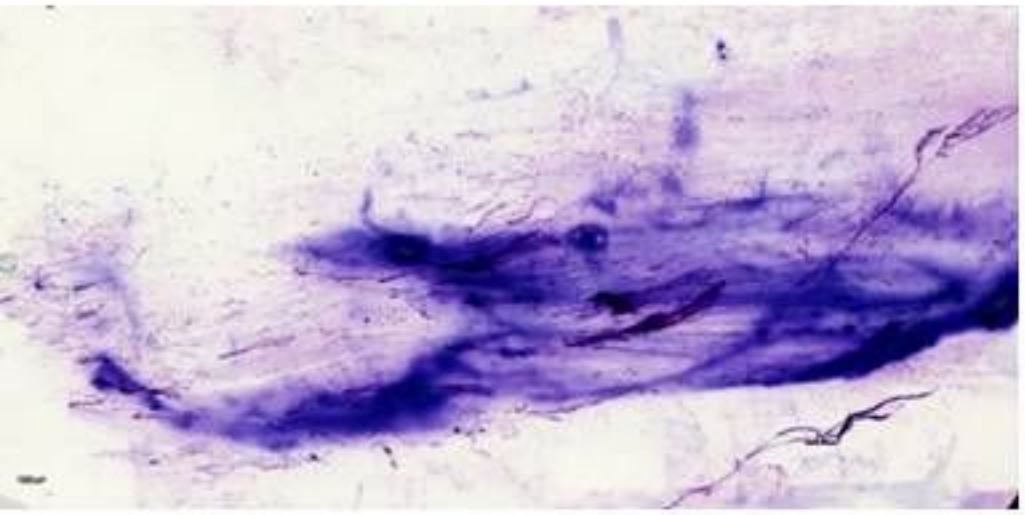
# Discussion

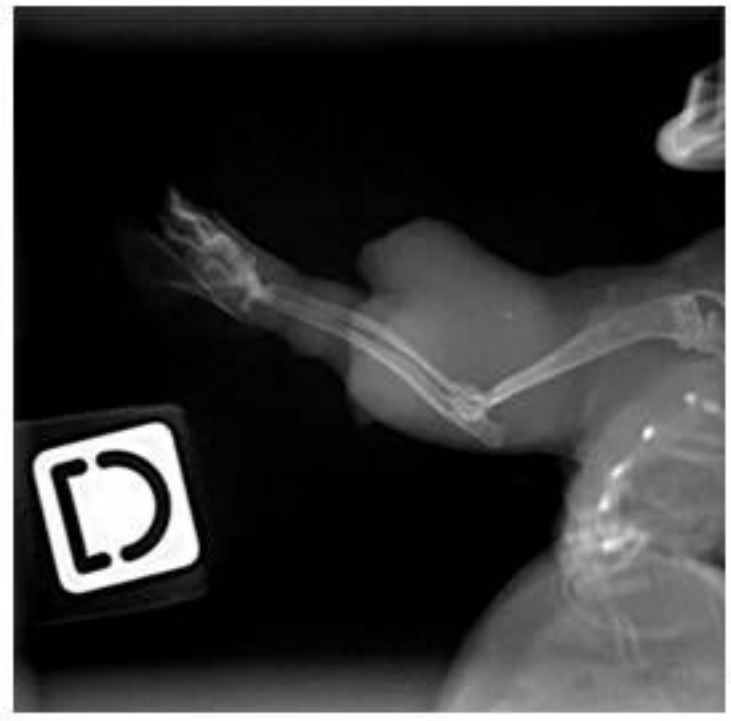
- **Poxvirus responsible for myxoid tumor in small animals**

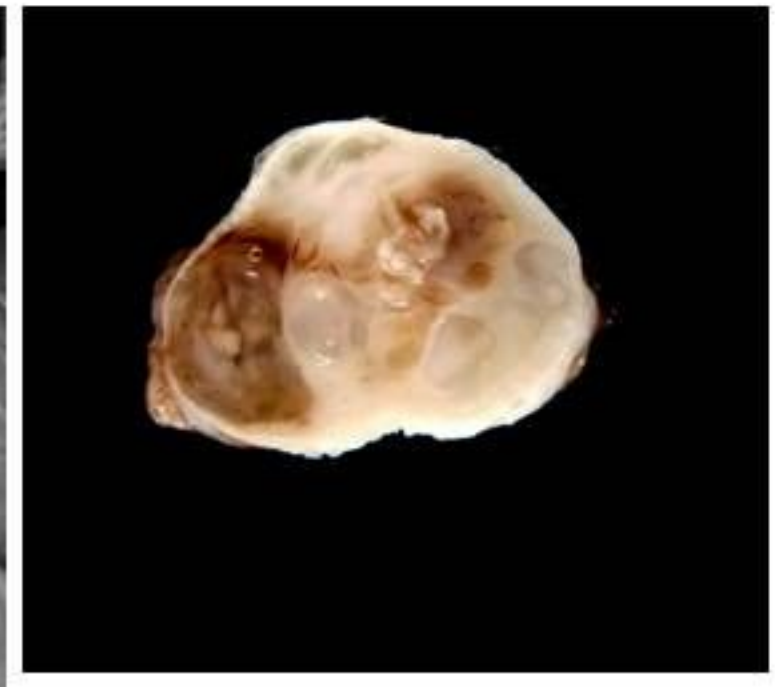


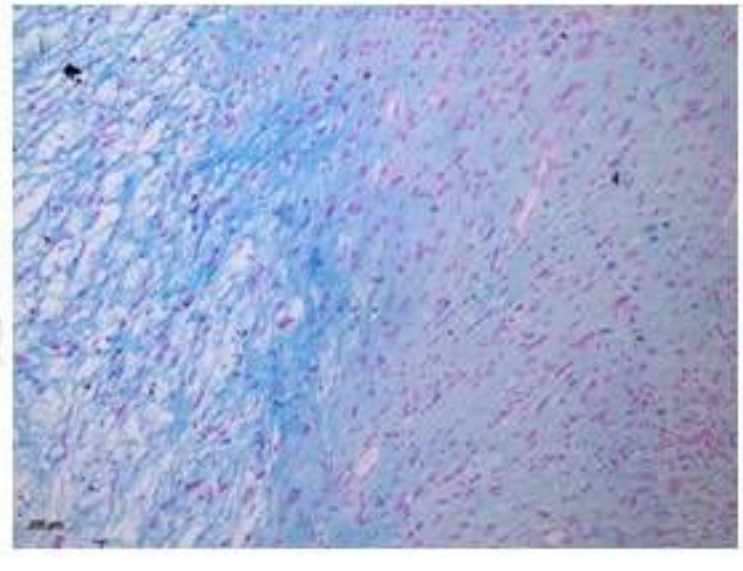
- Histology : epidermic hyperplasia, intracytoplasmic inclusions?
- Polymerase Chain Reaction (PCR) : virus identification and phylogenetical analysis?
- Electron microscopy : viral particles?

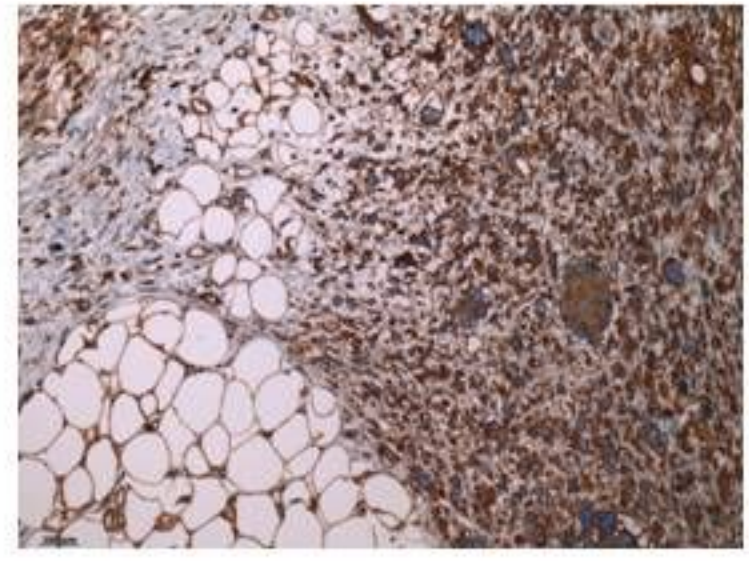
# Conclusion and perspective











# Acknowledgments


- Dr Minh HUYNH
- Dr Charly PIGNON
- Dr Anne-Sophie BEDU
- Dr Edouard REYES-GOMEZ
- Dr Eve LALOY
- Dr Meryem EL MRINI
- Patricia WATTIER
- Agnès CHAMPEIX
- Fara RAKOTOVAO
- Sophie CHÂTEAU-JOUBERT
- Jean-Luc SERVELY

# Selected references


- CAGNINI D. Q. et al., Cutaneous myxosarcoma in a Syrian hamster, in *Ciências Agrárias*, 2011, vol 32 (3), p. 1145-1150
- GOLDSCHMIDT M. H. and HENDRICK M. J., Tumors of the skin and soft tissues, in MEUTEN, D. J. *Tumors in domestic animals,* Iowa, 2002, 4 ed., p. 227-233
- HEADLEY S.A. et al., Cutaneous myxosarcoma with pulmonary metastases in a dog, in *Journal of Comparative Pathology*, 2011, vol 145, p. 31-34
- **JEKL V. et al., Diseases in pet degus : a retrospective study in 300 animals, in *Journal of Small Animal Practice*, 2011, vol 52, p. 107-112**
- **MURPHY S. et al., Spontaneous lesions in the degu (Rodentia Hystricomorpha : *Octodon degus*), in *Symposium of Comparative Pathology of Zoo Animals*, Washington DC, 1979, p 437-444**
- SINGH K. et al., Spontaneous subcutaneous myxosarcoma in a captive european hedgehog, in *Journal of Veterinary Diagnosic Investigation*, 2006, vol 18, p. 627–631
- van ZEELAND, Y. R. A. et al., Carpal myxosarcoma and forelimb amputation in a ferret (*Mustela putorius furo*), in *Veterinary Record,* 2006, vol 159, p. 782-78