EPITHELIAL AND MESENCHYMAL TUMORS
Skin Cytology

Jill Schappa, DVM, DACVP

Jennifer Bouschor, DVM, DACVP

Outline

- Normal skin structures

- Tumor types and characteristics
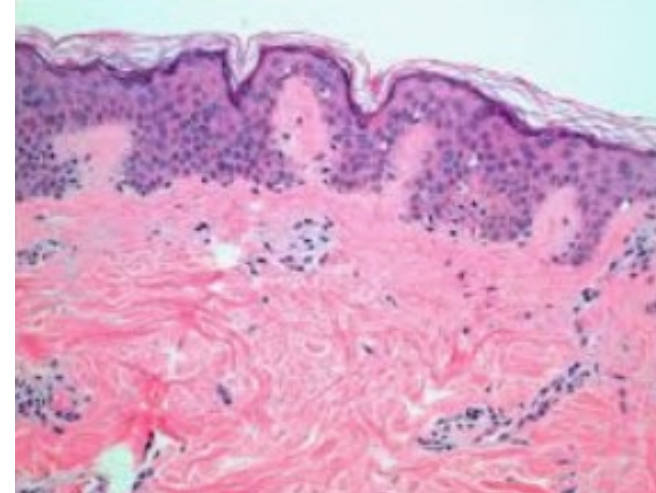
Normal Structures

- ☐ Epidermis
  - ■ Multiple layers of squamous epithelium from superficial keratinized to basal epithelium

- ☐ Dermis
  - ■ Hair follicles, sebaceous glands, apocrine glands
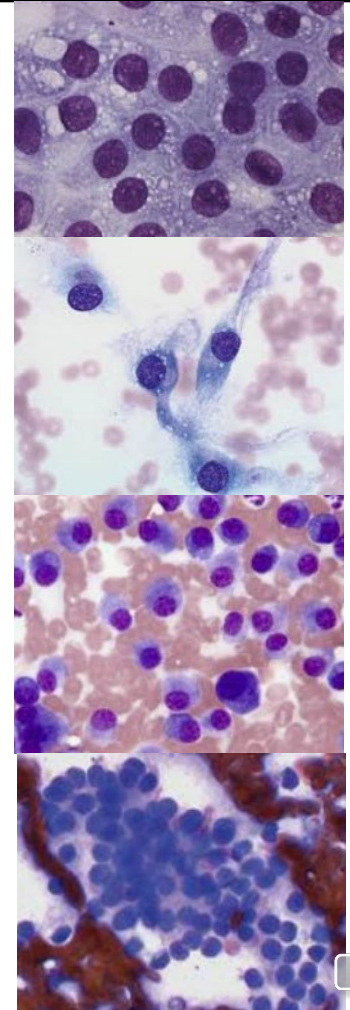 - ■ Collagen and elastic fibers, smooth muscle bands, blood and lymphatic vessels, nerves

- ☐ Subcutis
 - ■ Adipose tissue, collagen bundles, blood vessels

What are the 3 Main Types of Tumors?

- ☐ Epithelial

- ☐ Mesenchymal

- ☐ Round Cell-another lecture

- ▪ Neuroendocrine

Epithelial Tumor Characteristics

- [ ] How do these cells associate?
  - [ ] Cohesive clusters
- [ ] What structures do they form?
  - [ ] Acinar structures/palisading
- [ ] Margins-discrete or indistinct?
  - [ ] Usually Distinct!
- [ ] Cell shapes?
  - [ ] Cuboidal, columnar, polygonal, rounded margins
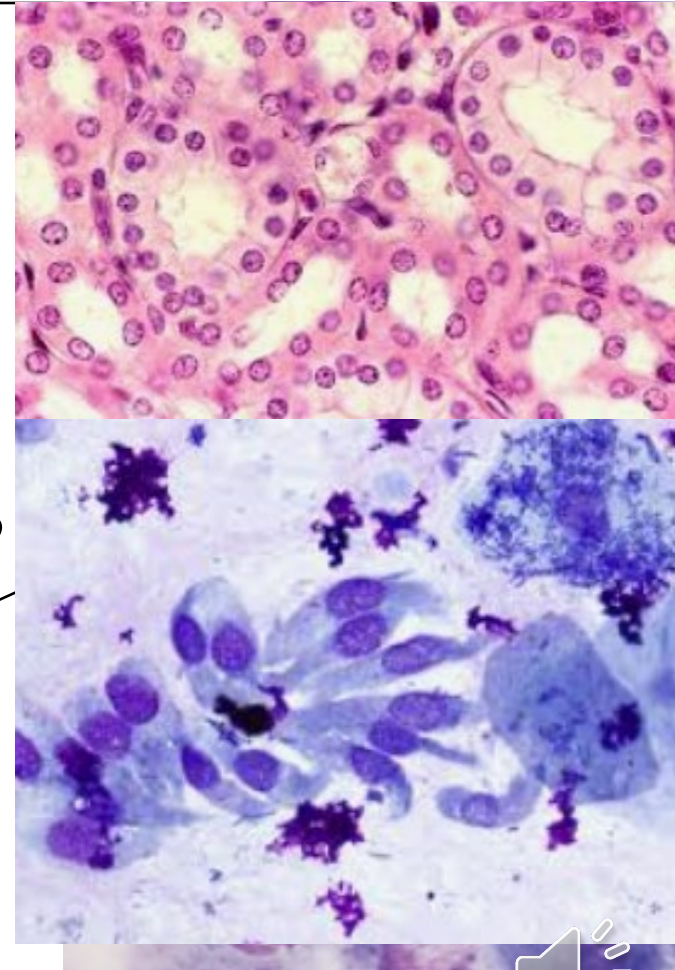
Benign Epithelial Tumors

- Sebaceous adenoma/ Sebaceous hyperplasia

- Epithelial tumor with follicular differentiation/Inclusion cyst

- Cutaneous basilar epithelial neoplasm

- Perianal adenoma

Sebaceous Masses


- Common masses in dogs and lesser extent cats

- Cytologically similar
  - Sebaceous adenoma
  - Sebaceous nodular hyperplasia
  - Meibomian gland adenoma (eyelid)

- Need histopathology to differentiate
 - Neoplasms can have significant basilar cell component (epithelioma) which can be more aggressive tumor type
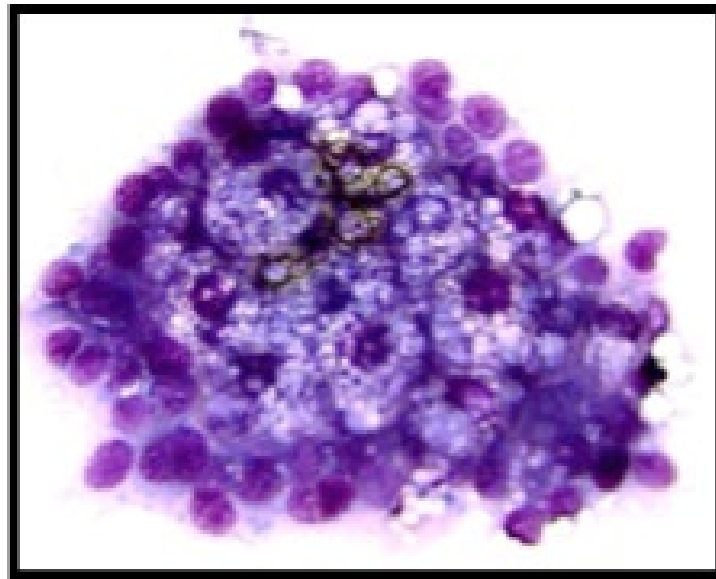
Sebaceous Masses

□ Sebaceous cells:

- ■ Large polygonal, highly vacuolated (3D) cells with a central nucleus

□ Reserve cells:

- ■ Smaller cuboidal cells with deeply basophilic cytoplasm and a round nucleus with a single variably distinct nucleolus
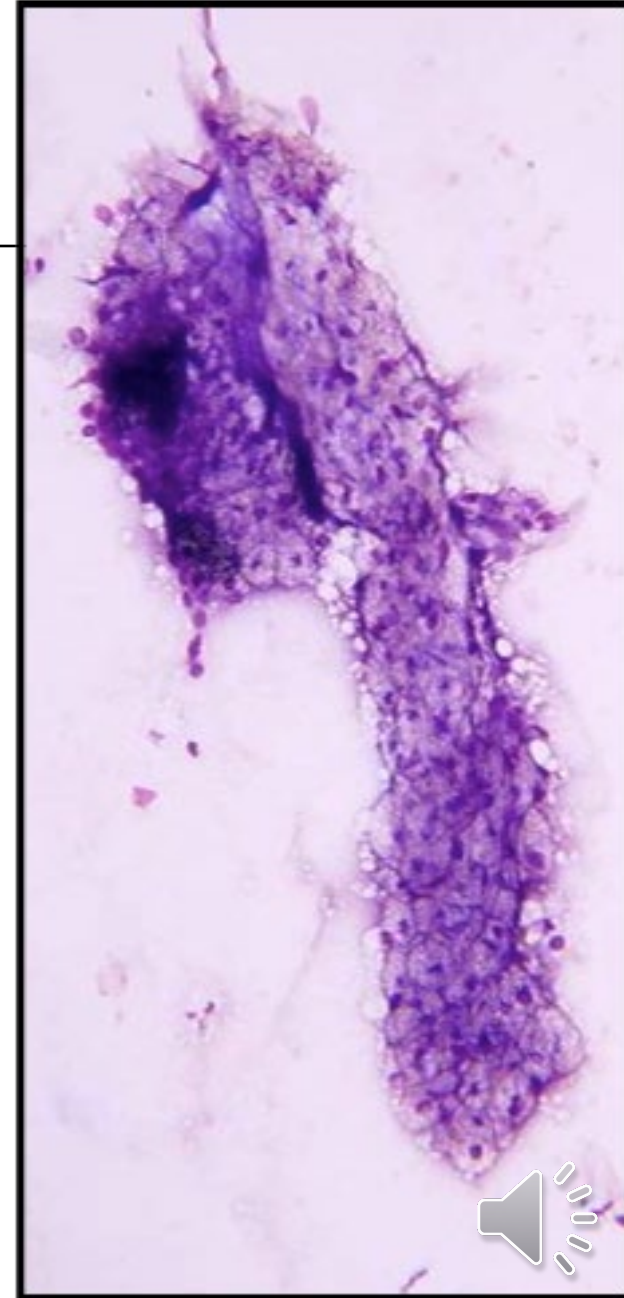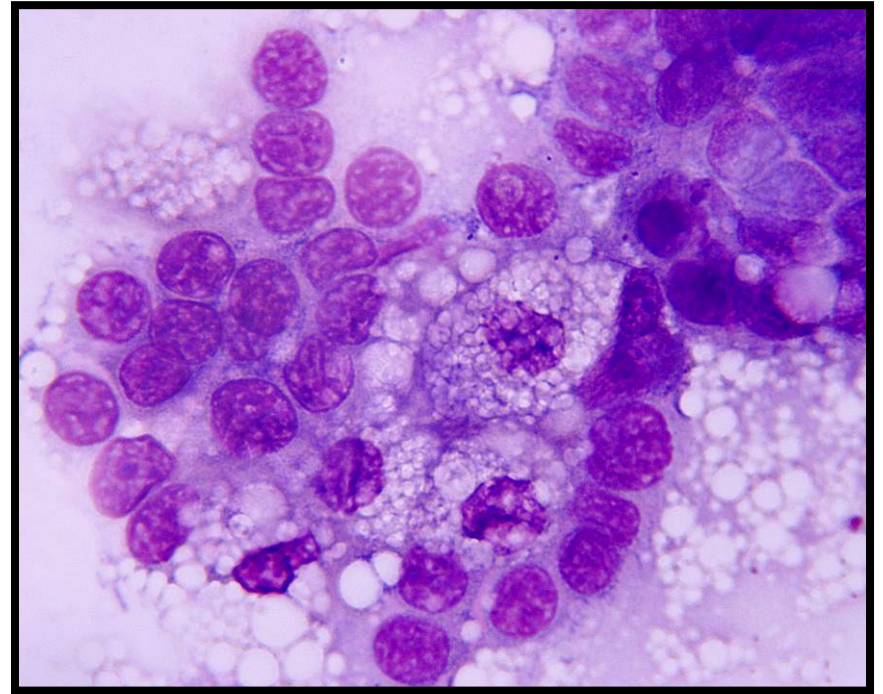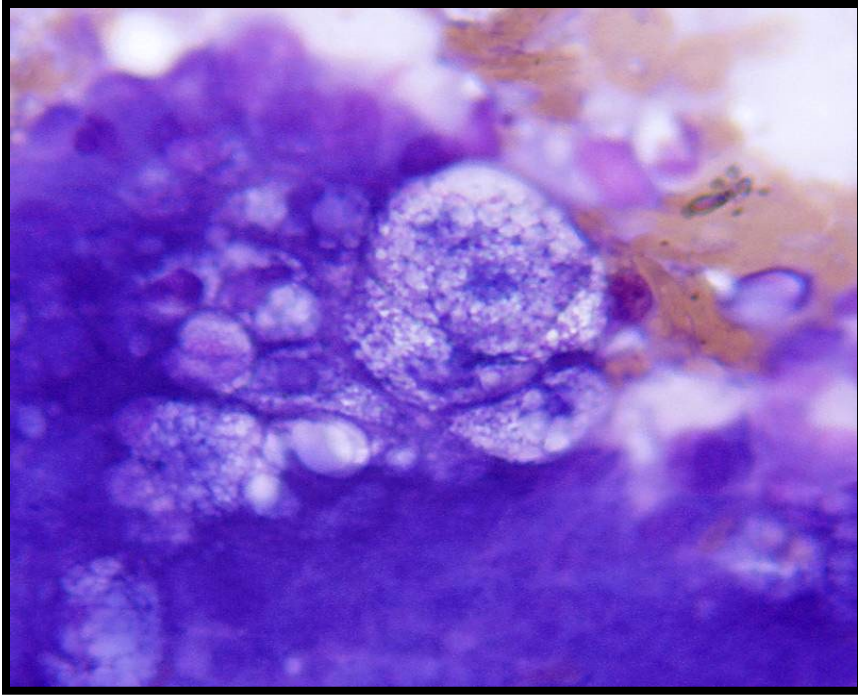
Sebaceous Masses
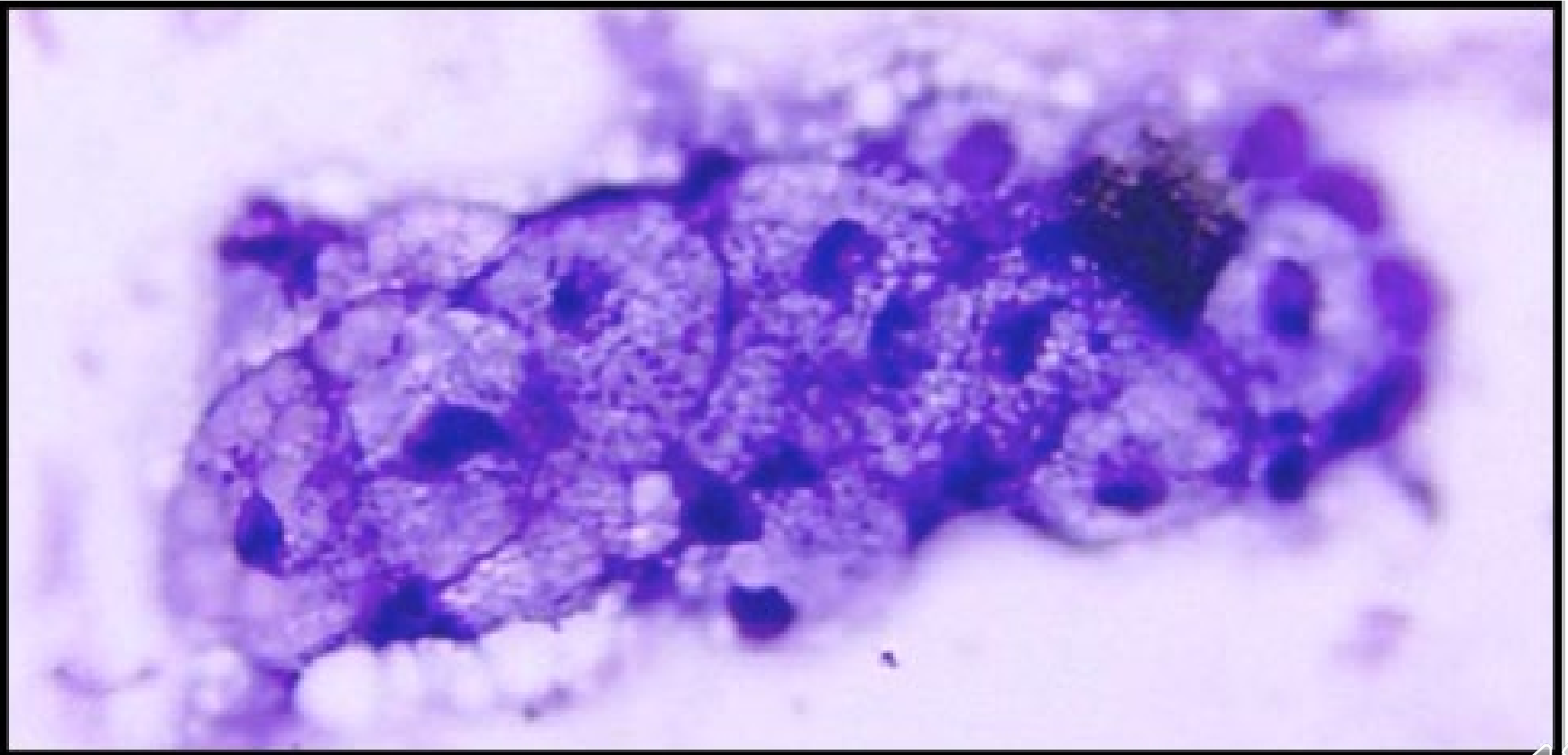
Sebaceous Masses

Sebaceous Masses

Epithelial Tumors with Follicular Differentiation or Inclusion Cysts

- ☐ Cytologically similar
  - ■ Epithelial tumors w/ follicular differentiation
  - ■ Inclusion cysts

- ☐ Secondary inflammation and cholesterol crystals common-why?
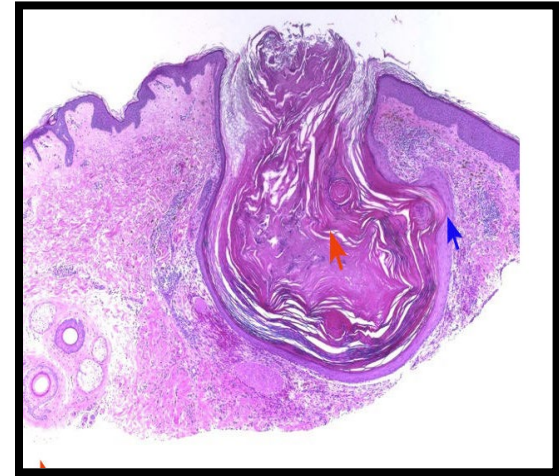
- ☐ Animal may have multiple masses

Inclusion Cysts

Noah's Arkive

Inclusion cyst vs. Cystic epithelial tumor w/follicular differentiation

Epithelial tumor w/ follicular diff.

Inclusion cyst

- ☐ Different tissue architecture on histopathology
    - Similar cytology appearance
   - Similar clinical behavior (ie benign)

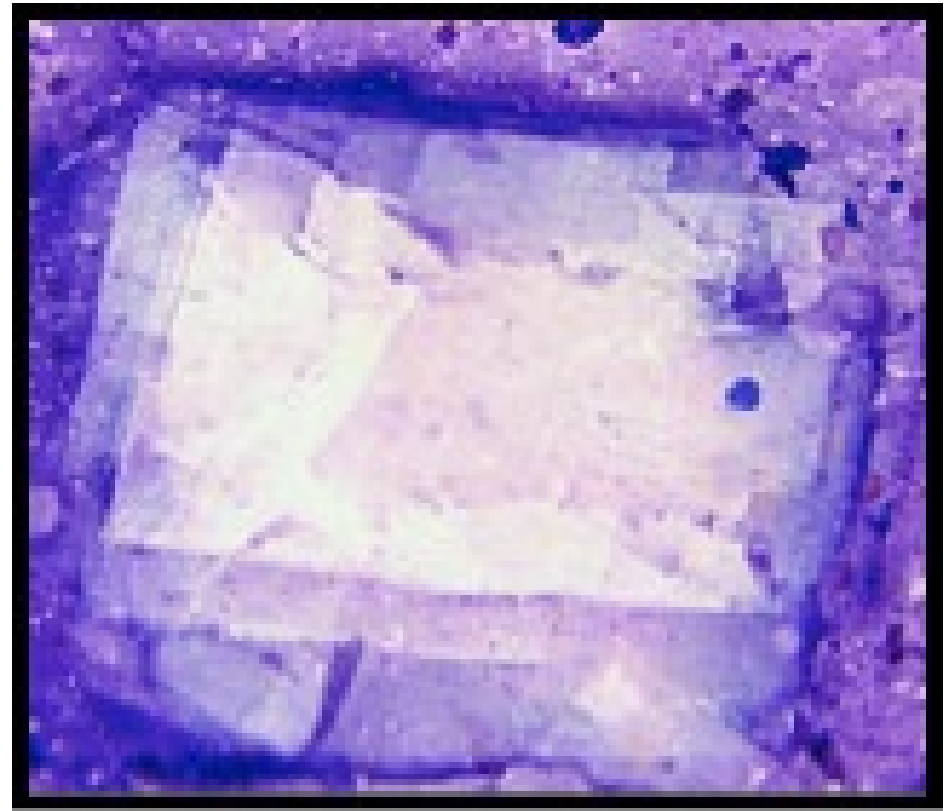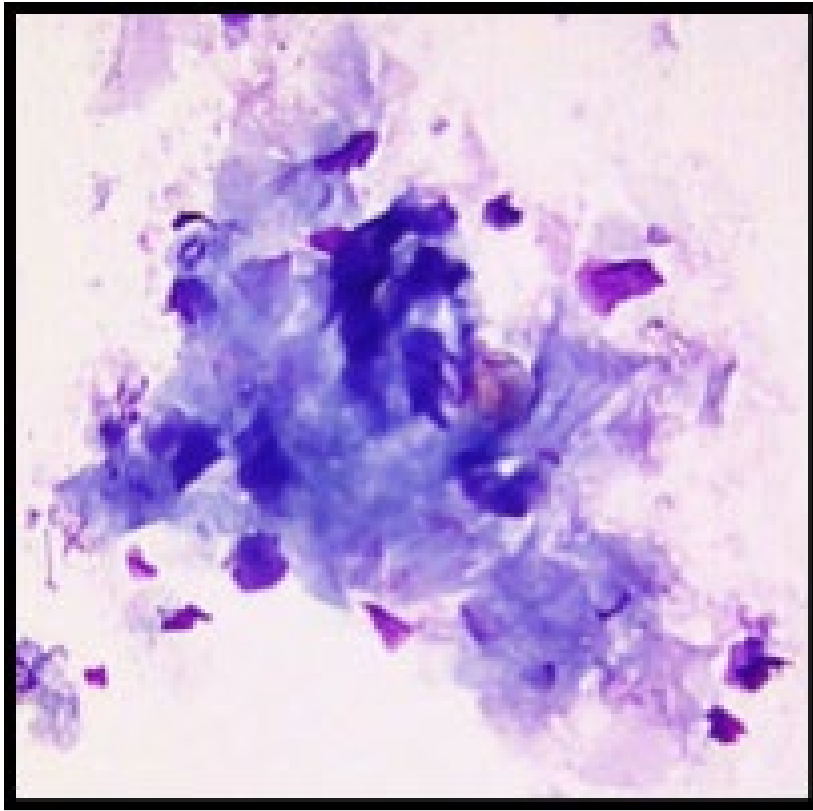# Epithelial Tumors with Follicular Differentiation or Inclusion Cysts

- ☐ Keratinized squamous cells
  - ■ Large, angular, polygonal cells with glassy basophilic cytoplasm
  - ■ Flat, anuclear, basophilic (robin's egg blue) cells
- ☐ Keratinized debris
- ☐ Cholesterol crystals

Epithelial Tumors with Follicular Differentiation or Inclusion Cysts
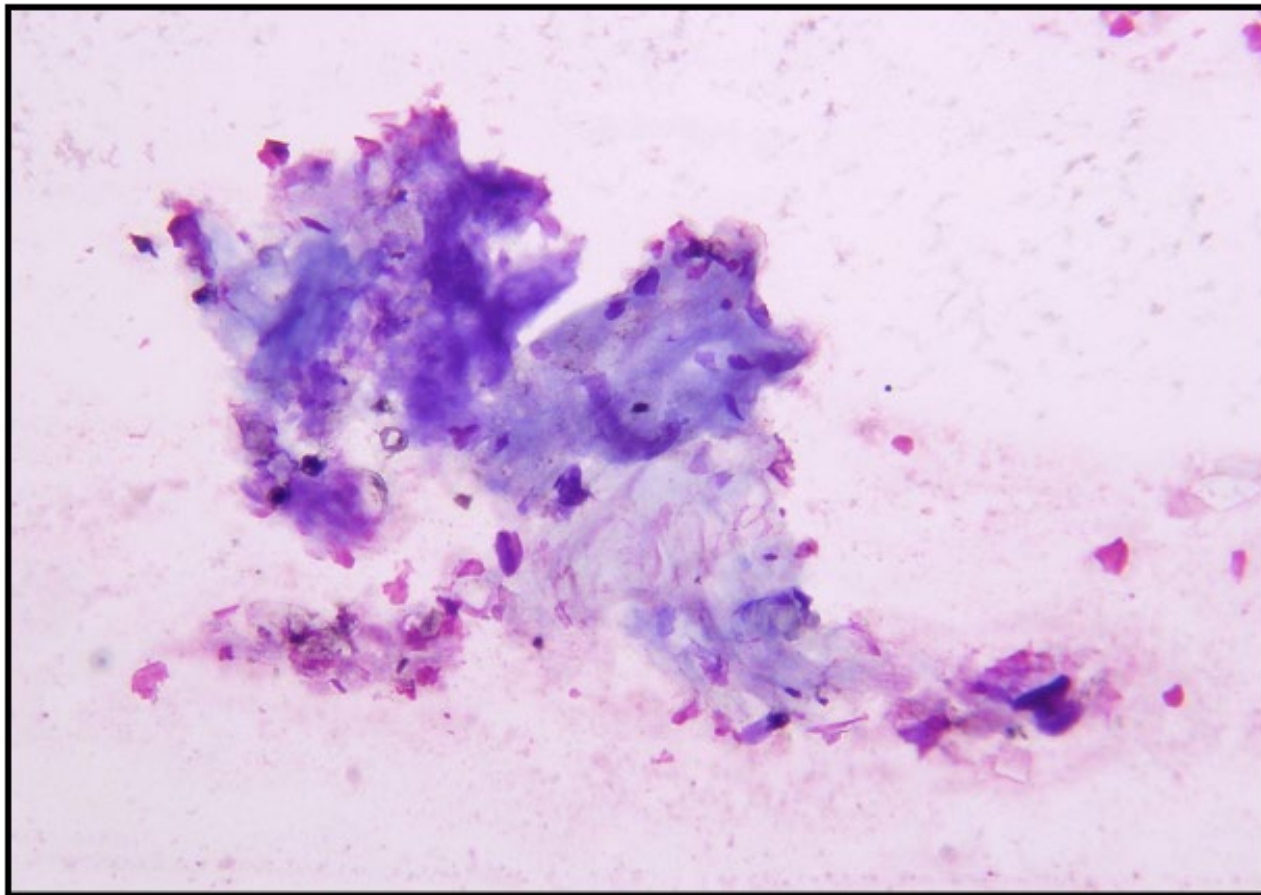
# Epithelial Tumors with Follicular Differentiation or Inclusion Cysts

Epithelial Tumors with Follicular Differentiation or Inclusion Cysts

- May see marked neutrophilic to mixed inflammation-why?

  - Keratin is inflammatory

- Prognosis for follicular cysts and tumors?

  - Overall good

  - Inflammation may be driving force for excision
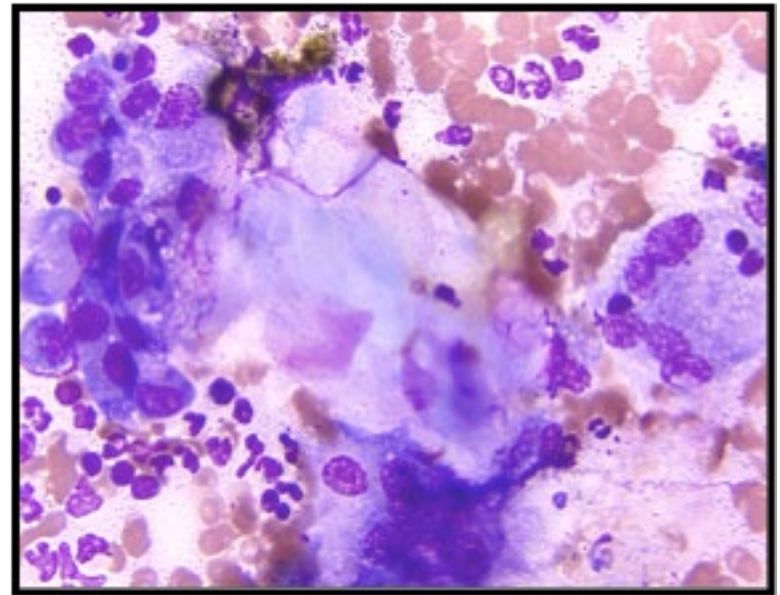
Inclusion cyst vs. Cystic epithelial tumor w/follicular differentiation

□ Epithelial tumor w/follicular differentiation

   ■ More likely to sample epithelial cells and other adnexal structures that are proliferating
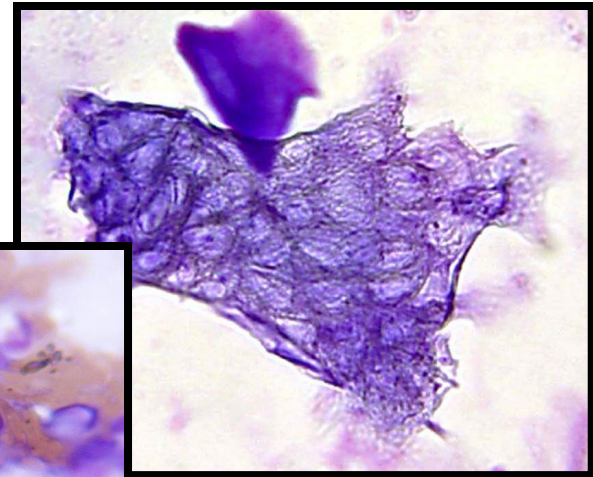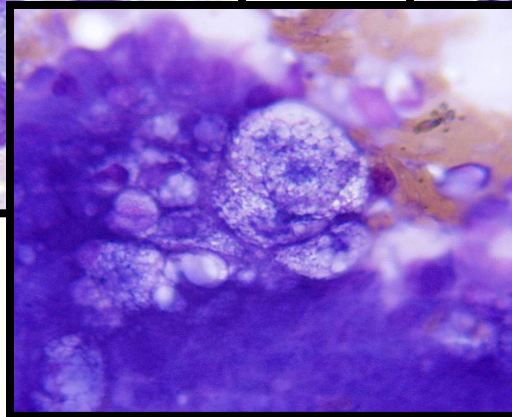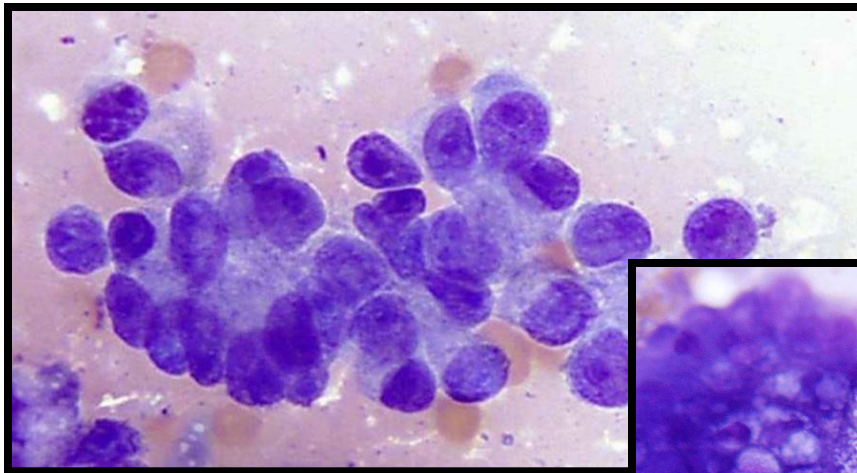
Cutaneous Basilar Epithelial Neoplasms (CBENs)

- Cats-Basal cell tumor*
- Dogs
  - Trichoblastoma*
  - Tricholemmoma
  - Trichoepithelioma*
  - Plicomatricoma
  - Infundibular keratinizing acanthoma
- Derived from the hair germ cells of a developing follicle
- Complete excision is generally curative

Cutaneous Basilar Epithelial Neoplasms (CBENs)

- Tight, dense clusters or rows
- Uniform, cuboidal, basilar epithelial cells
- Often difficult to distinguish cell margins
- Scant amounts of deeply basophilic cytoplasm with a high N:C ratio
- Single round central hyperchromatic nucleus
- May have regions of sebaceous or squamous differentiation
- Keratin debris if cystic region is sampled
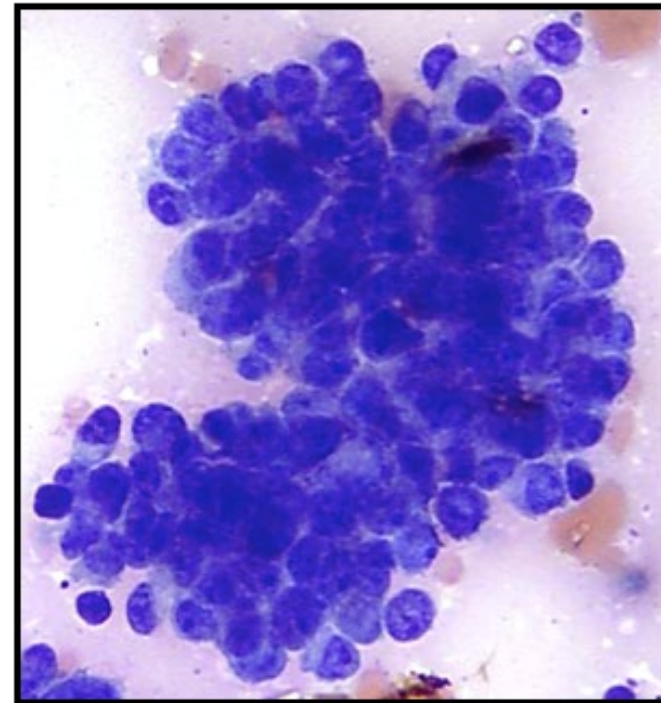
# Basal Cell Tumor/Trichoblastoma
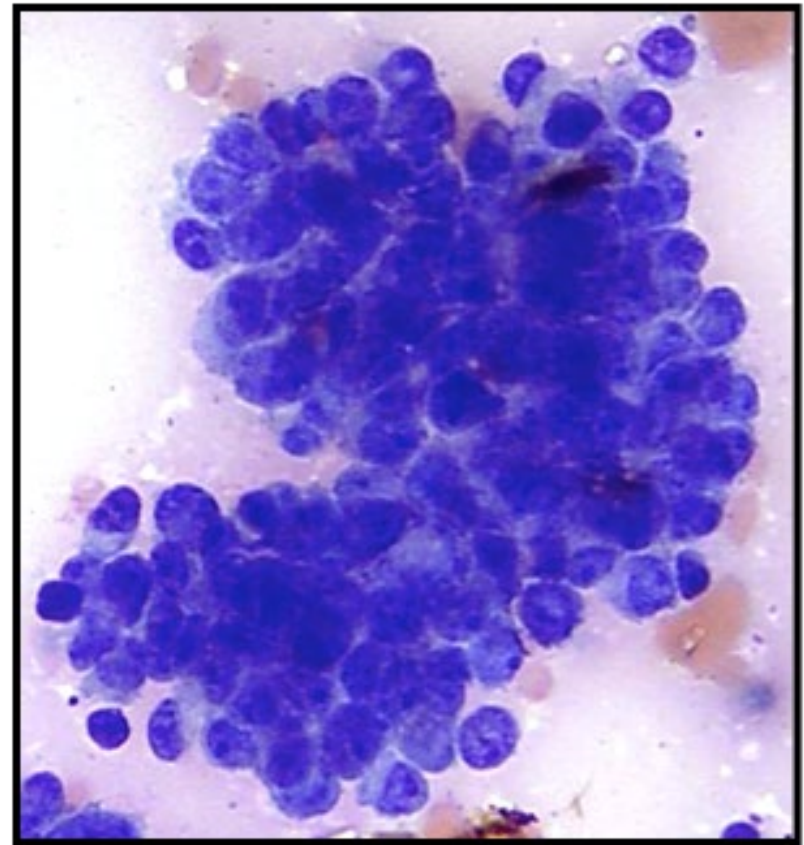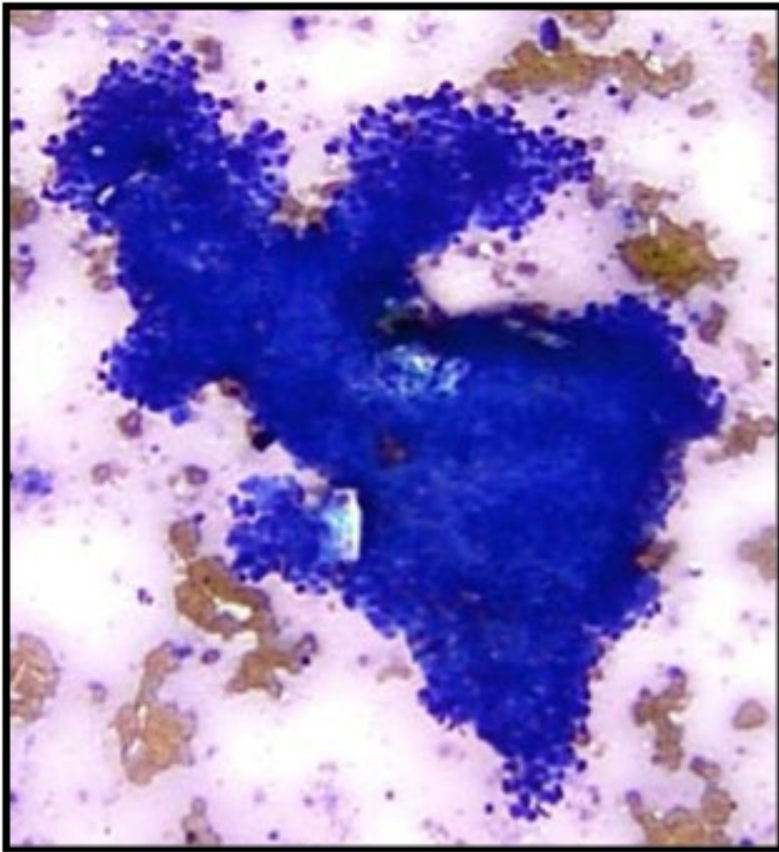
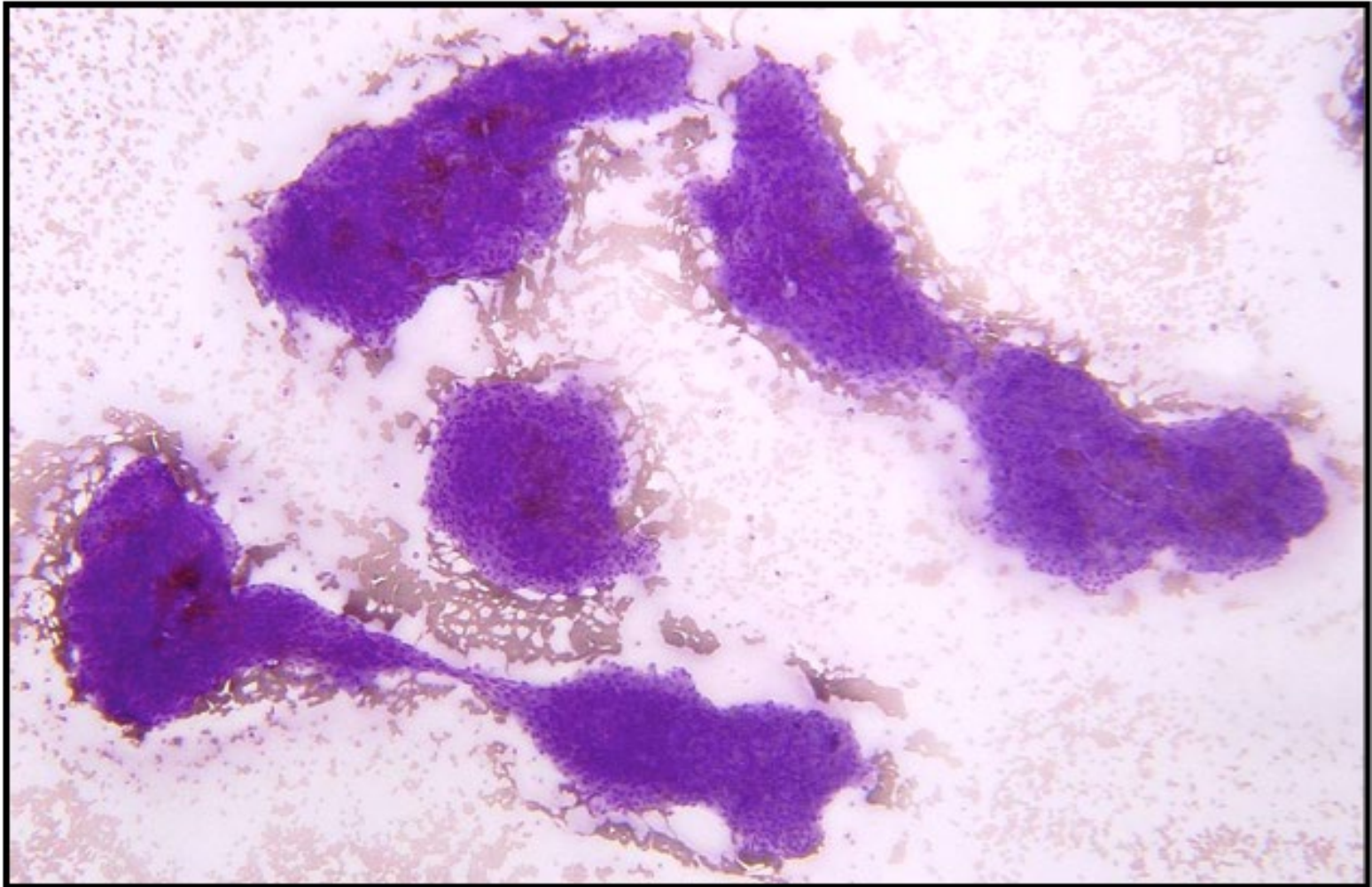# Perianal Adenoma-yikes!

Noah's Arkive

Perianal Adenoma

- Most common signalment? Intact male dogs
- Usually benign
- Clusters of "hepatoid cells"
  - Large, oval to polygonal to round epithelial cells cells
  - Abundant granular amphophilic (pink-blue) cytoplasm
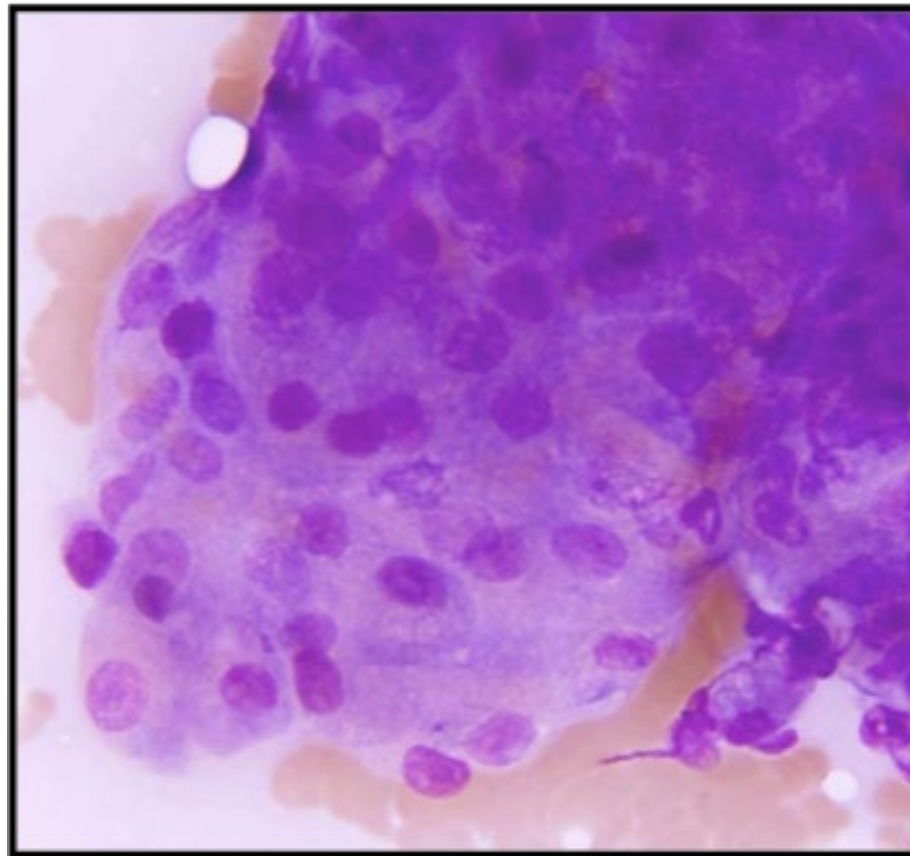 - One to rarely two round nuclei with lacy chromatin
  - Single prominent nucleolus
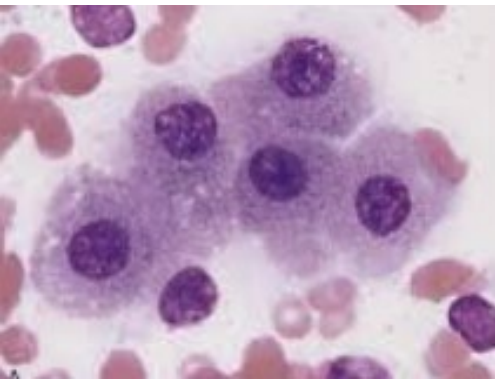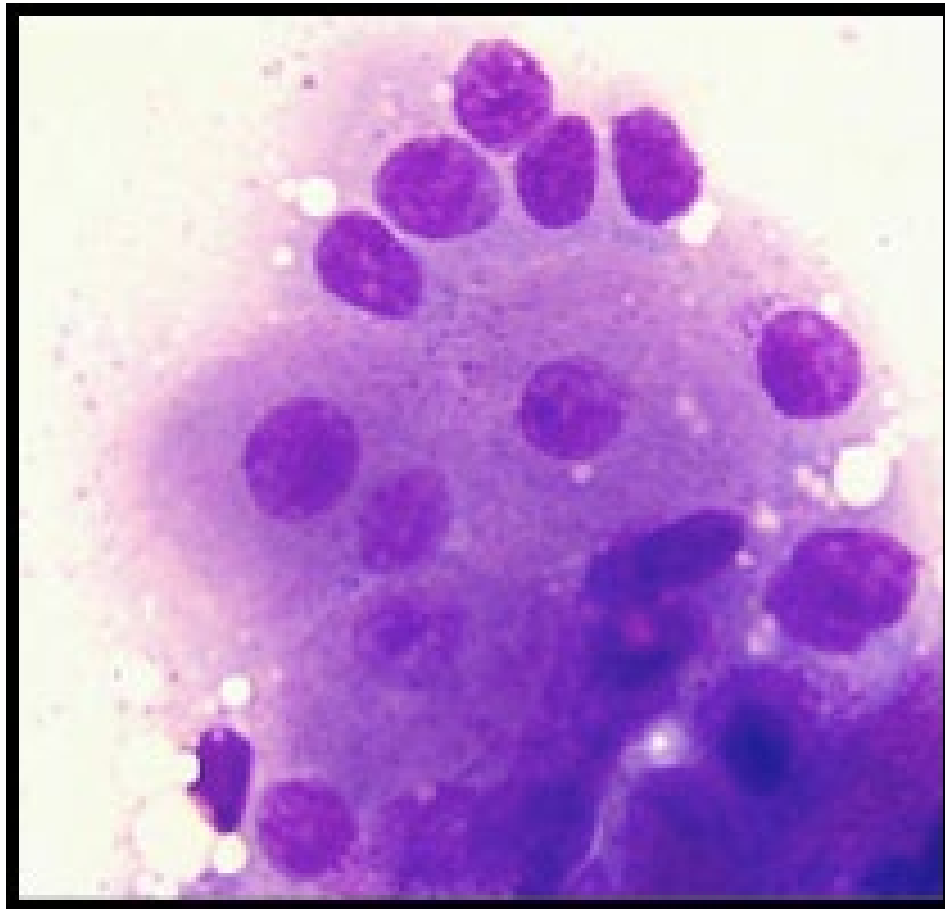

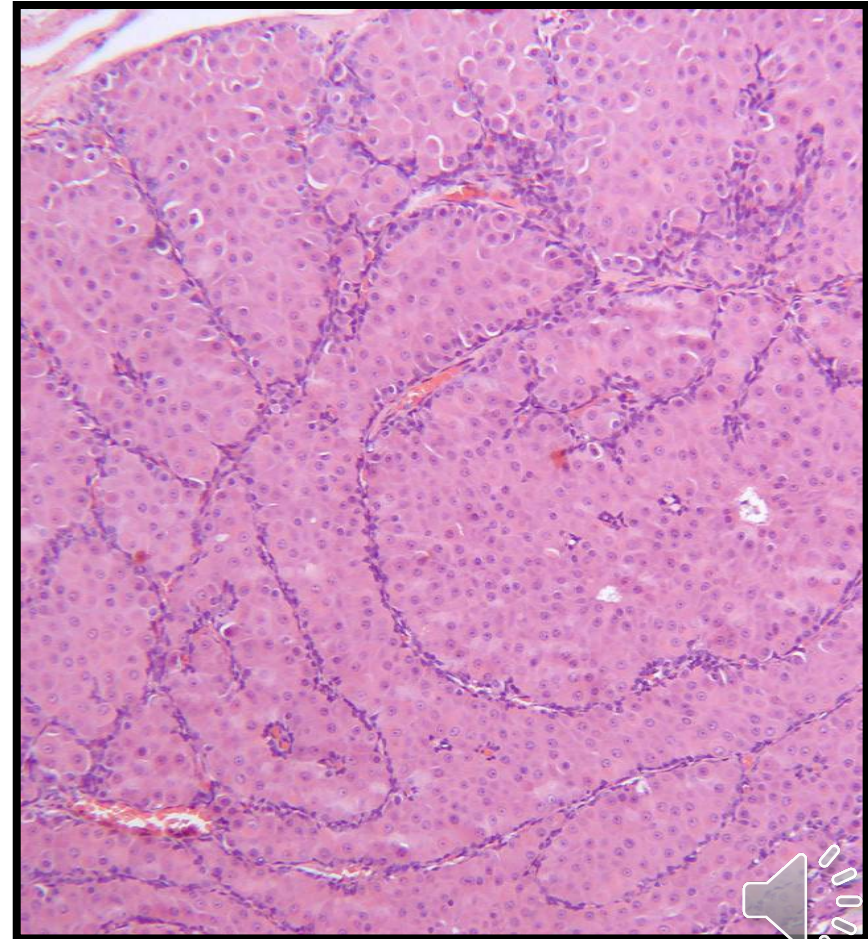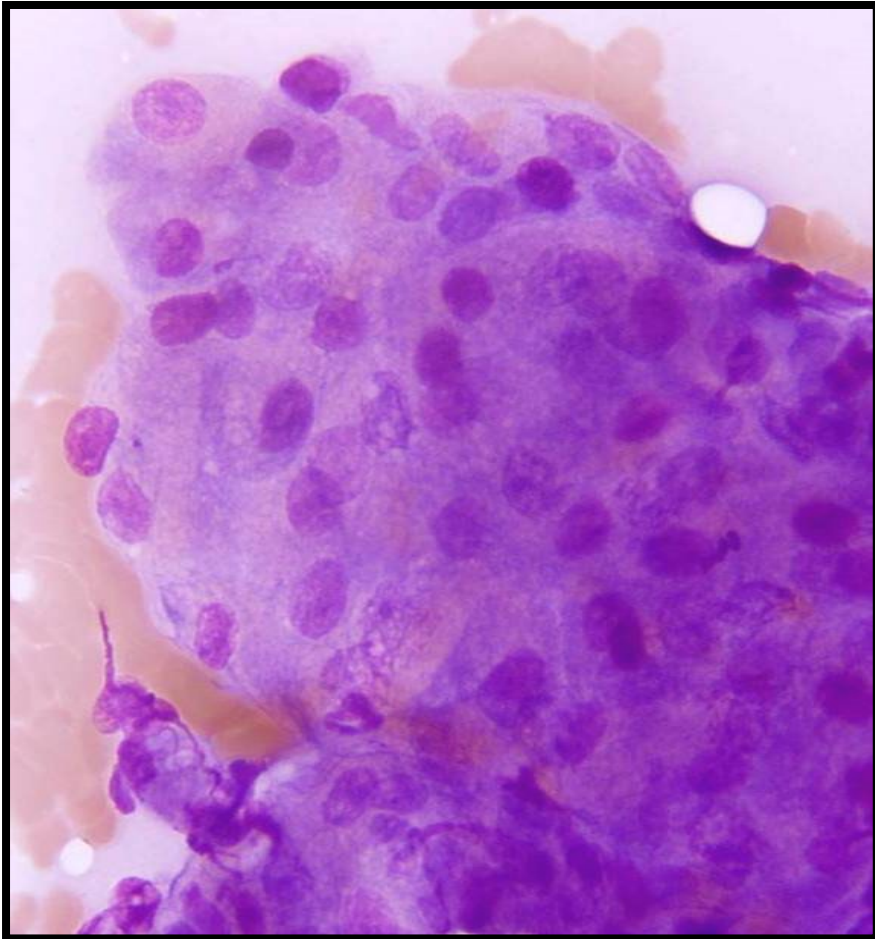← Liver or butt? →
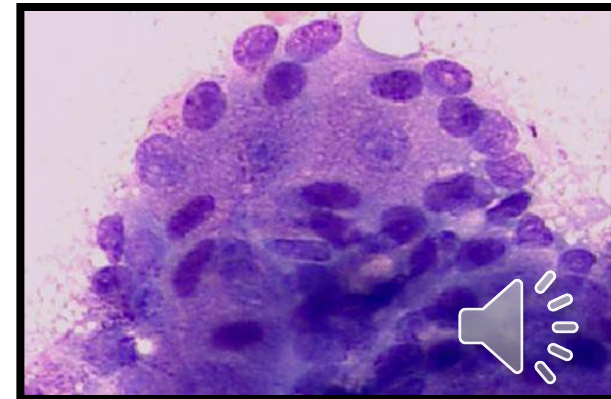
Perianal Adenoma
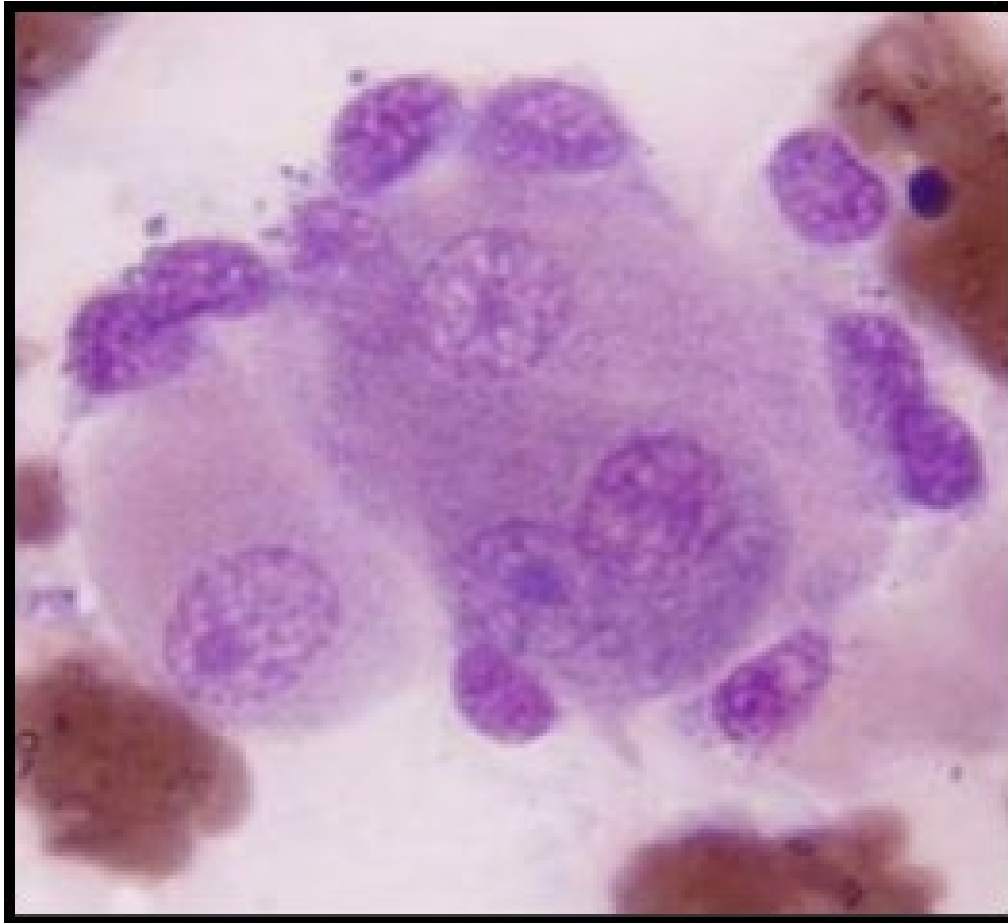
Perianal Adenoma

Perianal Adenoma

Perianal Adenoma

Perianal Adenoma

# Malignant Epithelial Tumors

- Anal gland adenocarcinoma
- Squamous cell carcinoma

- Also basal cell carcinoma, sebaceous carcinomas, perianal gland carcinomas, follicular carcinomas but less common than benign

Anal Gland Adenocarcinoma

- What term do we use to refer to their appearance?
  - Neuroendocrine-appearing
- Does their appearance reflect their behavior?
  - No!
- What biochemical abnormality do we often associate with AGASCA?
  - Hypercalcemia
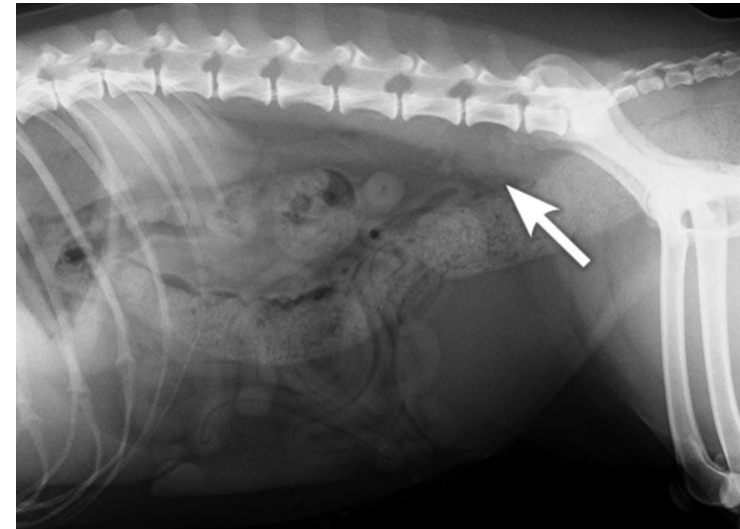
Anal Gland Adenocarcinoma

❑ Appearance

Free nuclei on a lake of
  cytoplasm

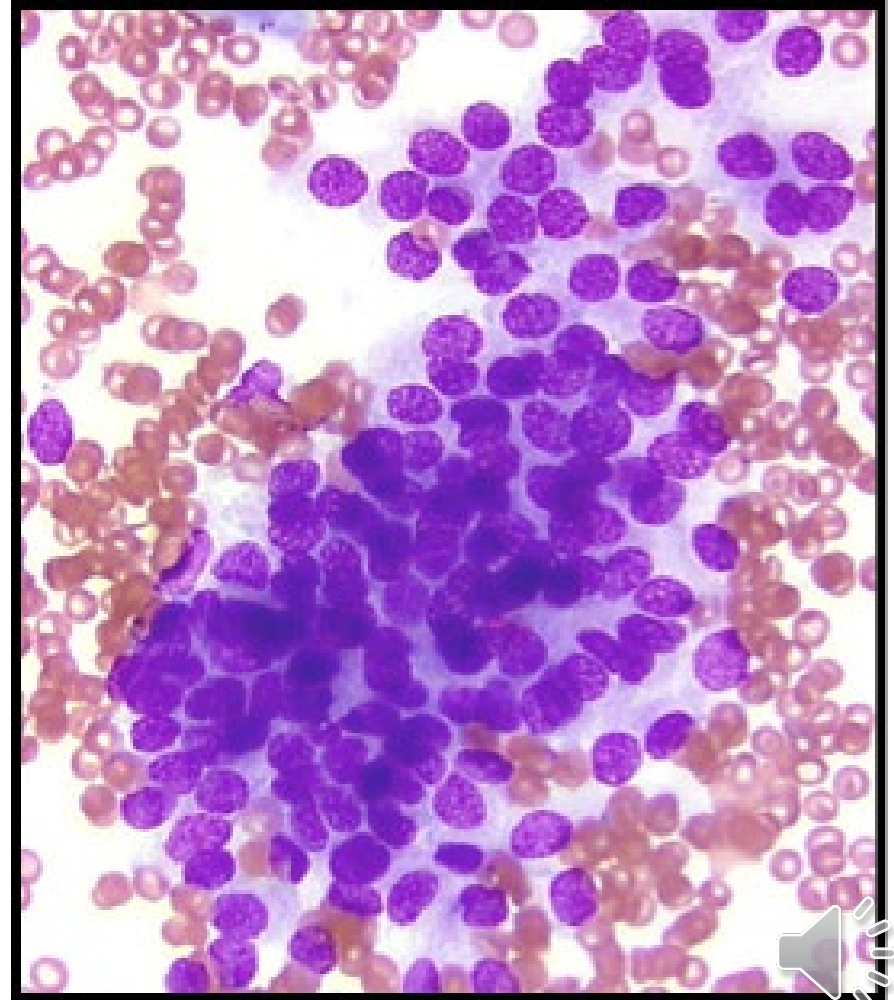Indistinct cell margins

Loosely cohesive clusters
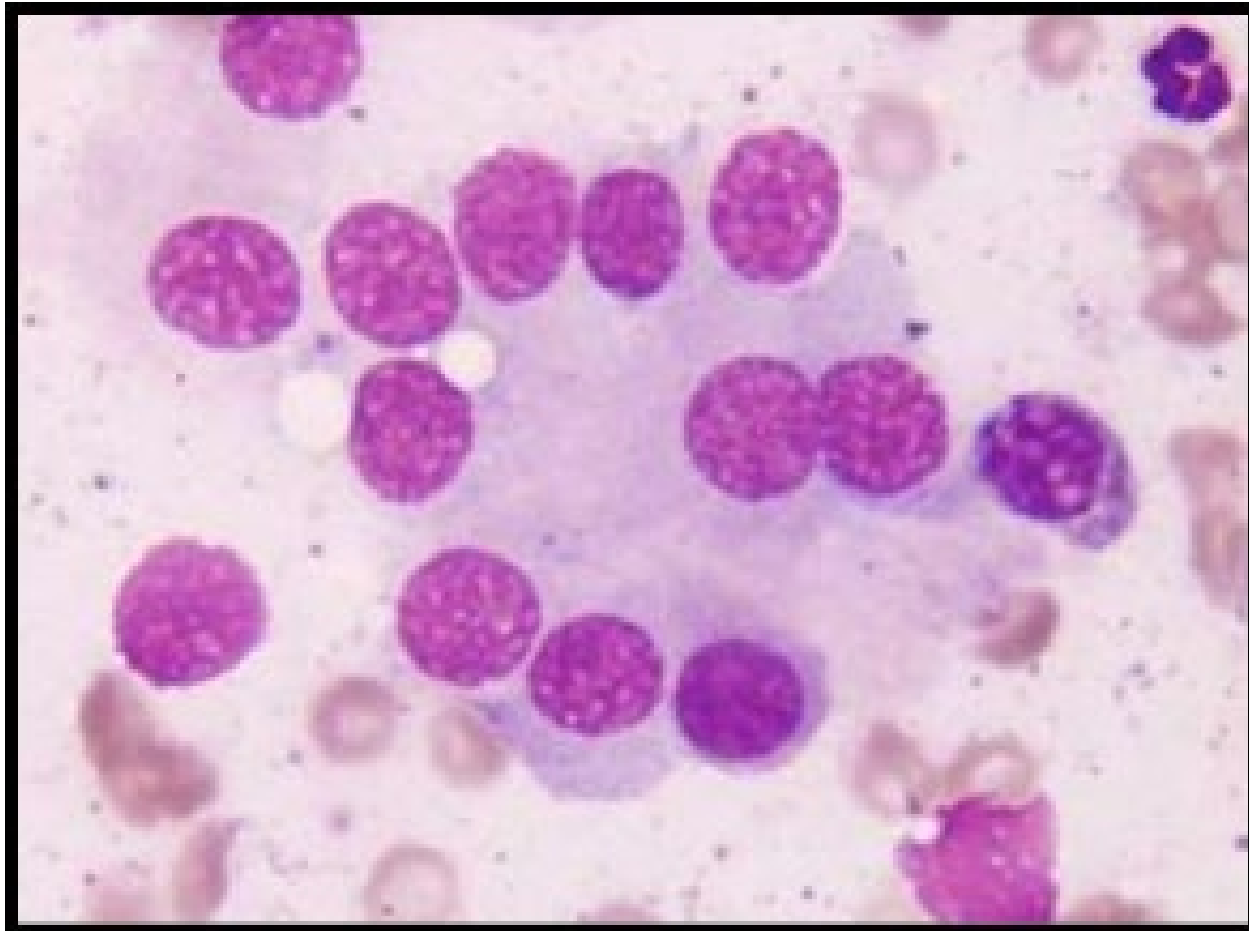
❑ Uniform-appearing cells

Round nuclei
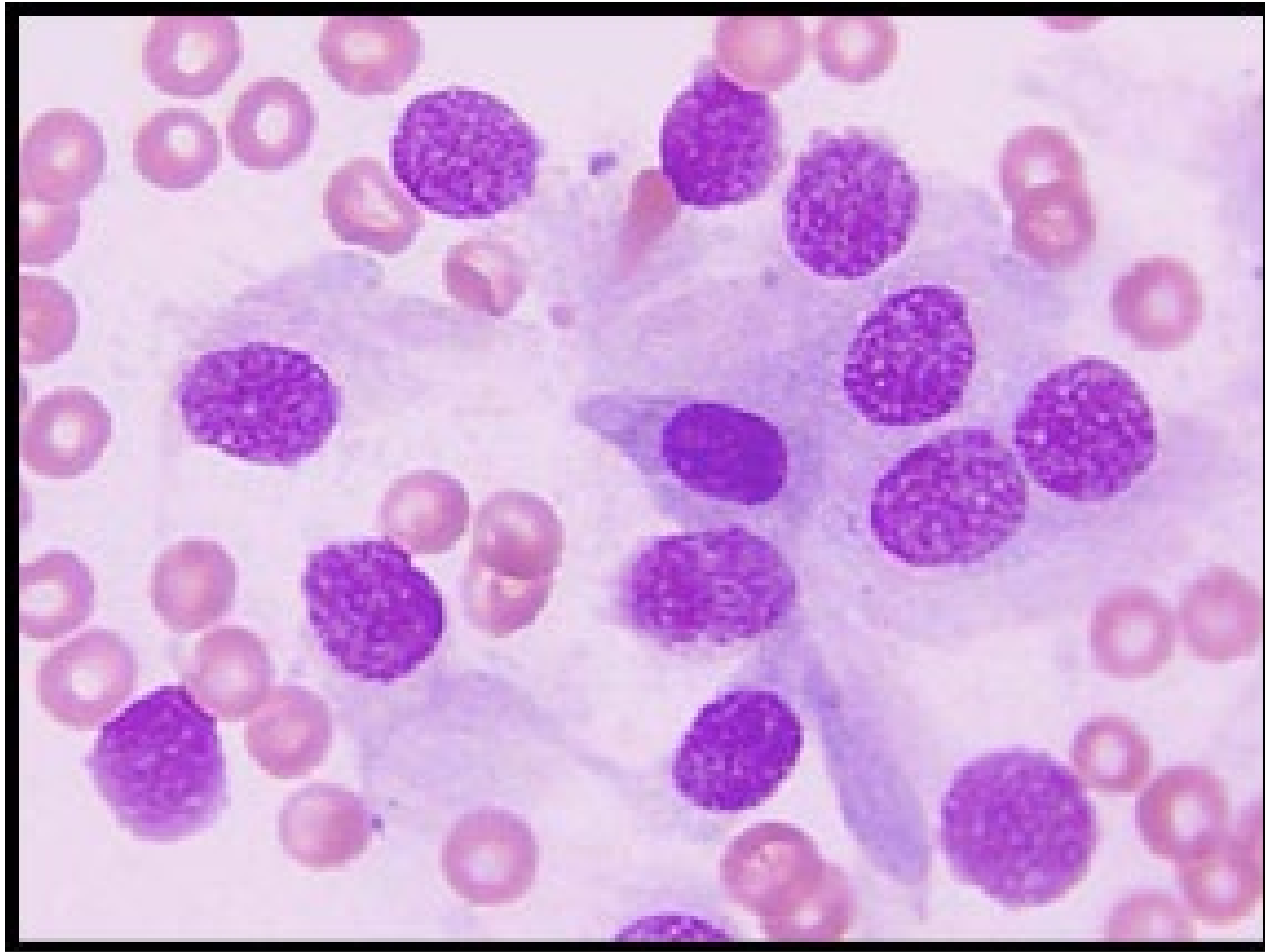
Immature-appearing chromatin
  pattern

Pale nucleoli

Generally relatively low criteria
  of malignancy
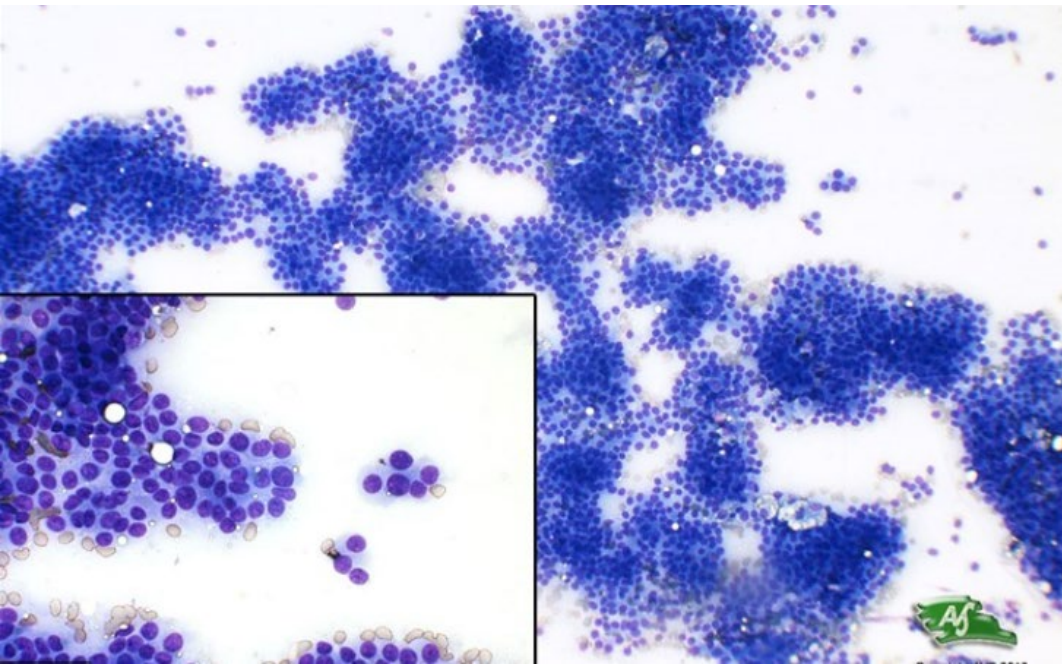
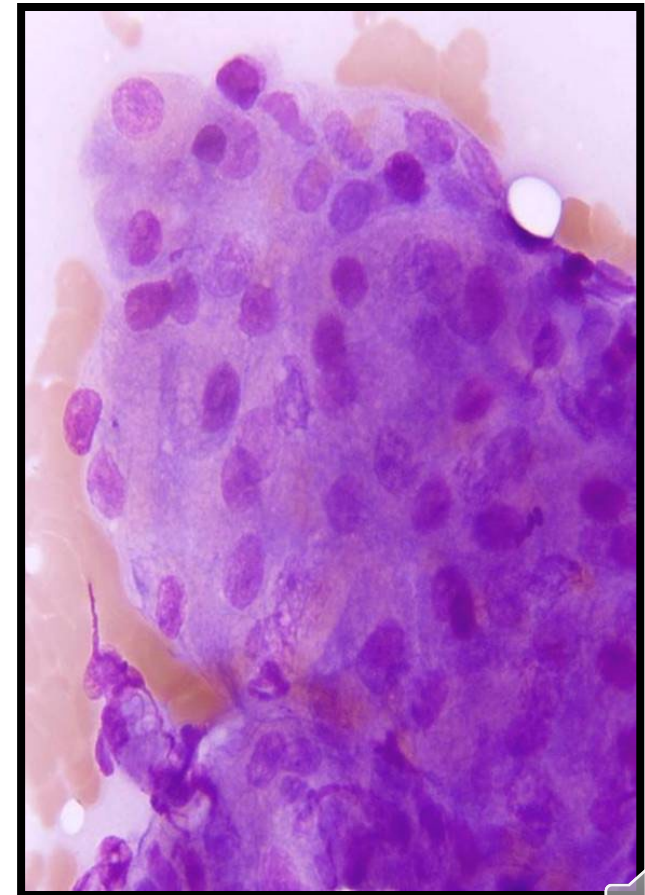# Anal Gland Adenocarcinoma

Anal Gland Adenocarcinoma

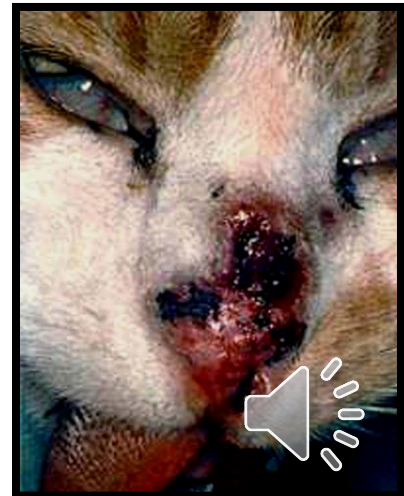# Anal Gland Adenocarcinoma vs Perianal Adenoma


AGASCA

Perianal Adenoma

Squamous Cell Carcinoma

☐ Malignant tumor of squamous epithelium

   ■ Oral, nasal planum, ears, tonsils

☐ White or light-colored animals

☐ Poorly haired or hairless areas

Squamous Cell Carcinoma

- Varying degrees of maturation in epithelial cells
- Cells in clusters or individualized
- Angular to slightly rounded large polygonal cells
- "Waxy" hyalinized basophilic cytoplasm
    - May have fine perinuclear clear vacuoles
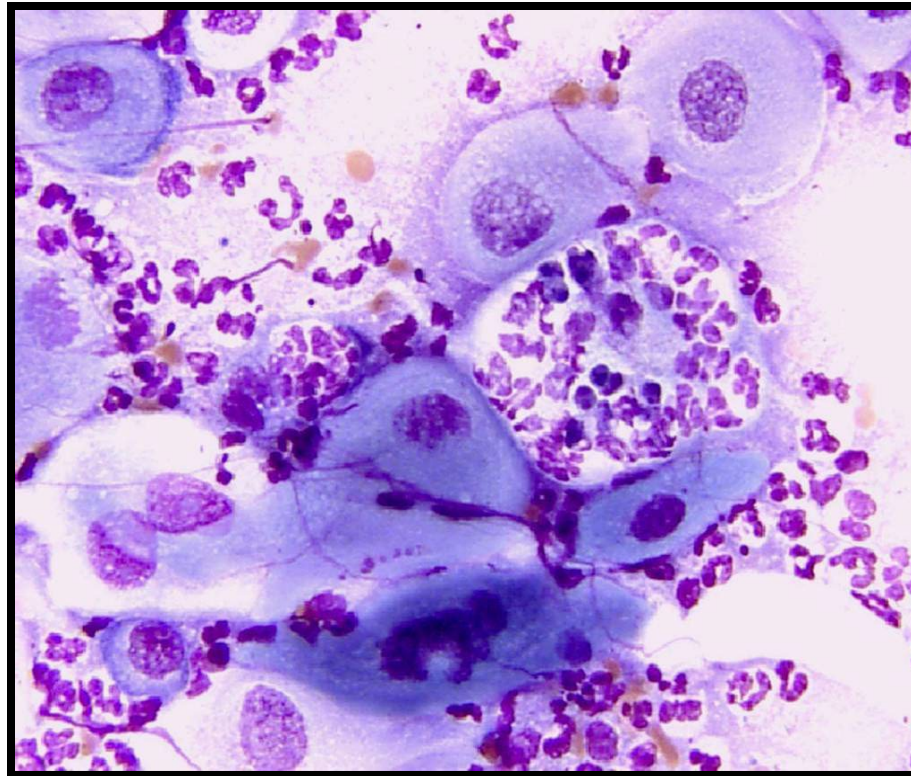- One to multiple round to oval nuclei
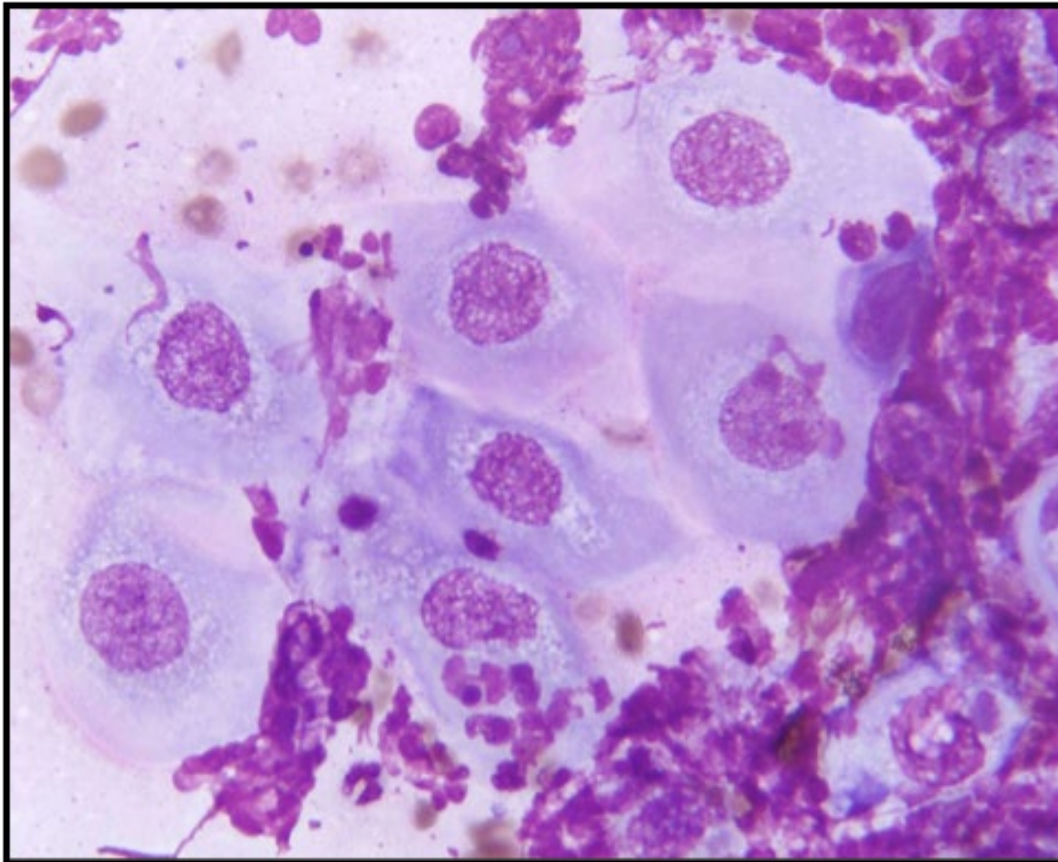- Often marked criteria of malignancy
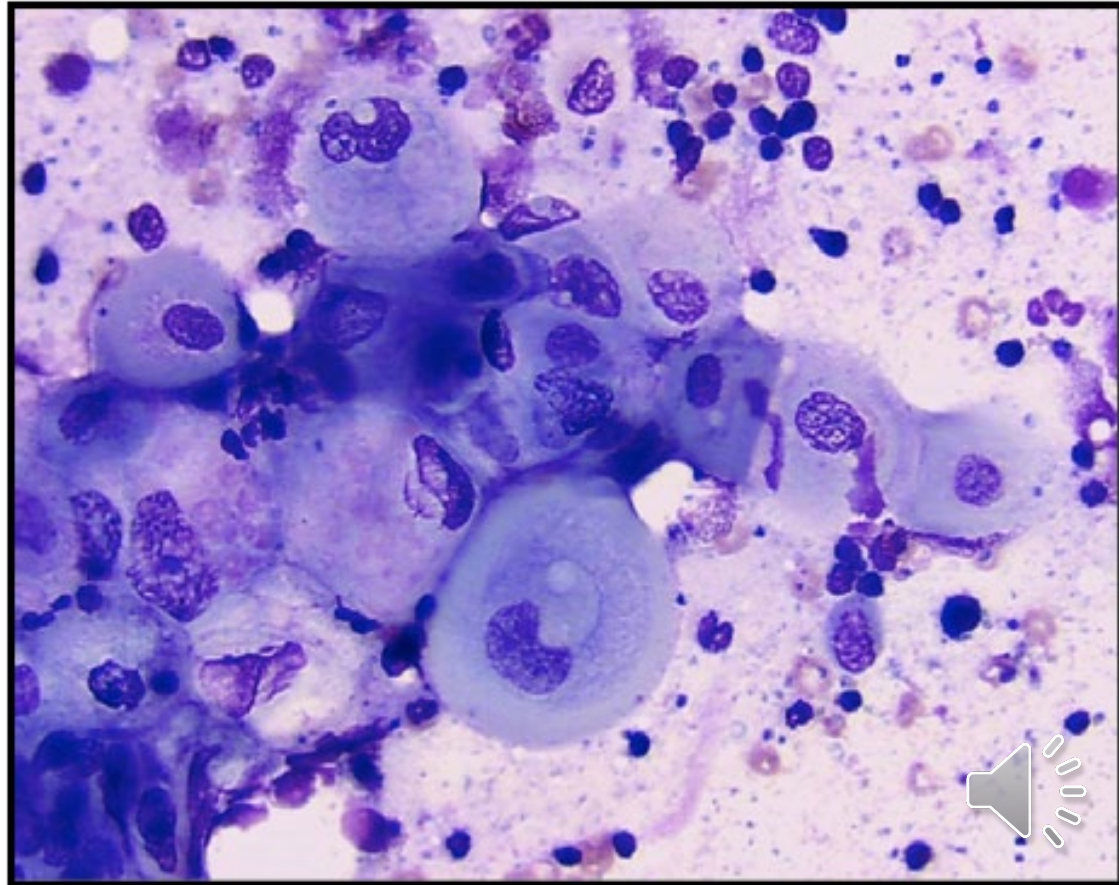
Squamous Cell Carcinoma
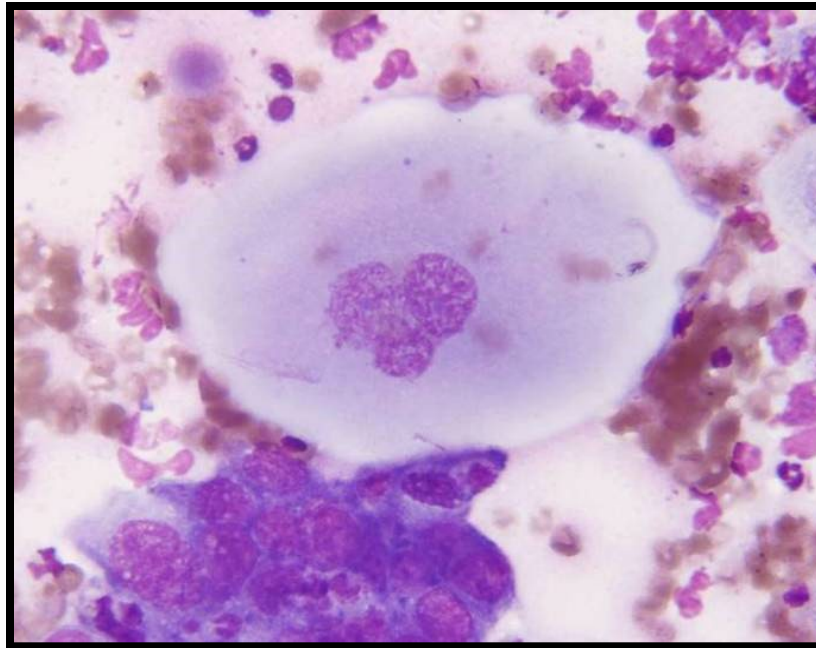
Squamous Cell Carcinoma

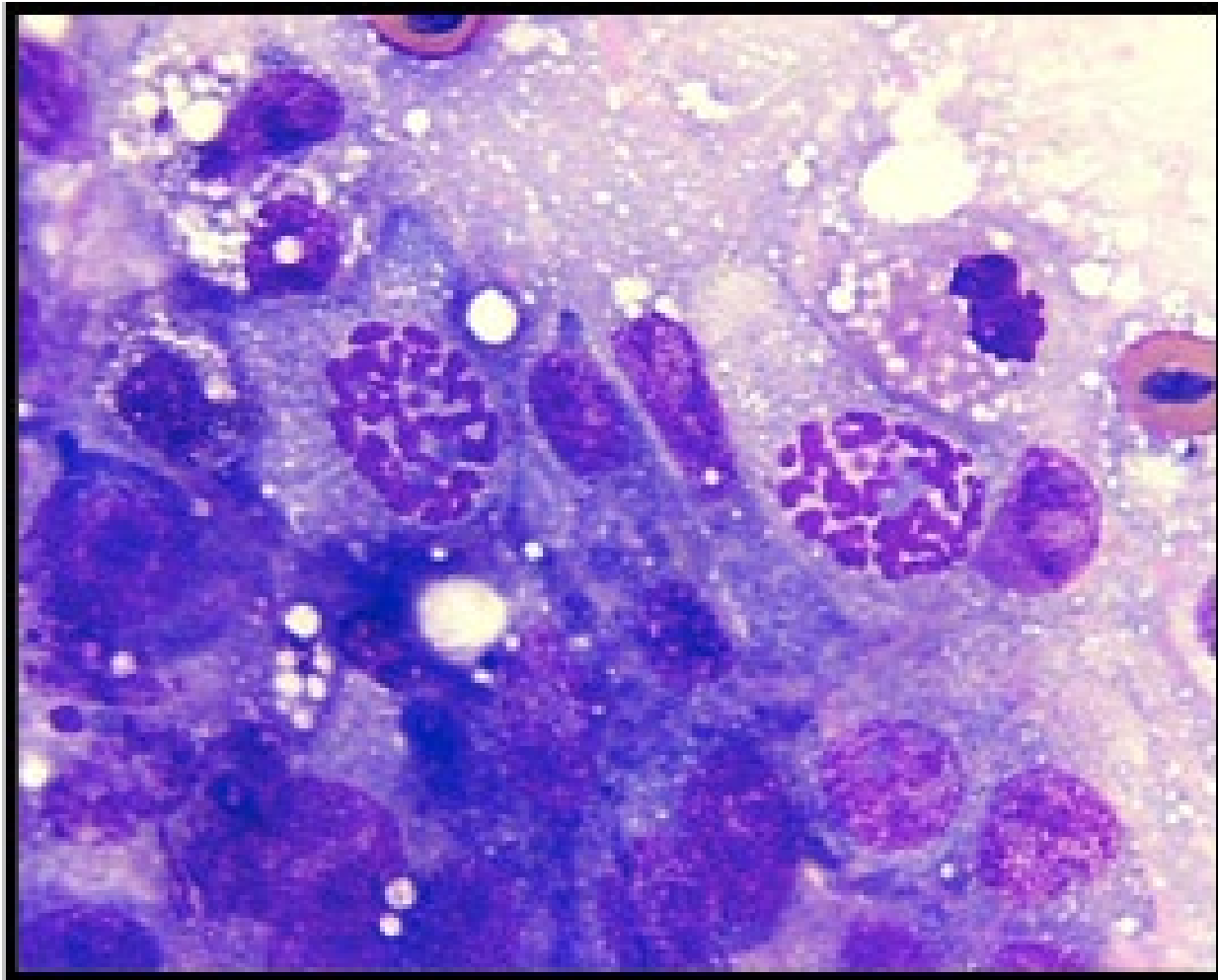□ May have marked inflammation (esp neutrophilic)

Squamous Cell Carcinoma

- ☐ May exhibit emperipolesis

Squamous Cell Carcinoma

Mesenchymal Tumors

- Benign
  - Lipomas

- Malignant
  - Soft tissue sarcomas
    - Many types
    - Can't differentiate cytologically
    - Need histopathology for definitive diagnosis and grading

Mesenchymal Tumors

□ Soft tissue sarcomas
  - Fibrosarcoma
  - Hemangiopericytoma
  - Peripheral nerve sheath tumors
  - Myosarcoma
  - Rhabdomyosarcoma
  - Hemangiosarcoma
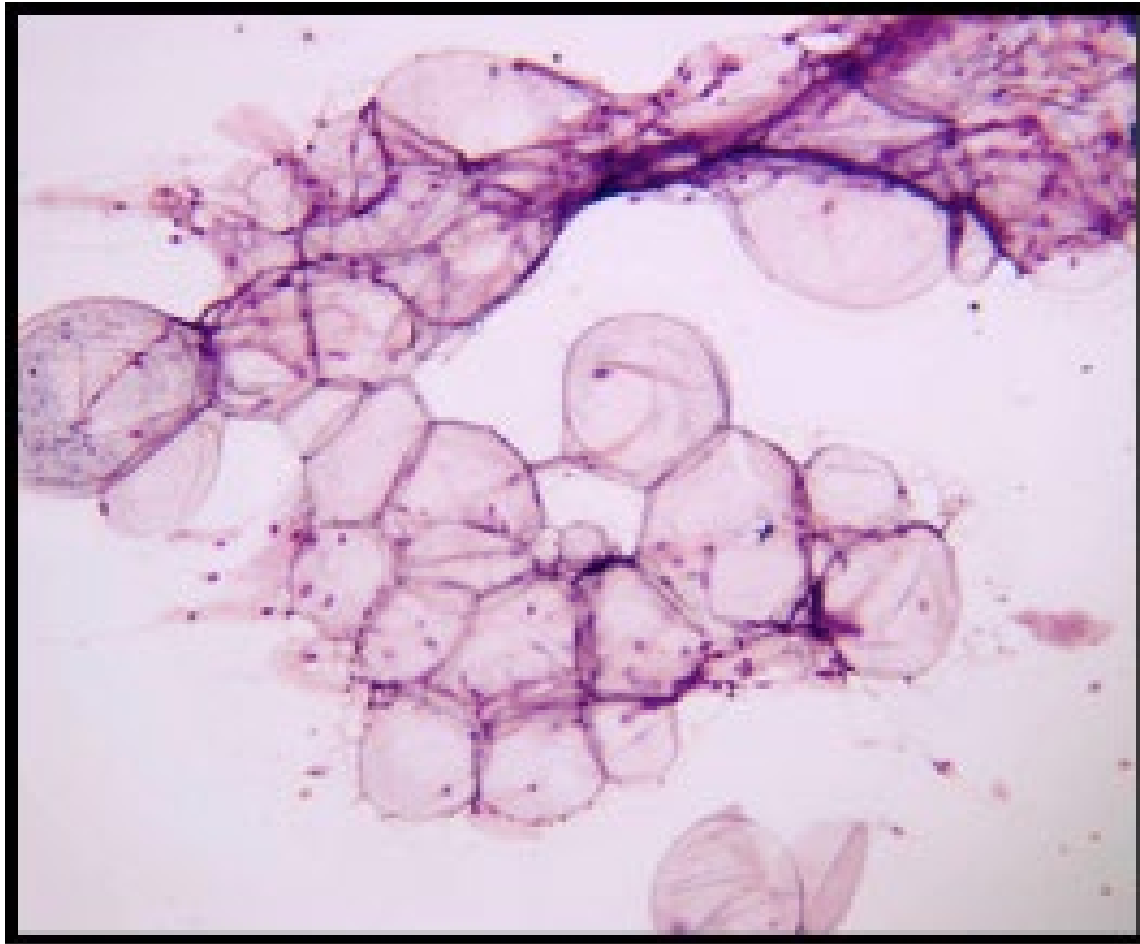
■ Others-osteosarcoma, chondrosarcoma

Lipoma

- Indistinguishable from normal fat

- Grossly slides often appear oily

- Aggregates of large cells with abundant pale cytoplasm and small nuclei.

- Alcohol fixative may remove cells

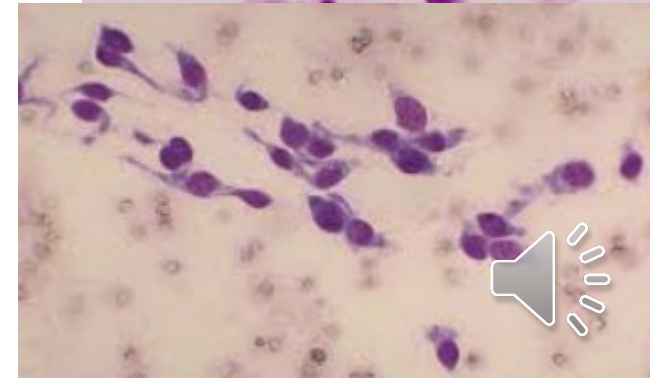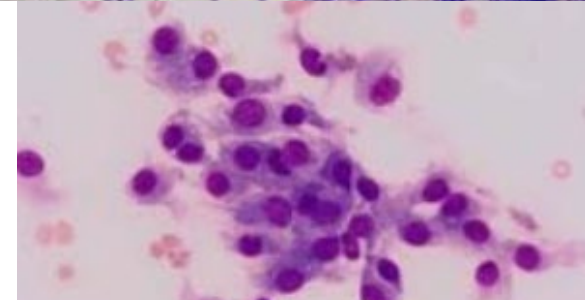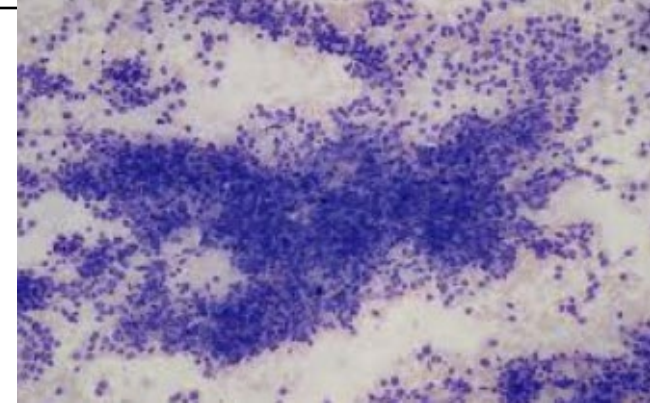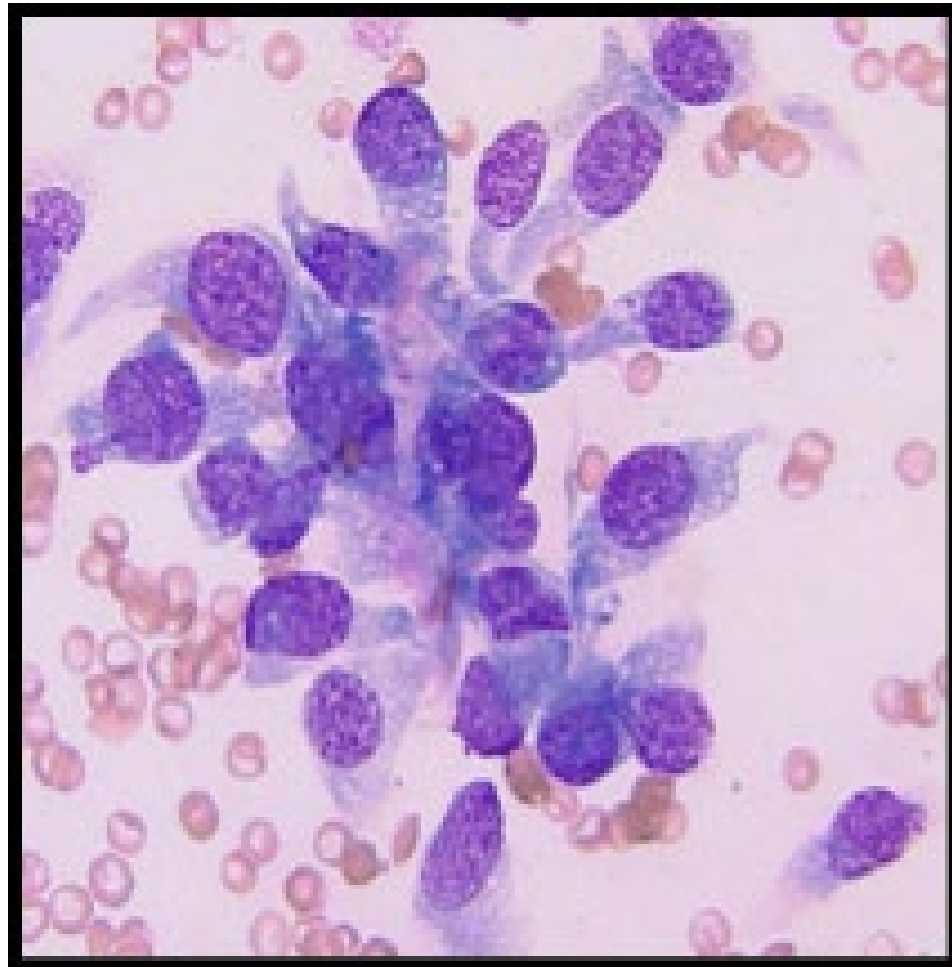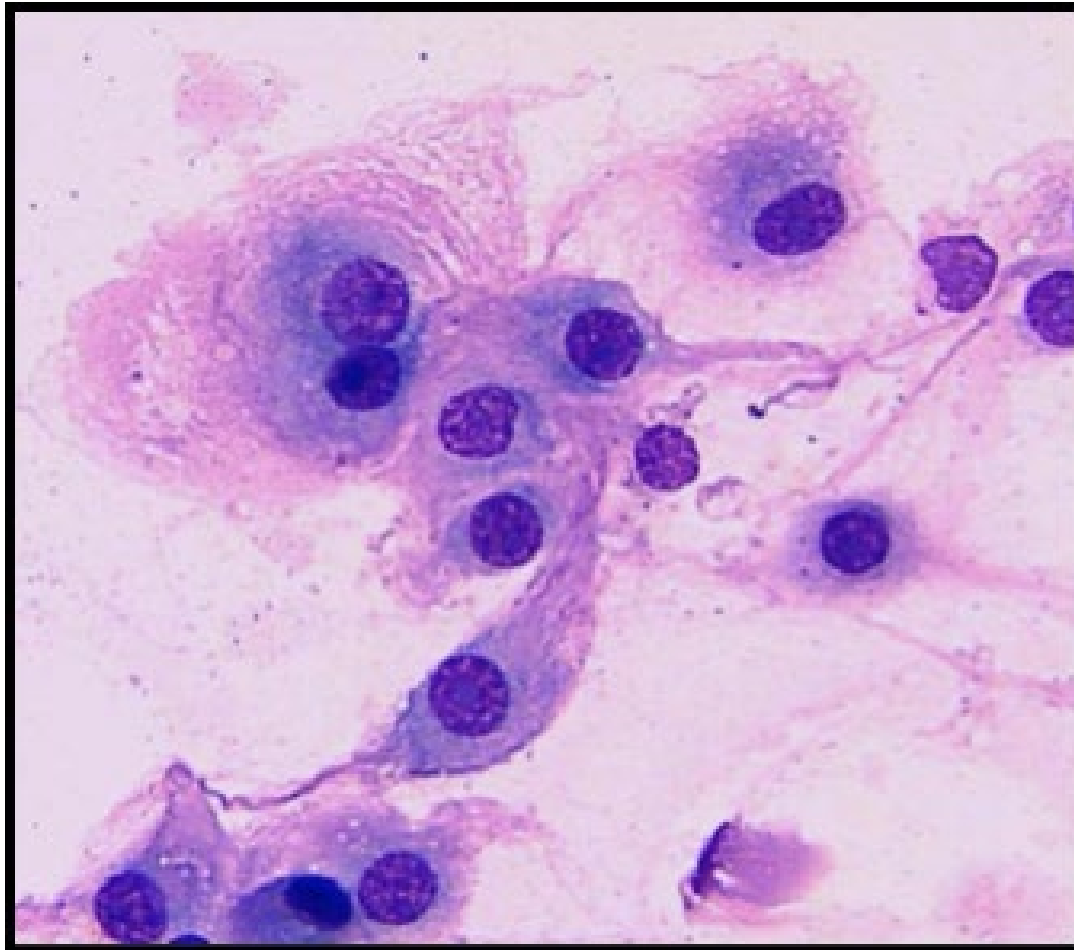# Lipoma

Soft Tissue Sarcoma

- How do cells associate?
  - Loose aggregates, sometimes individual
- Cell margins-distinct vs. indistinct?
  - Usually indistinct!
- Shapes?
  - Spindloid, stellate, sail-shaped, oval
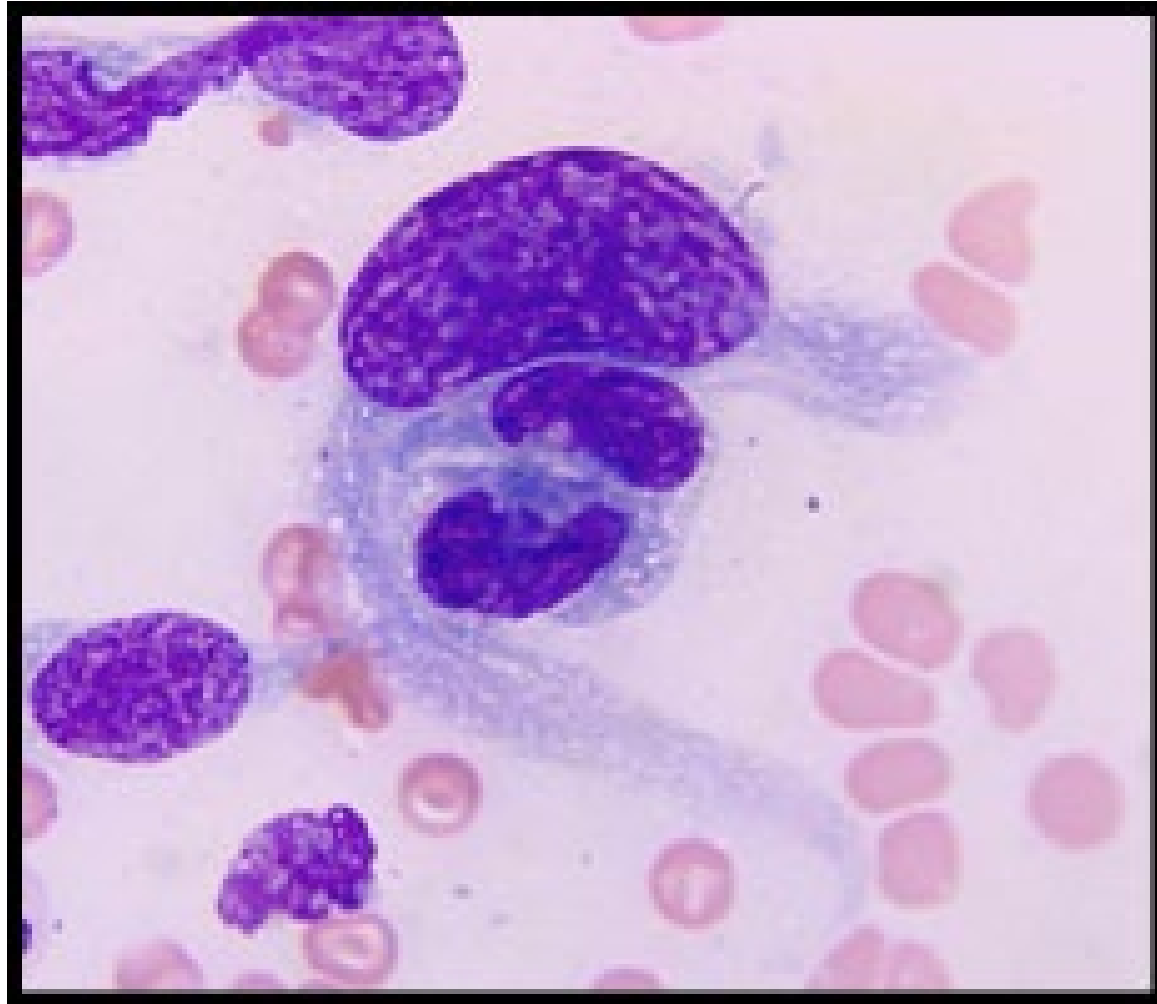- Other features?
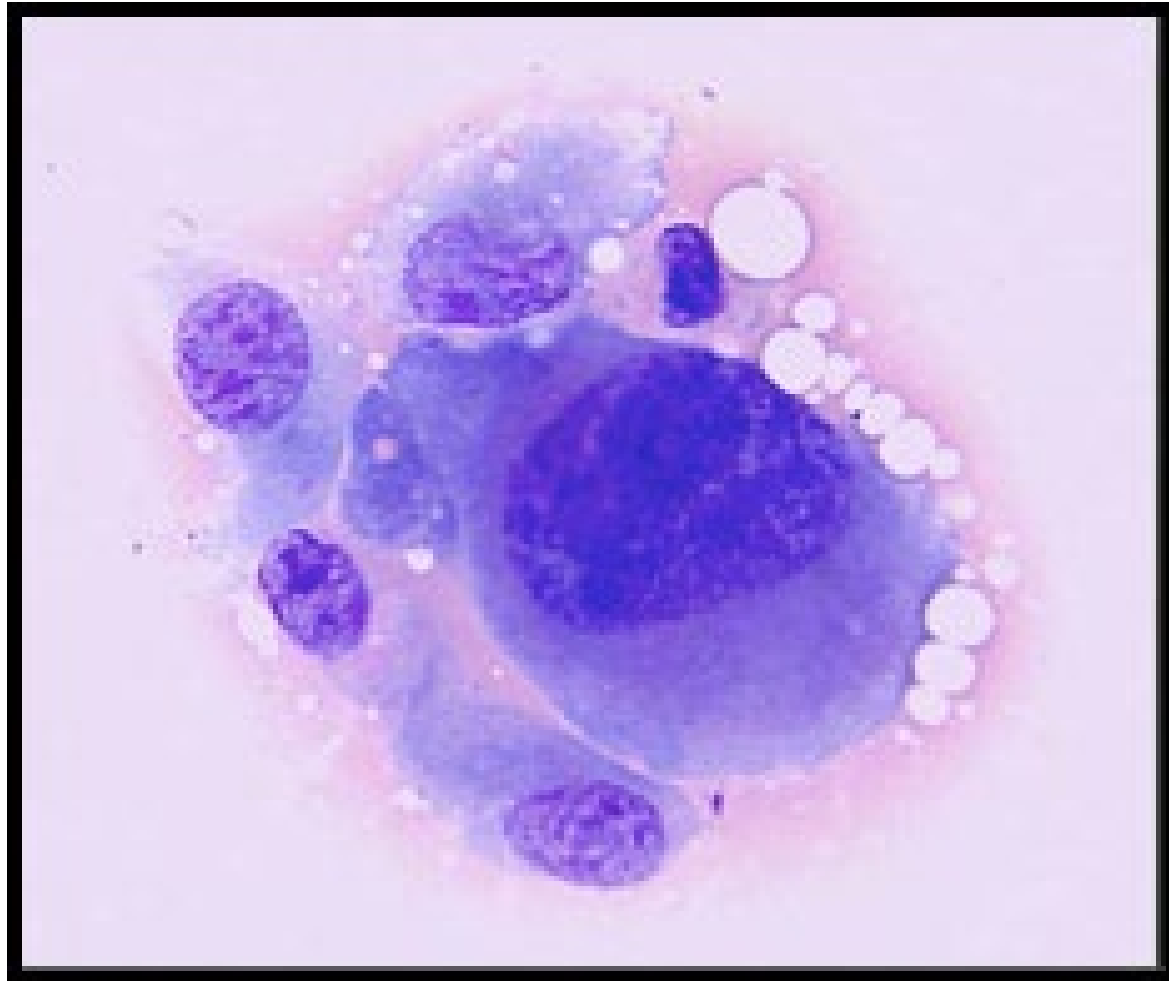 - Matrix, sometimes lymphocytic inflammation

Soft Tissue Sarcoma

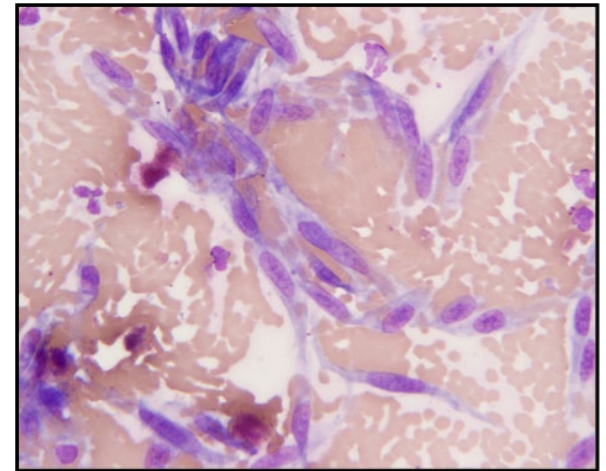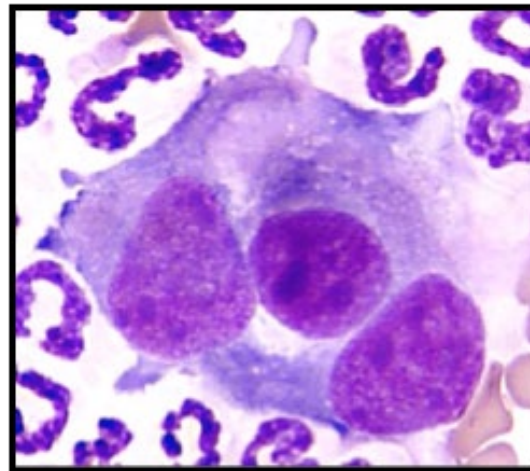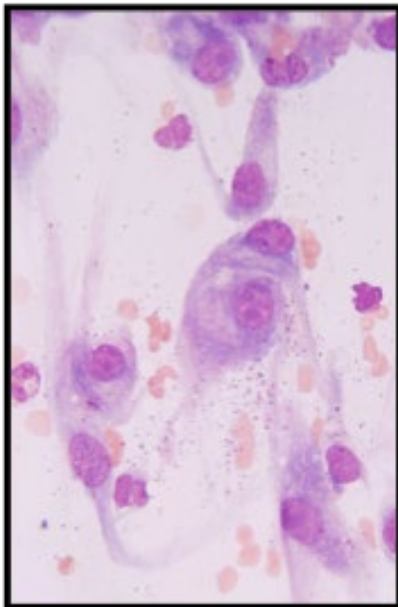# Soft Tissue Sarcoma

Soft Tissue Sarcoma

Soft Tissue Sarcoma

Sarcoma vs Fibroplasia-a diagnostic quandary

□ CAUTION: difficult to distinguish sarcoma from reactive fibroplasia/granulation tissue

■ Especially with concurrent inflammation

Sarcoma vs. Fibroplasia

- Solutions

  - Definitely send these cases to the pathologist!
  - Consider history and PE findings
  - Use caution when significant inflammation is present
  - Cellularity-sarcomas usually more cellular
  - Look for multiple nuclear criteria of malignancy
  - Surgical biopsy

Summary

Epithelial Tumors

- Cell Association:
  - Cohesive clusters and sheets
- Cell margins
  - Usually distinct
- Shapes:
  - Polygonal, cuboidal, columnar, oval, angular
- Other features
  - Acinar structures, rowing

Mesenchymal Tumors

- Cell Association:
  - Loose aggregates, sometimes individual
- Cell margins
  - Usually indistinct!
- Shapes:
  - Spindloid, stellate, sail-shaped, oval
- Other features
  - Matrix, sometimes lymphocytic inflammation