Cytology of Lumps and Bumps
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Submission of samples
- **Air dry only**
  - No wet fixation using formalin or ethanol
- Stain 1-2 on-site to evaluate quality
- Send all slides
  - stained slides as well
- Protect from formalin fumes
- Protect from moisture

History helps……..

“Whoa……….way too much information!”

Evaluation of samples
- 10x scanning
  - Adequacy of staining
  - Adequacy of sample
  - General cellular characteristics
  - Appropriate sample present (eg bone marrow)
- 100x objective (oil immersion)
  - Cellular characteristics

Criteria of malignancy
- Anisocytosis/anisokaryosis
- Pleomorphism
- Macrokaryosis (nuclei >10 microns)
- Increased nuclear to cytoplasmic ratio
- Multinucleation
- Abnormal mitoses
- Nuclear molding
- Macronucleoli
- Angular nucleoli

Use caution interpreting….

- Endocrine tumors
  - thyroid, pancreas
- Mammary tumors
- Anal sac tumors

Can all appear “benign” cytologically when actually aggressive biologically
8 yr old FS Golden Retriever:
-Small raised, alopecic mass on R cheek

Cohesive epithelial cells
-tight clusters
-often form rows

High N:C ratio
Very uniform

**Basal cell tumor**

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8 yr old MC Poodle:
-haired mass over dorsum
-aspirate yielded thick, chalky material

Anuclear, keratin flakes
Deeply basophilic
Angular

**Epidermal inclusion cyst**

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8 yr old FS Golden Retriever:
-Small raised, alopecic mass on R cheek

Cohesive epithelial cells
-tight clusters
-often form rows

High N:C ratio
Very uniform

**Basal cell tumor**

Scant amounts of basophilic cytoplasm
Tight cluster

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**Basal cell tumor:**

Can contain fine melanin granules

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**Basal cell tumor:** 7 yr old dog, mass under chin

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8 yr old MC Poodle:
-haired mass over dorsum
-aspirate yielded thick, chalky material

Anuclear, keratin flakes
Deeply basophilic
Angular

**Epidermal inclusion cyst**

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Epidermal inclusion cyst

10 year old Mixed breed dog:
-Firm, circumscribed, hairless mass on L flank

Keratin debris

1. Keratinocytes, keratin debris

Differentials:
-Hair follicle tumors
- Trichoepithelioma
- Pilomatrixoma

-Keratoacanthoma
- adnexal and follicular structures

-Basal cell tumors
- w/follicular differentiation
- Basosquamous carcinoma

2. Basal epithelial cells

Keratin debris

Basal cells

Trichoepithelioma

12 yr old FS DSH:
-multiple, small, hairless nodules on neck

Cohesive clusters

Punctate cytoplasmic vacuoles

Foamy

Sebaceous glands: hyperplasia vs. adenoma
12 yr old FS DSH:
- multiple, small, hairless nodules on neck

Nodular sebaceous hyperplasia

9 yr old Mixed breed dog:
- single, alopecic, lobulated mass on lip

Sebaceous adenoma

13 yr old FS Malamute:
- firm SQ mass directly under tail base

Reserve cells
Cohesive cells
Perianal gland tumor

“Hepatoid cells”
Perianal gland tumor

12 yr old MI German Shepard:
- SQ mass in perianal region

Perianal gland tumor

10 yr old MC Australian Heeler:  
- mass near anus

Uniform cells

“naked nuclei”
Dense clusters
Anal sac adenocarcinoma

Ca=15.4 mg/dl
Anal sac adenocarcinoma

Fragile cells

Uniform, bland cells

“Neuroendocrine” appearance

5 yr old FS DSH cat
-diffuse laryngeal mass

Cohesive cells

Abundant, glassy Blue-gray cytoplasm

Squamous cell carcinoma

12 yr old F Quarterhorse:
-firm ulcerated mass over R jaw

Squamous cell carcinoma

5 yr old FS DSH cat
-diffuse laryngeal mass

Intact

Broken

Acinar structure

Squamous cell carcinoma

12 year old FS DSH cat:
-mass along mammary chain

Acinar structure

Mammary Carcinoma
4 yr old MC Golden Retriever: 
- small, circumscribed hairless mass on hip

- Discrete cells
- Round to oval nuclei
- Mod. pale blue cytoplasm

1 yr old Min. Dachsund
- small, hairless nodule R hind leg

Histiocytoma

12 yr old FS Golden Retriever:
- swelling over L metacarpal bone, bone lysis on rads

- Discrete cells
- Peri-golgi clear zone
- Coarse nuclear chromatin
- Eccentric nuclei
- Deeply basophilic cytoplasm
Plasma cells; Plasmacytoma, Myeloma

7 yr old MC mixed breed dog: -mass on prepuce
Discrete cells
-Deeply basophilic cytoplasm
Binucleates
Plasmacytoma

Plasmacytoma

8 yr old MC Labrador: -haired, raised mass over L lateral stifle
Cluster of cells
-Dark, purple granules in cytoplasm

8 yr old MC Labrador: Mast cell tumor
Discrete cells
-Well-granulated
eosinophil

Mast cell tumor
Can see a scirrhous response in some MCTs fibroblasts

Some fibrosarcomas will recruit mast cells eosinophils

8 yr old Mixed breed dog:
-oral mass

8 yr old Mixed breed dog:
-oral mass

Fine, black-green granules

Melanoma

Clustered cells

Fine, green-black cytoplasmic granules

Melanoma
11 yr old FS DSH:  
-dark mass behind right ear

11 yr old Mixed breed dog:  
-swelling over one of metatarsals

11 yr old Mixed breed dog:  
-Spindled to discrete cells

Small # of melanin granules

Melanoma; “amelanotic”

11 yr old Skye terrier  
-multi-lobulated SQ mass over L stifle

11 yr old Skye terrier  
-multi-lobulated SQ mass over L stifle

Spindled cells

Mild-mod anisocytosis, anisokaryosis

11 yr old Skye terrier  
-multi-lobulated SQ mass over L stifle

11 yr old MC Corgi:  
SQ mass over hip

9 yr old MC Corgi:  
-SQ mass over hip

Nucleoli

Soft tissue sarcoma; grade 2

Eosinophilic matrix material

Soft tissue sarcoma; grade 1
**Soft tissue sarcoma**

Eosinophilic matrix material

Can see purple cytoplasmic granules

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**Malignant fibrous histiocytoma:**
- Morphologic variant of a sarcoma
- Dogs and cats (some vaccine-associated)

Multinucleated giant cells

Spindled cells

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**Liposarcoma:**
- Features of sarcoma cells
- Discrete lipid filled cytoplasmic vacuoles

* Steatitis, inflamed lipomas can resemble this

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**Use caution interpreting....**

- Atypical cells in the presence of significant inflammation

Ex. Fibroblasts walling off an abscess

Squamous epithelial cells in a superficial erosion

- Will become hyperplastic/dysplastic and can have many criteria of malignancy

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16 week old F Boxer: aspiration pneumonia 4 wks earlier
- on TMS since that time
- 2 day hx of swelling in neck
Normal appearing thyroid tissue: “Goiter”

- Functionally Hypothyroid:
  - T4: <0.5 ug/dl  1.2-3.1 ug/dl
  - TSH: 7.1 ng/ml  0.03-0.40 ng/ml

- TMS can impair thyroglobulin iodination and coupling of tyrosinases

“Well, as we thought, it's something gross.”