IN-HOUSE CYTOLOGY
TELLING THE GOOD FROM THE BAD & THE UGLY

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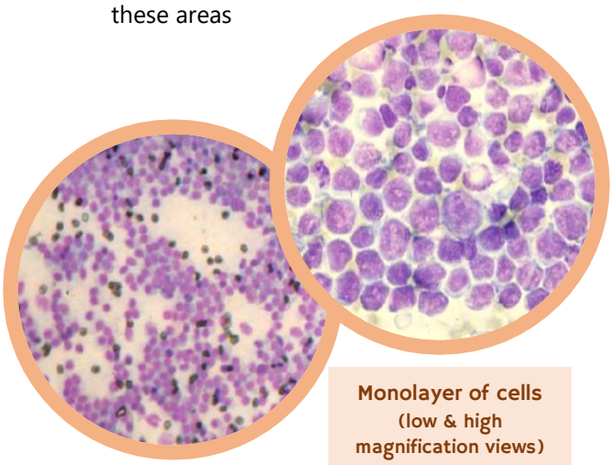
OPTIMAL VIEWING EXPERIENCE

A **poor sample** will always give a **suboptimal result** no matter how good the pathologist is.

Stain and check a sample slide in-house before sending off to the pathologist.

Train yourself on where to look at your slide:

- Look for a **monolayer of intact cells** using 4x or 10x magnification
- Gradually make your way through the slide at 20x + 40x magnification
- Assess if everything you are looking for is in these areas



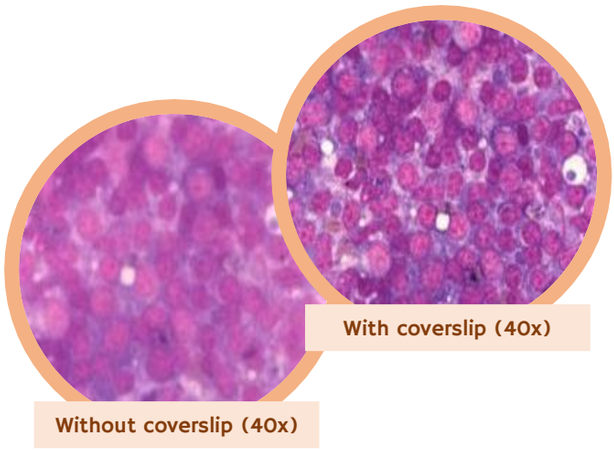
Monolayer of cells (low & high magnification views)

NOTE: Do not forget to **send unstained slides** to the lab as they might use different stains. Diff-Quick is sufficient for in-house cytology.

USING THE BLUE LENS

With 40x magnification, sample slides need to be looked at **with a coverslip** (high dry technique):

- Prepare your slide, stain it, and dry it again
- Place a dry coverslip on top of the slide



With coverslip (40x)

Without coverslip (40x)

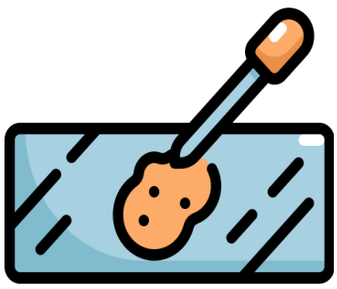
If the **view is blurry**, these are the possible reasons:

- ✓ There is **oil on the lens**
  - Clean the lens using an alcohol solution and a lens cleaning cloth (keep the oil away).
- ✓ The objective needs **an interface between the sample**

PRO TIP: Do not use 100x magnification. Use it only when you are looking for **infectious agents.**

GETTING A REPRESENTATIVE SAMPLE

- ✓ Make sure you have **adequate FNA samples** by collecting it from **different angles** (Christmas pudding analogy).
- ✓ Carefully place and **gently smear your samples** on the glass slides.
  - Put your sample on the slide
  - Place a spreader slide parallel to the bottom slide
  - Gently smear the sample



NOTE: Make sure the samples are **not too thick** as the samples **dry slower** and may result in **cellular crenation**.

OTHER TECHNIQUES	
STARBURST	**BLOOD FILM METHOD**
Splatter the sample on the slide and use your needle to push it out in different angles	Best used for fluid samples

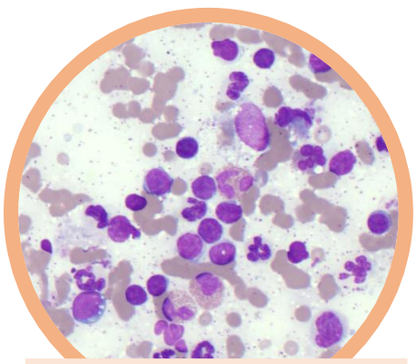
THOUGHT PROCESS: GENERAL APPROACH TO CYTOLOGY

1 IS IT INFLAMMATORY OR NON-INFLAMMATORY?

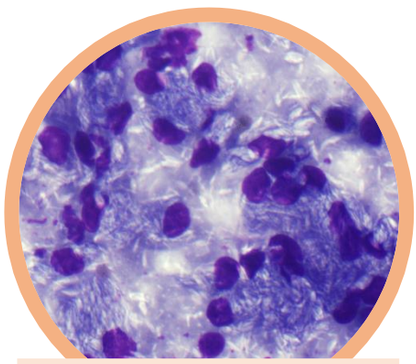
To be classified as **inflammatory**:

- ✓ No neoplastic or malignant criteria present
- ✓ High number of inflammatory cells (vs. blood contamination)
- ✓ May be infectious or non-infectious

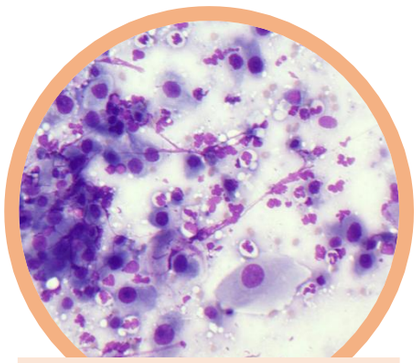
INFLAMMATION TYPE	LOOK FOR	POSSIBLE ETIOLOGIES
NEUTROPHILIC	>50% Neutrophils	Bacteria
GRANULOMATOUS	Neutrophils + foamy-looking macrophages with vacuolated cytoplasm	Foreign body type reaction, furunculosis, follicular cysts, bacteria or mycobacteria infection, fungi, parasites (*e.g.* Toxoplasma),
PYO-GRANULOMATOUS		
EOSINOPHILIC	>5-10% Eosinophils	Allergies/hypersensitivity reactions, parasites, fungi, mast cell tumors



Inflammation
(Feline Skin)



Granulomatous Inflammation with Mycobacteria
(Feline Skin)



Inflammation with Squamous Cell Carcinoma
(Feline Skin)

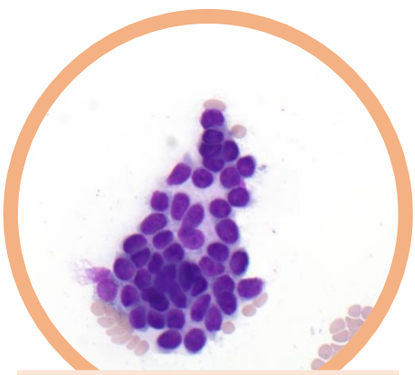
2 IF NON-INFLAMMATORY, IS IT BENIGN OR MALIGNANT?

Classify the neoplastic cells as either **benign or malignant**:

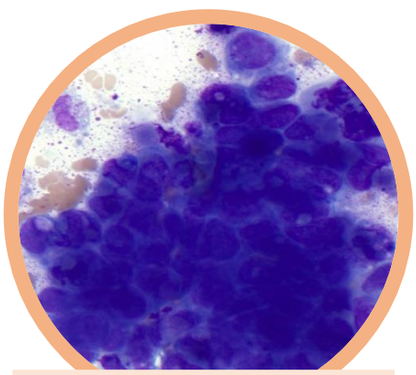
CELL CRITERIA	BENIGN	MALIGNANT
CELL SIZE	Small and homogenous (use size marker: RBC)	Big and variable (anisocytosis, anisokaryosis)
NUCLEAR-CYTOPLASMIC RATIO	Low N:C ratio w/o nuclear moulding	Increased N:C ratio w/ nuclear moulding
NUCLEOLI	Barely visible, small and regularly sized	Visible, +/- multiple (anisonucleosis)
CHROMATIN	Finely dispersed w/o clumping	Coarse pattern w/ clumping
CYTOPLASMIC STAINING	Lacks intense basophilic stain	Hyperchromasia (basophilia)

NOTES:

- ✓ To be classified as malignant, **at least 3 or more** of these criteria must be present in the cell.
- ✓ Grading of malignancy **cannot be solely done on cytology**.
- ✓ You can **collect samples from the regional lymph nodes for staging** if you have already decided to remove a mass or tumor in surgery.

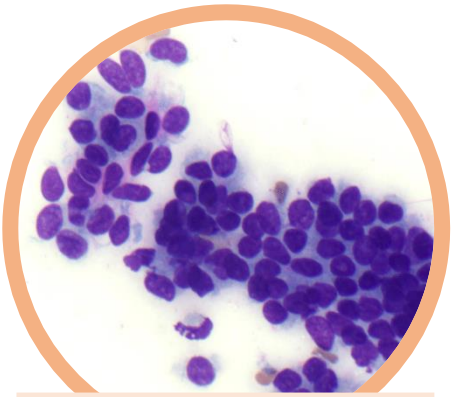


Adenoma
(Feline Skin Mass, FNAB)

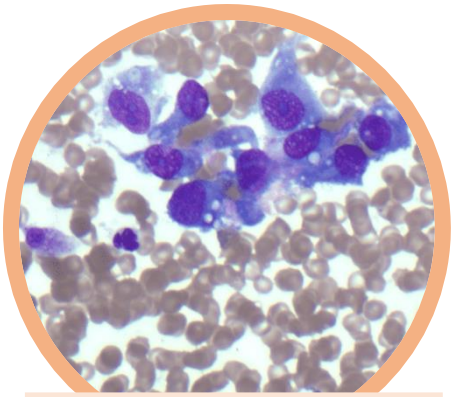


Carcinoma
(Feline Pulmonary Mass, FNAB)

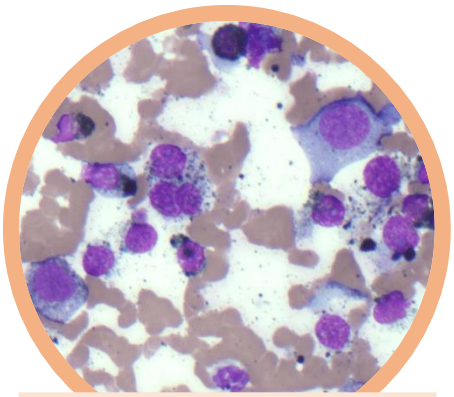
Other examples of benign and malignant cells:



Adenoma
(Canine Skin)

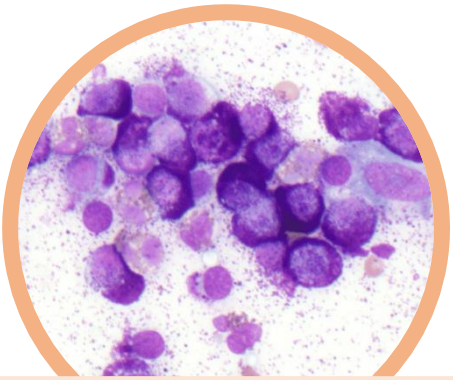


Sarcoma
(Canine Skin)

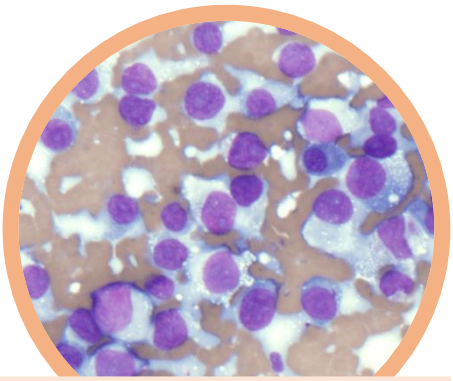


Malignant Melanoma
(Feline Skin)

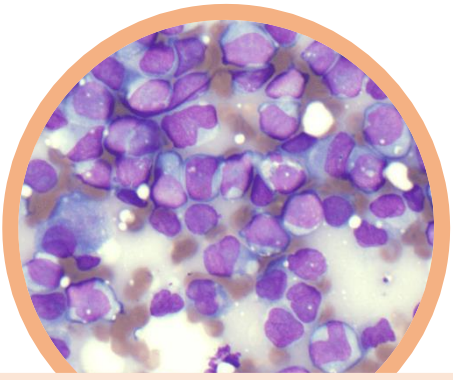
ROUND CELL TUMOURS & THEIR FRIENDS



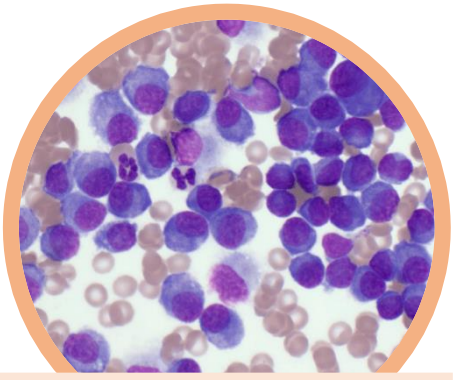
Mast Cell Tumor
(Canine Skin Mass)
Often also have **eosinophils** present



Histiocytoma
(Canine Skin Mass)
Often also have **small lymphocytes** present



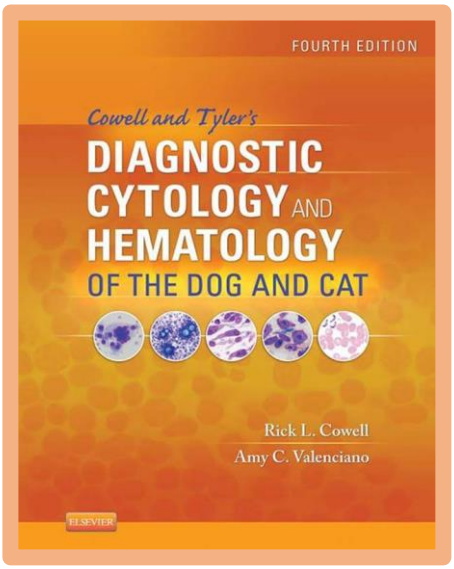
Lymphoma
(Feline Intestinal Mass)
May also have **eosinophils** present



Plasmacytoma
(Canine Skin)

NOTE: Immunocytochemistry can be used for phenotyping lymphoma to determine on cytology whether it is a **T-cell or B-cell lymphoma.**

SUGGESTED REFERENCES



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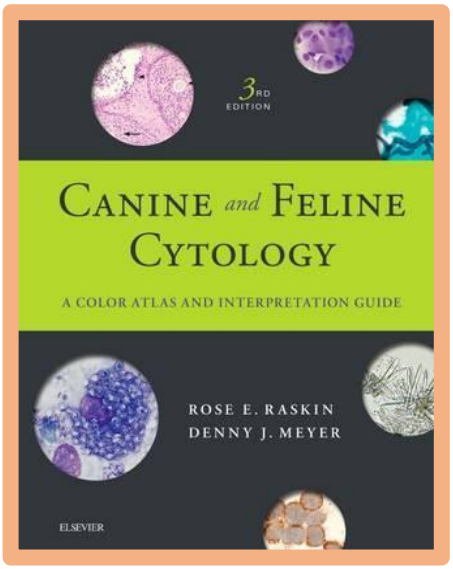

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