

Cytology of Lymph Nodes

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Indications

- Lymph node enlargement
- That was easy

Indications

- Lymph node enlargement
- Suspect metastasis
- Normal sized lymph nodes are Normal – Do NOT aspirate

Causes of lymphadenopathy

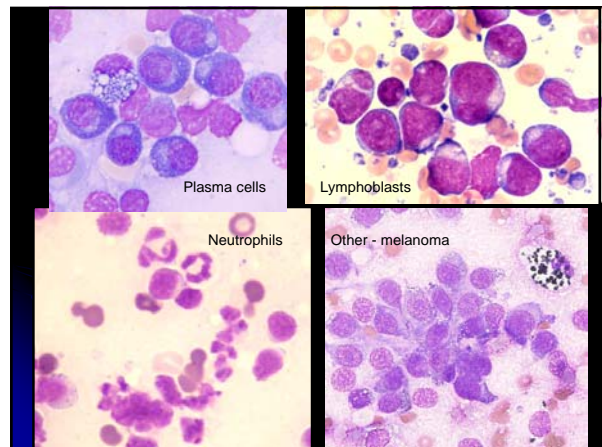
- Hyperplasia/ Reactive (Antigenic stimulation)
- Lymphoma
- Lymphadenitis
- Metastatic neoplasia

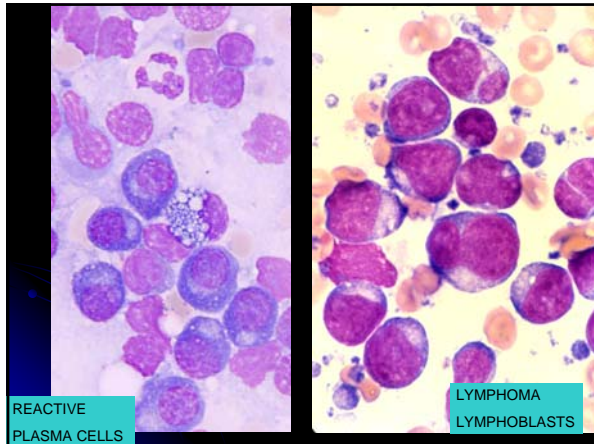
Lymphadenopathy- CELLS

- Hyperplasia/ Reactive
- Lymphoma
- Lymphadenitis
- Metastatic neoplasia

PLASMA CELLS
LYMPHOBLASTS
NEUTROPHILS

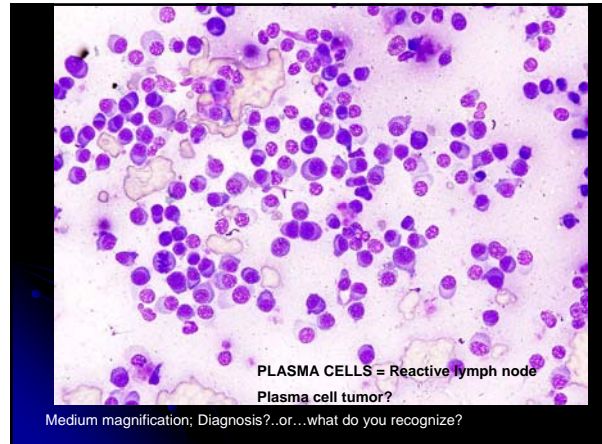
GROUPS OF
NEOPLASTIC
CELLS





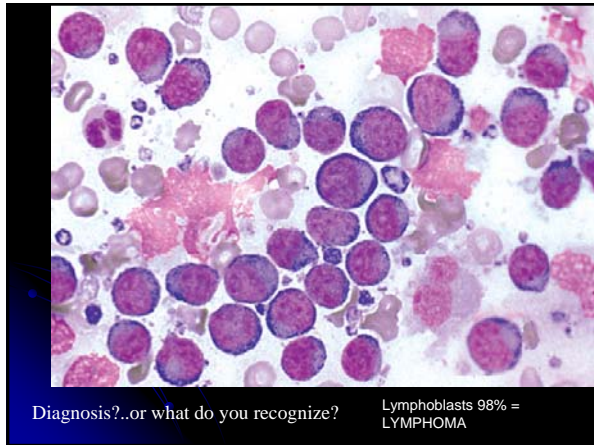
REACTIVE
PLASMA CELLS

LYMPHOMA
LYMPHOBLASTS



PLASMA CELLS = Reactive lymph node
Plasma cell tumor?

Medium magnification; Diagnosis?...or...what do you recognize?



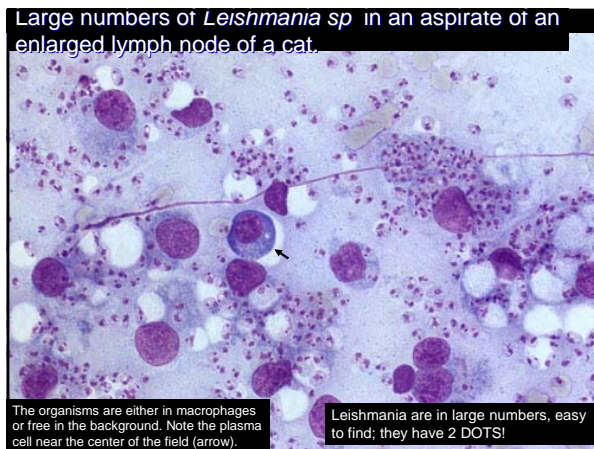
Diagnosis?...or what do you recognize?

Lymphoblasts 98% =
LYMPHOMA

Reactive vs. Lymphoma

- Small lymphocytes #1
- Lymphoblasts < 20%
- Numerous plasma cells
- Other cells present
- Lymphoblasts #1 cell
- Lymphocytes < 50% of nucleated cells
- Few to no plasma cells
- Few or no other cells

In most cases you do NOT find the cause for the reactive node in the cytologic specimen. The "antigen" stimulating the node is outside the node but in its field of drainage.



Large numbers of *Leishmania sp* in an aspirate of an enlarged lymph node of a cat.

The organisms are either in macrophages or free in the background. Note the plasma cell near the center of the field (arrow).

Leishmania are in large numbers, easy to find; they have 2 DOTS!

Types of cells seen in lymph nodes

- Small lymphocytes
- Intermediate-sized lymphocytes
- Lymphoblasts
- Plasma cells
- Macrophages
- Eosinophils
- Mast cells
- Abnormal cells (metastatic neoplastic cells)

Indications for FNA of lymph nodes

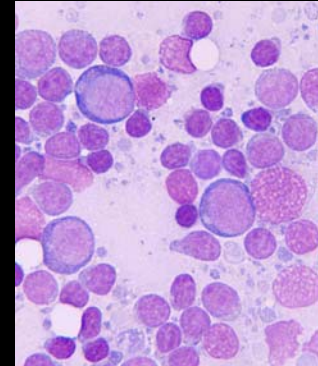
- Lymph node enlargement
- That was easy
- **DO NOT ASPIRATE NORMAL SIZE LYMPH NODES!!!!**
 - Lymphoma search
 - Metastatic neoplasm search

Normal lymph nodes:

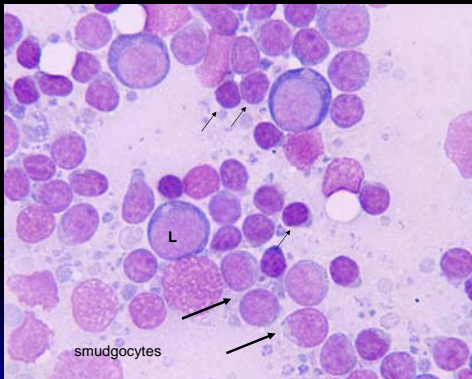
Lymphoblasts:

- < 20% - 3 in this photo
- Larger than a neutrophil
- Often up to 4x size of a RBC
- Chromatin less dark
- Nucleoli often visible
- More cytoplasm (blue)

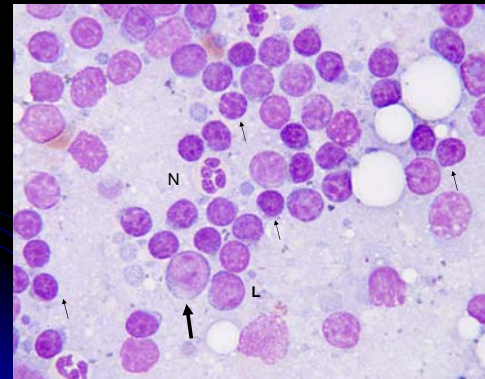
Mature, small and intermediate size lymphocytes predominate



Small lymphocytes (small arrows), intermediate-sized lymphocytes (large arrow) lymphoblasts (L) and neutrophil (N)



Small lymphocytes (small arrows), intermediate-sized lymphocytes (L) lymphoblasts (large arrow) and neutrophil (N)

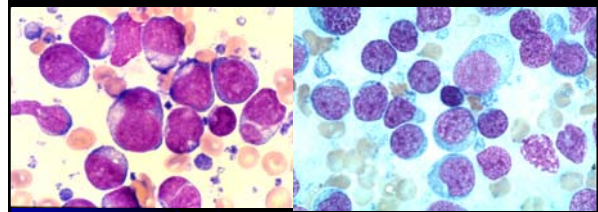


LYMPHOMA LYMPHOSARCOMA

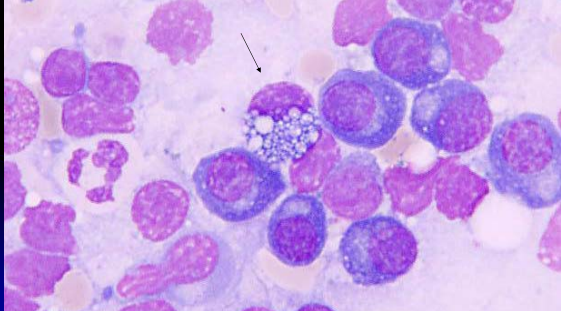
- **>50% Immature (large)** lymphoblasts
high N:C ratios
- **Many cases are 100% blasts = easy diagnosis**
- Large nuclei, +/- prominent nucleoli, basophilic cytoplasm

LYMPHOMA

- May have numerous lymphoglandular bodies (cytoplasmic remnants)
- Presence of mitotic figures variable
- Key is lymphoblasts inc., lymphocytes dec. and no or rare plasma cell
- Each photo below has one mature lymphocyte surrounded by lymphoblasts

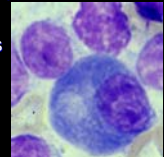


Reactive lymph node. Note plasma cells with deep blue cytoplasm and prominent Golgi; Neutrophil and Mott cell (arrow).

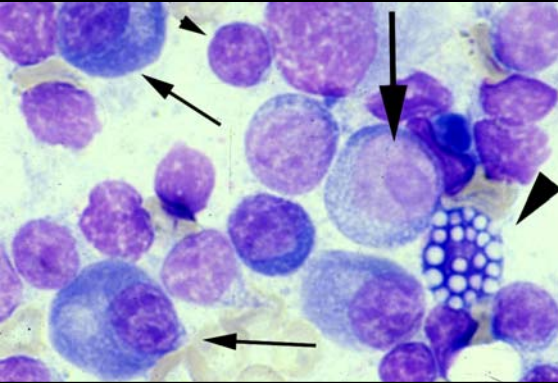


REACTIVE LYMPH NODES: (HYPERPLASIA)

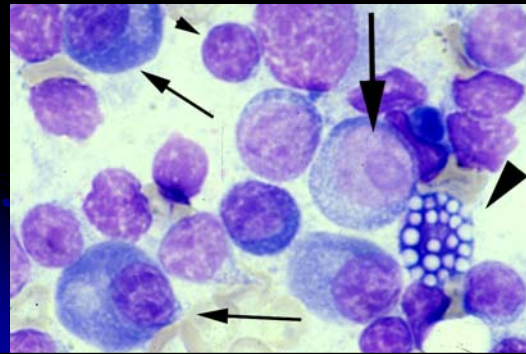
- Enlarged lymph node due to proliferation of lymphoid cells
- Predominately **small lymphocytes**
- **Plasma cells** increased to 5-20% **KEY** to this diagnosis
- Medium and large lymphocytes inc. but lymphoblasts still **< 20%**
- Macrophages, neutrophils, mast cells variable
- Common in lymph nodes draining GI



Lymph node. What do you see? What is your interpretation?

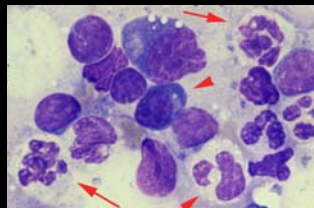
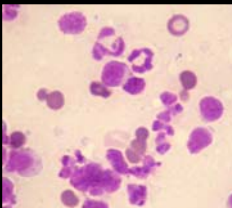


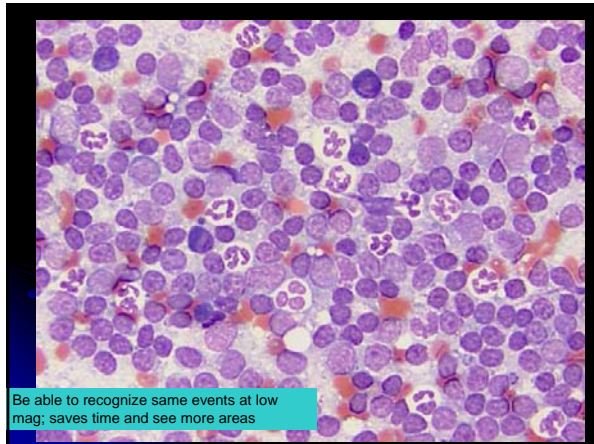
Plasma cells (small arrows), lymphoblast (large arrow), small lymphocytes (small arrowhead), and Mott cell (large arrowhead).
Diagnosis = **Reactive lymph node**



LYMPHADENDITIS:

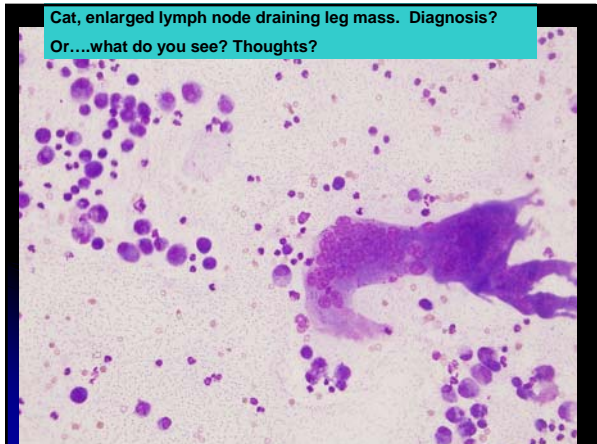
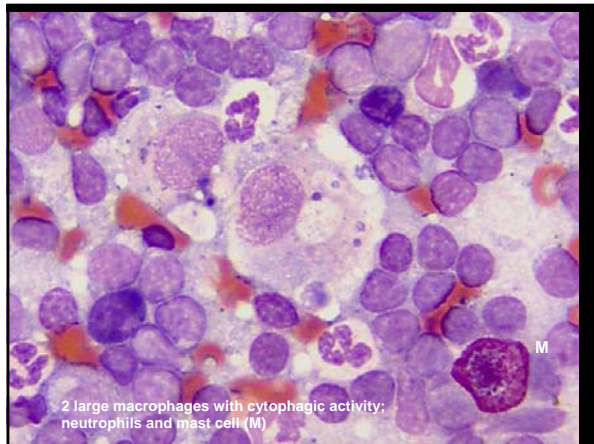
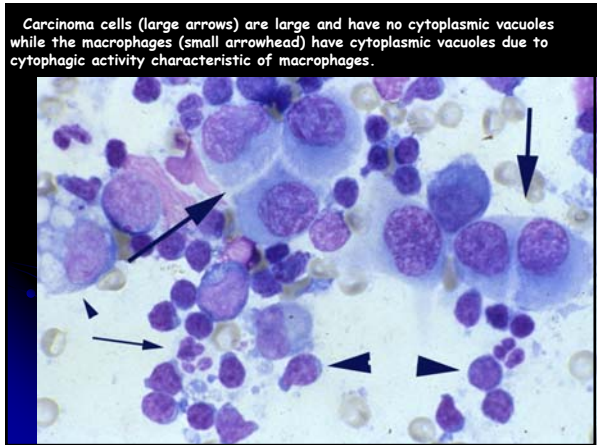
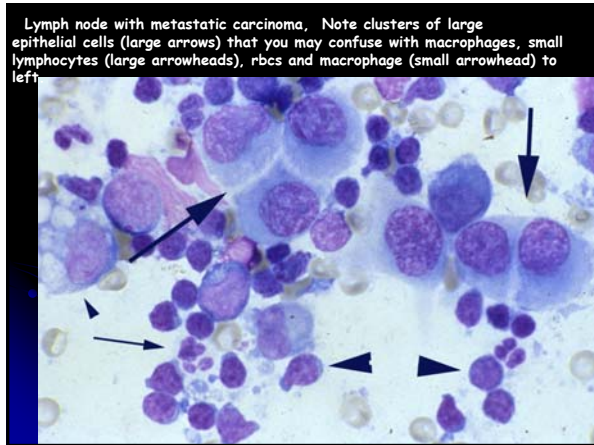
- Purulent – increased **neutrophils**, low numbers to 100% of the nucleated cells; degenerative features depends if bacteria are in the node.
- Other cases may have increased **eosinophils**
- **Granulomatous** – inc. macrophages
- Specific agents may be identified in these nodes

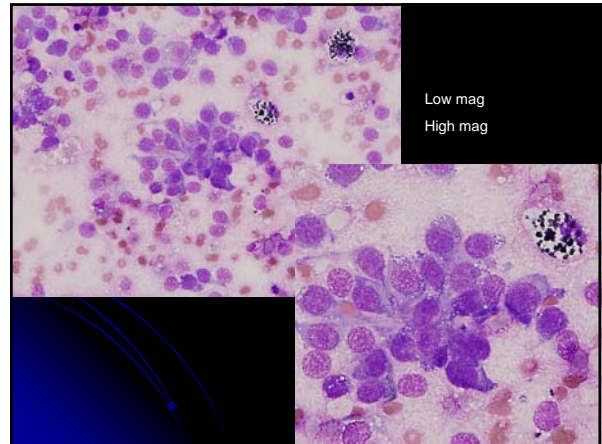




METASTASIS TO LYMPH NODE(S):

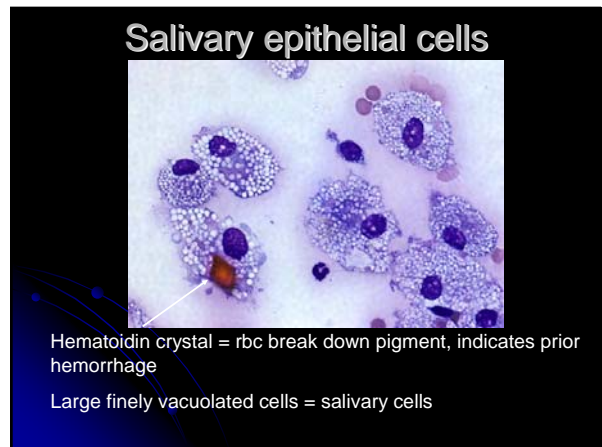
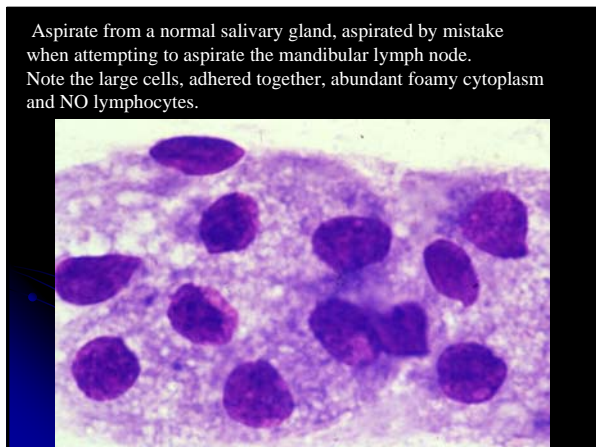
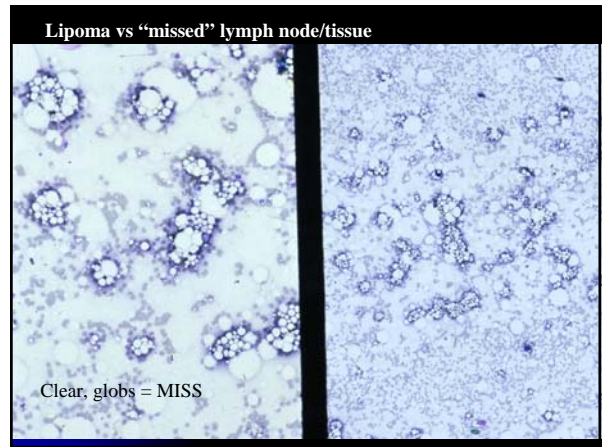
- Presence of cells **not normally found** in lymph nodes
- **Metastasis** of **any malignant tumor** is a possibility
- **Epithelial cells** – Easy to confuse with macrophages or accidental aspiration of submandibular salivary gland
- Cytology is as accurate as histopathology in predicting presence or absence of metastasis



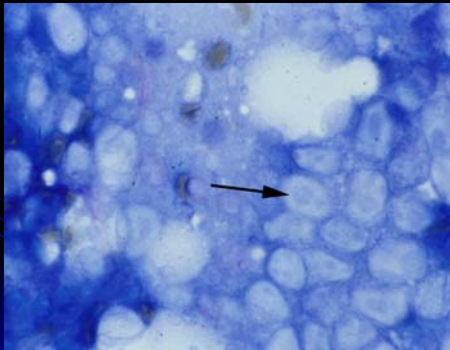


“TRICKS”

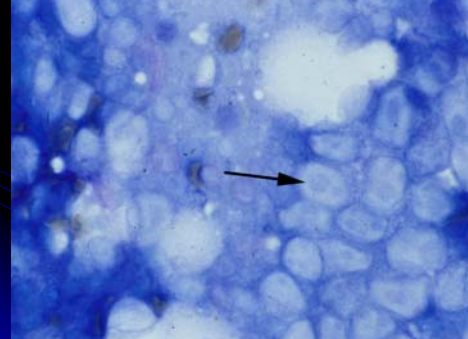
- Missed lymph node
 - Fat
 - Salivary gland
- Understained slides!!!
- Look for etiologies in reactive nodes, but uncommon to find them



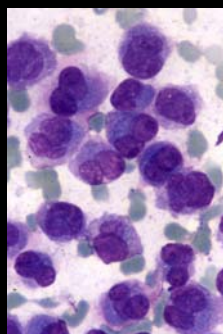
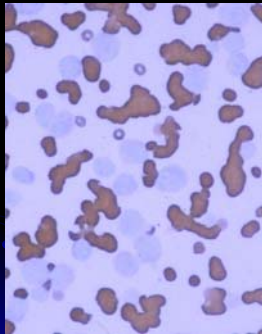
Example of lymph node aspirate that is too thick and staining poorly (lightly). Note that the nuclei are staining light blue, and the nucleoli are staining darker blue. How do you fix this?



Dip slide twice more in blue solution (jar number 3), re-examine and repeat in small increments until cells are stained well. Also examine cells in thinner areas, they may be stained fine. DO NOT DX these slides! The cells look immature and you will misdiagnose as lymphoma.

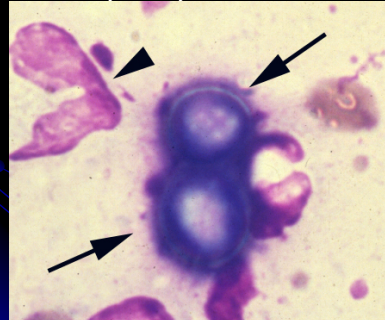


Understained smears

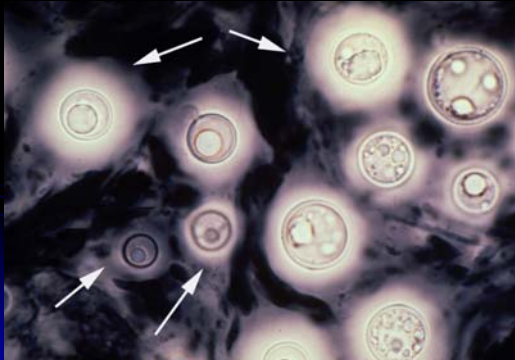


Understained slide on left; same smear on right but dipped a few more times (becareful) in the polychrome (blue) stain. The cells are now clearly visible

Lymph node aspirate from a dog with blastomycosis. Two *Blastomyces dermatididis* organisms (arrows) and a degenerate neutrophil (arrowhead). Organisms are deep blue, no capsule, and about the size of neutrophils. Find these at low mag! This of course is oil...yuk, sorry.



Lymph node aspirate from a cat with cryptococcosis. Cryptococcal organisms (arrows) are variable in size and surrounded by a large clear mucopolysaccharide capsule. India ink preparation.



SUMMARY

Reactive lymph node vs Lymphoma

>plasma cells vs > lymphoblasts

Cytology is as good as excisional biopsy and histopathology for metastatic neoplasms

Missed the lymph node – fat; salivary gland

Understained hypercellular samples!!!

Look for etiologies but.....reactive without cause is most common

SLIDE EXAMPLES

Cytology specimen

- **KEEP AWAY FROM FORMALIN**
- Air dry specimens
- Don't even put cytology slides in same box that may contain jars with tissues in formalin
- Formalin destroys cytologic features

Cytological Diagnosis of those "tricky ones":

- Don't hesitate to ask for a second opinion...

