

CONTRIBUTOR NAME	Daniel Heinrich, DVM
CONTRIBUTOR EMAIL	dheinric@umn.edu
COAUTHORS	Jed Overmann, DVM, DACVP; Davis Seelig DVM, PhD, DACVP & Matthew Sturos, DVM
COMPANY OR UNIVERSITY	University of Minnesota College of Veterinary Medicine

SPECIMEN: Liver fine needle aspirate cytology

SIGNALMENT: 17 yo, F/S, DSH Cat

HISTORY AND CLINICAL FINDINGS: A 17-year-old female spayed domestic short hair cat was presented to the University of Minnesota Veterinary Medical Center emergency service for evaluation of progressive anorexia, lethargy, and icterus over a 5 day period. The patient had a history of chronic renal insufficiency and elevated liver enzymes of several years duration. Physical exam revealed dehydration (~7%), icterus, a parasternal heart murmur and small kidneys.

LABORATORY DATA:

Hemogram results

TEST	UNITS	RESULT	REFERENCE INTERVAL
WBC	x 10 ³ /uL	71.77 H	1.83-16.27
Neutrophil Segs	x 10 ³ /uL	31.58 H	1.2-13.2
Lymphocytes	x 10 ³ /uL	31.58 H	0.2-9.4
Monocytes	x 10 ³ /uL	6.46 H	0-0.8
Eosinophils	x 10 ³ /uL	0.72	0-1.9
Unclassified	x 10 ³ /uL	1.44 H	No range
RBC	x10 ⁶ /uL	4.85 L	6.44-10.36
Hemoglobin	g/dL	8.4 L	9.8-16.8
HCT	%	25.6 L	29.5-47
MCV	fL	52.7 H	37.4-50.4
MCH	pg	17.3	14-18
MCHC	g/dL	32.7	32.1-39.7
RDW	%	18.1	No range
Retic #	x10 ⁶ /uL	0.015	0.004-0.066
Retic %	%	0.32	0.1-0.8
Platelet	x 10 ³ /uL	113	110-413
MPV	fL	20.5	9.9-21.5

Pathologist review of peripheral blood smear (see below for images) revealed a mild macrocytic, normochromic, non-regenerative anemia. A leukocytosis was present due to lymphocytosis, neutrophilia, and monocytosis. Most lymphocytes were small to intermediate in size, had a small amount of basophilic cytoplasm, and a single round to

often irregularly shaped nucleus (clefted or lobular). Occasional lymphocytes had small to moderate numbers of azurophilic cytoplasmic granules. Unclassified cells as noted on the CBC appeared most consistent with large lymphocytes. These cells had a small to moderate amount of basophilic cytoplasm that contained a single round nucleus with smooth chromatin, visible nucleoli, and variable numbers of azurophilic granules. Based on the number of lymphocytes, their morphology, and the presence of large lymphocytes, findings were thought consistent with lymphoma or lymphoid leukemia (Figure 1).

Chemistry results

TEST	UNITS	RESULT	REFERENCE INTERVAL
BUN	mg/dL	124 H	12-39
Creatinine	mg/dL	7.2 H	0.5-2.1
Calcium	mg/dL	9.3	8.3-10.9
Phosphorous	mg/dL	9.8 H	3.3-7.8
Magnesium	mg/dL	5.0 H	1.6-2.4
Protein	g/dL	6.0	5.9-8.2
Albumin	g/dL	2.4	2.4-4.1
Globulin	g/dL	3.6	2.5-5.3
Sodium	mmol/L	148	147-158
Chloride	mmol/L	112 L	113-123
Potassium	mmol/L	3.7 L	3.9-5.3
Bicarbonate	mmol/L	15.9	12-20
Osmolality		335	298-319
Anion Gap		24	19-30
Bilirubin, Total	mg/dL	19.3 H	0-0.3
ALP	U/L	368 H	2-88
GGT	U/L	21 H	0-3
ALT	U/L	263 H	16-127
AST	U/L	179 H	14-42
CK	U/L	298	54-744
Glucose	mg/dL	119	74-143
Cholesterol	mg/dL	240 H	56-226
Amylase	U/L	1435	555-1600

Urinalysis was unavailable for review; however, due to this patient's history of chronic renal insufficiency and findings discussed in the case summary, the azotemia is likely renal in origin with possible pre-renal and post-renal components. The hyperphosphatemia and hypermagnesemia are attributed to decreased GFR. The hypokalemia is likely secondary to anorexia and possibly complicated due to renal loss. The elevated bilirubin, ALP and GGT activity, and cholesterol are consistent with a post-hepatic cholestasis. The elevated ALT and AST activity are indicative of hepatocellular damage.

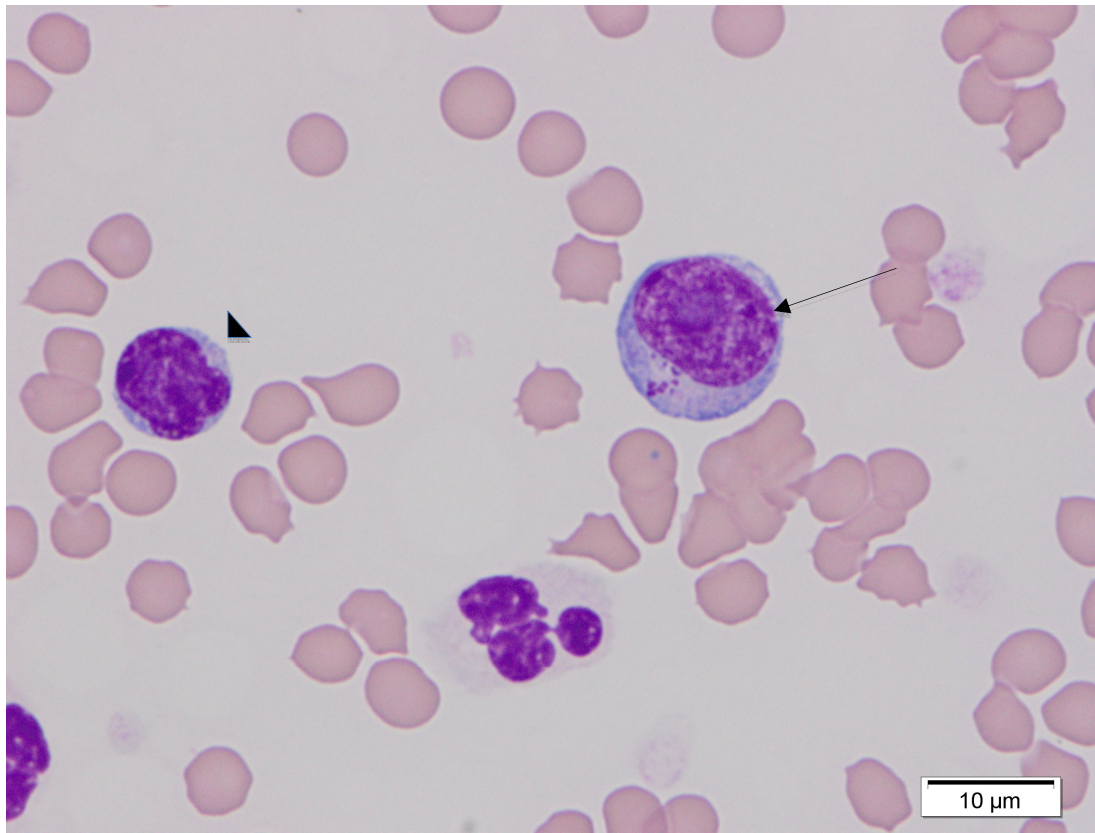


Figure 1. Peripheral blood smear, 100X objective, Wright's stain: Intermediately sized lymphocyte with clefted nuclear margins (arrowhead) and large lymphocyte with a visible nucleolus and azurophilic cytoplasmic granules (arrow).

ADDITIONAL DIAGNOSTIC TESTS:

Abdominal ultrasound findings relevant to this sample: The liver was diffusely enlarged with variably sized hypoechoic nodules and masses throughout. Several hepatic and mesenteric lymph nodes were moderately enlarged, rounded and hypoechoic. Liver fine needle aspirates were obtained

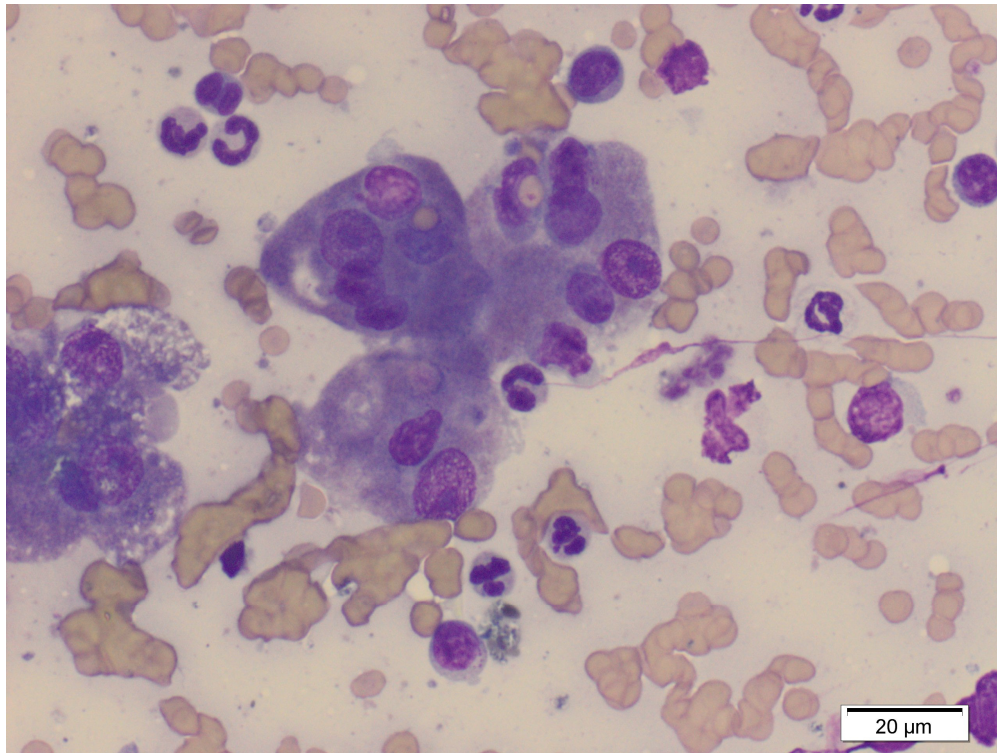


Figure 2. Liver fine needle aspirate cytology, 50X objective, Wright's stain

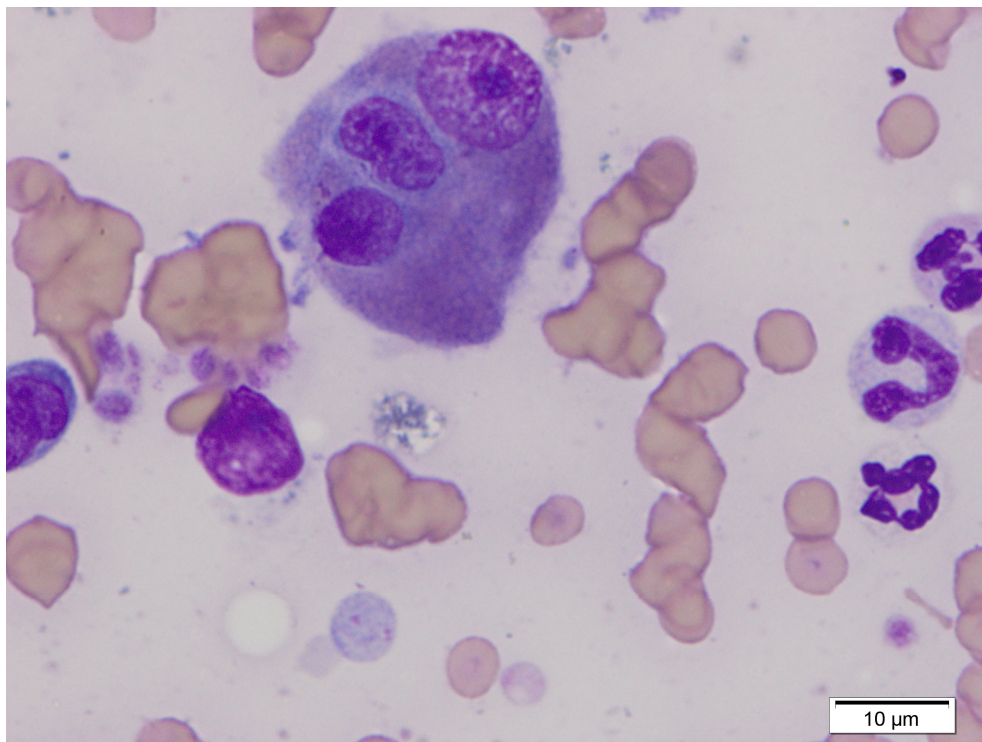


Figure 3. Liver fine needle aspirate cytology, 100X objective, Wright's stain

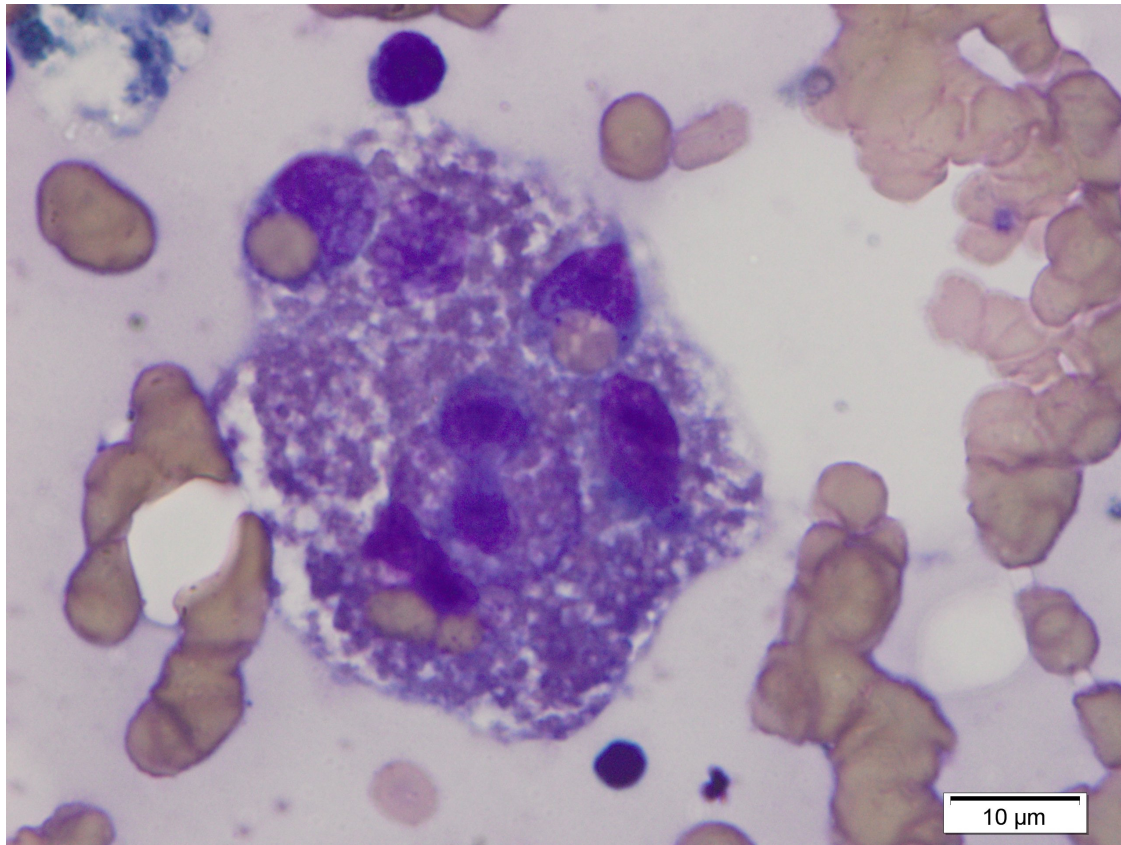


Figure 4. Liver fine needle aspirate cytology, 100X objective, Wright's stain

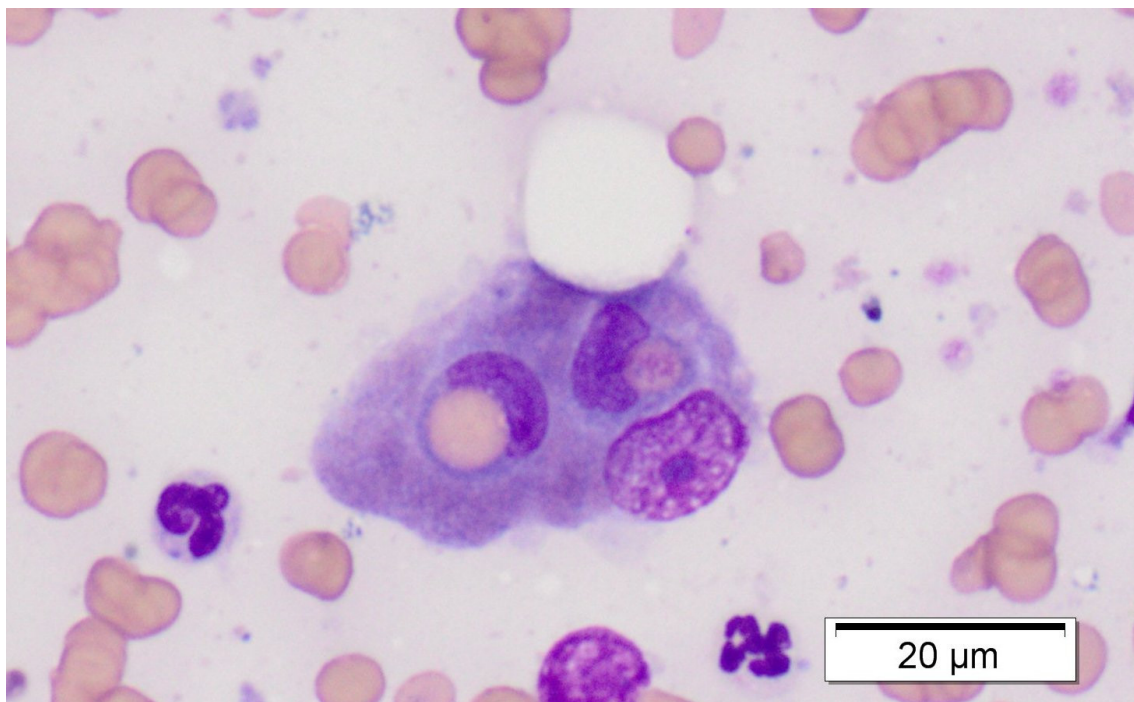


Figure 5. Liver fine needle aspirate cytology, 50X objective, Wright's stain

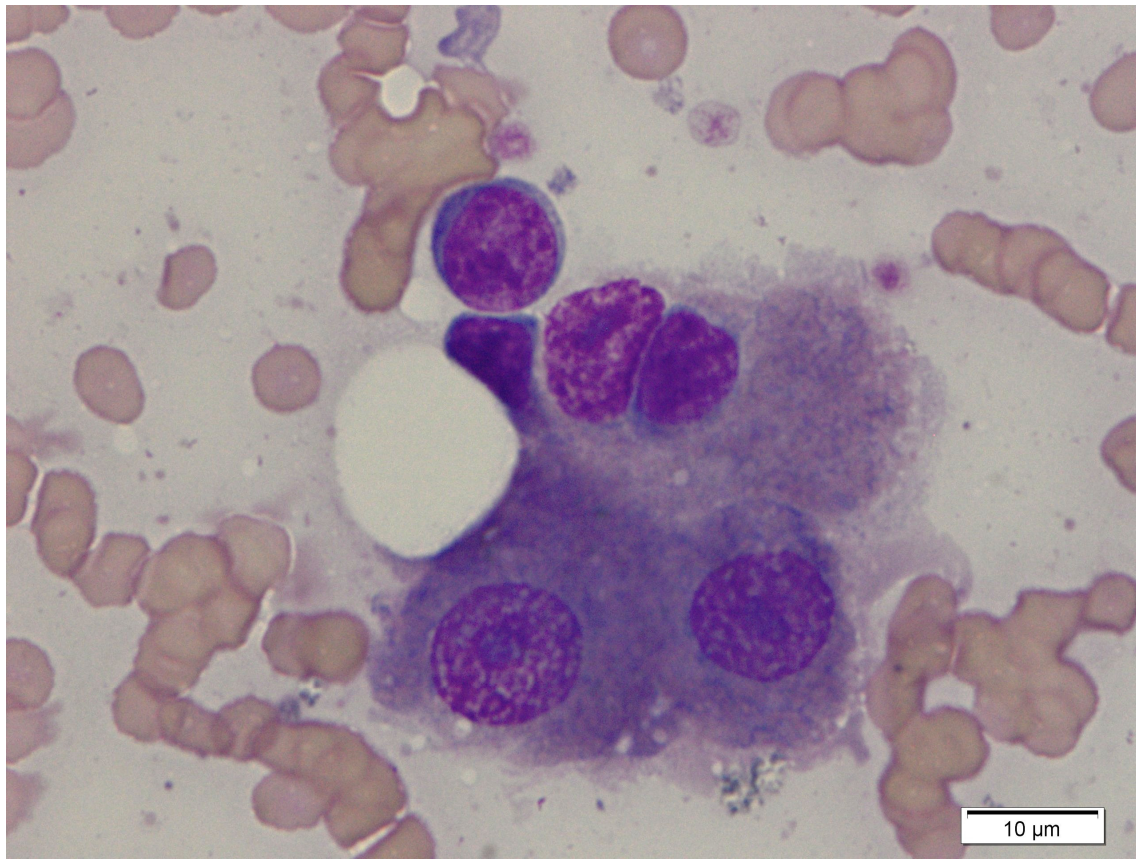


Figure 6. Liver fine needle aspirate cytology, 100X objective, Wright's stain

QUESTIONS:

1. With which neoplasms in the cat has tumor cell erythrophagocytosis been reported?
2. How does emperipolesis differ from phagocytosis?