

# Extreme neutrophilic leukocytosis in a dog

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**Signalment:** Mixed breed canine, 6 year old spayed female named Lusy

**Specimen:** Blood smear, Sysmex XT-2000iV scattergrams

**History:** Lusy was presented to the Clinic for Small Animal Medicine, Ludwig Maximilian University Munich with a one month history of reduced general condition, anorexia, vomiting once a week for the past month, melena of a few days duration, and marked neutrophilic leukocytosis. Prior to her presentation, she has been treated by the referring veterinarian with amoxicillin/clavulonic acid and enrofloxacin but no clinical improvement was observed. Lusy has been receiving nonsteroidal anti-inflammatory drugs (NSAIDs) from time to time due to orthopedic problems but has not been on NSAIDs or corticosteroids in recent months.

**Clinical findings:** Clinical examination revealed a thin, quiet patient with pale mucus membranes, strong regular pulse and 2/6 systolic heart murmur. Palpation of the abdomen showed prominent, soft, barrel-shaped liver. The rest of the clinical examination was unremarkable. Hematology results obtained on Sysmex XT-2000iV are listed in Table 1. Additionally, microscopic evaluation of the blood smear and a manual 500-cell differential count was performed as listed in Table 2. Total protein and albumin were decreased: TP 49.5 g/L (RI 55.5-77.6) and albumin 28.0 g/L (RI 31.3-43). Potassium was 3.5 mmol/L (RI 3.8-5.5). Liver enzyme activities were increased: ALT 266 IU/L (RI 18-110), ALP 849 IU/L (RI 13 – 152). Total bilirubin was 4.9 µmol/L (RI 0-5.26). RI means reference interval. PT and aPTT were within reference ranges. *Babesia canis* ELISA did not detect the presence of *B. canis* antibodies. Urine (obtained via cystocentesis) had specific gravity of 1.042 and pH of 6. Urinalysis was unremarkable with the exception of bilirubinuria ++, proteinuria + and rare bilirubin crystals.

**Table 1.** Hematology results (Sysmex XT-2000iV)

Parameter	Value	Reference interval	Unit
WBC	115.49 ↑	5-16	$\times 10^9/L$
RBC	3.24 ↓	5.5-9.3	$\times 10^{12}/L$
HGB	5.3 ↓	7.45-12.5	mmol/L
HCT	0.279 ↓	0.35-0.58	L/L
MCV	86.1 ↑	58-72	fL
MCH	1.636 ↑	1-1.4	fmol/L
MCHC	19	19-21	mmol/L
PLT	146 ↓	180-550	$\times 10^9/L$
NEUT#	96.8 ↑	3-9	$\times 10^9/L$
LYMPH#	9.47 ↑	1-3.6	$\times 10^9/L$
MONO#	8.5 ↑	0.04-0.5	$\times 10^9/L$
EO#	0.66 ↑	0.04.-0.6	$\times 10^9/L$
BASO#	0.06 ↑	0-0.04	$\times 10^9/L$
RET#	414.4 ↑	19-150	$\times 10^9/L$

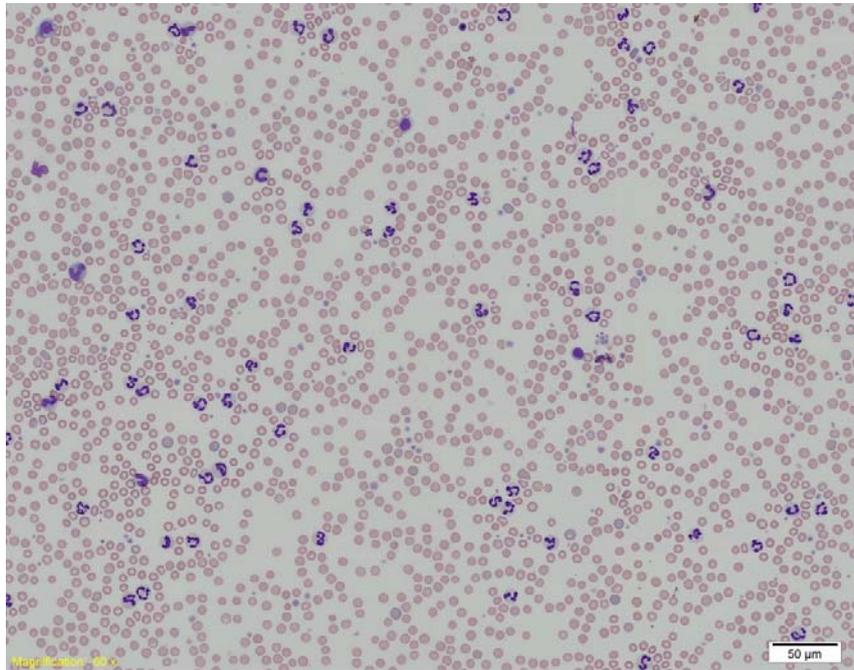
**Table 2.** Hematology results obtained by a manual differential count

Parameter	Value	Reference interval	Unit
NEUT#	101.63 ↑	3-9	$\times 10^9/L$
BANDS#	3.46 ↑	0	$\times 10^9/L$
METAMYELOCYTES#	1.15 ↑	0	$\times 10^9/L$
LYMPH#	2.31	1-3.6	$\times 10^9/L$
MONO#	5.77 ↑	0.04-0.5	$\times 10^9/L$
EO#	1.15 ↑	0.04.-0.6	$\times 10^9/L$
BASO#	0	0-0.04	$\times 10^9/L$

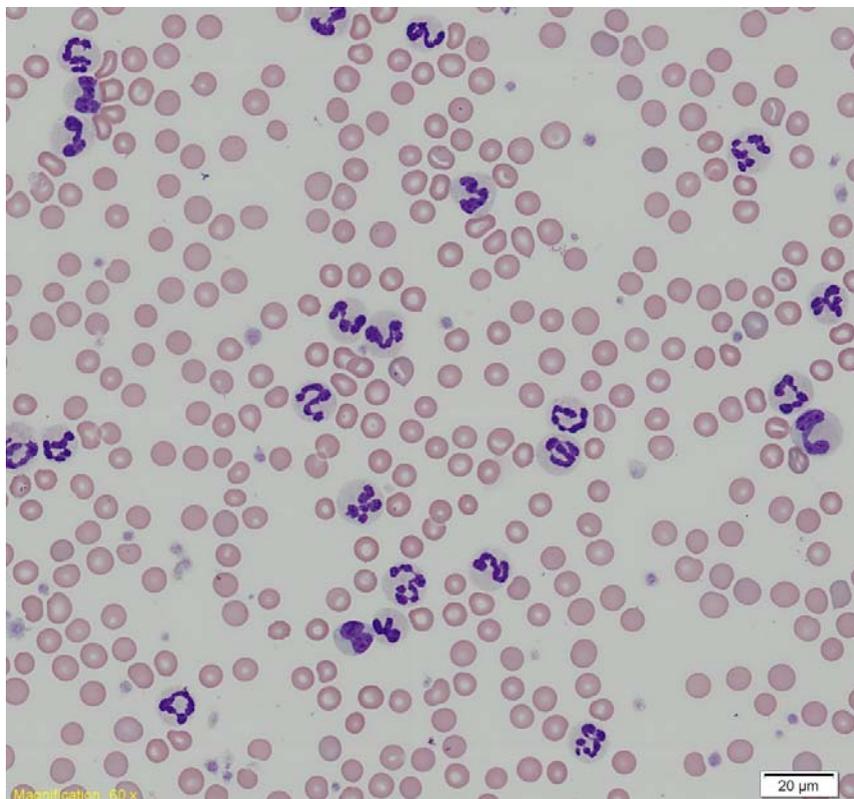
**Questions:**

1. What are the diseases and conditions that cause marked neutrophilic leukocytosis in dogs?
2. How could you confirm the diagnosis?

**Blood smear images:**



**Figure 1.** Blood smear from a mixed breed dog. Modified Wright's stain. Scale bar = 50μm.



**Figure 2.** Blood smear from a mixed breed dog. Modified Wright's stain. Scale bar = 20μm.

Sysmex XT-2000iV scattergrams:

