

# Diagnostic workup of an orangutan with chronic respiratory problem

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## Signalment:

49 years old female Sumatran Orangutan (*Pongo abelii*).

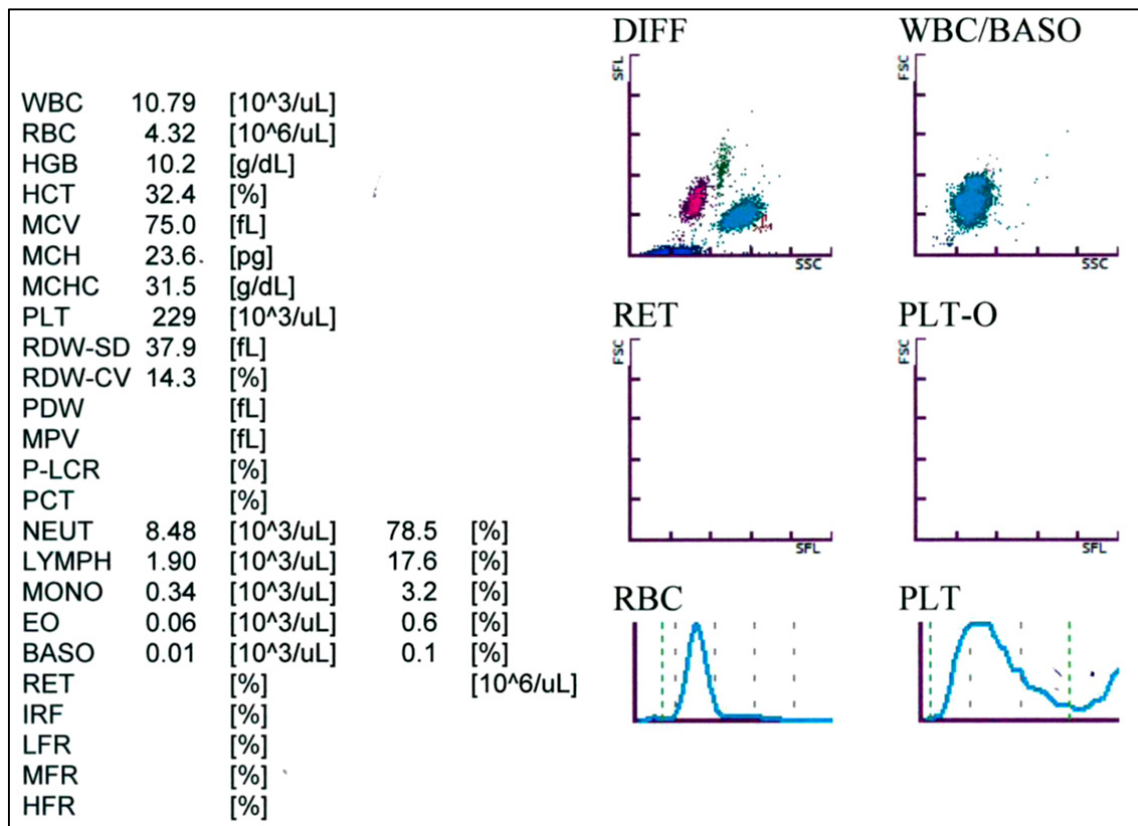
## History and clinical findings:

The orangutan had been housed for many years in the Zoo of Zurich (Switzerland) and presented with respiratory problems over the past several months. In addition fetor ex ore (bad breath) and intermittent apathy were noted.

## Diagnostic procedures:

Clinical examination demonstrated, in addition to the previously mentioned clinical findings, decreased body weight. Hematological and biochemistry analysis were performed. Hematology results were obtained using the species specific profile for monkeys of the Sysmex XT-2000iV<sup>®</sup> (Sysmex). Scattergram were judged reliable and values were given as reported by the instrument.

**Figure 1.** Hematology results and scattergrams obtained using Sysmex XT-2000iV<sup>®</sup>



**Table 1:** Hematology results

Parameter	Values	Unit	Mean*	SD*	Range*
Htc	32	%	37.91	3.60	29-45
Hb	10.2	g/dL	11.76	1.27	8.5-15
RBC	4.32	10 <sup>6</sup> /μL	4.36	0.63	3.17-6.64
MCH	24	pg	27.30	3.18	19.6-37
MCHC	32	g/dL	30.99	1.86	19.6-37
MCV	75	fL	86.83	12.28	64.8-110.4
WBC	10.8	× 10 <sup>3</sup> /μL	11.3	5.19	5.6-32
Neutrophils	8.48	× 10 <sup>3</sup> /μL	6	4.22	1.32-27.2
Eosinophils	0.06	× 10 <sup>3</sup> /μL	0.29	0.26	0-1.02
Basophils	0.01	× 10 <sup>3</sup> /μL	0.02	0.06	0-0.49
Monocytes	0.34	× 10 <sup>3</sup> /μL	0.29	0.31	0-1.92
Lymphocytes	1.90	× 10 <sup>3</sup> /μL	4.56	2.81	0.26-20.9

\*McClure HM, Keeling ME, Guilloud NB. Hematologic and blood chemistry data for the orangutan (*Pongo pygmaeus*). Folia Primatol (Basel). 1972;18(3):284-99

**Table 2:** Biochemical profile

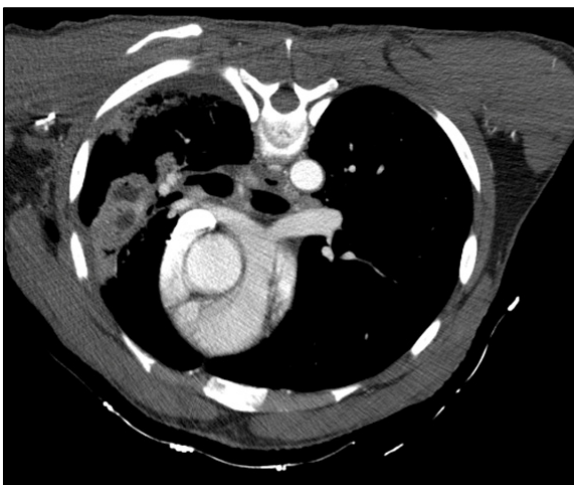
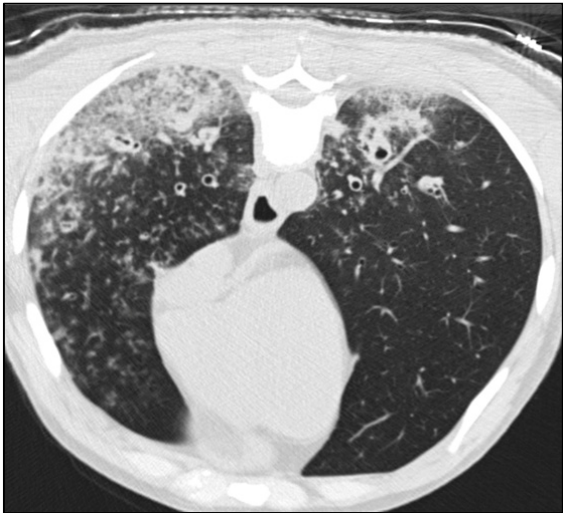
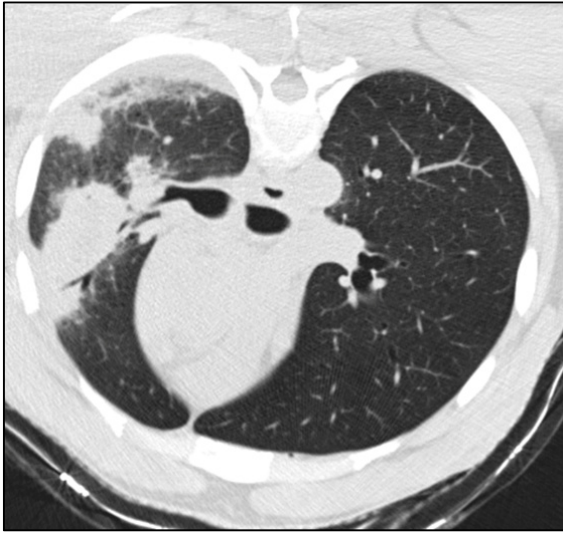
Parameter	Values	Unit	Mean*	SD*	Range*
Bilirubin	5.9	μmol/L	9.75	9.23	1.7-44.5
Glucose	8.4	mmol/L	6.59	2.64	3.2-15.2
Urea	2.4	mmol/L	1.80	2.24	0.2-1.3
Creatinine	60	μmol/L	123.9	194.7	62-974
Protein	58	g/L	67.5	6.3	55-85
Albumin	25	g/L	40.7	5.5	29-56
Globulin	34	g/L	26	4.2	20-35
Cholesterol	4.2	mmol/L	4.21	4.31	0.3-29.3
Triglycerides	1.2	mmol/L	0.81	0.35	0.3-1.8
ALP	242	U/I	288.9	186.3	2-1186
Lipase	34	U/I	23.2	22.4	2-126
ALT	5	U/I	65.9	88.8	14-520
CK	194	U/I	2497	3796	72-10000
Calcium	1.99	mmol/L	2.11	0.33	0.5-2.7
Phosphorous	1.11	mmol/L	1.19	0.82	0.61-2.36

\*Kilbourn AMI, Karesh WB, Wolfe ND, Bosi EJ, Cook RA, Andau M. Health evaluation of free-ranging and semi-captive orangutans (*Pongo pygmaeus*) in Sabah, Malaysia. J Wildl Dis. 2003 Jan; 39(1): 73-83

Reference intervals for orangutans are not available in our laboratory, therefore published reference intervals were used (see Tables 1 and 2). The published ranges for some test results seem wide compared to reference intervals for other animals, thus factors such as capture stress or subclinical disease may have been present in the reference population. No major deviations from reference values were detected in hematology or biochemistry.

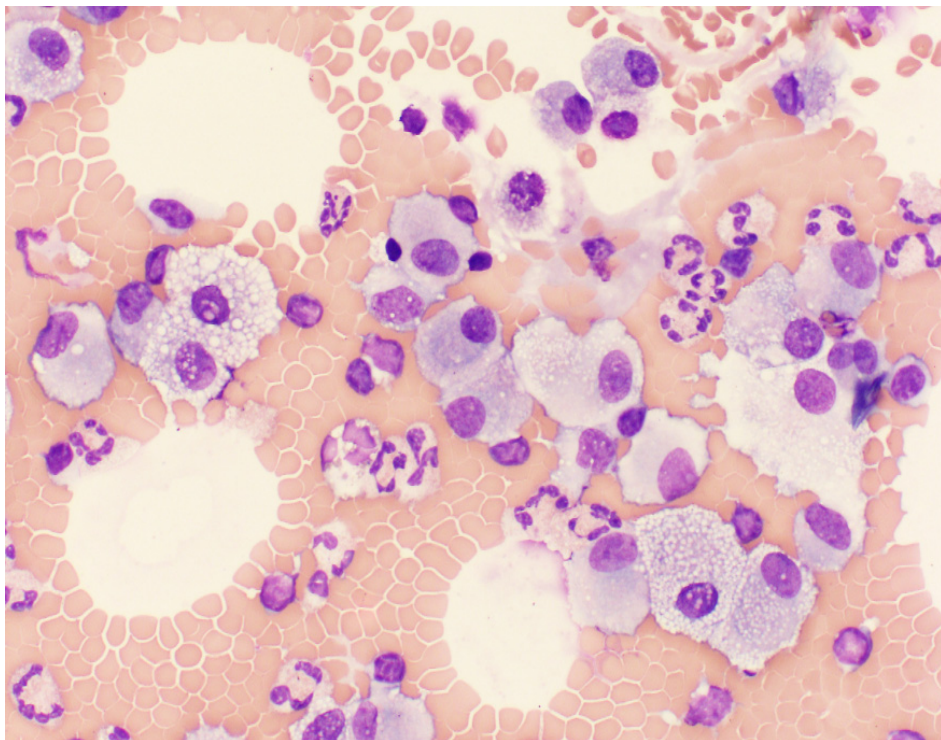
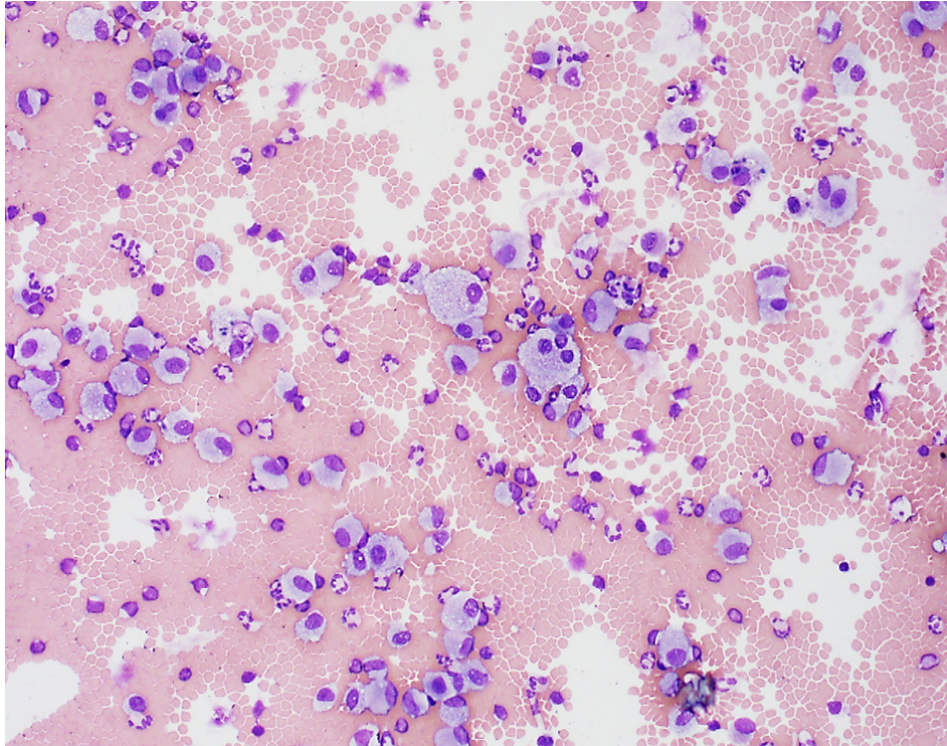
Radiographs and computed tomography (CT) of the head and thorax were performed in order to further assess the respiratory problems. A sinusitis (mainly involving the right side) was detected. In addition, a severe bronchial, interstitial and alveolar consolidation mainly affecting the right lung lobes was seen. A milder involvement of the left caudal lung lobe, without consolidated lesions was also noted. In addition, tracheobronchial lymphadenopathy and a mild right-sided pleural effusion were present. A sinusitis, mainly right-sided was also found. Granuloma or abscess formation was the main differential diagnosis. Exclusion of tuberculous granuloma was the primary concern.

**Figure 2:** CT imagines of the thorax demonstrating areas of consolidation, mainly in the right caudal lung lobe.

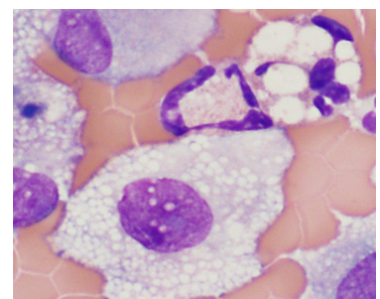
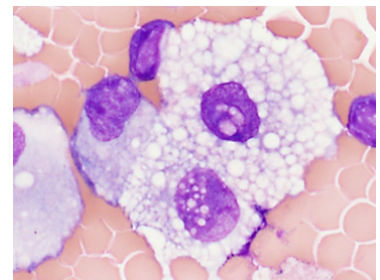
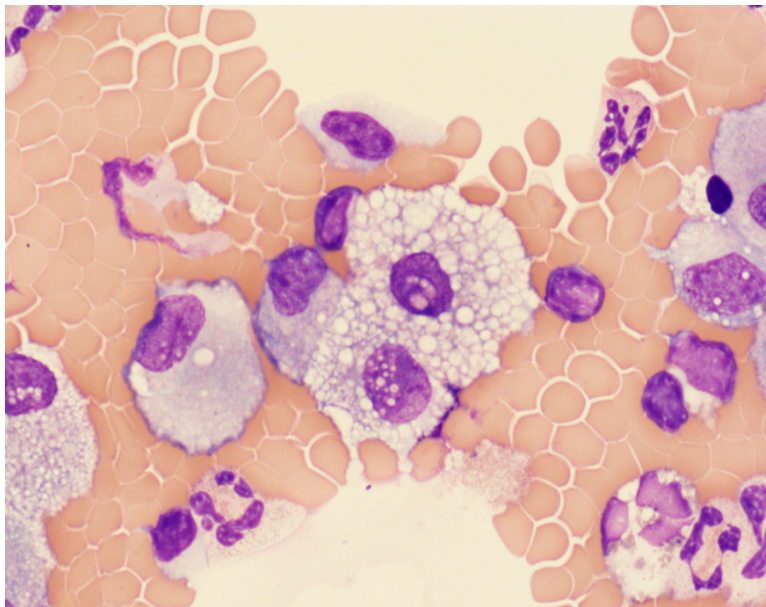
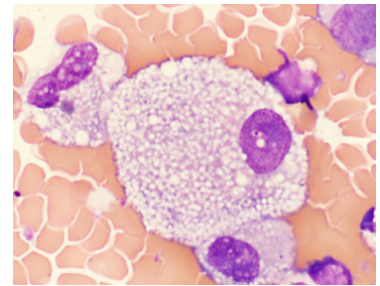
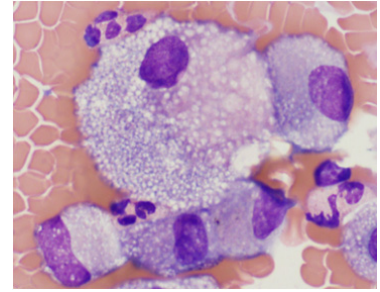
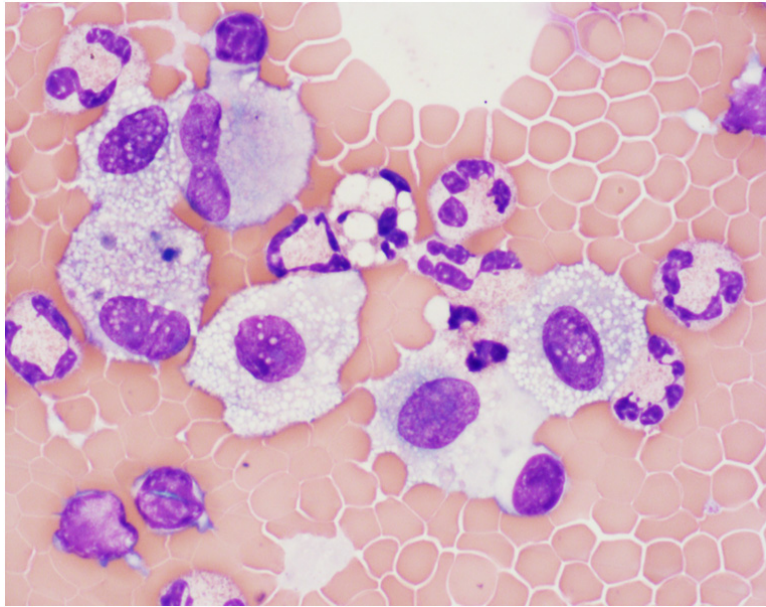


Bronchoalveolar lavage (BAL) was performed to further evaluate the lung lesion. Cytological findings of the cytocentrifuge preparations were as shown in Figure 3.

**Figure 3:** BAL fluid, Wright-Giemsa stain, cytocentrifuge preparation (200 and 500 × magnification)







**Questions:**

What is your diagnosis?

Which kind of cytological features display the macrophages?

Which stains would you use to further characterize the macrophages?