

# Veterinærdagene 2024

13.-15. mars, Bergen



Seksjonen er sponset av



Fredag 15. mars



## Program for Smådyr

# Body cavity effusions- how to get the most clinically useful information

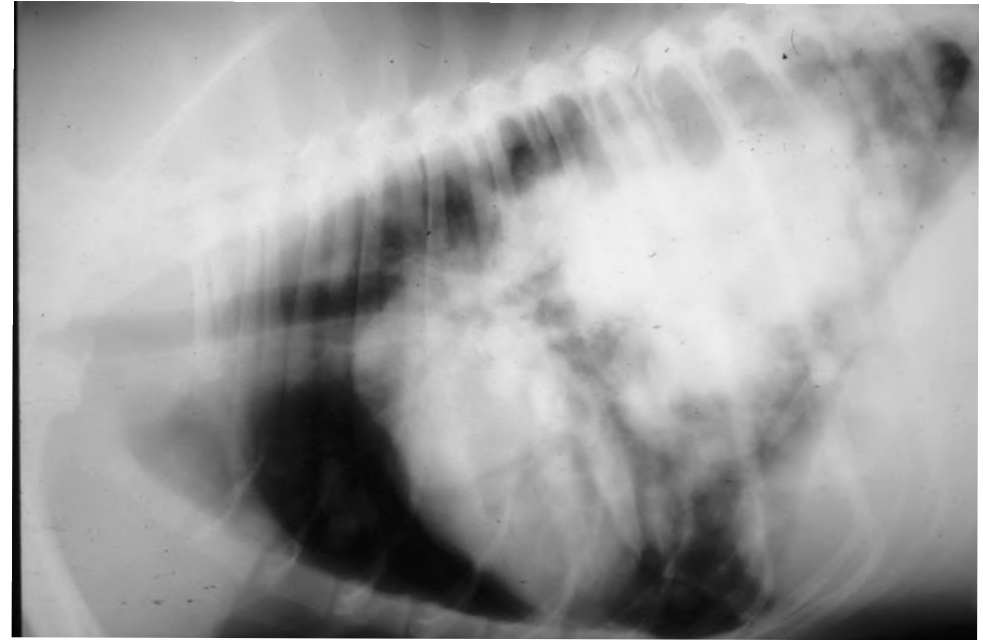
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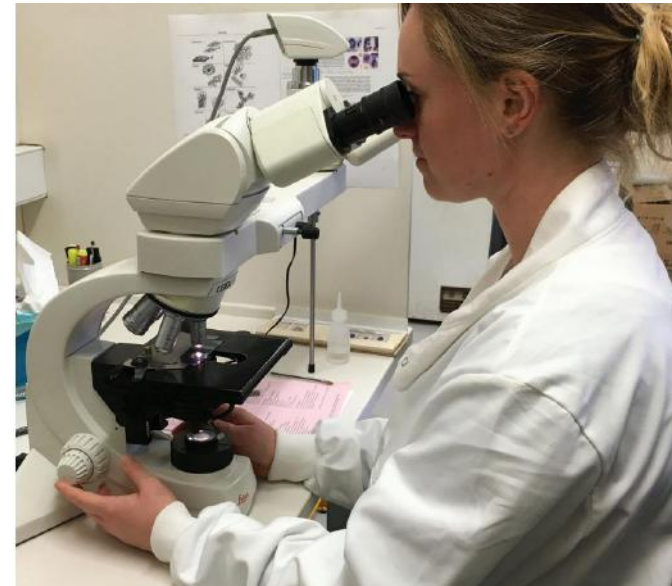
Diagnostic Laboratories, Langford Vets, Bristol Veterinary School, University of Bristol

kos.papasouliotis@icloud.com

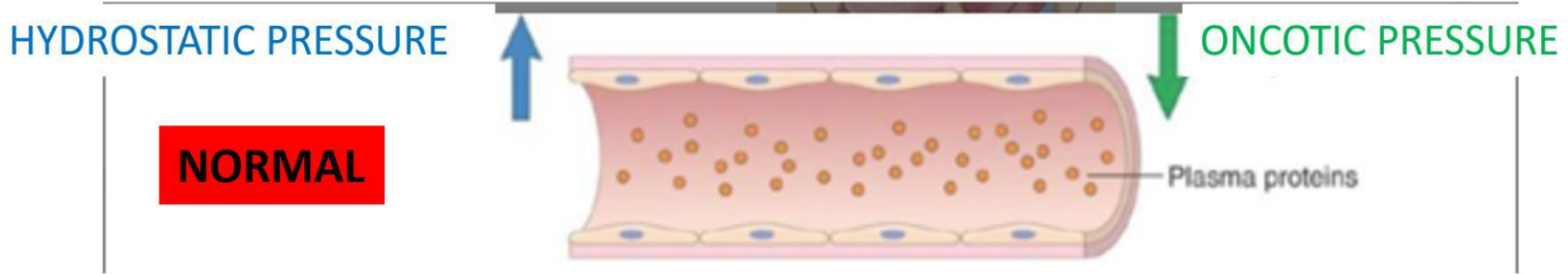


## Content

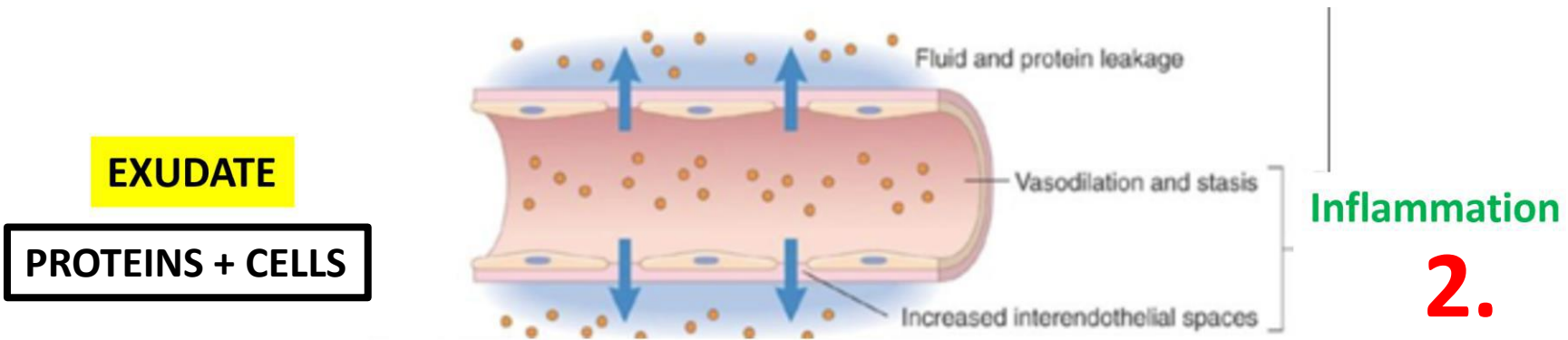
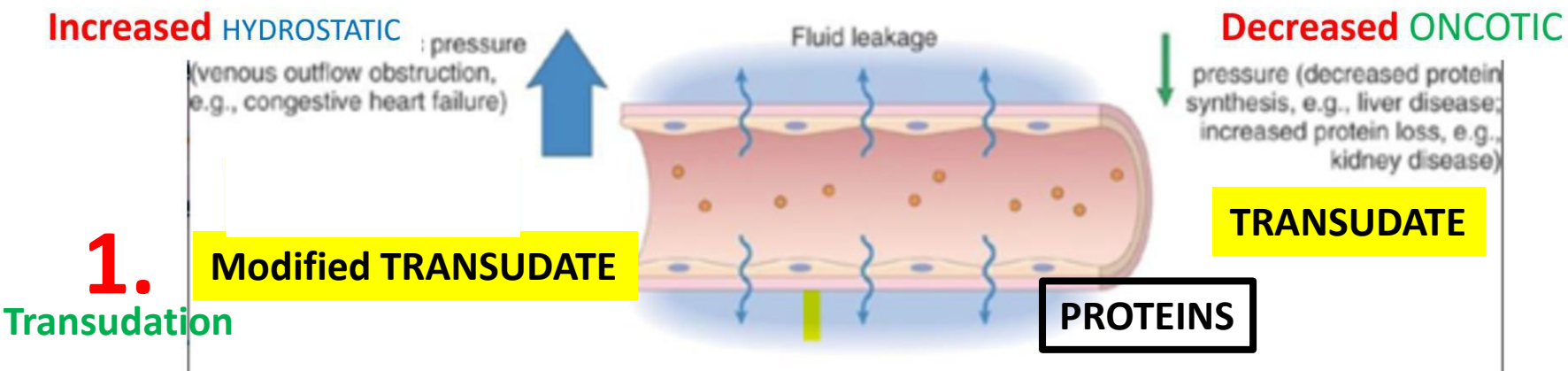
- Pathomechanisms
- Sample Collection
- Sample analysis
- Diseases – Cytology
- Quiz



# Body cavity effusion - Three pathomechanisms (Robbins & Cobran; Pathologic basis of disease)



Pleural (Thoracic), Peritoneal (Abdominal), Pericardial

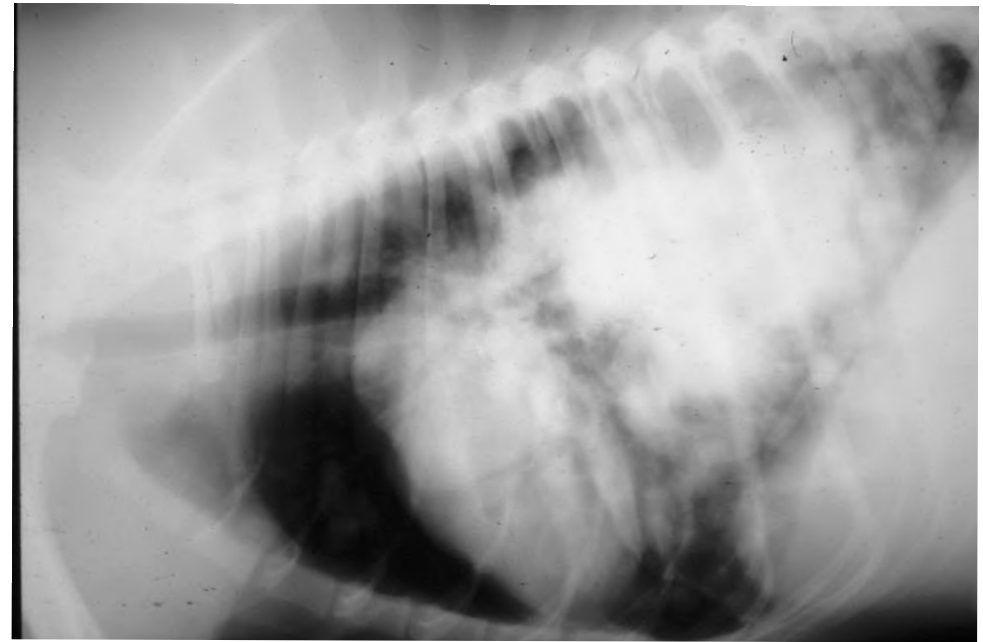


### 3. Organ/Vessel rupture or leakage

- *Hemorrhagic effusion* (e.g. vessel, spleen, liver)
  - Blood in the body cavities
- *Gallbladder (Bile peritonitis)*
  - *Bile in the abdominal cavity*
    - *Bilirubin in the effusion*
- *Urinary track (Uroabdomen)*
  - *Urine in the abdominal cavity*
    - *Creatinine in the effusion*
- *Gastrointestinal track (Septic peritonitis)*
  - *Bacteria in the abdominal cavity*

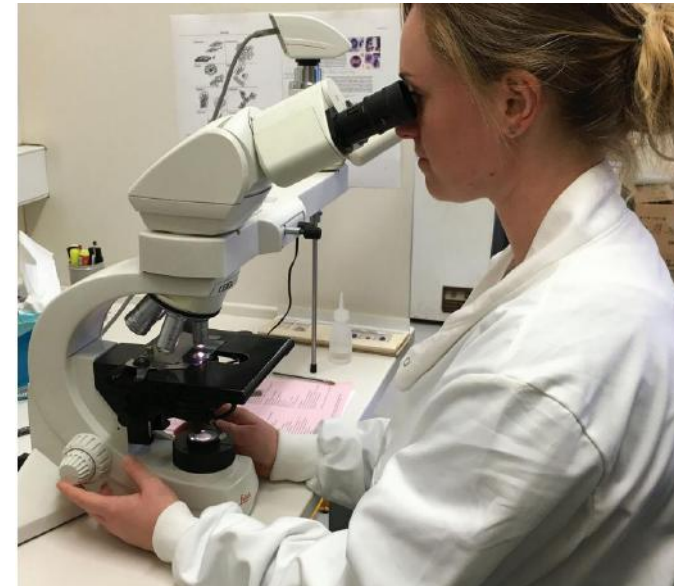






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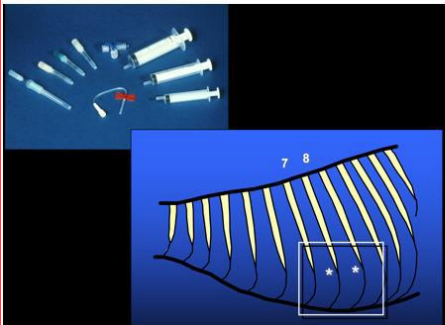
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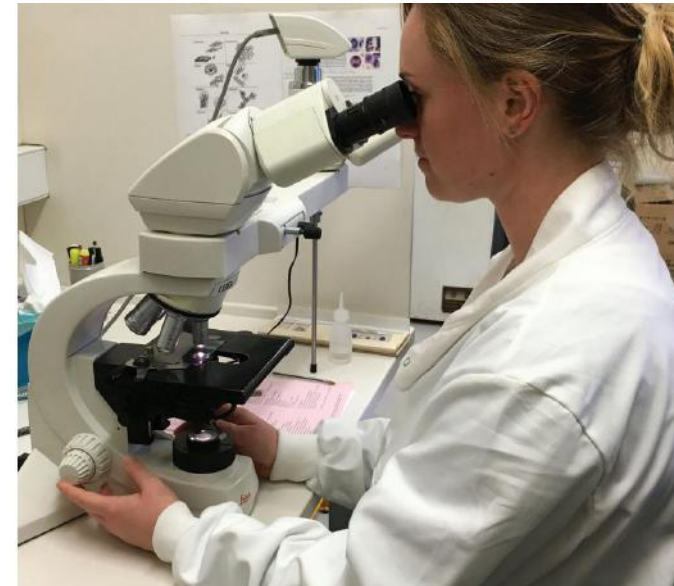
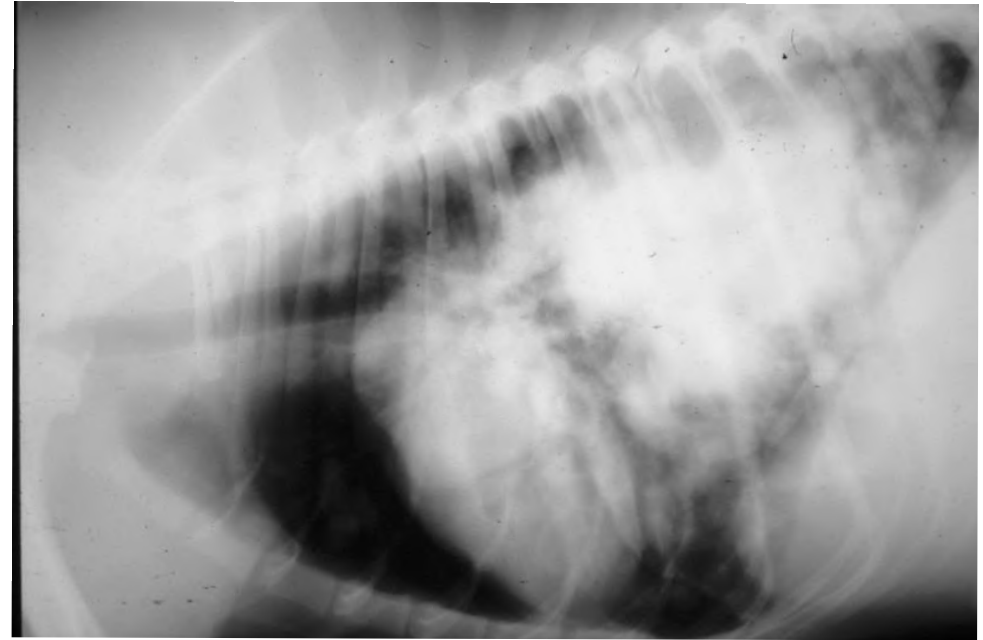


**Abdominocentesis**

**Thoracocentesis**



# Content



- Pathomechanisms
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# SAMPLE ANALYSIS

- Plain tube/Heparin/Fluoride Oxalate
  - Physiological characteristics
  - Biochemical analysis
- EDTA tube
  - PCV
  - Cell count
  - Smear for cytology
- Sterile plain tube
  - *Culture*

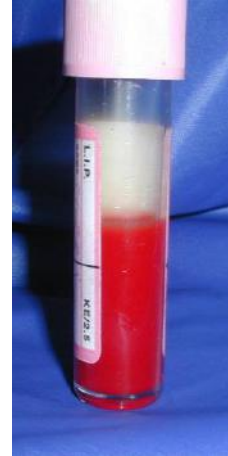




# Plain tube - Physiological characteristics

- Colour

- Dark Red?
  - Haemothorax
  - Haemoperitoneum
- Milky?
  - Chylous (lymph, decreased drainage)



Fibrinous material

- Odour

- Urine?
- “Foul”? (bacteria present)

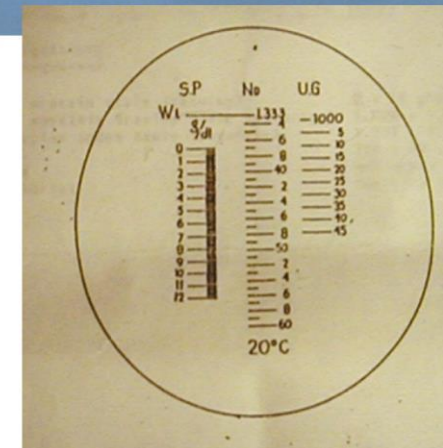


# Biochemical analysis of effusion (E) sample (compared with blood (b) result)

- Total proteins (TP)
- Albumin (ALB)
- Globulins (=TP- ALB)
- ALB:Globulins ratio (A:G)
  
- Triglycerides (E>b), Cholesterol (E<b)
  - Chylous effusion
- Bilirubin (E>b)
  - Bile peritonitis
- Creatinine (E>b)
  - Uroabdomen
- Glucose (E<b)
  - Septic peritonitis



In-clinic biochemistry analysers



**Samples can also be submitted to an external Veterinary Diagnostic Laboratory**

## Use of the Vetest 8008 and refractometry for determination of total protein, albumin, and globulin concentrations in feline effusions.

Papasouliotis K<sup>1</sup>, Murphy K, Dodkin S, Torrance AG.

## Biochemical assessment of canine body cavity effusions using three bench-top analysers.

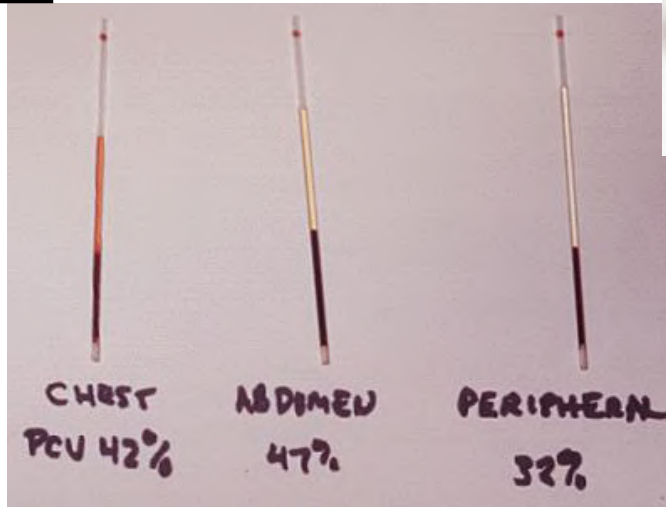
Hetzel N<sup>1</sup>, Papasouliotis K, Dodkin S, Murphy K.

|       | Refractometer | Vetest | Catalyst | VetScan | Spotchem |
|-------|---------------|--------|----------|---------|----------|
| TP    | v*            | v*     | ?        | v*      | x        |
| ALB   |               | v*     | ?        | x       | x        |
| GLOB  |               | v*     | ?        | x       | x        |
| CREAT |               | v*     | ?        | v*      | x        |
| CHOL  |               | x      | ?        | n/a     | x        |
| TRIGS |               | x      | ?        | n/a     | x        |
| TBIL  |               | ?      | ?        | ?       | ?        |
| GLUC  |               | v*     | ?        | ?       | ?        |

No studies for the Catalyst but should be the same as Vetest (use the same slides)

\*=Different results to those from external DL – clinically significant

# EDTA tube - PCV & Cell counts



**Samples can be submitted to an external Veterinary Diagnostic Laboratory for cell counts using a Haematology analyser**



## Approach of Cavitory Effusion Classification and Comparison between Manual and Automatic Methods for Total Nucleated Cell Count

Nilson Júnior da Silva Nunes, Naila Cristina Blatt Duda, Juliana Pereira Matheus,  
Ana Paula Soares Borenstein, Bruno Albuquerque de Almeida, Angelica Menin & Stella de Faria Valle

Vet Clin Pathol. 2015 Dec;44(4):570-9. doi: 10.1111/vcp.12298. Epub 2015 Oct 26.

**Total nucleated cell and leukocyte differential counts in canine pleural and peritoneal fluid and equine synovial fluid samples: comparison of automated and manual methods.**

Brudvig JM<sup>1</sup>, Swenson CL<sup>1</sup>.

VetScan HMT5

**ProCyte & VetScan HMT5 in-clinic haematology analysers can be used for nucleated cell counts in effusions**

# EDTA tube - Sample/Smear preparation (Cytology)

- **Samples**

- **Low cellularity fluid** (appear clear, colourless, watery)
  - **Centrifuge** [200g-350g, (1000 -1500 rpm) x 5 mins]  
Re-suspend cell pellet in 0.5 ml of supernatant
  - Transfer one drop to a glass slide
- **High cellularity fluids** (appear turbid, have a colour)
  - Transfer one drop to a glass slide

- **Prepare smears**

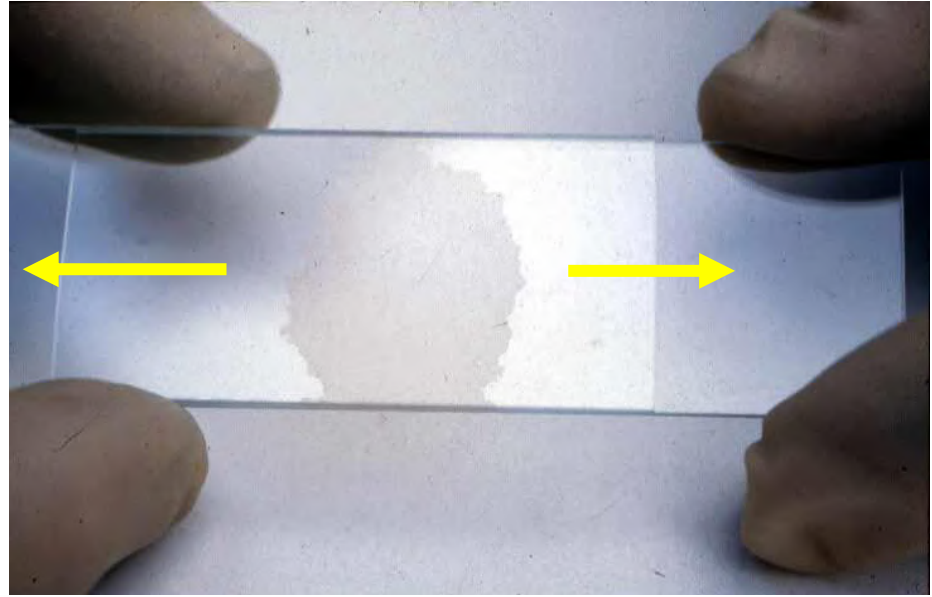
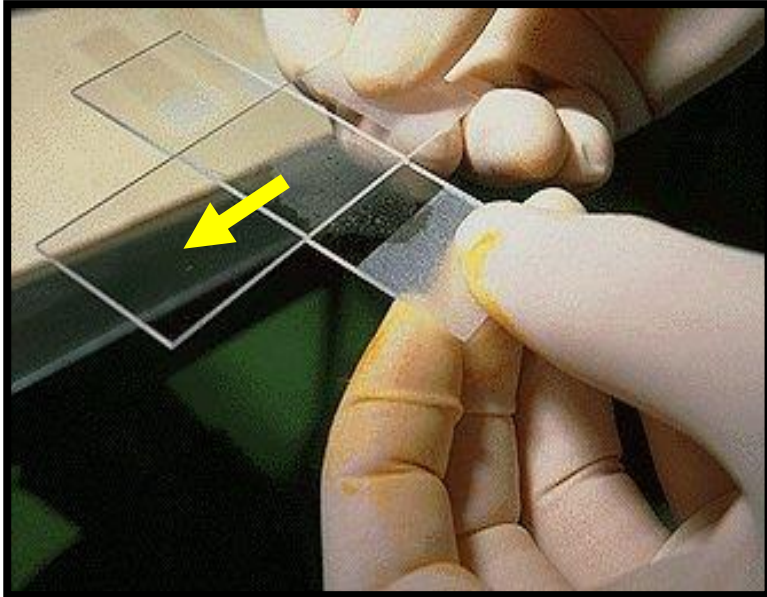
- keep formalin pots away

- **Stain**

- Diff-Quik, Gram



# Effusions- Smear preparation



**Produce 2 smears for examination**

## **Effect of storage time on automated cell count and cytological interpretation of body cavity effusions.**

[Maher I<sup>1</sup>](#), [Tennant KV](#), [Papasouliotis K](#).

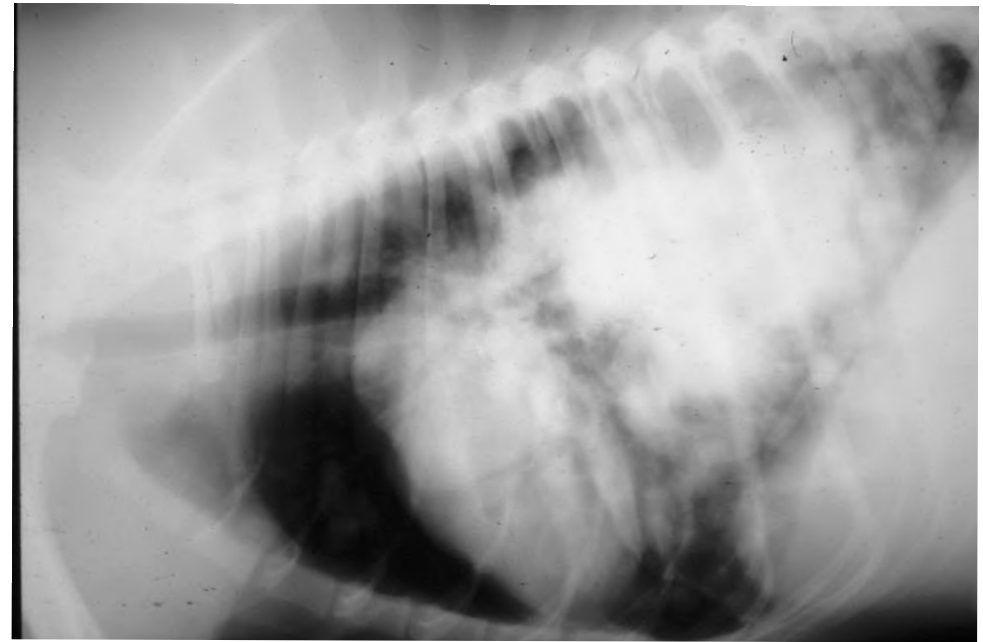
### **24 hours post collection:**

1. TNCC decreases
2. Neoplastic cells may not be recognised
3. Intracellular bacteria may be missed

Cell count within 24 hours post collection.

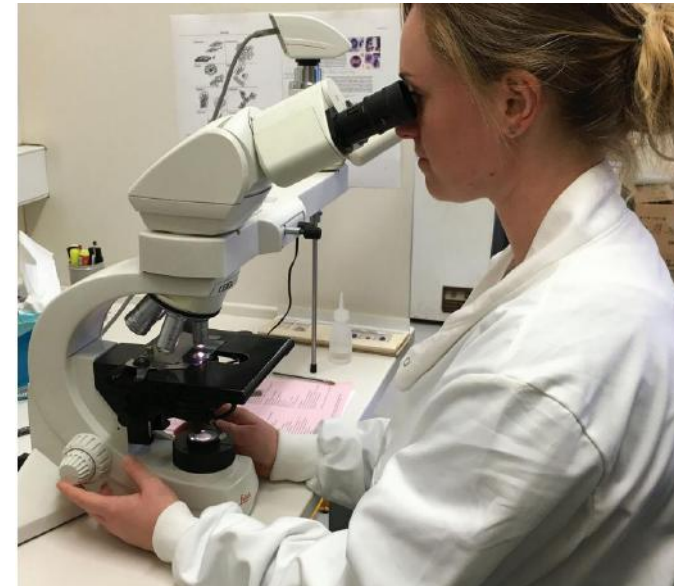
Important to prepare direct smear as soon as possible after collection.





# Content

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- **Diseases – Cytology**
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# Classification of effusions (Guidelines)

## Effusion

Transudate

Mod. Transudate

Exudates

Chylous

Haemorrhagic

TP <25 g/l

TP 25-50 g/l

TP 25-70 g/l

TP >25 g/l  
(E)Trigs > (b)Trigs  
(E)Chol < (b)Chol

TP 40-80 g/l

Cell count <1 x10<sup>9</sup>/L

Cell count <5 x10<sup>9</sup>/L

Cell count >10 x10<sup>9</sup>/L

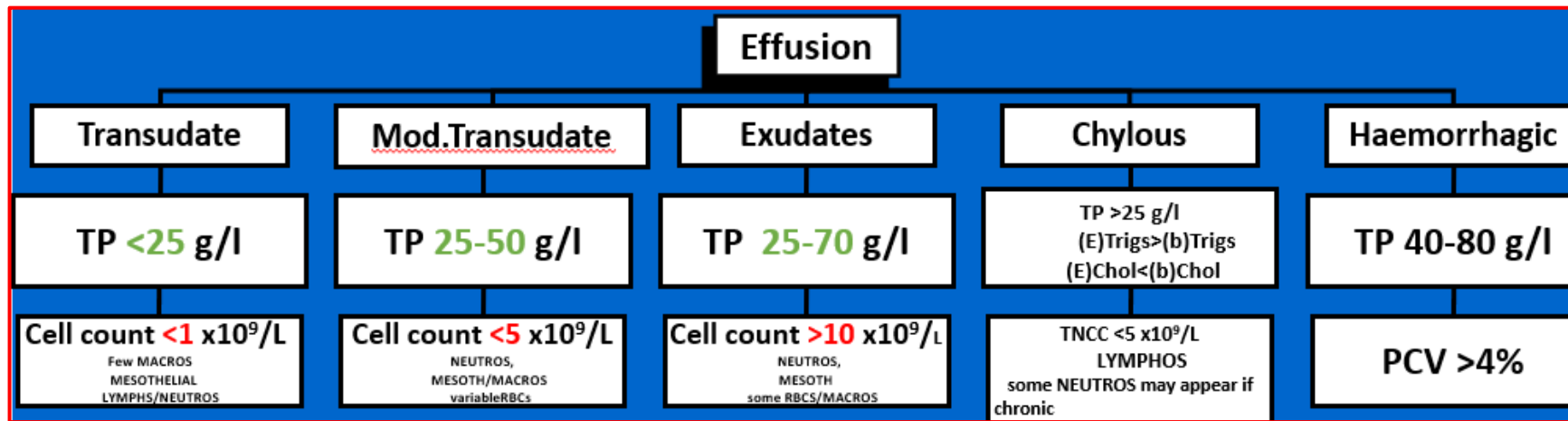
TNCC <5 x10<sup>9</sup>/L  
LYMPHOS  
some NEUTROS may appear if  
chronic

PCV >4%

Few MACROS  
MESOTHELIAL  
LYMPHS/NEUTROS

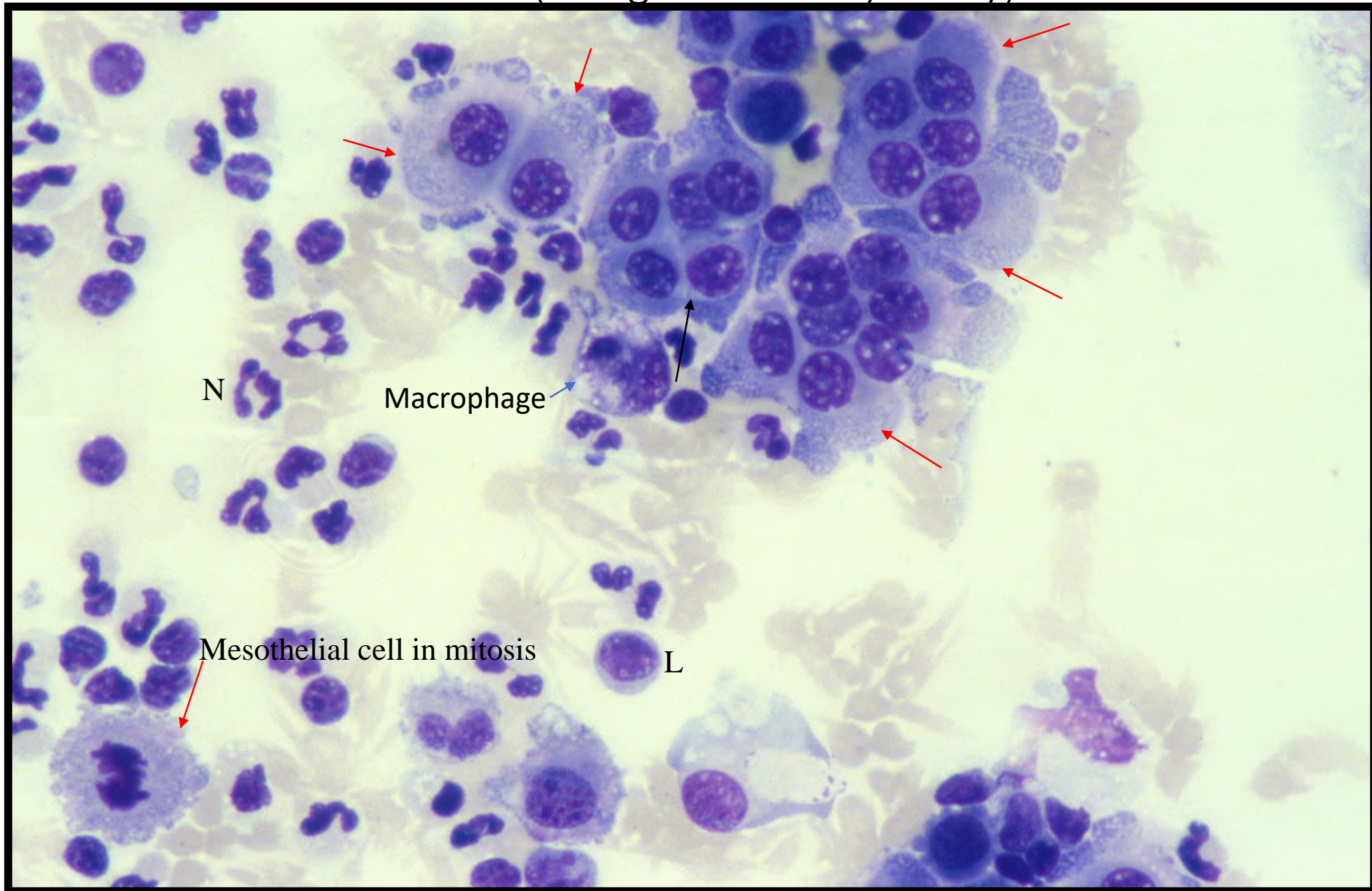
NEUTROS,  
MESOTH/MACROS  
variable RBCs

NEUTROS,  
MESOTH,  
some RBCS/MACROS

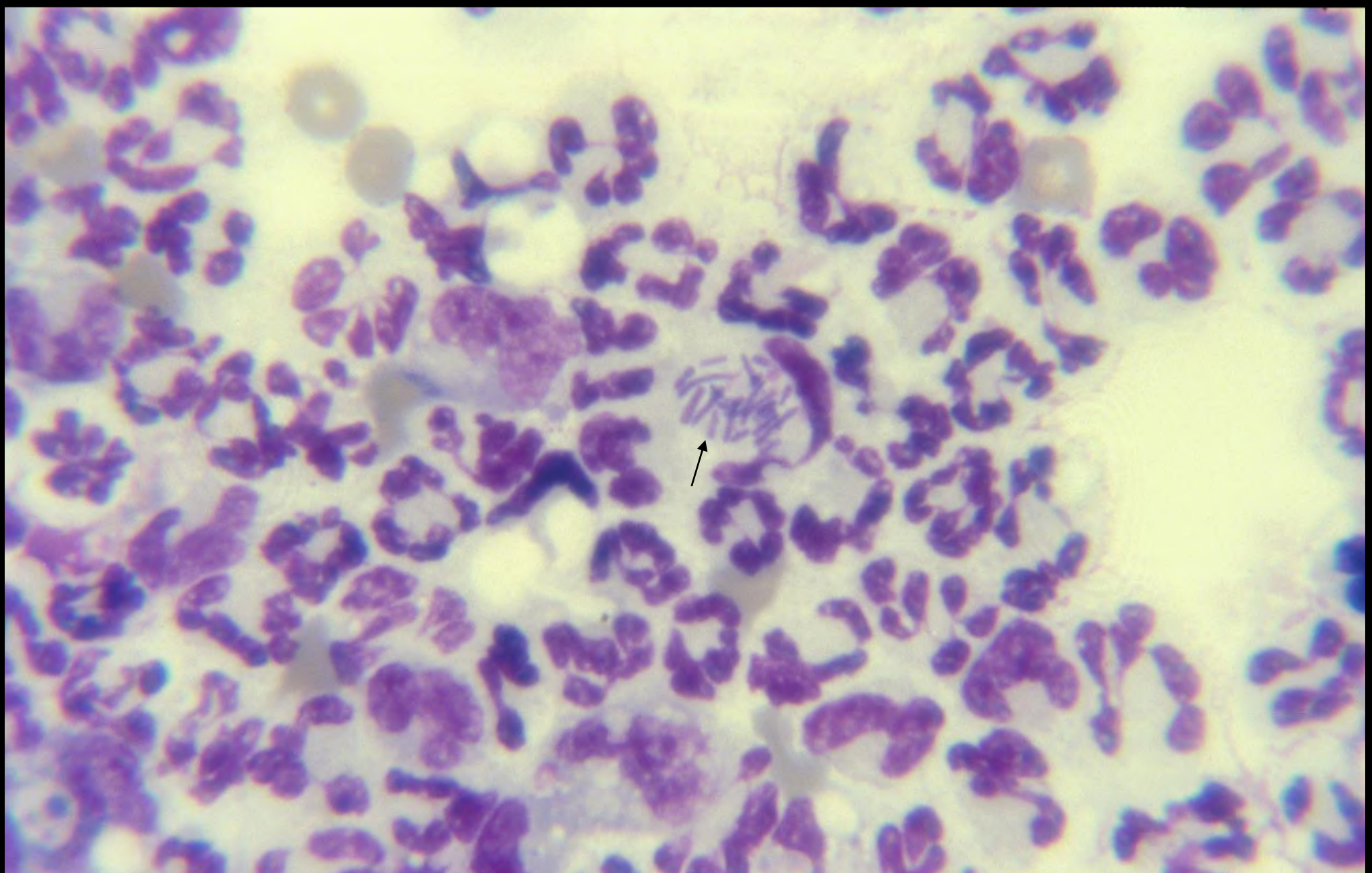


| Transudate                 | Mod. Transudate      | Exudate      | Chylous              | Haemorrhagic         |
|----------------------------|----------------------|--------------|----------------------|----------------------|
| Liver dz                   | Liver dz             | Inflammation | Idiopathic           | Organ/vessel Rupture |
| Protein losing ENTEROPATHY | Heart dz             | Infection    | Heart dz             | Coagulopathy         |
| Protein losing NEPHROPATHY | Neoplasia            | Neoplasia    | Neoplasia            | Neoplasia            |
|                            | Diaphragmatic hernia |              | Lymphangiectasia     |                      |
|                            |                      |              | Diaphragmatic hernia |                      |
|                            |                      |              | Lung lobe torsion    |                      |
|                            |                      |              | Trauma - Infection   |                      |

# Mesothelial cells (lining of the body cavity)



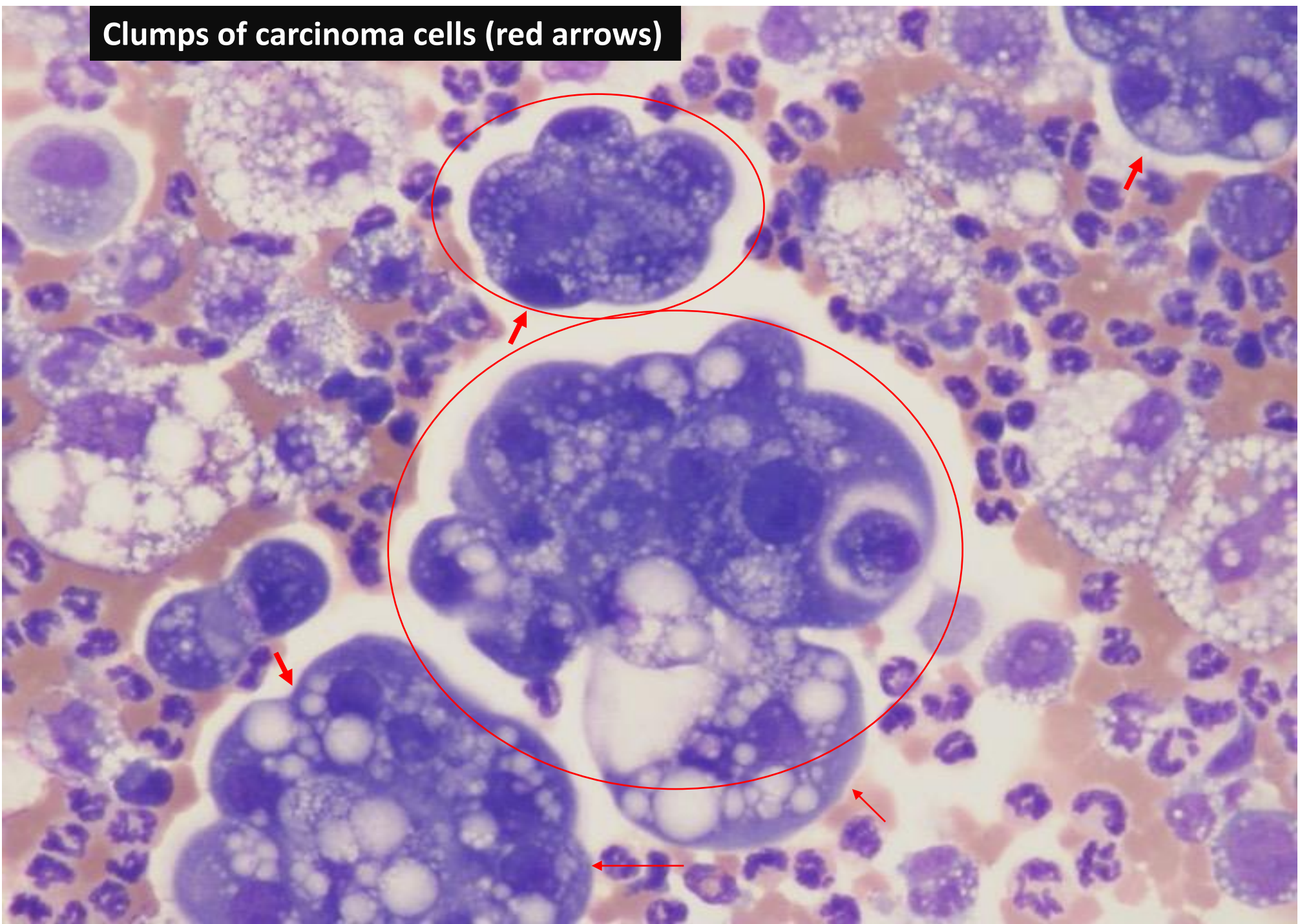


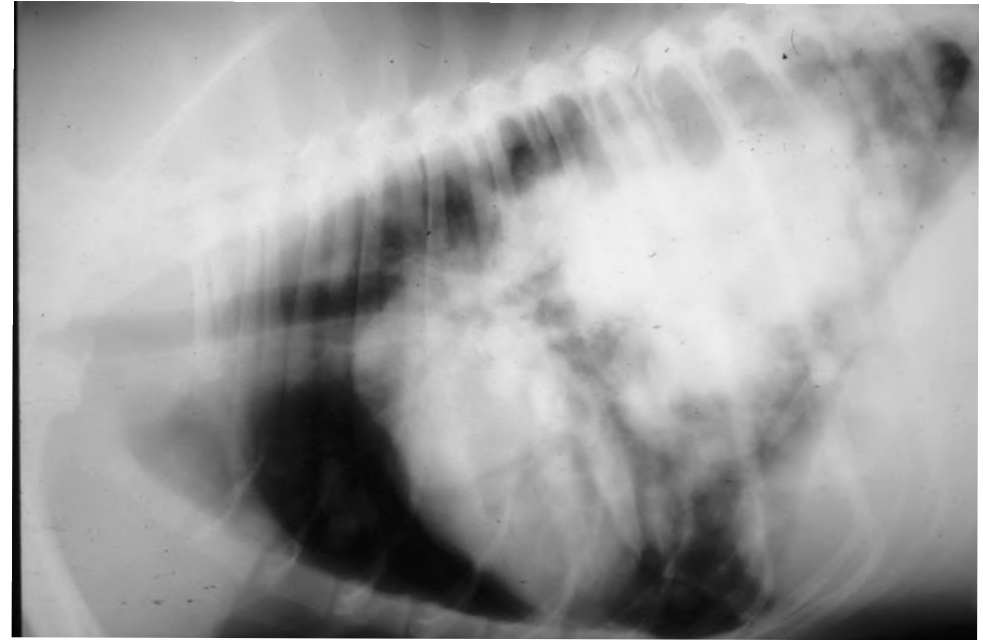


Numerous neutrophils and intracellular bacteria (septic peritonitis)



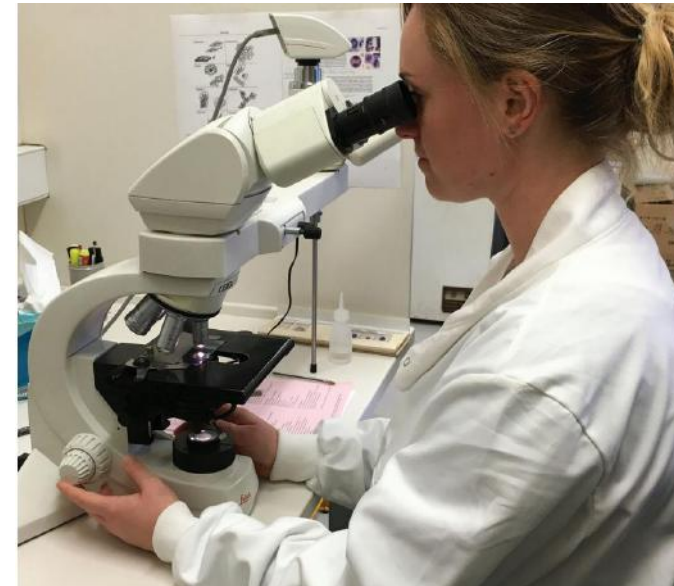
Clumps of carcinoma cells (red arrows)





# Content

- Pathomechanisms
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- **Summary - Quiz**



# Summary

- Always analyse a sample from the effusion.
- Determine the pathomechanism – Use the figures, do not let figures use you.
- Always perform cytology, if you have enough sample.
- Always use the Albumin to Globulins ratio (A:G) in feline cases.
- The physiological characteristics may help you prioritise lab tests (small volume samples).
- **Interpret the effusion results in conjunction with haematology, serum biochemistry results and imaging findings.**



Tusen takk!

Har du noen spørsmål?

Seksjonen er sponset av

Fredag 15. mars

Program for Smådyr