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TRIOLAB

MSD Animal Health

Fredag 15. mars

Program for Smådyr

Cytology of skin lumps and bumps – identifying malignant cells

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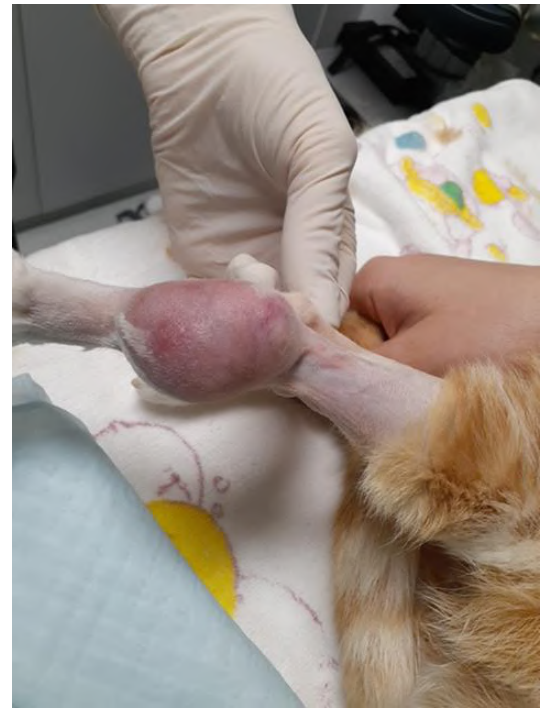
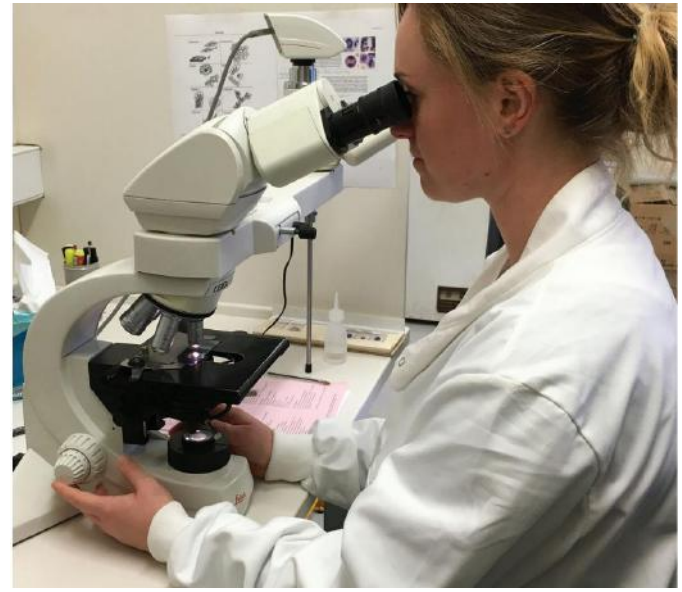


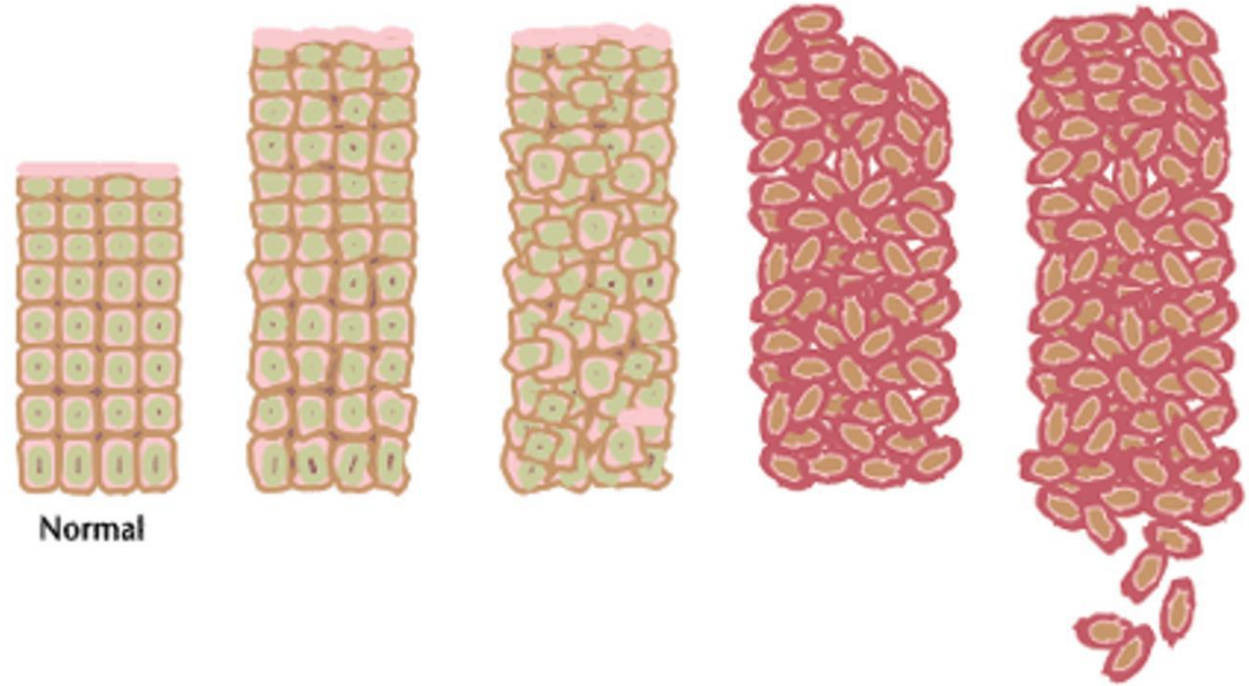
Content

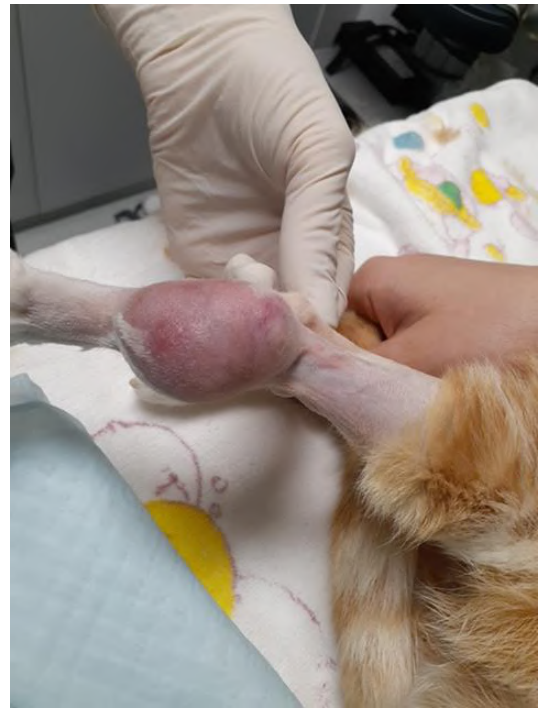
- What is neoplasia?
- Types of neoplasms
- Benign or Malignant?



What is neoplasia?

- Is:
  - The unregulated autonomous clonal proliferation of one or more cells.
  - The cells occur in increased numbers.
  - May not be expected in the position in which they are found.





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- **Types of neoplasms**
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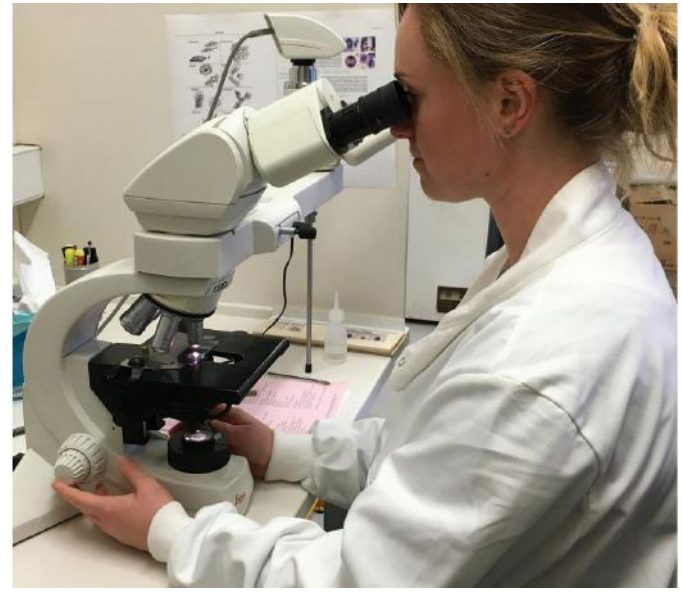
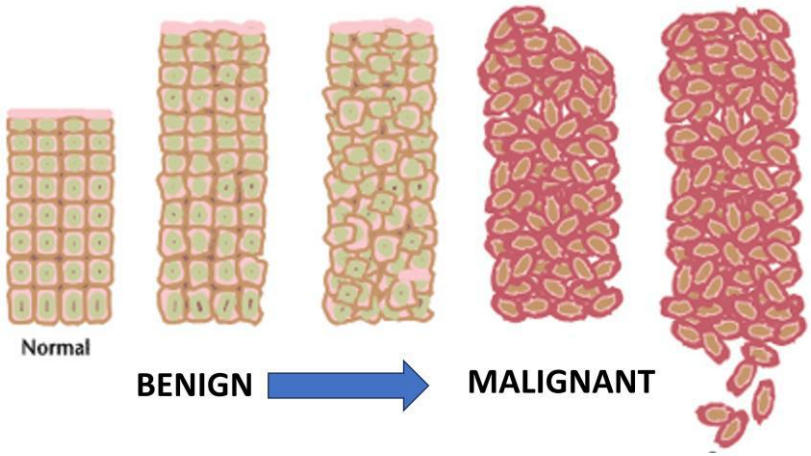


A neoplasia can be benign or malignant.



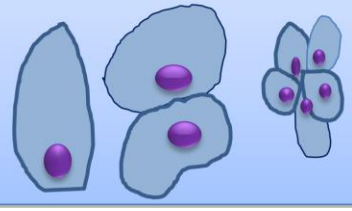
Epithelial tumours

Celularity: moderate to high

Cell organization: clusters, clumps or sheets

Cell morfology: round/oval /polygonal

Cell borders: distinct



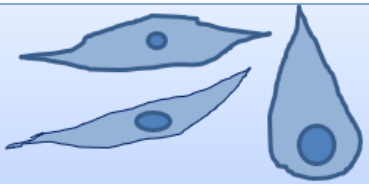
Mesenchymal tumours

Celularity: usually low

Cell organization: single cells or clusters

Cell morfology: elongated/oval/spindle shaped

Cell borders: indistinct/ hazy



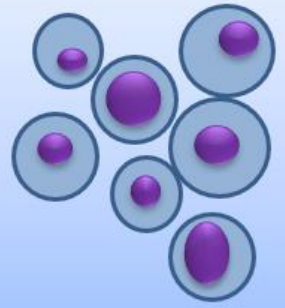
Discrete cell tumours

Celularity: usually high

Cell organization: single cells

Cell morfology: round to oval

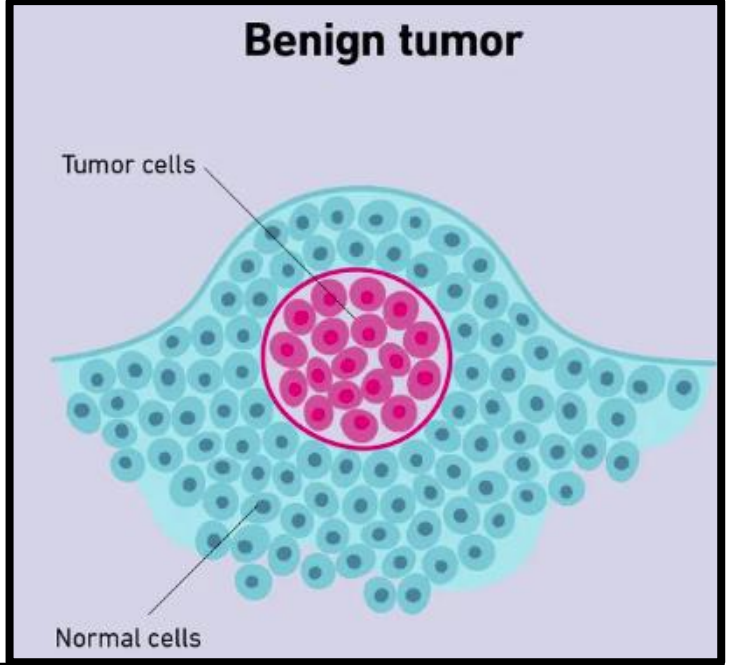
Cell borders: well defined

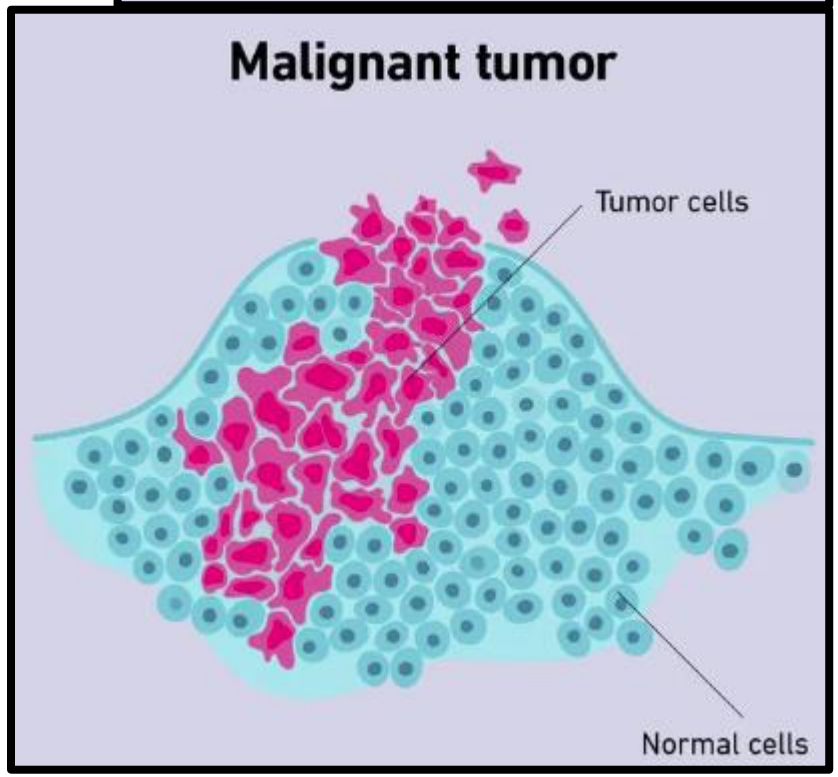


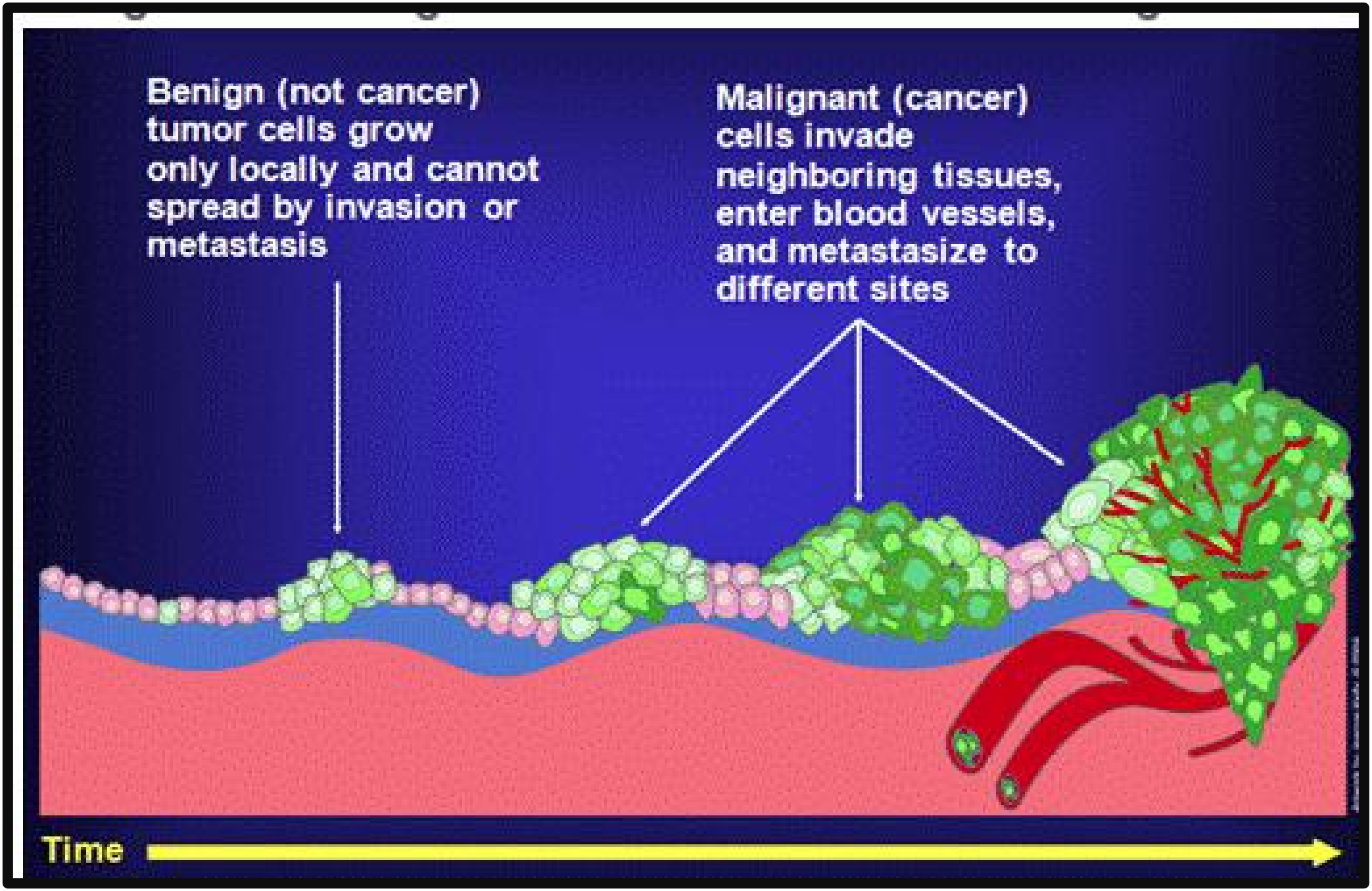
Benign vs Malignant

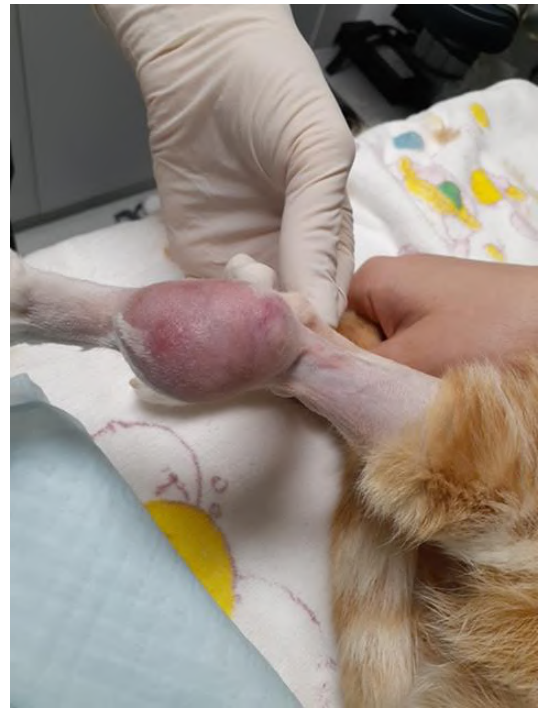
- **Benign neoplastic cells:**
  - Self-limited growth, do not invade or metastasize.

- **Malignant**: the cells display 3 main properties
  - **1.** Uncontrolled growth and division beyond the normal limits.
  - **2.** Invasion and destruction of adjacent tissues.
  - **3.** Although not always, metastasis which is the spread of the cells to other locations in the body via lymph or blood.



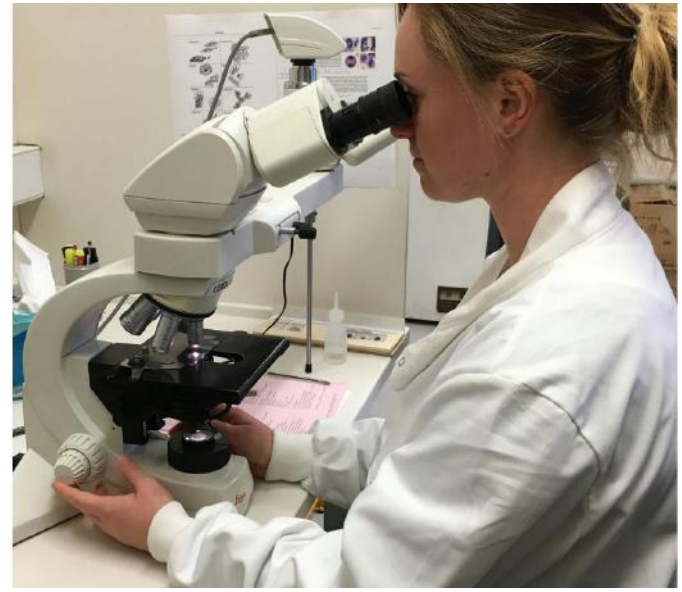



Benign (not cancer) tumor cells grow only locally and cannot spread by invasion or metastasis
Malignant (cancer) cells invade neighboring tissues, enter blood vessels, and metastasize to different sites
Time



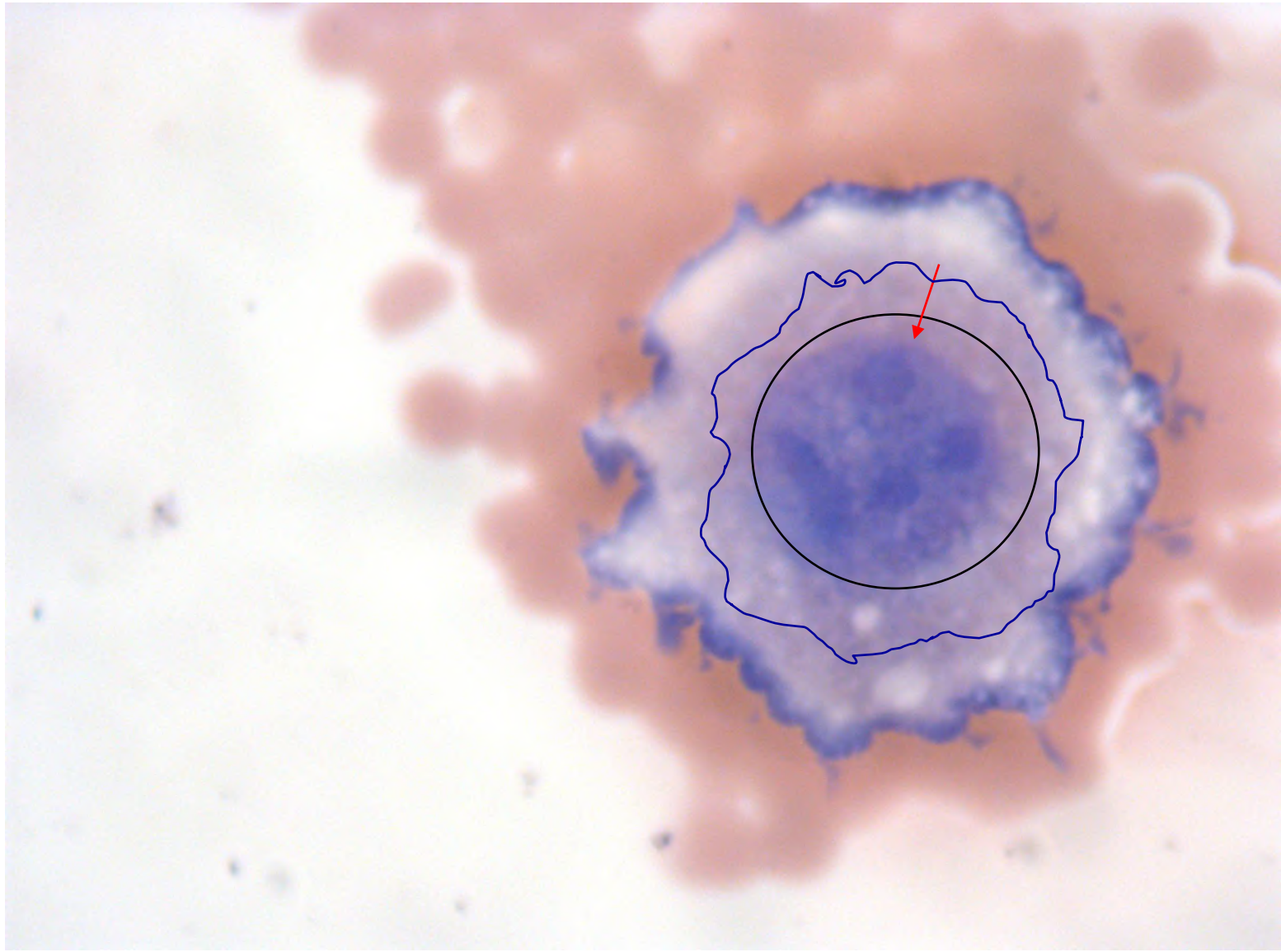
Content

- What is neoplasia?
- Types of neoplasms
- **Benign or Malignant?**
  - **Cytology**



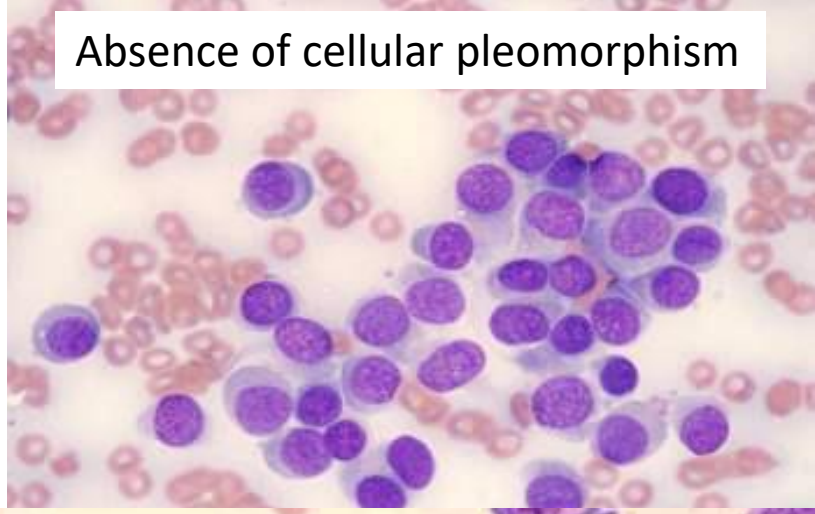
Morphological characteristics of malignancy

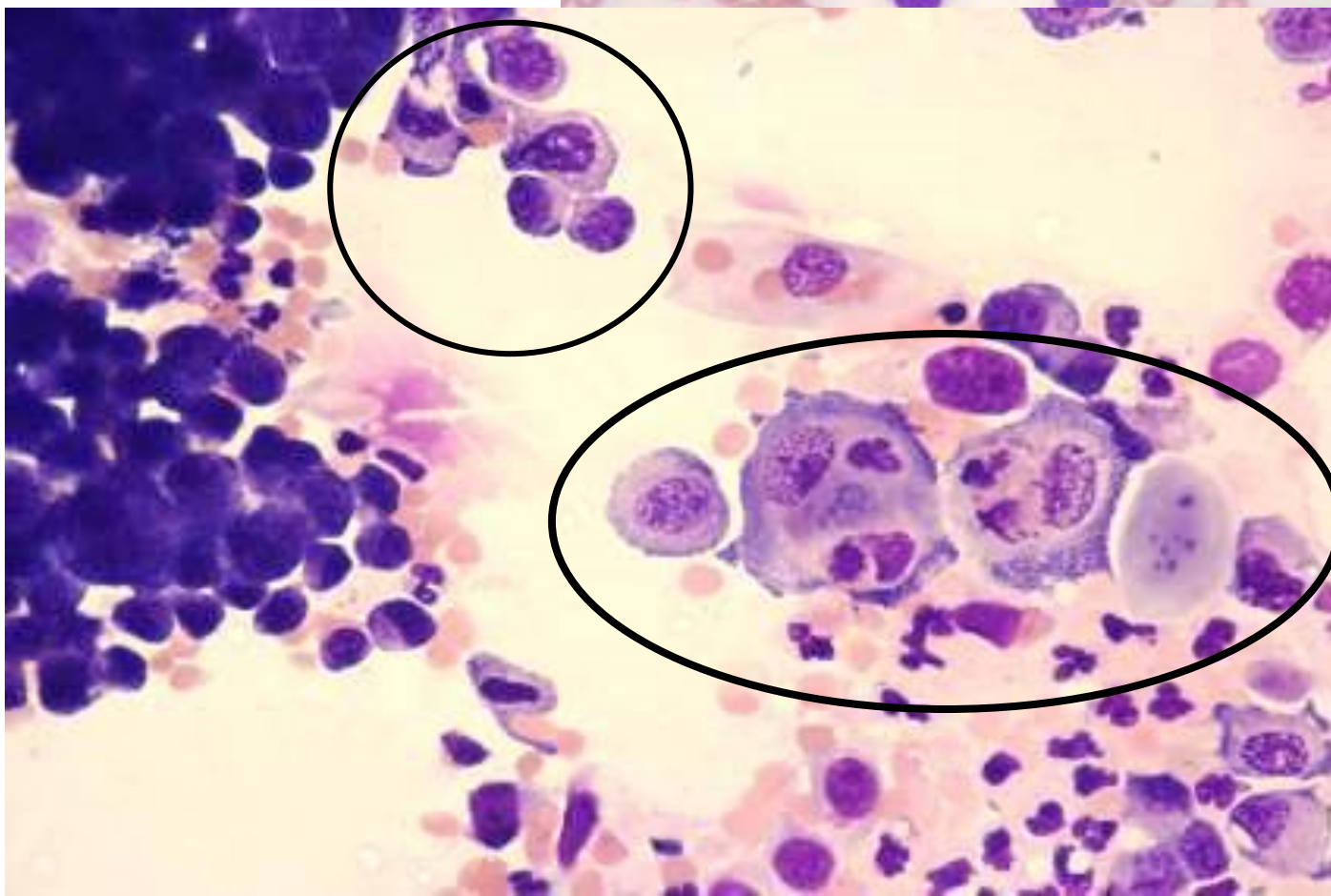
- **Cellular**
- **Nuclear**
- **Nucleolar**
- **Cytoplasmic**



Cellular

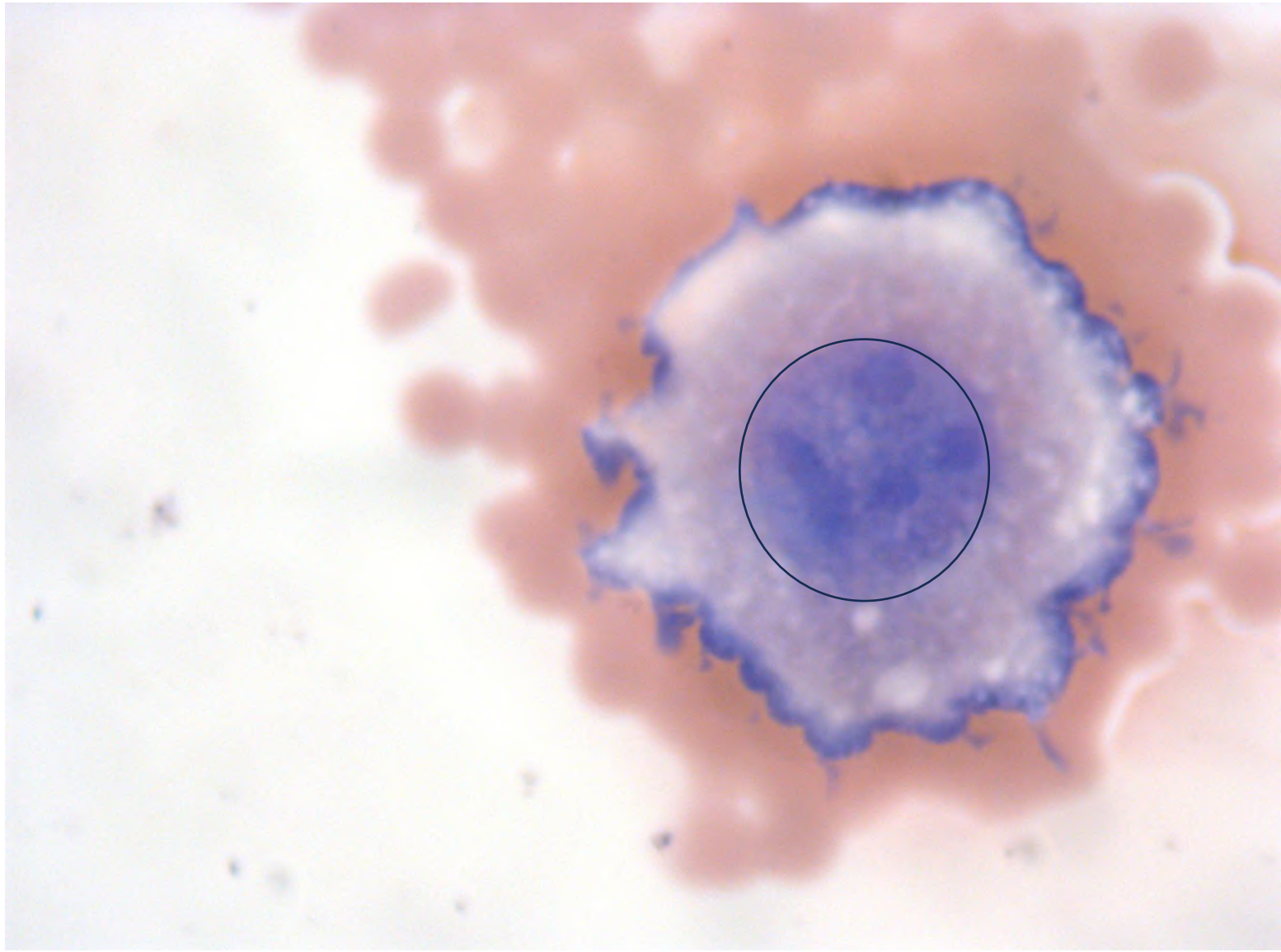
- Increased cellularity
- **Pleomorphism**
  - marked variation in cell size and shape
  - indicates unregulated and asynchronous cell growth





Nuclear

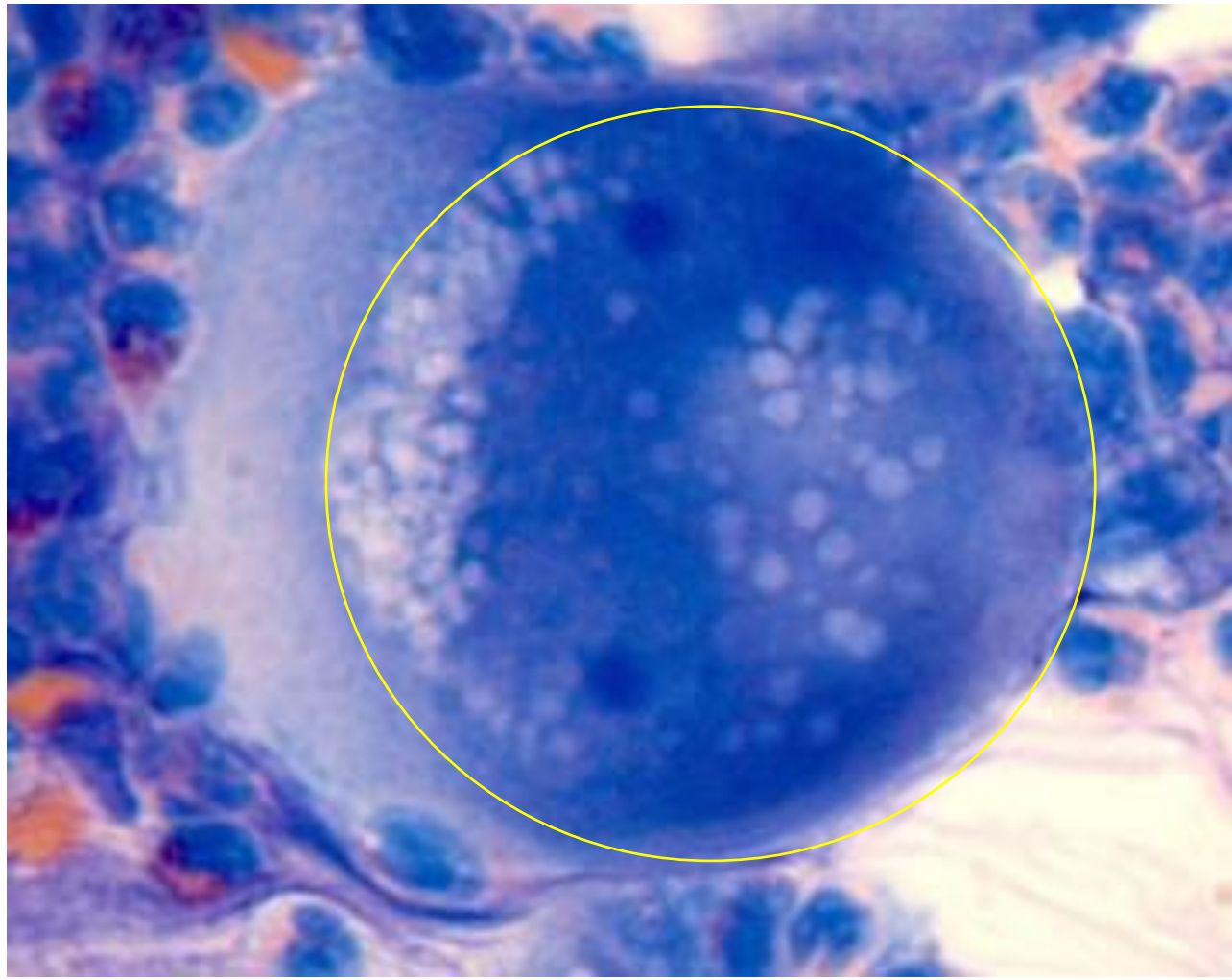
- Nuclear enlargement
- Nuclear pleomorphism
- Multinucleation
- Nuclear anisocytosis
  - especially in multinucleated cells
- Nuclear moulding
- Abnormal mitotic figures



Nuclear enlargement

- Generally, cells with nuclei larger than 2-3 red blood cells in diameter are strongly suspected to be malignant.

- This nuclear enlargement results from lack of nuclear division.



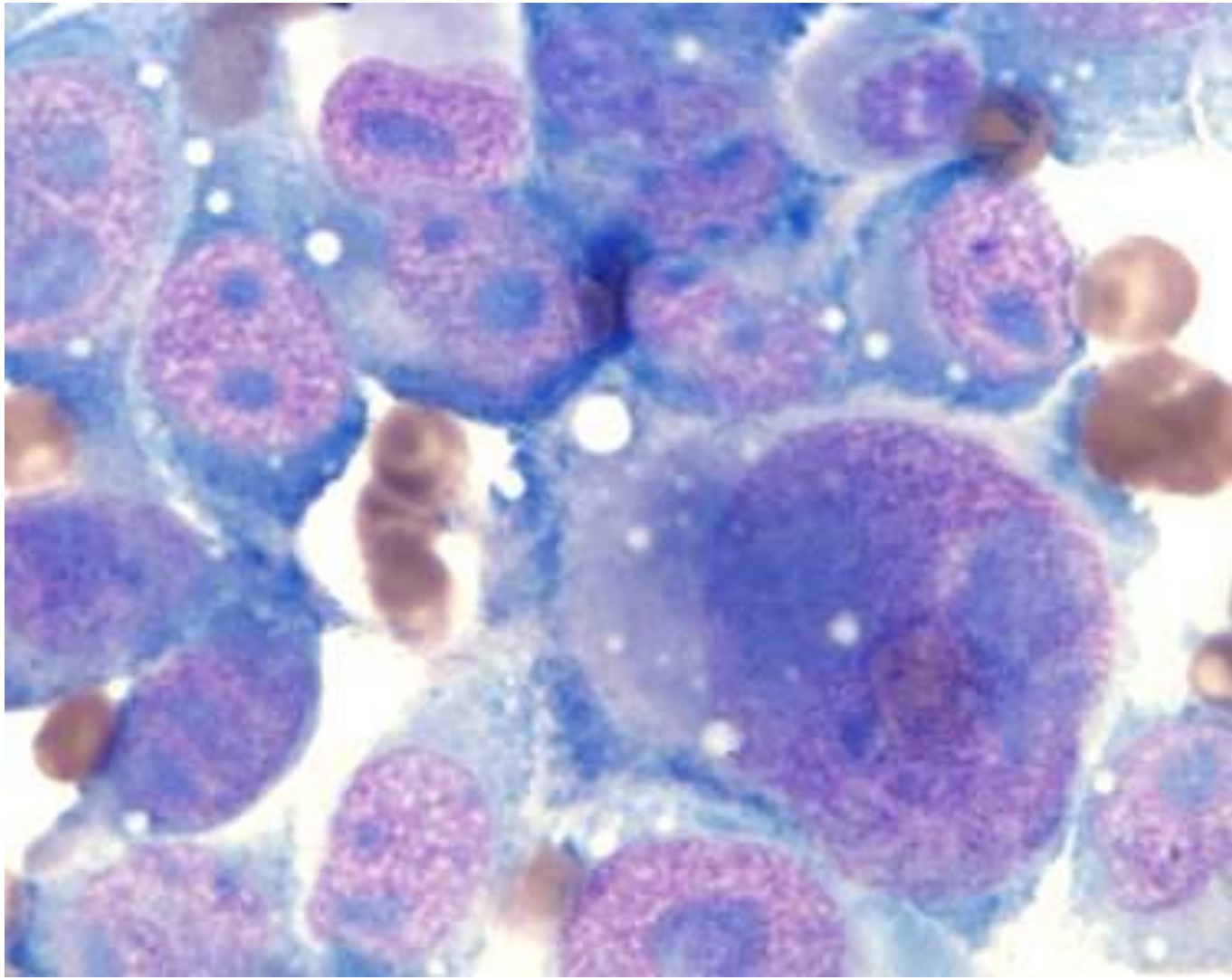
Nuclear Pleomorphism

Cutaneous firm mass between shoulder blades

- Variation in the nuclear size
  - Anisokaryosis
- Variation in the shape of nuclei
  - within the same population of cells.

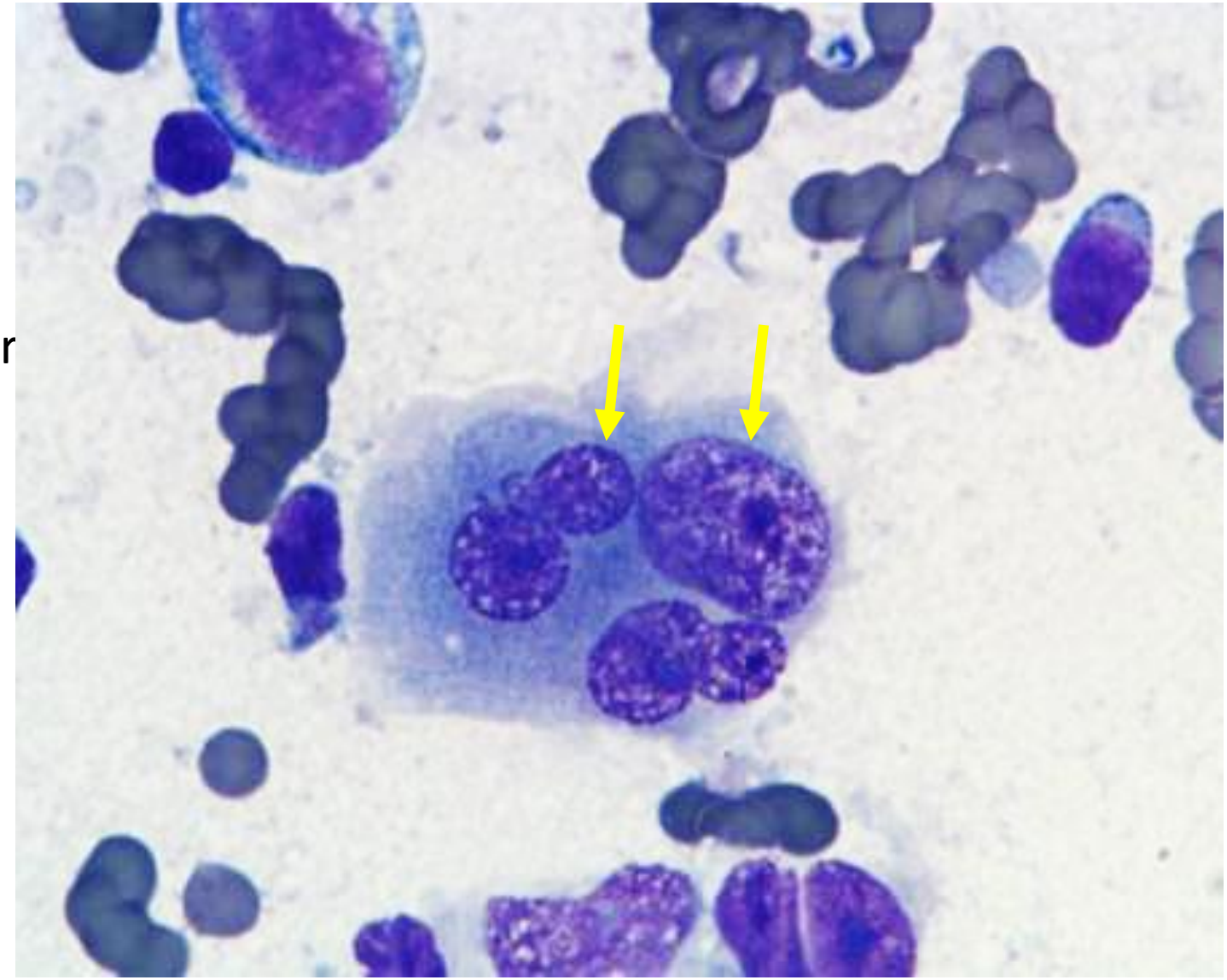
- The enlargement of the nucleus and anisokaryosis result in cells with increased or variable nucleus to cytoplasmic ratio which is another criterion for malignancy.

Nuclear pleomorphism present



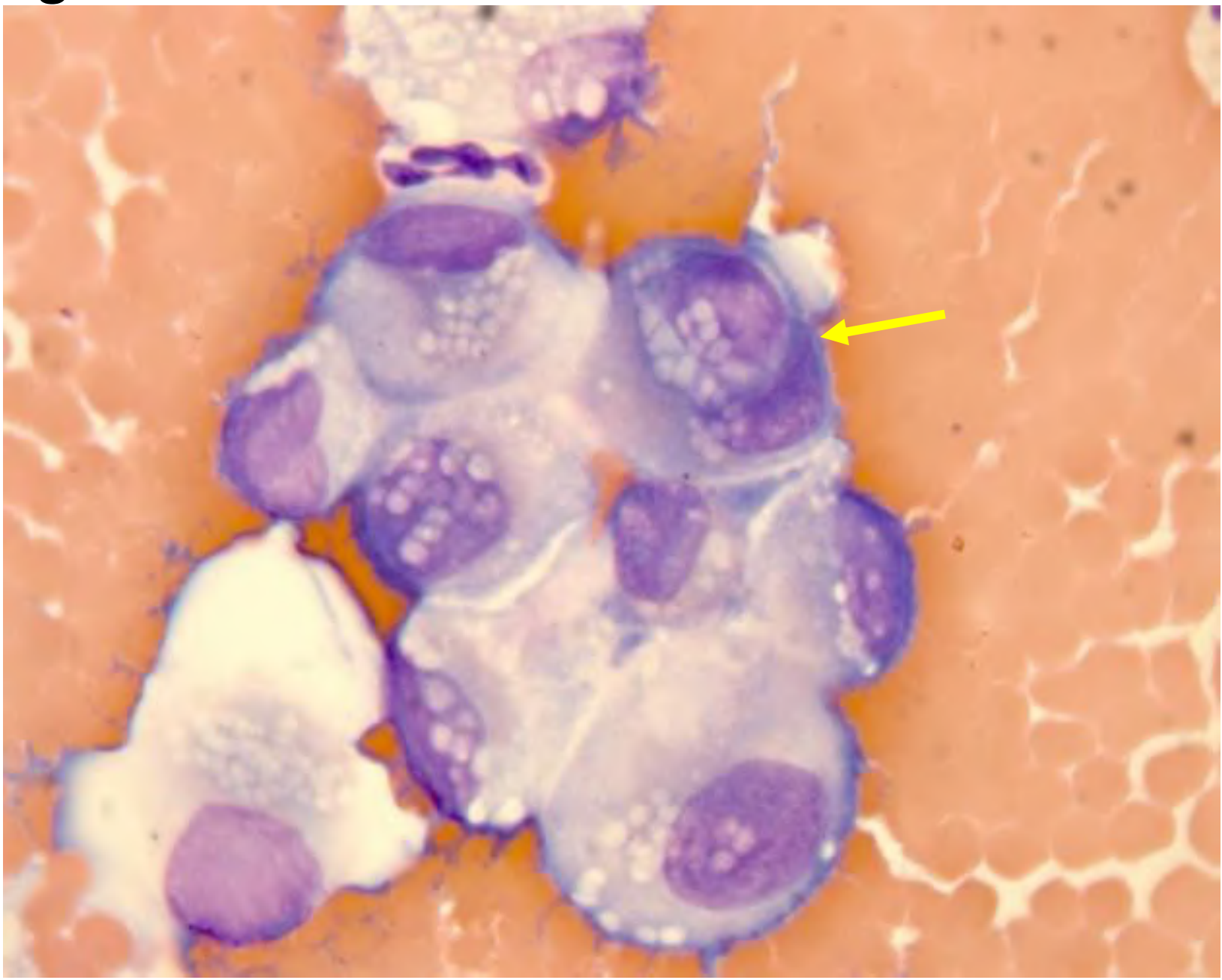
Multinucleation

- Result of abnormal mitosis.
- In general, nuclei of benign multinucleated cells have nuclei of similar size and shape.
- Nuclei of multinucleated malignant cells exhibit marked anisokaryosis.



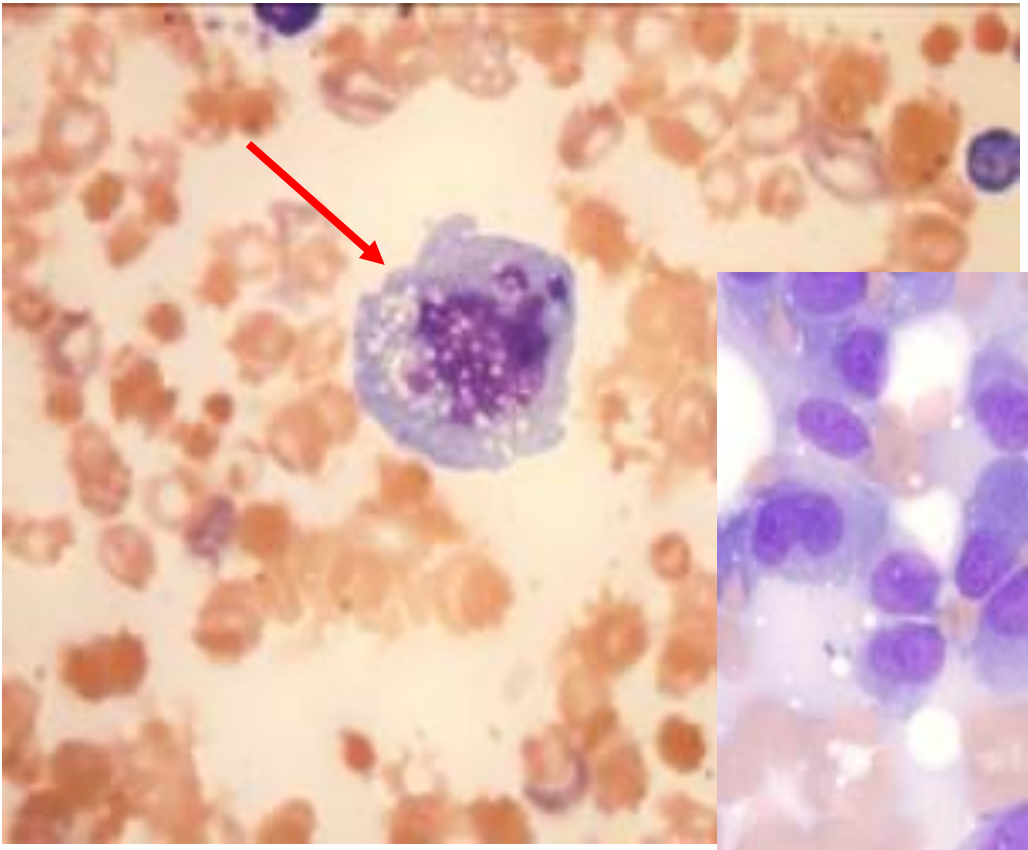
Nuclear moulding

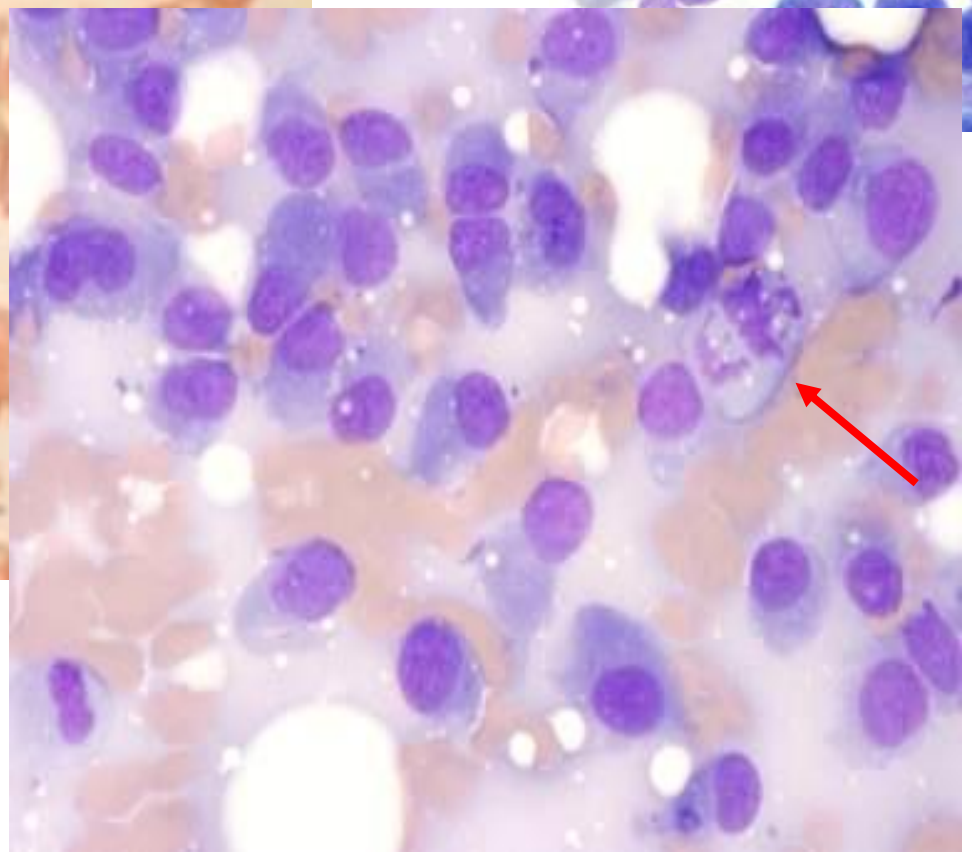
- Nuclear distortion.
- Nucleus is compressed
  - by another adjacent cell
  - or by another nucleus within the same malignant cell.

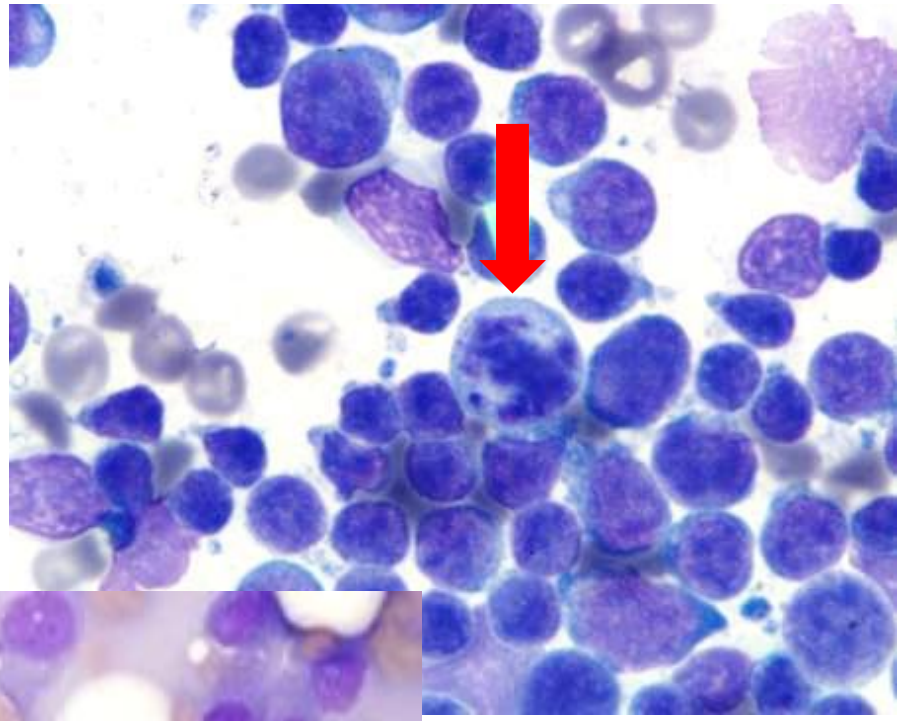


Abnormal mitotic figures

- Nuclei are divided unevenly and in numerous directions.

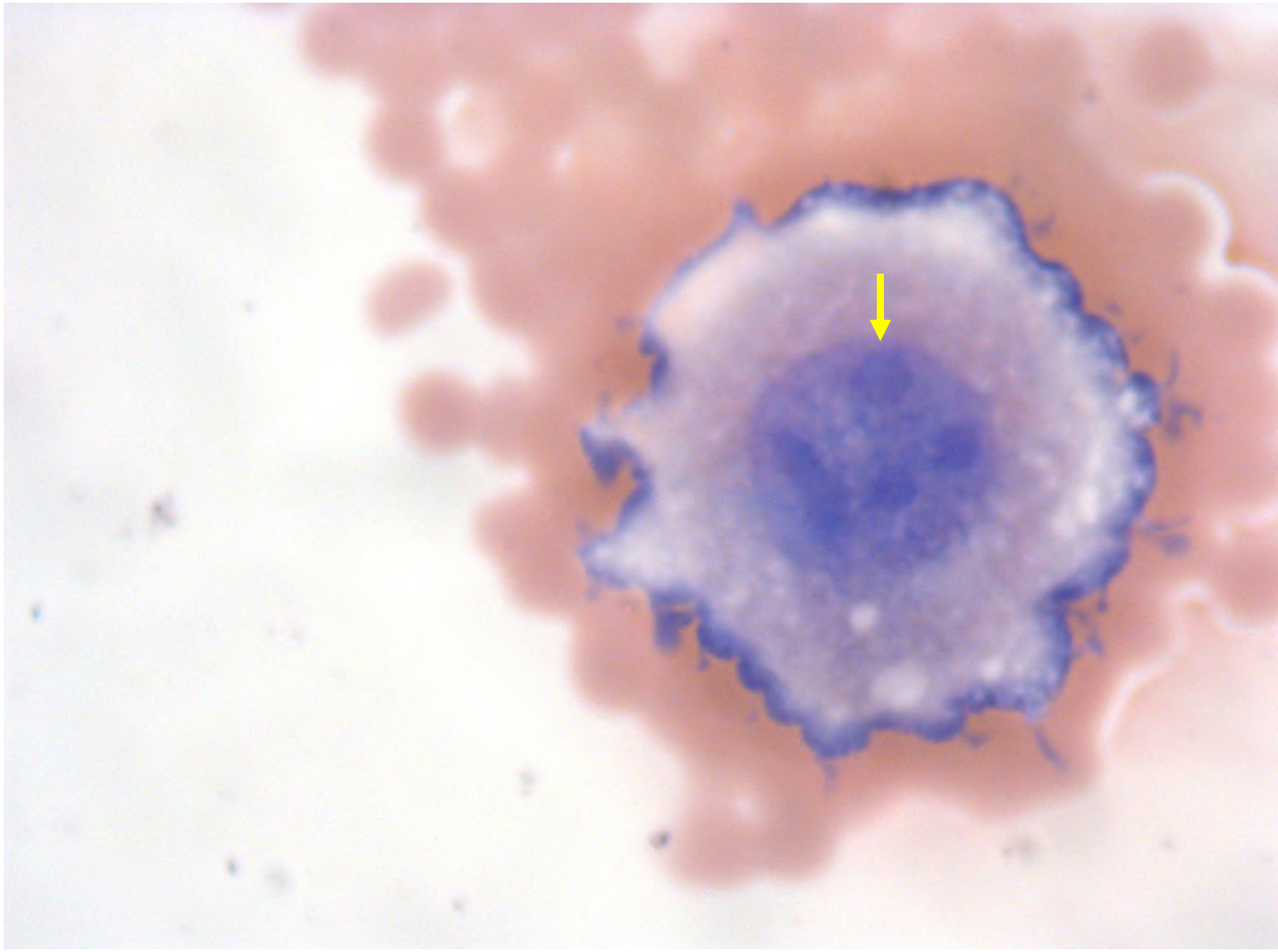


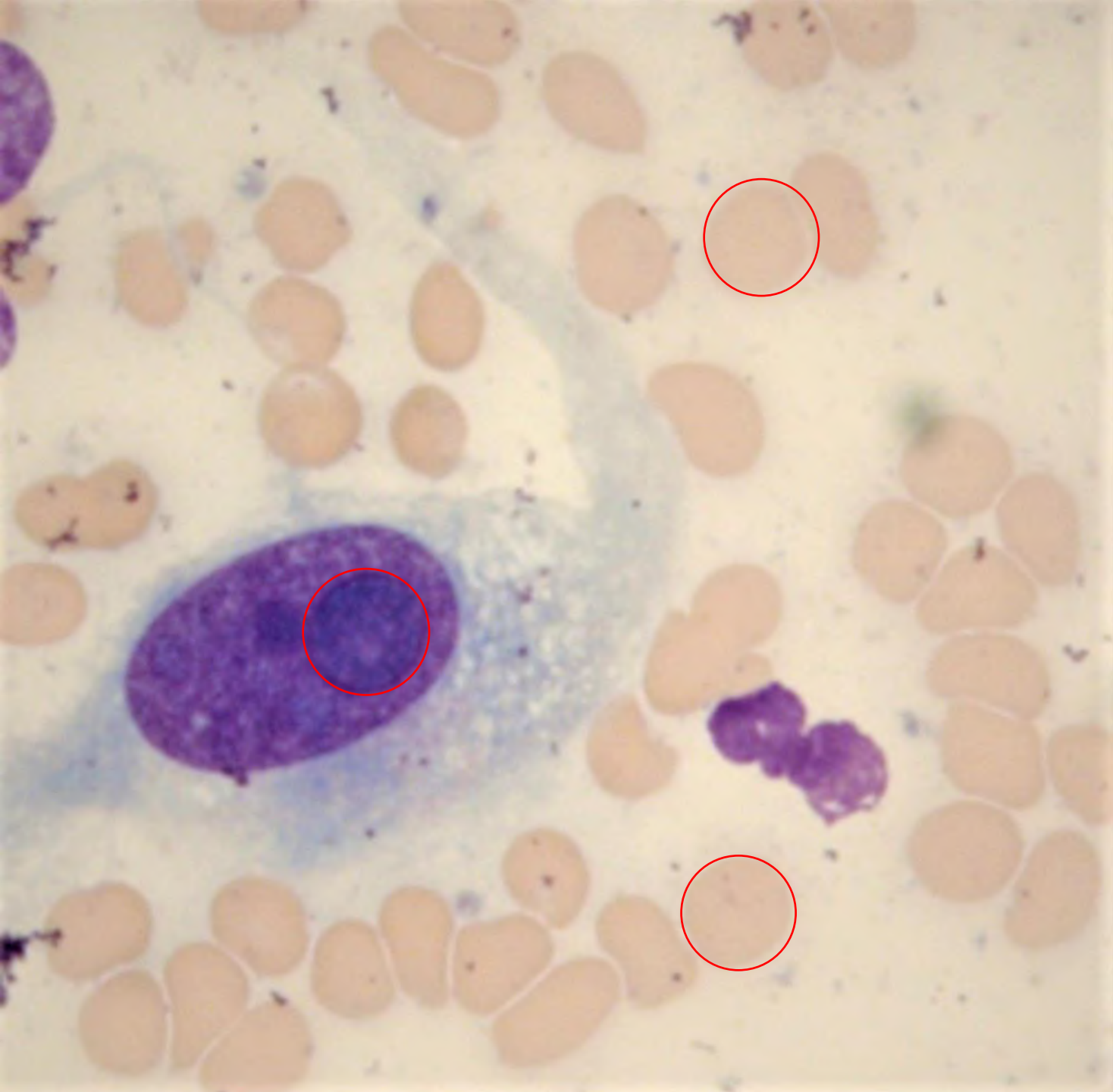




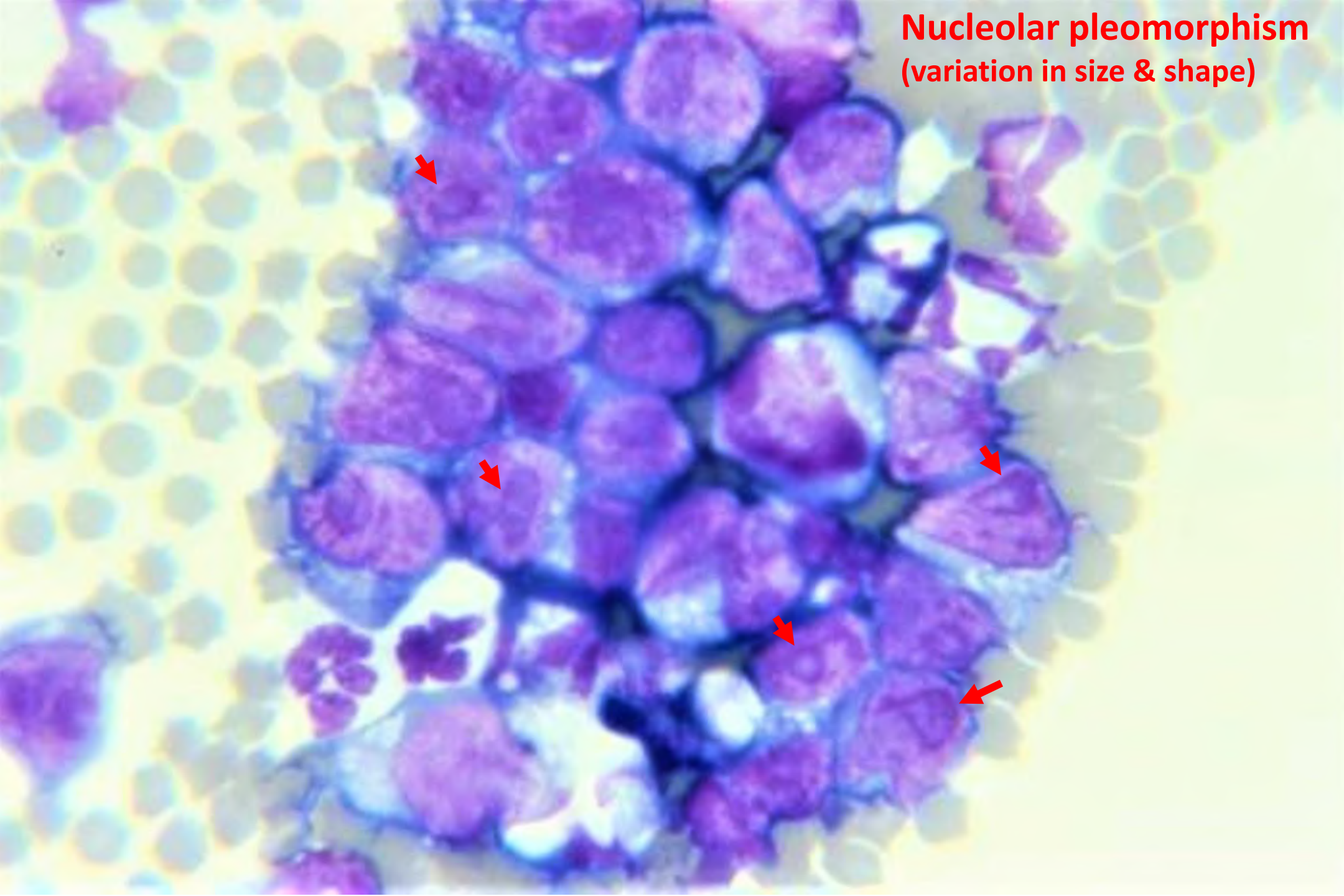
Nucleolar

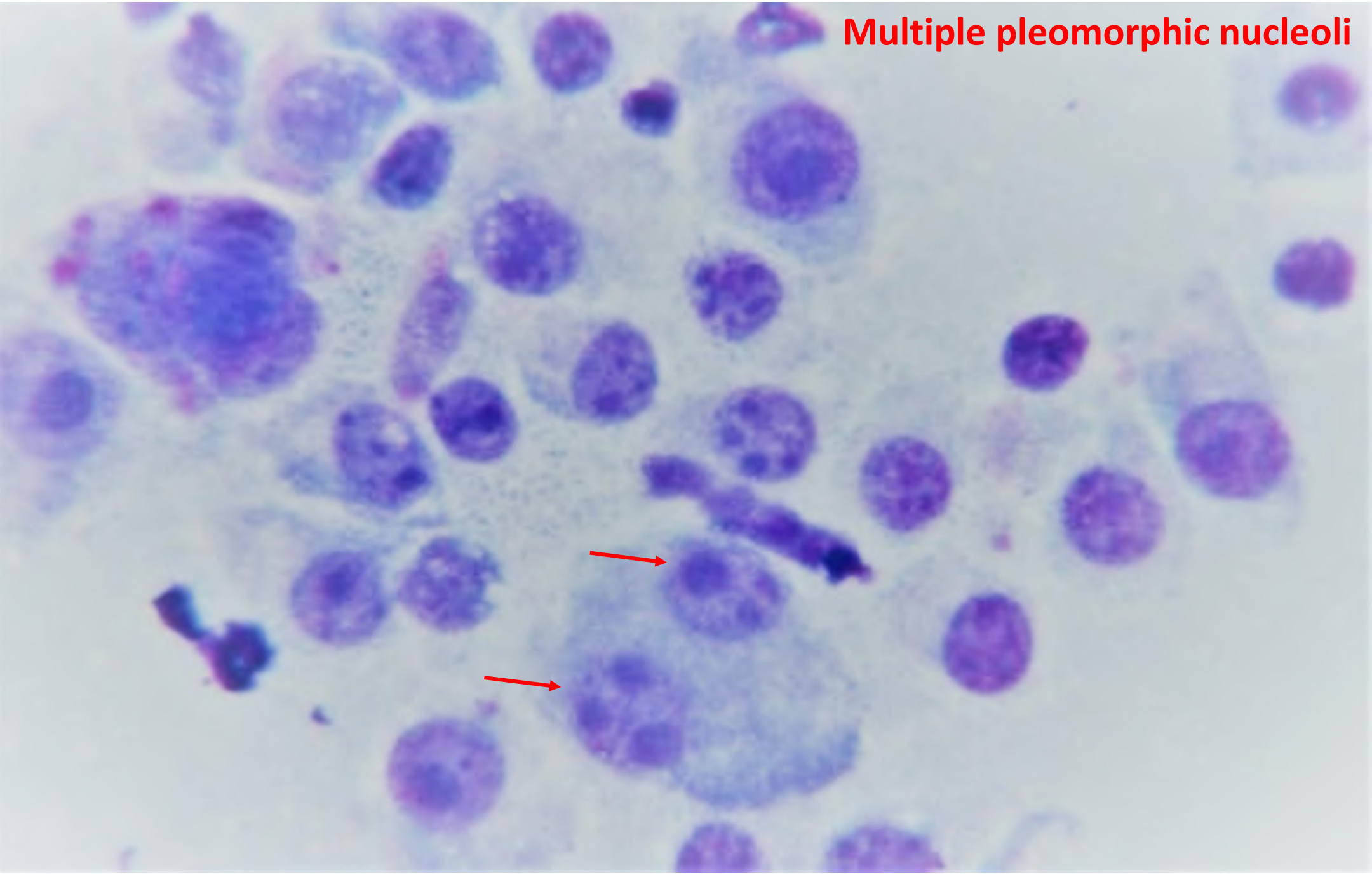
- Large nucleoli
- Pleomorphic nucleoli
  - variation in the number, size and/or shape
- Presence of **multiple nucleoli in the same nucleus** which vary in size and/or shape





Large nucleolus.
Especially when is similar in size to an erythrocyte.

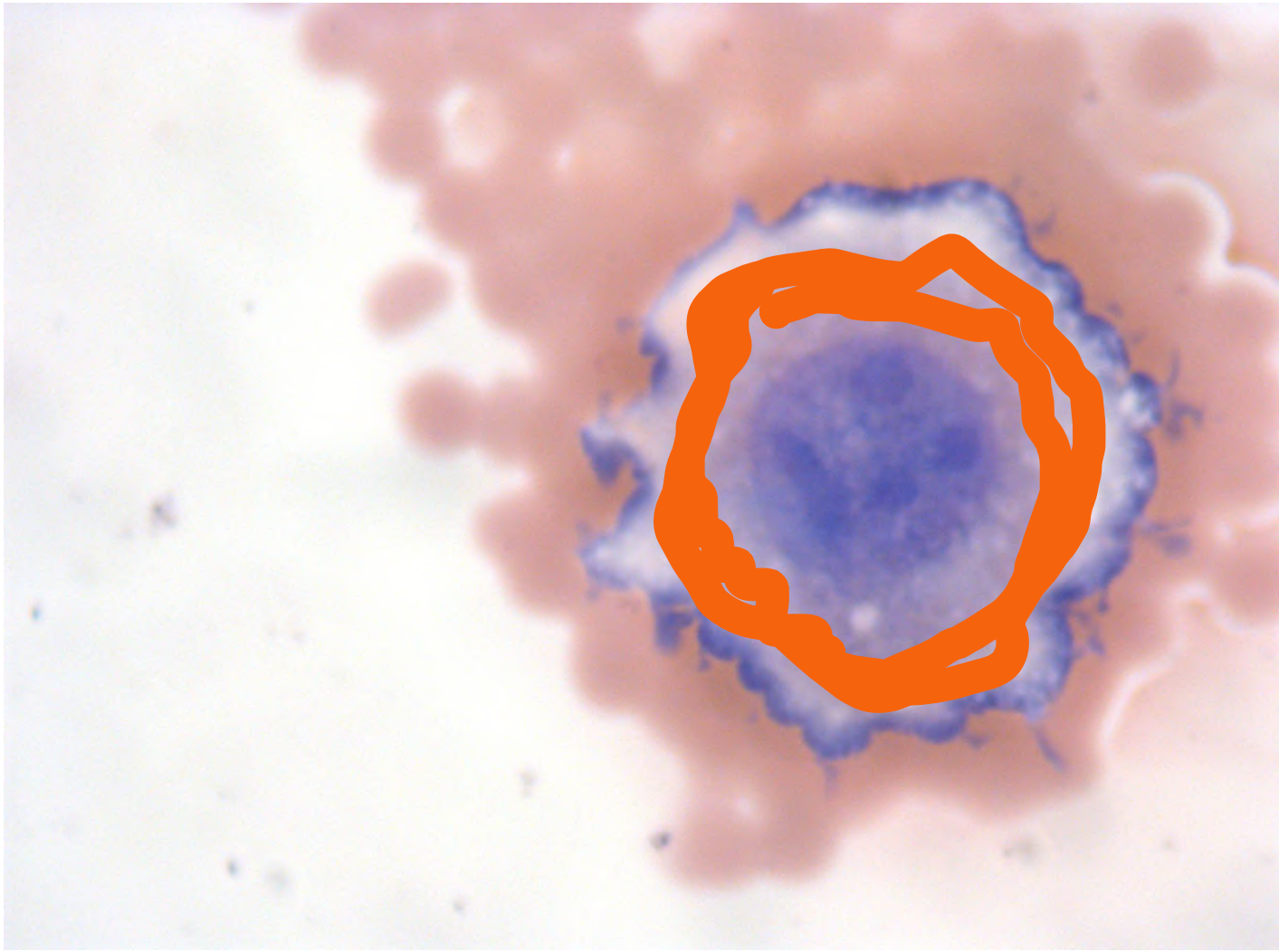

Nucleolar pleomorphism
(variation in size & shape)


Multiple pleomorphic nucleoli

Cytoplasmic

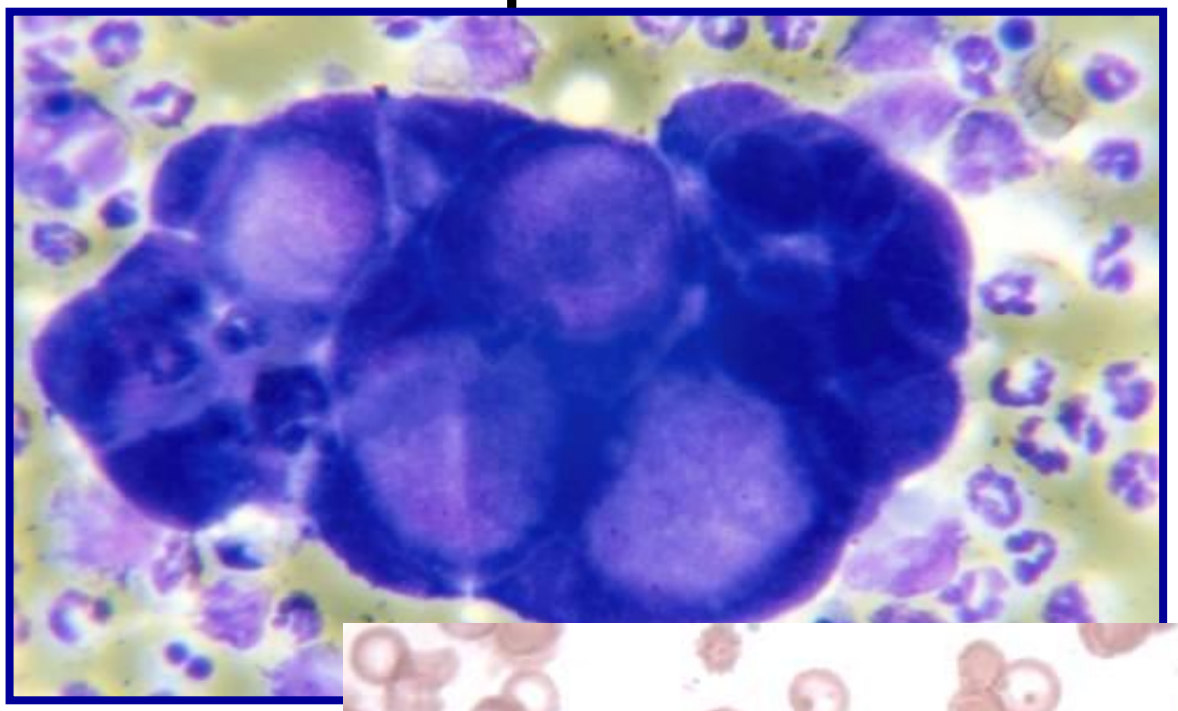
- Two main criteria for malignancy:
  - **Increased cytoplasmic basophilia**
  - **Presence of large coalescing vacuoles**

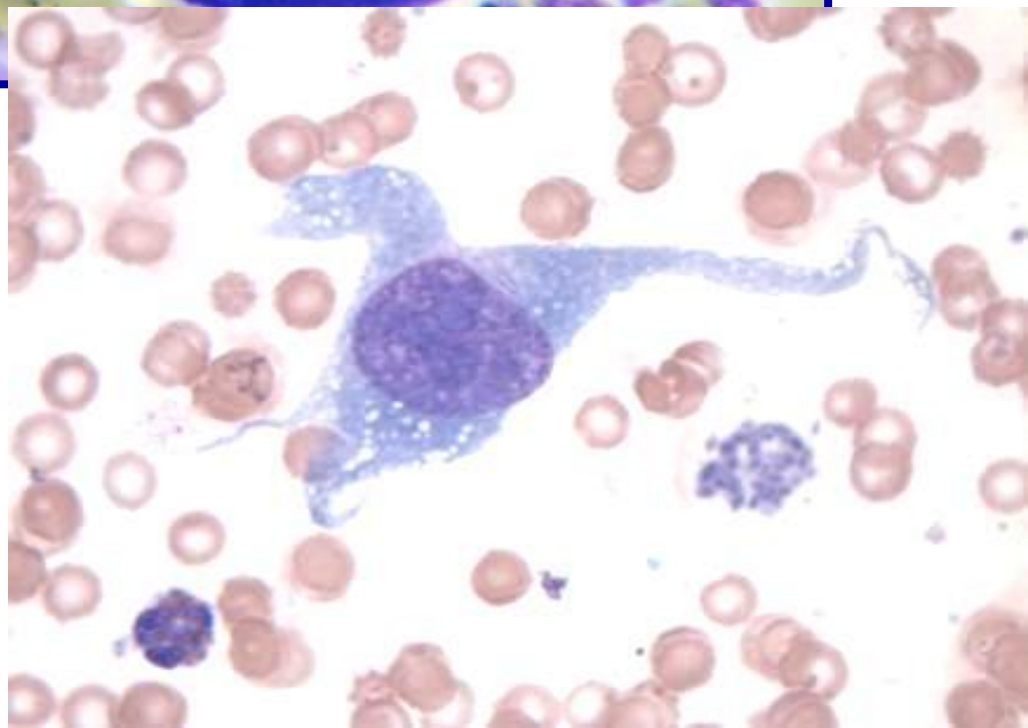
- Less definitive than the nuclear and nucleolar criteria.



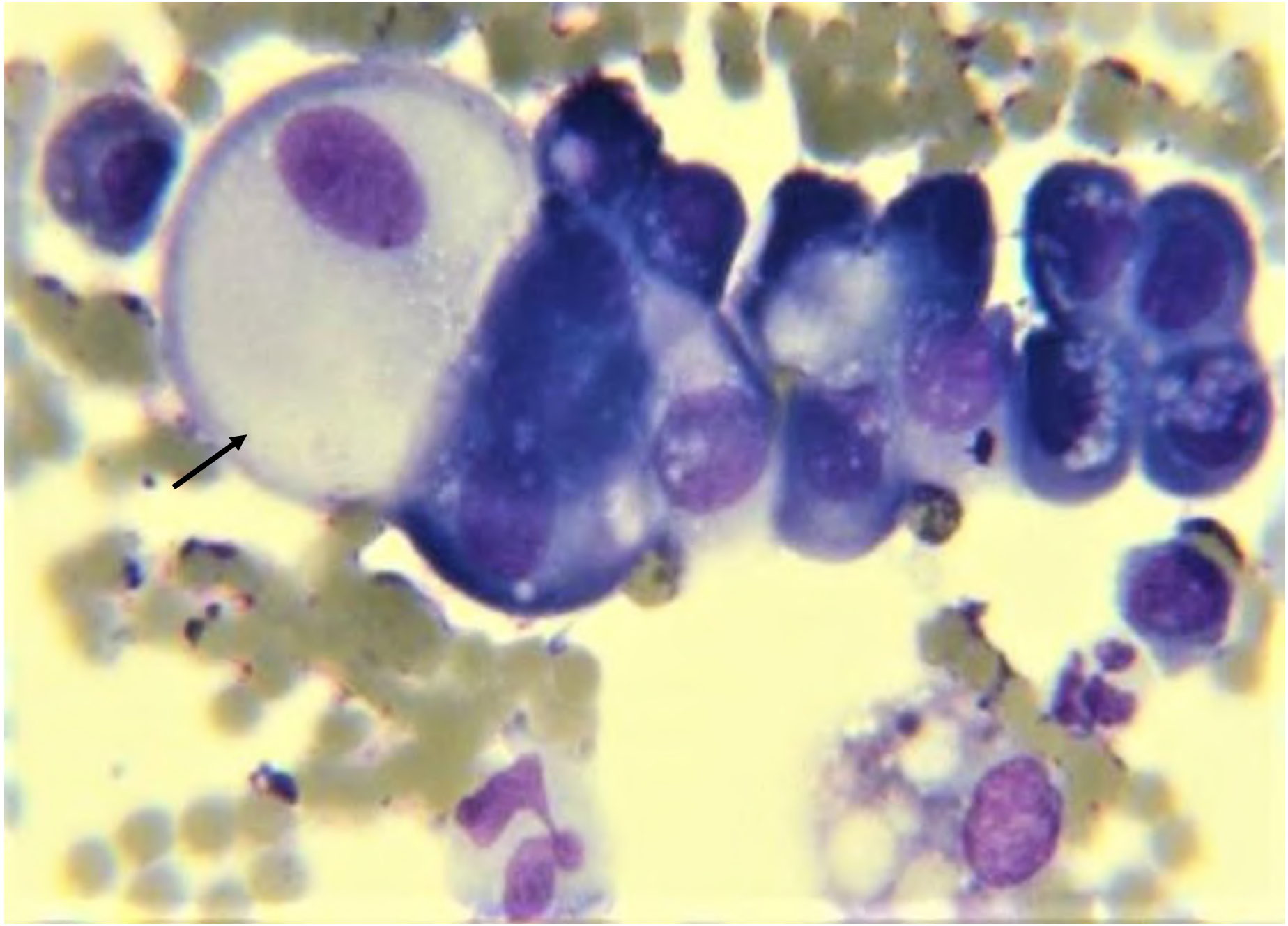
Increased cytoplasmic basophilia

- Increased RNA content of immature cells and indicates rapid cell growth.
- Can be seen in any metabolically active population of cells.
- On its own is not always indicative of a malignant process.





Large coalescing vacuoles



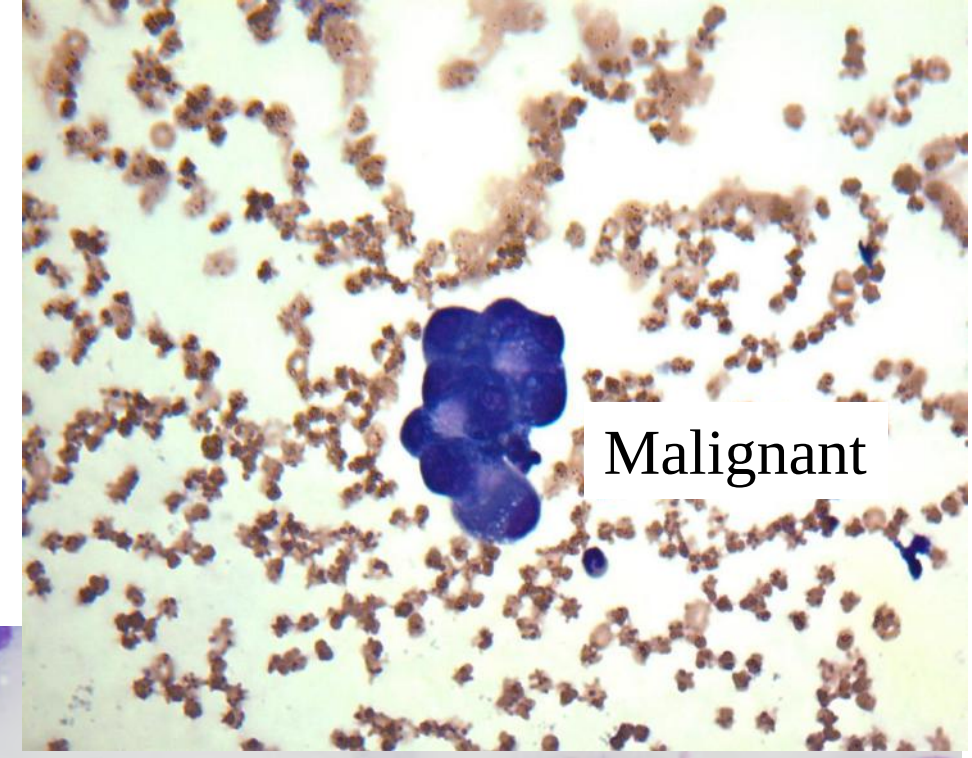
Malignancy – Degree of certainty

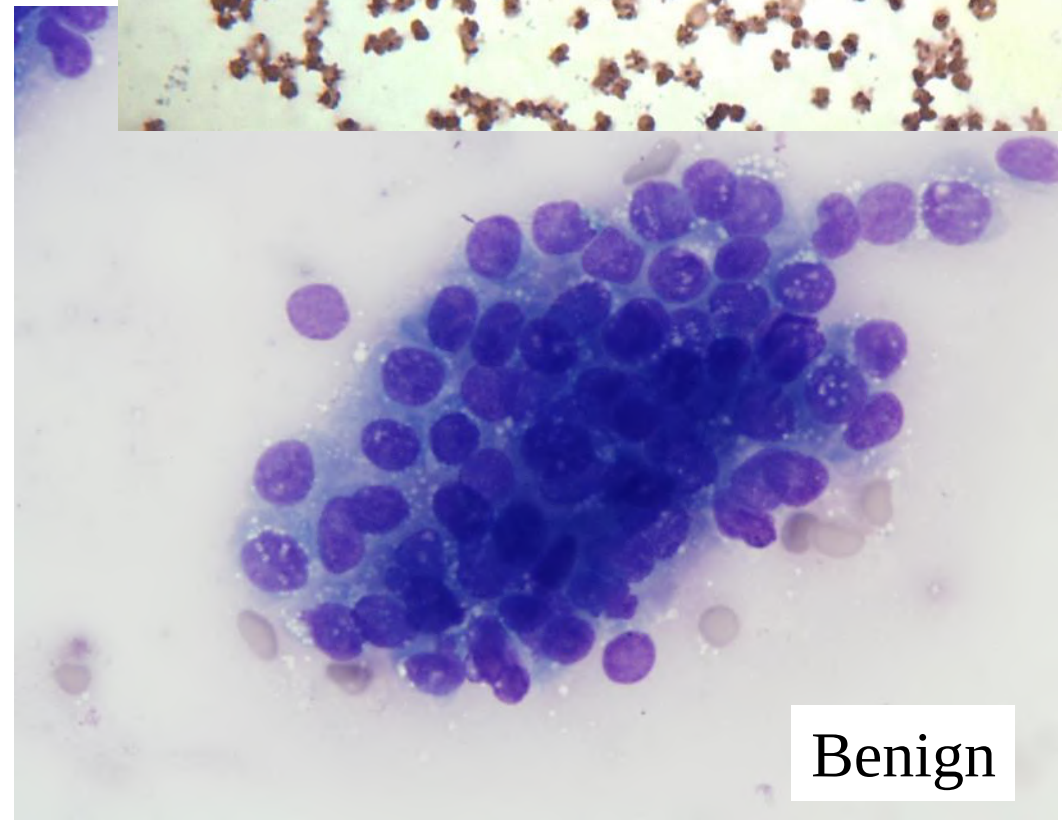
- Numerous criteria of malignancy = High degree of certainty
- If less than 3 criteria of malignancy are present
  - Biopsy/Surgical excision & Histopathology (if possible)

- **Criteria offering the highest degree of certainty**
  - Nuclear pleomorphism
  - Multiple nucleoli with nucleoli varying in size
  - Nucleolar pleomorphism (nucleoli varying in shape)
  - Large nucleoli
  - Numerous & atypical mitoses

Epithelial tumours

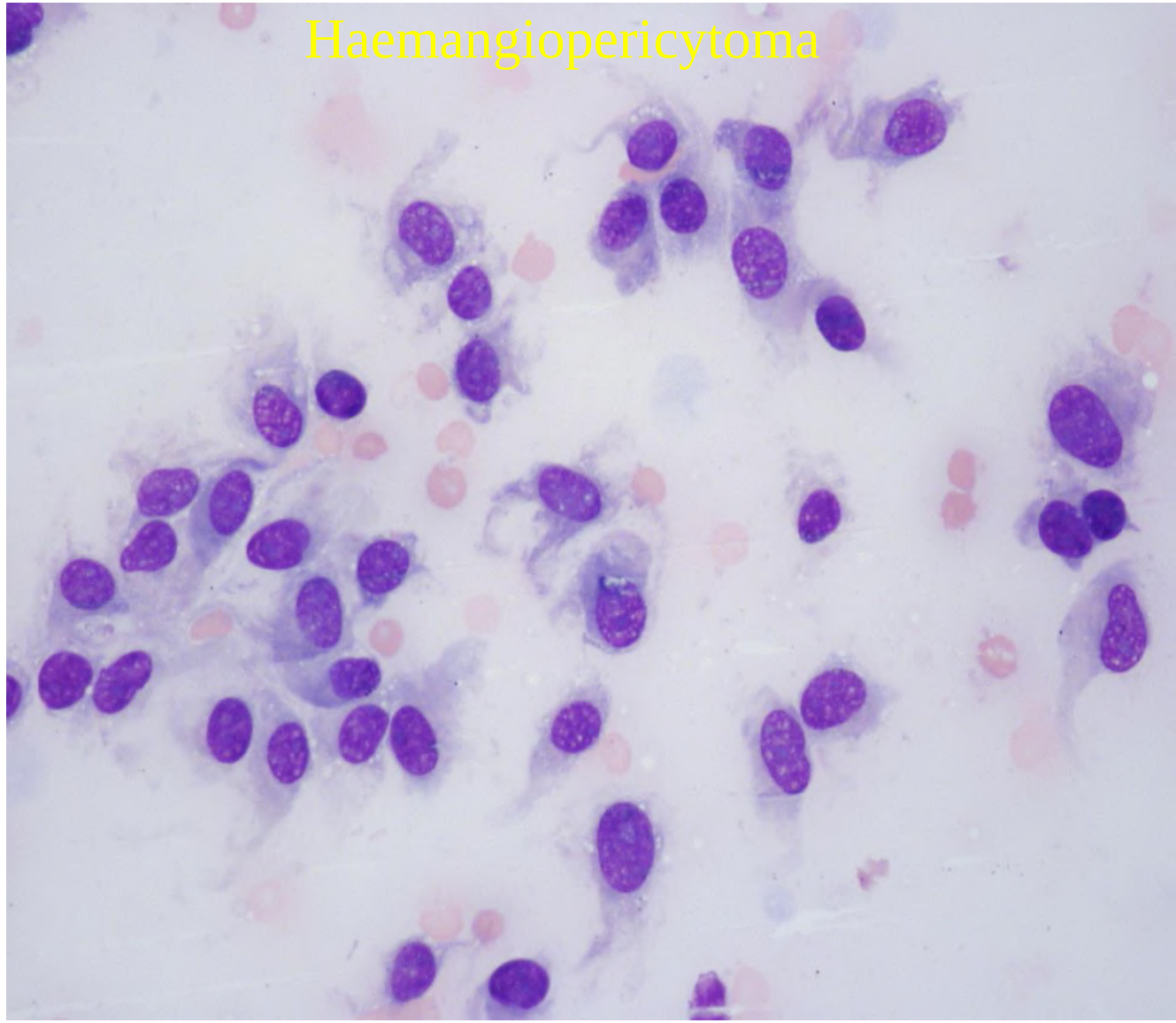
- BENIGN
  - Adenoma
  - Epithelioma
- MALIGNANT
  - Carcinoma
  - Adenocarcinoma





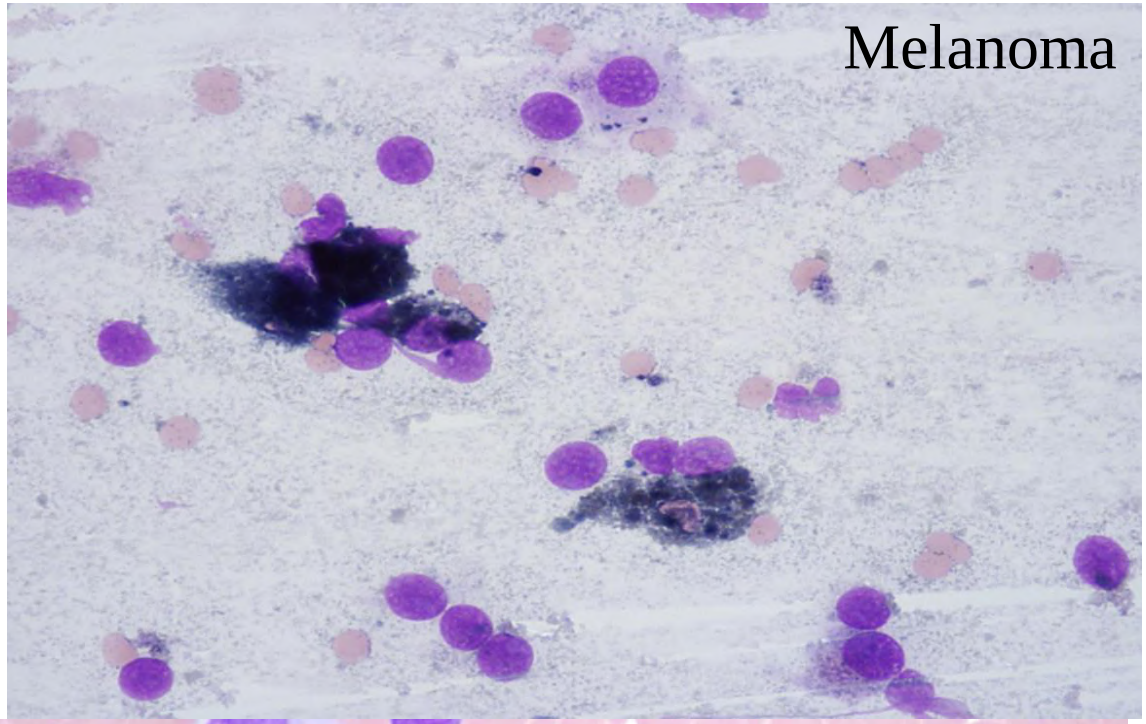
Mesenchymal neoplasms

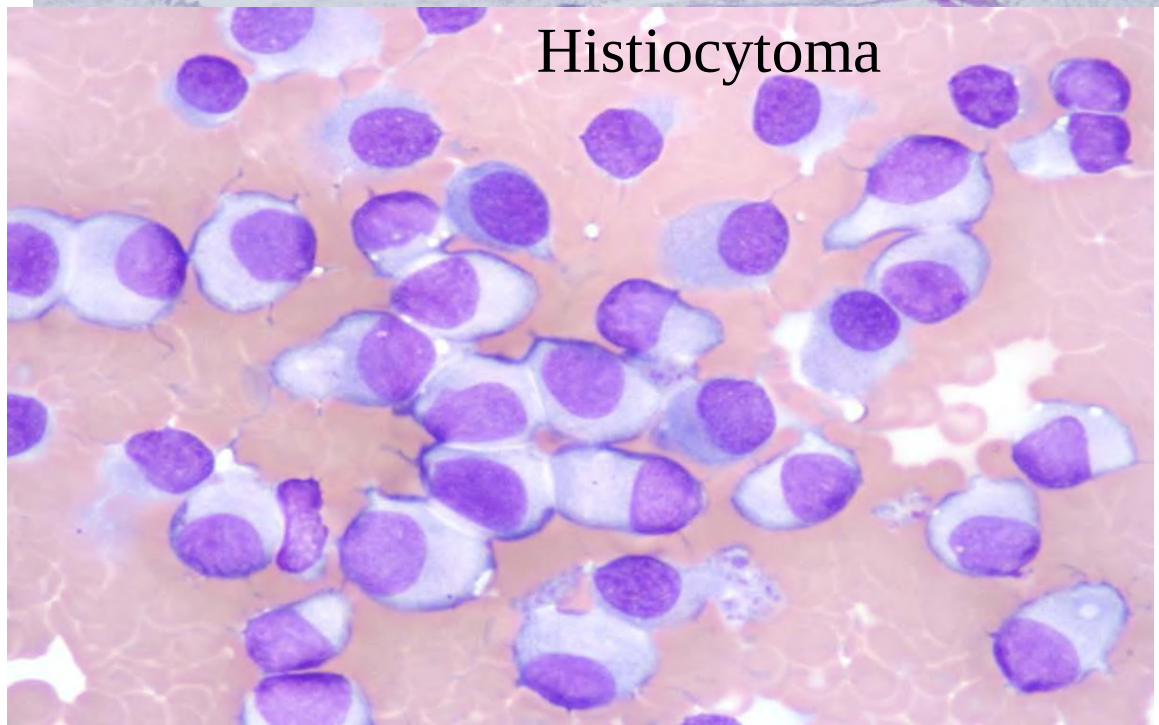
- Benign (-oma)
  - i.e. lipoma, chondroma
- Malignant (-sarcoma)
  - Bone/cartilage
    - osteosarcoma
    - chondrosarcoma
  - Fibrous connective tissue
    - Fibrosarcoma
  - Endothelial tissue
    - Haemangiosarcoma
  - Fat tissue
    - Liposarcoma
  - Perivascular wall tumours
    - Haemangiopericytoma



Discrete cell neoplasms

- Benign histiocytoma (B)
- Malignant histiocytoma (M)
- Transmissible venereal tumour (B)
- Lymphoma (M)
- Plasmacytoma (B/M)
- Mast cell tumour (M)
- Melanocytic neoplasms (B/M)
  - Most benign





Cutaneous lumps & bumps – Malignant cells

Difficulties – Challenges

- Cells from some malignant neoplasms may exhibit no or very few morphological characteristics of malignancy.
  - Second opinion
  - Biopsy

- Origin of neoplastic cells cannot always be determined
  - Second opinion
  - Biopsy

- Cells deriving from reactive/inflammed tissue can appear malignant.
  - Second opinion
  - Biopsy, if practical