

Neoplasia

Lecture 2

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Objectives

- Compare between benign and malignant tumors in terms of differentiation, rate of growth, local invasion and metastases.
- Identify the **morphological changes** that differentiate between benign and malignant tumors.
- Define the terms: **differentiation and anaplasia**.
- List the **pathways** by which malignant tumors **spread**.
- Understand the terms **dysplasia and carcinoma in situ**.

Neoplasia

Characteristics of benign and malignant neoplasms

- **Differentiation and anaplasia**
- Rate of growth
- Local invasion
- metastasis

Neoplasia

1. Differentiation and anaplasia:
 - Differentiation means : the extent to which the parenchymal cells of the tumor resemble their normal counterparts morphologically and functionally

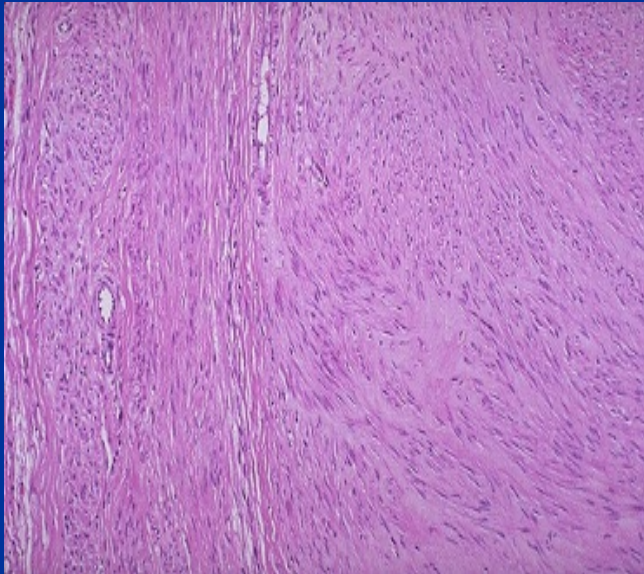
Neoplasia

- well differentiated = closely resemble their normal counterparts
- Moderately differentiated
- Poorly differentiated
- Undifferentiated (Anaplasia)

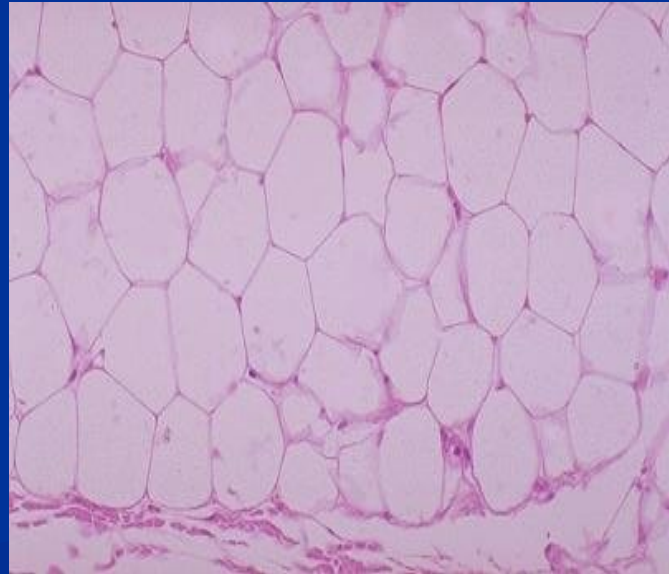
Neoplasia

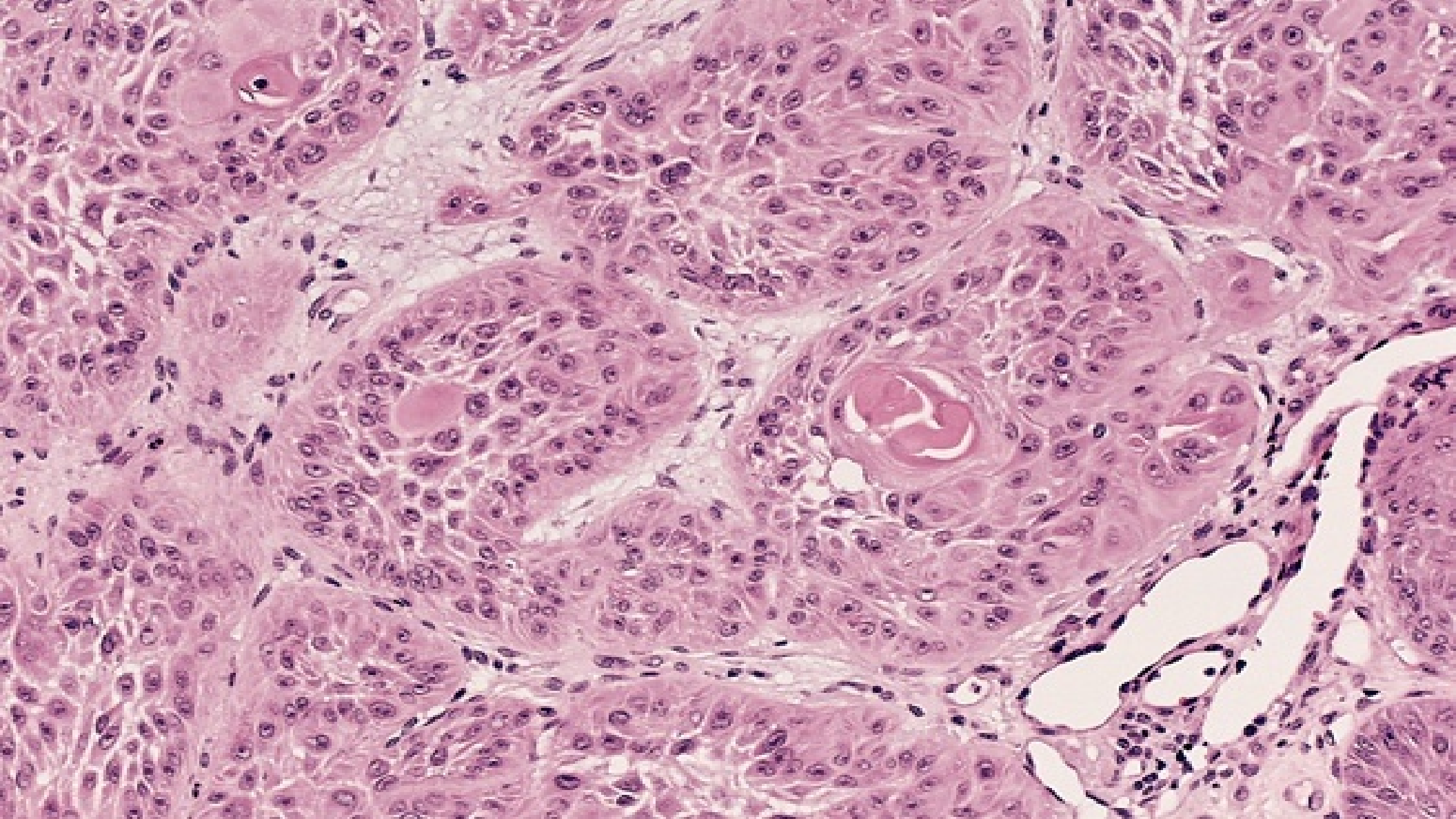
- Benign tumors = well differentiated
- Malignant tumors =
well differentiated -----> anaplastic

Leiomyoma

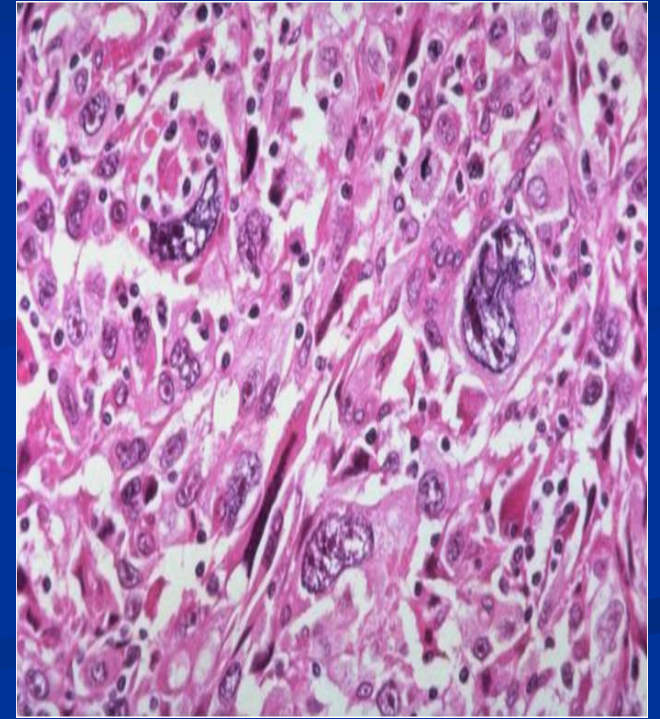
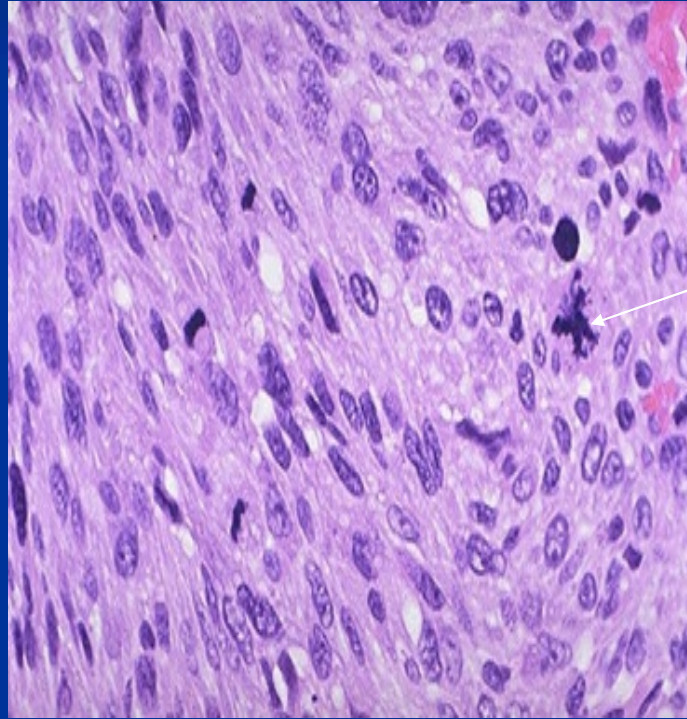
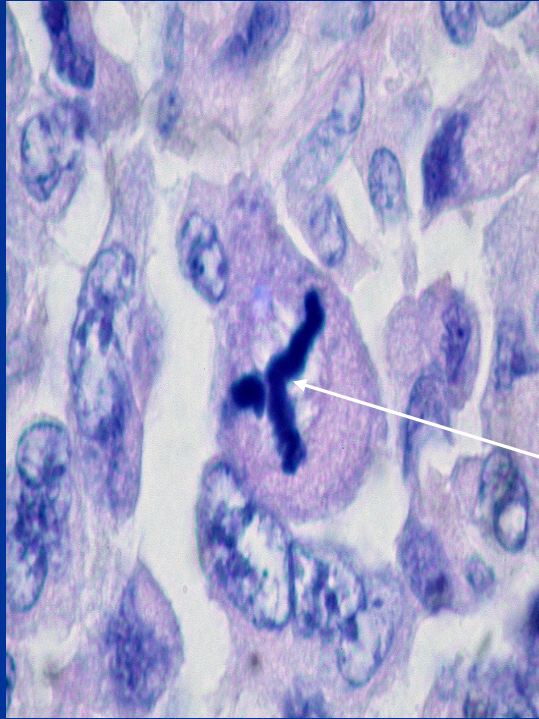


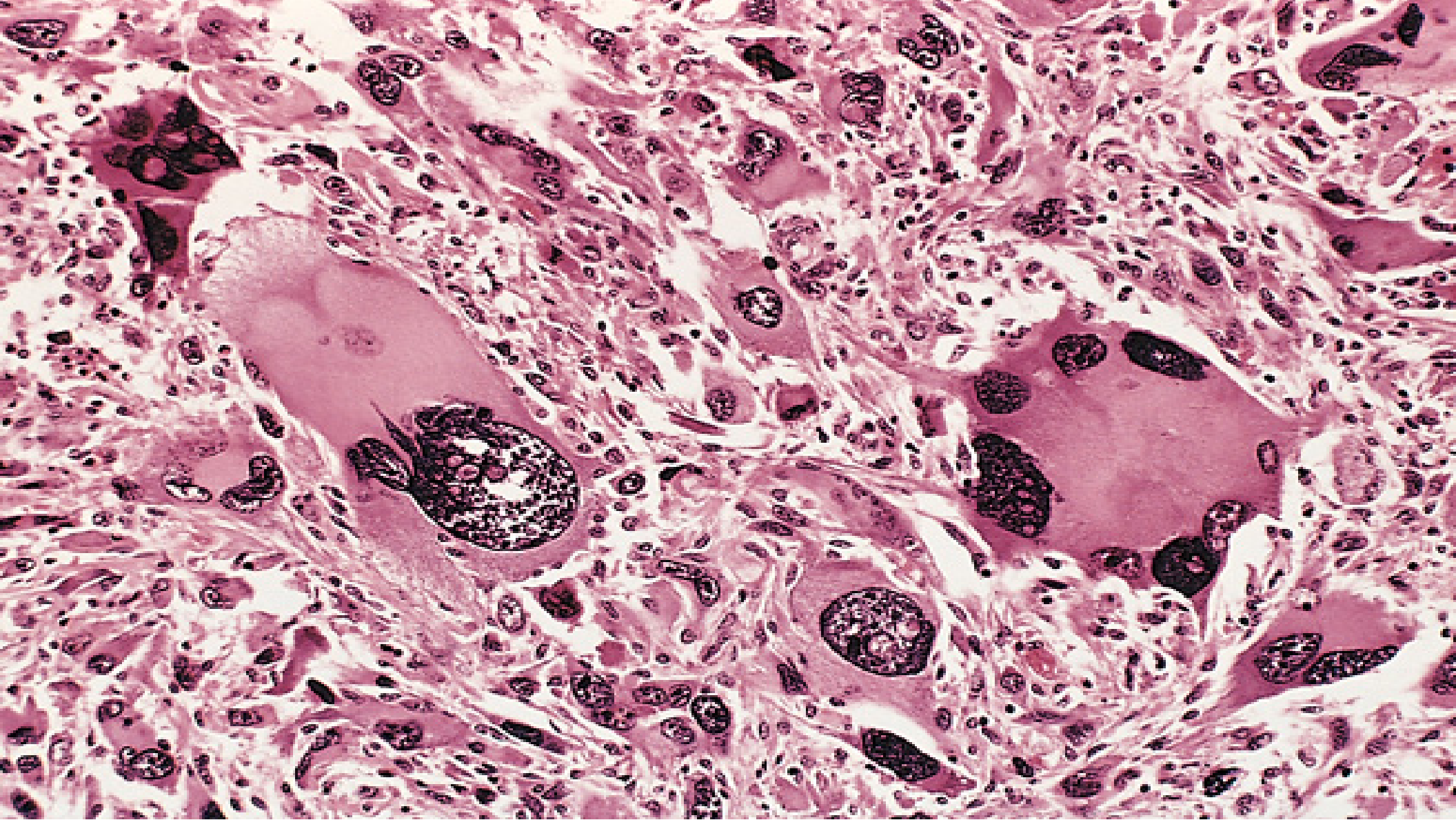
Lipoma

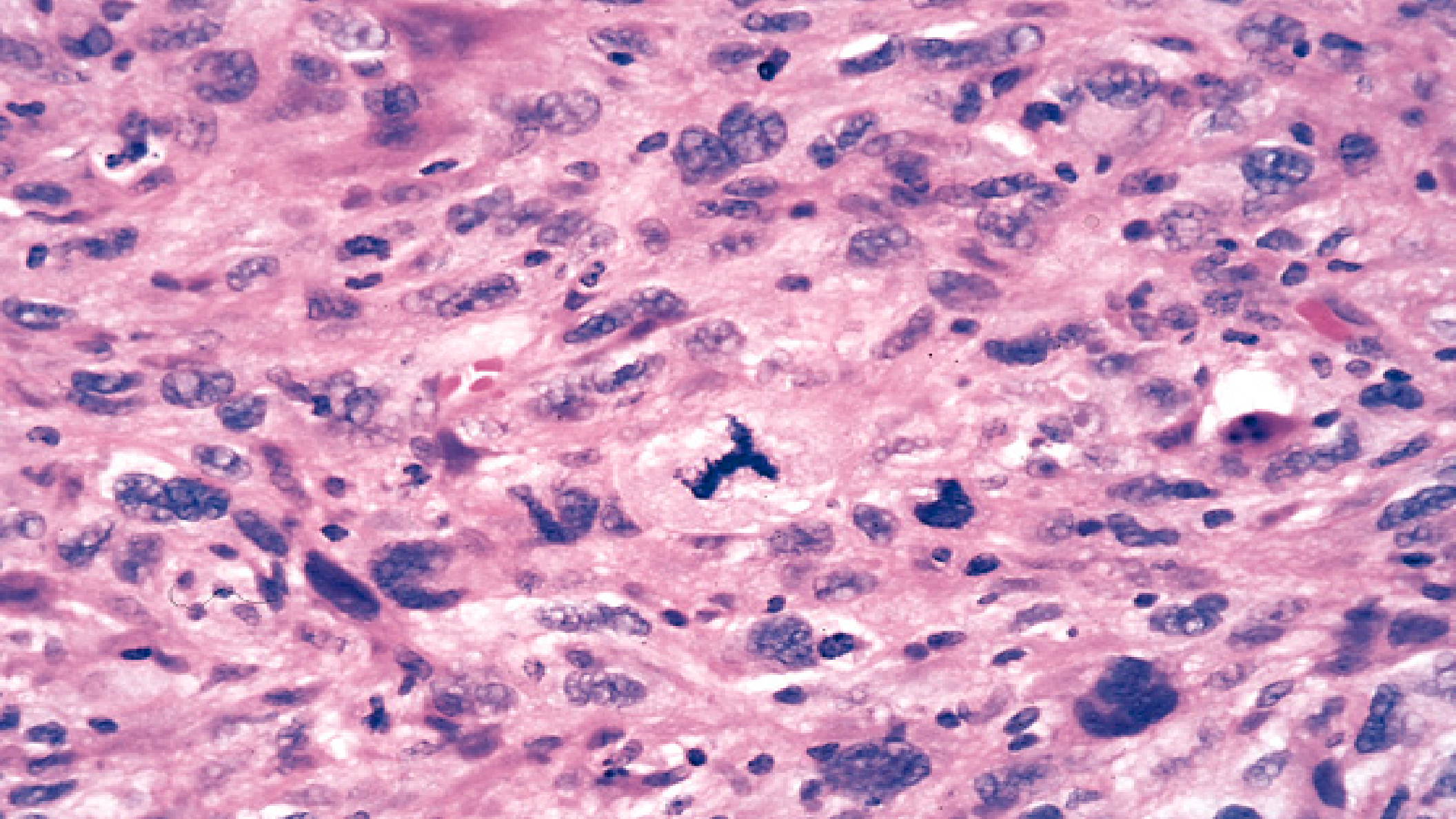




Anaplasia







Neoplasia

- In the histological examination of a tumor you should look for :
 - Pleomorphism : variation in size
 - High nuclear/ cytoplasm ratio (N/C ratio)
 - Hyperchromasia (dark cell)
 - Mitosis?abnormal one

Neoplasia

Characteristics of benign and malignant neoplasms

- Differentiation and anaplasia
- **Rate of growth**
- Local invasion
- metastasis

Neoplasia

- Rate of growth:
 - Benign tumors:
 - grows slowly
 - are affected by blood supply, hormonal effects , location
 - Malignant tumors :
 - grows faster
 - Correlate with the level of differentiation

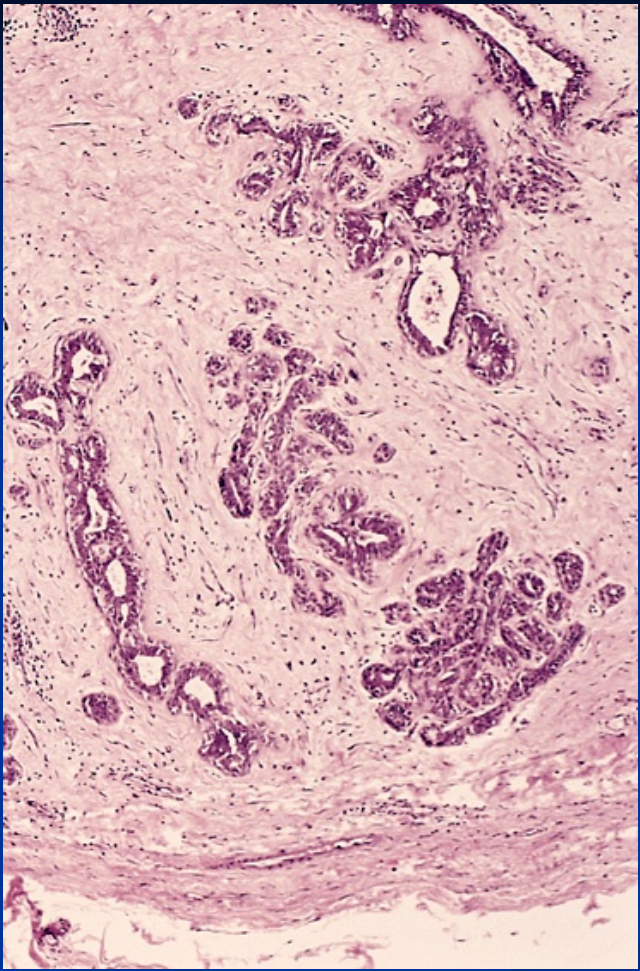
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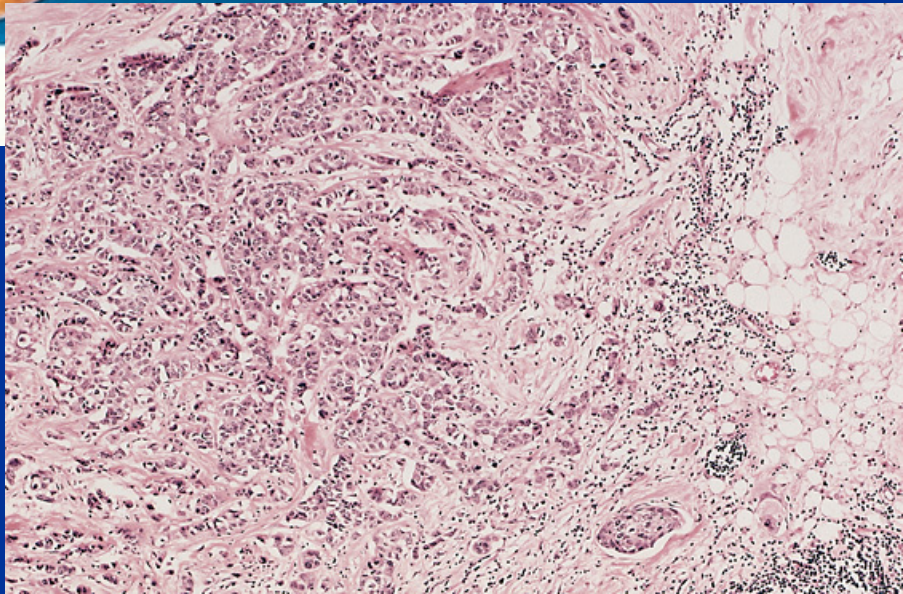
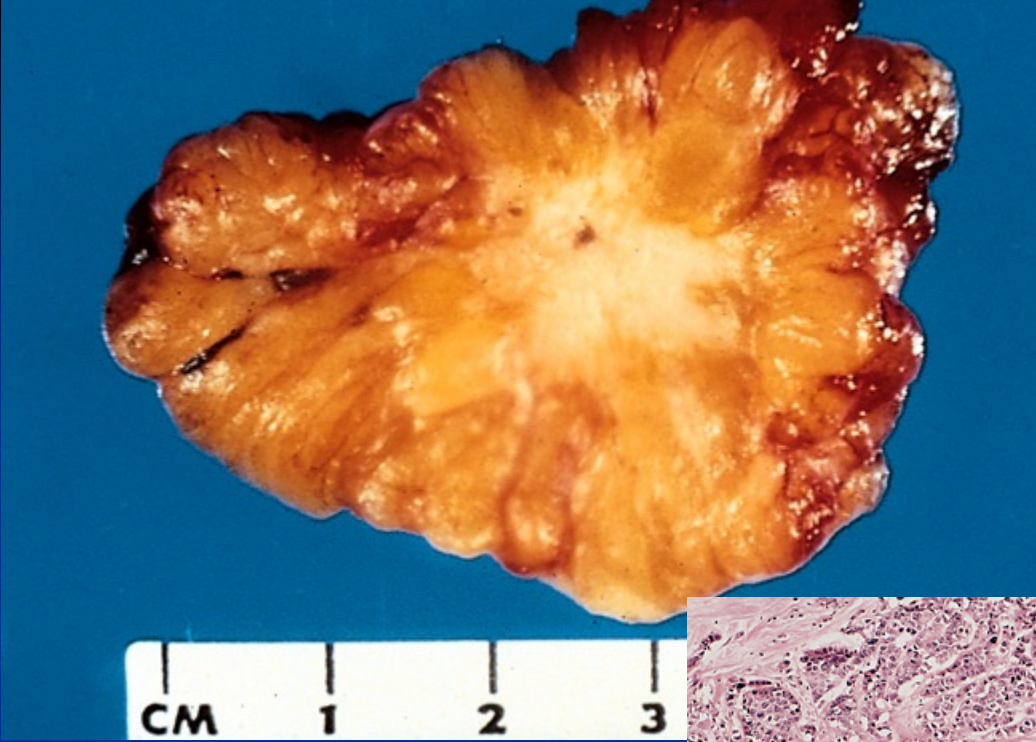
Characteristics of benign and malignant neoplasms

- Differentiation and anaplasia
- Rate of growth
- **Local invasion**
- metastasis

Neoplasia

- Local invasion :
 - Benign tumors :
 - Remain localized
 - Cannot invade
 - Usually capsulated
 - Malignant tumors :
 - Progressive invasion
 - Destruction
 - Usually not capsulated





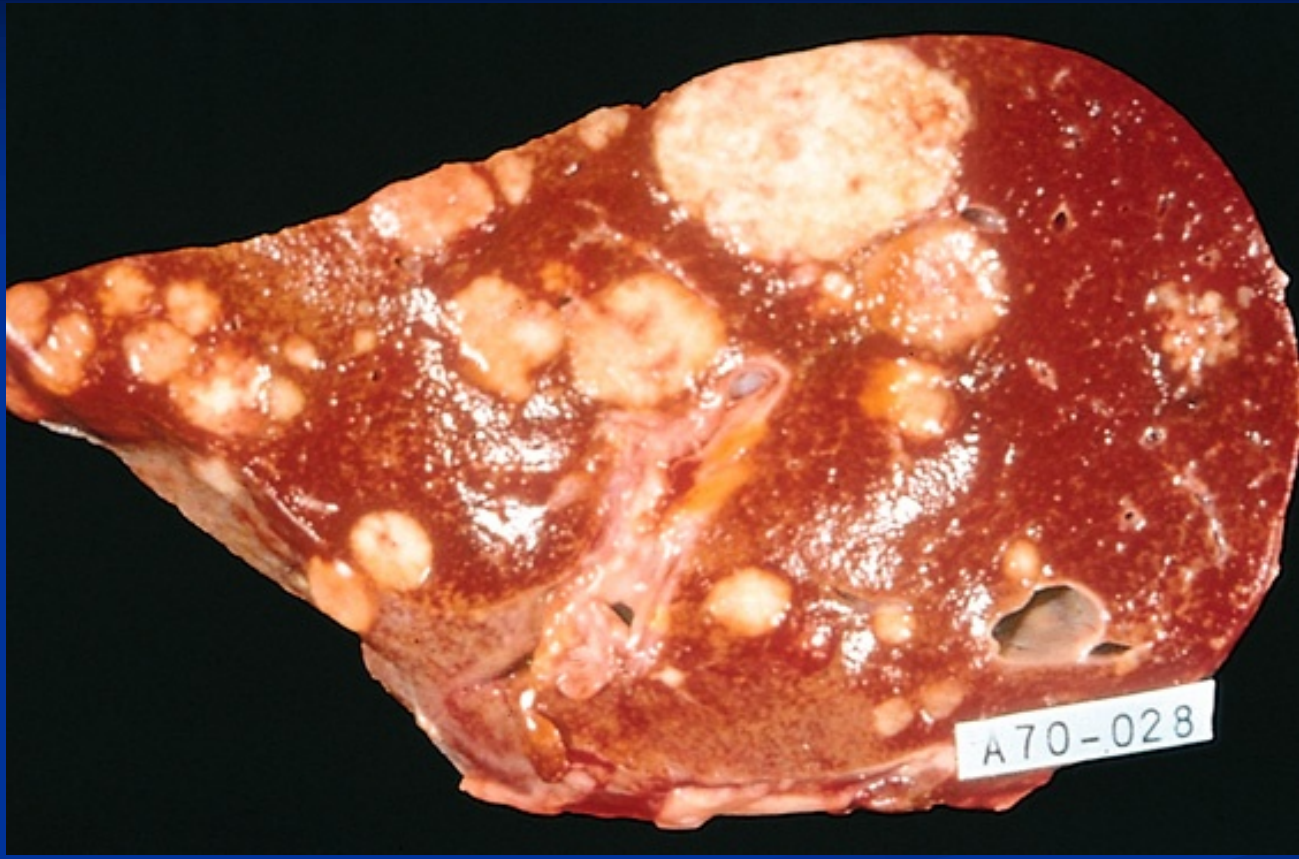
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Characteristics of benign and malignant neoplasms

- Differentiation and anaplasia
- Rate of growth
- Local invasion
- **Metastasis**

Neoplasia

- Metastasis :
 - Definition : the development of secondary implants discontinuous with the primary tumor, possibly in remote tissues



Neoplasia

- Metastasis :
 - Cancers have different ability to metastasize
 - Approximately 30% patients present with clinically evident metastases.
 - Generally, the more anaplastic and the larger the primary tumor, the more likely is metastasis

Neoplasia

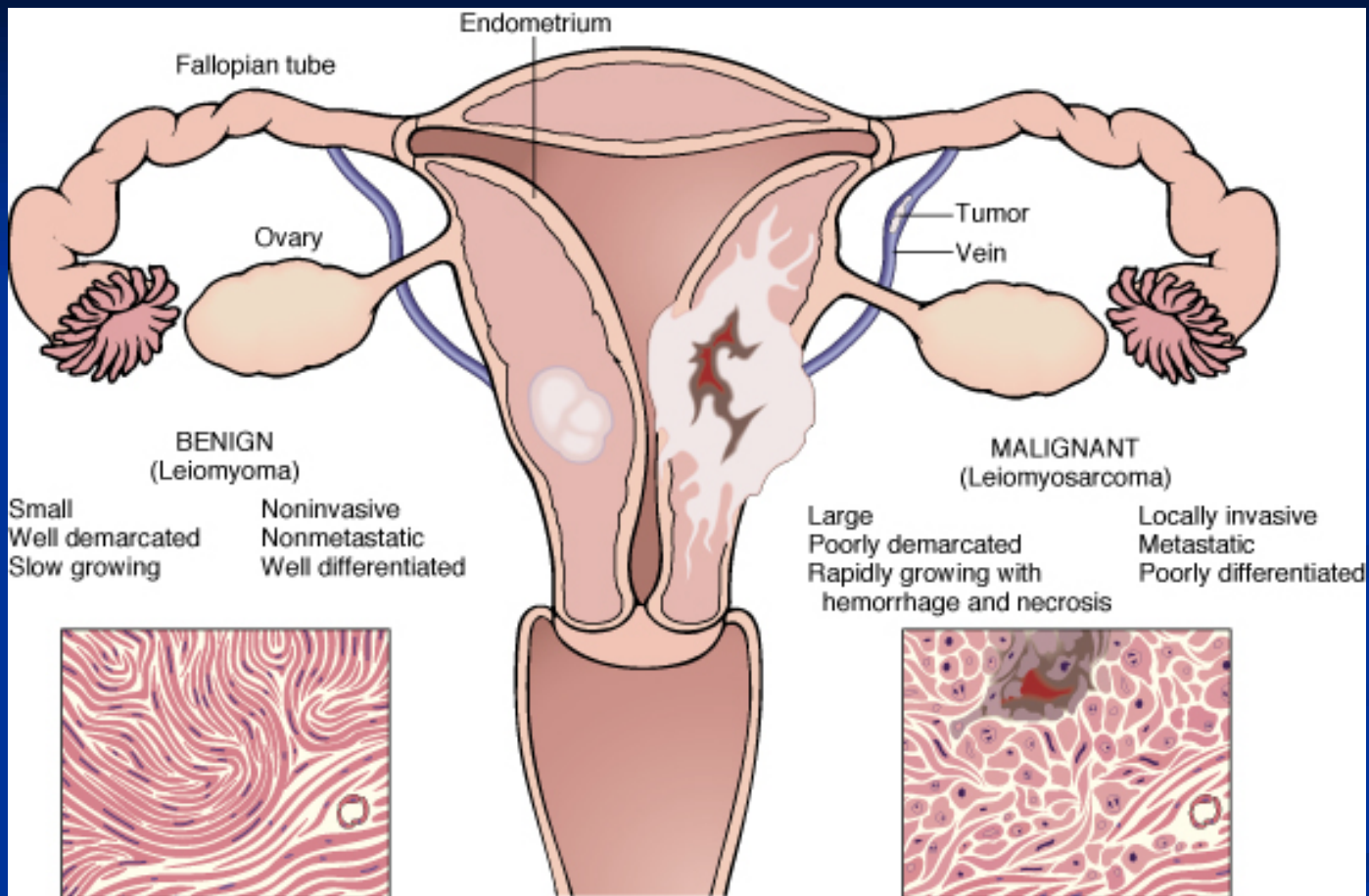
- Metastasis : three pathways
 - Lymphatic spread :
 - Hematogenous spread :
 - Seeding of the **body cavities**: pleural and peritoneal cavities.

Neoplasia

- **Lymphatic spread :**
 - favored by carcinomas
 - Breast carcinoma → axillary lymph nodes
 - Lung carcinomas → bronchial lymph nodes

Neoplasia

- **Hematogenous** spread :
- favored by sarcomas
- Also used by carcinomas
- Veins are more commonly invaded
- The liver and lungs are the most frequently involved secondary sites



Neoplasia

- In the histological examination of a tumor you should look for :
 - Pleomorphism : variation in size
 - High nuclear/ cytoplasm ratio (N/C ratio)
 - Hyperchromasia (dark cell)
 - Mitosis?abnormal one

Neoplasia

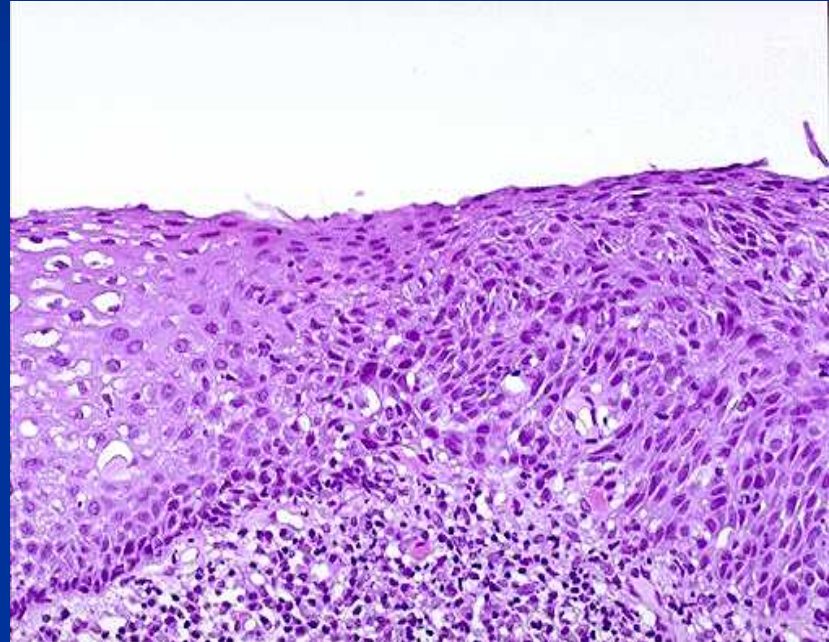
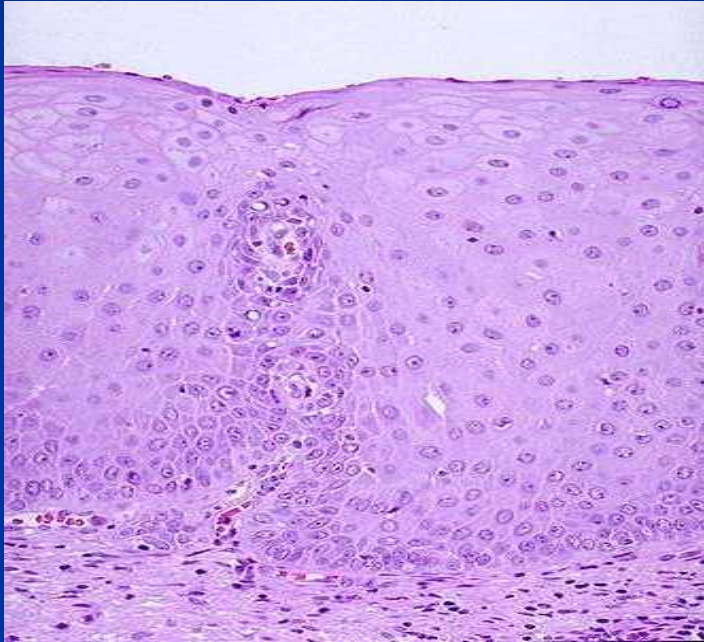
■ Dysplasia :

- Definiton: a loss in the uniformity of the individual cells and a loss in their architectural orientation.
- Non-neoplastic
- Occurs mainly in the epithelia
- Dysplastic cells shows a degree of : pleomorphism, hyperchrmasia,increased mitosis and loss of polarity.

Neoplasia

- Dysplasia does not mean cancer
- Dysplasia does not necessarily progress to cancer
- Dysplasia may be reversible
- If dysplastic changes involve the entire thickness of the epithelium it is called :

CARCINOMA IN-SITU

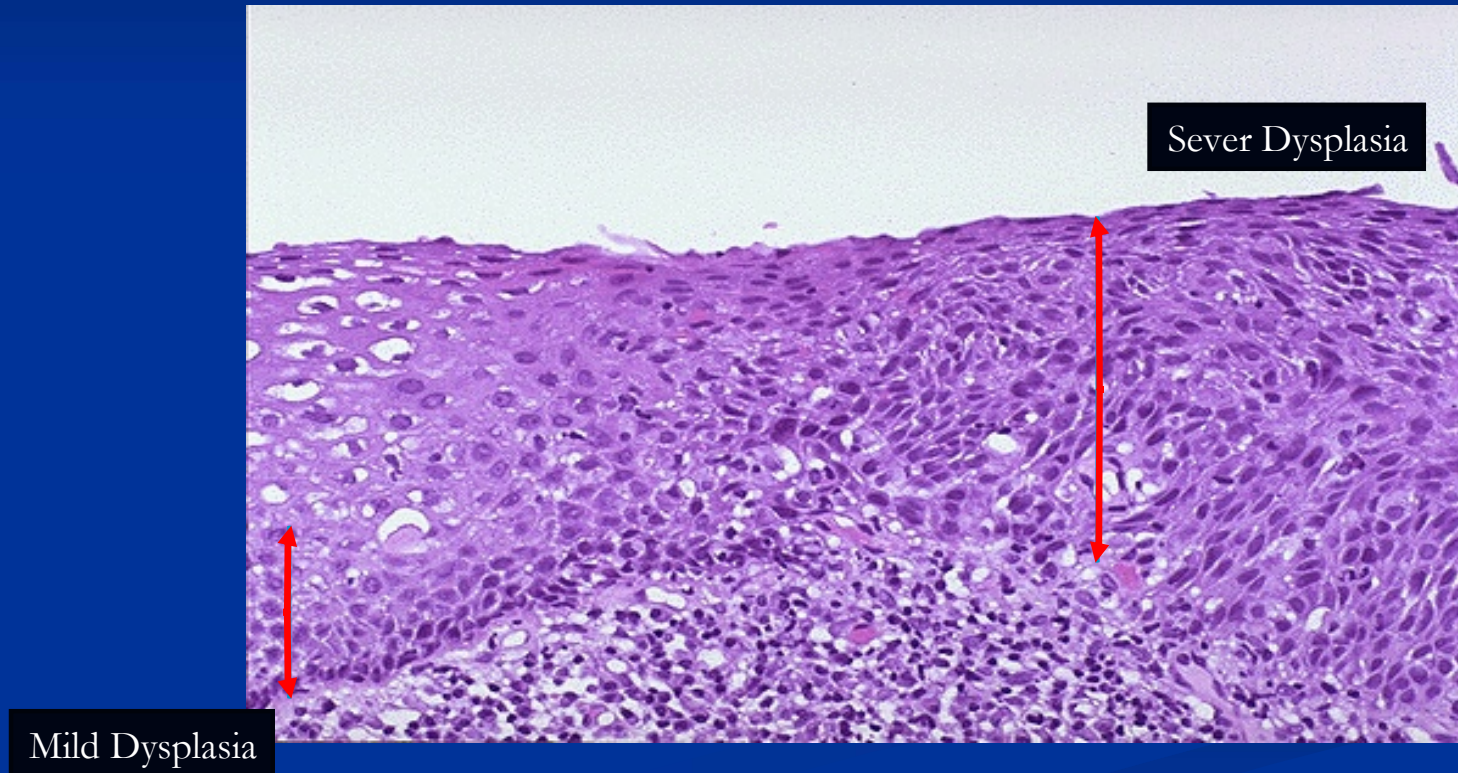


Dysplasia Features:

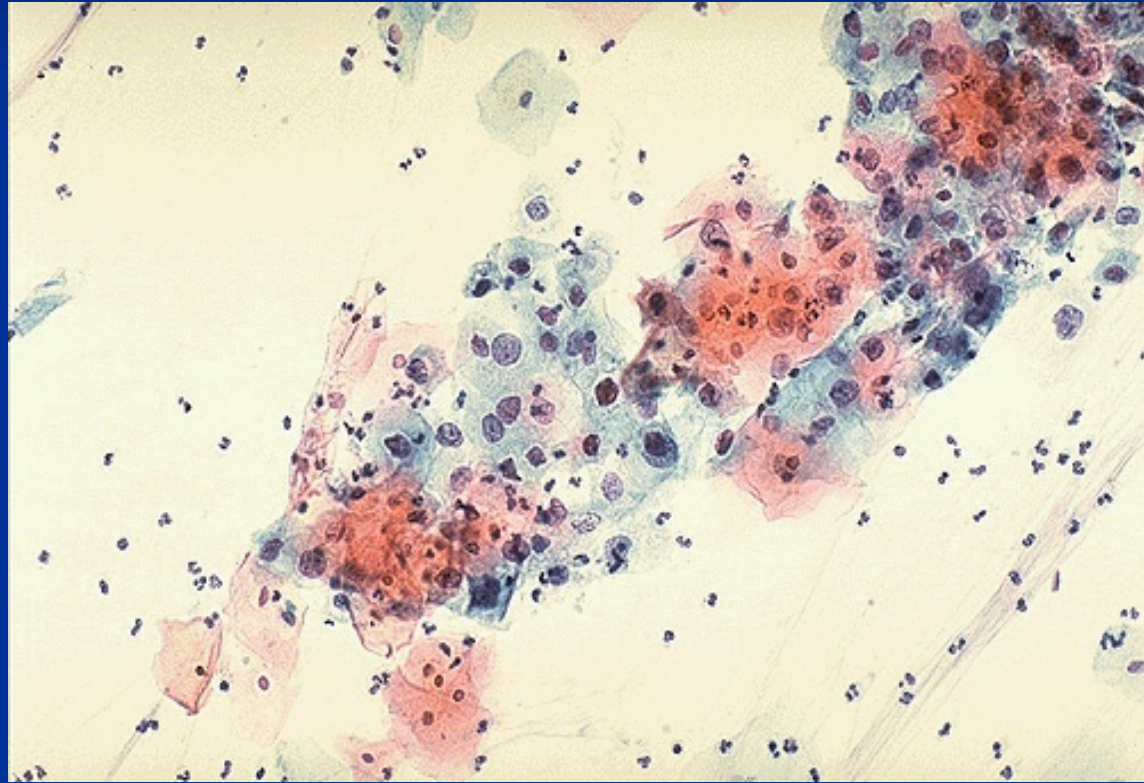
- Increased rate of multiplication.
- Disordered maturation.

- Nuclear abnormality
 - Increased N/C ratio
 - Irregular nuclear membrane
 - Increased chromatin content
- Cytoplasmic abnormalities due to failure of normal maturation

Dysplasia Uterine cervix



Dysplasia (cervical pap smear)



Dysplasia

- Clinical significance:
 - It is a premalignant condition.
 - The risk of invasive cancer varies with:
 - ✓ grade of dysplasia (mild, moderate, severe)
 - ✓ duration of dysplasia
 - ✓ site of dysplasia

Dysplasia

- Differences between dysplasia and cancer.
 - *lack of invasiveness.
 - *Reversibility

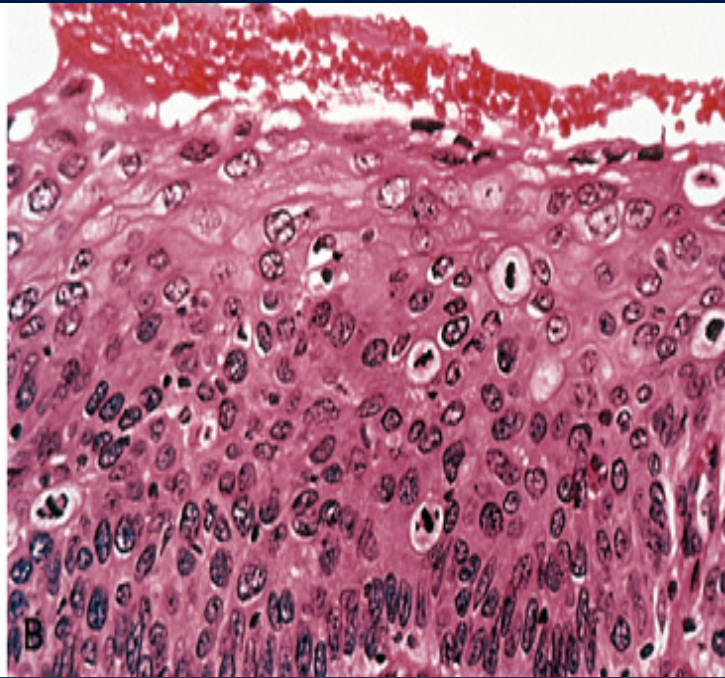
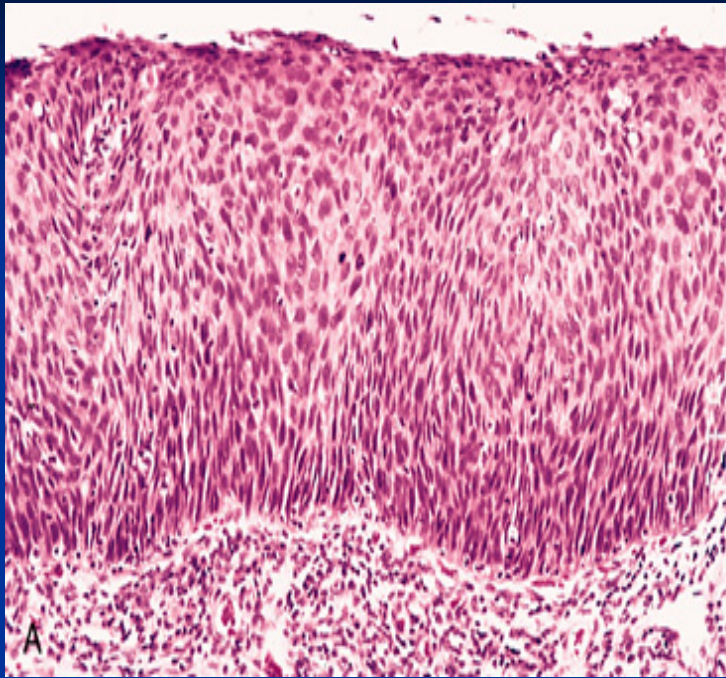
Neoplasia

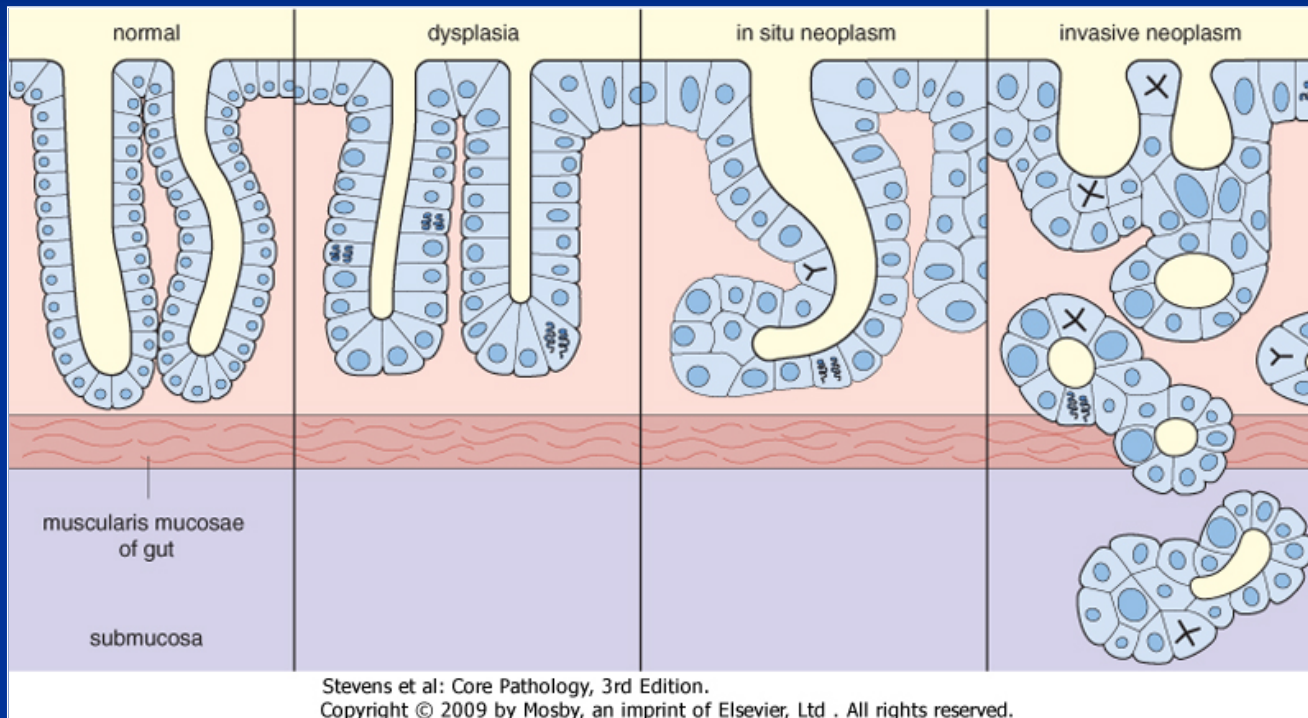
- Carcinoma in-situ

- Definition: an intraepithelial malignancy in which malignant cells involve the entire thickness of the epithelium without penetration of the basement membrane.
- Applicable only to epithelial neoplasms.

Carcinoma in situ

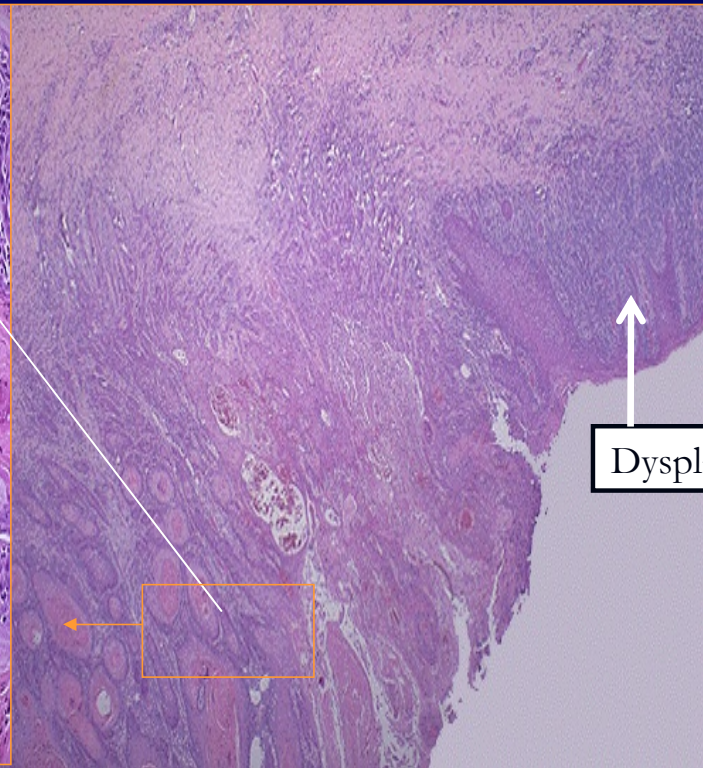
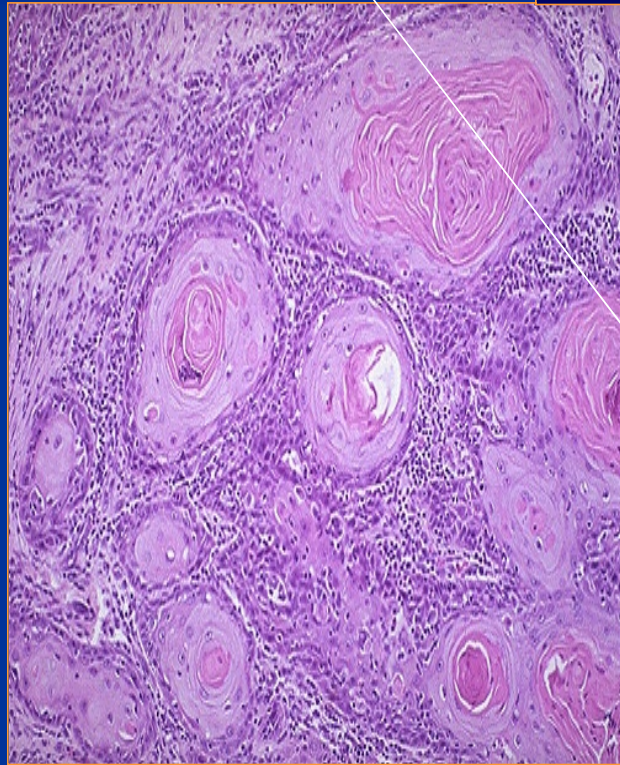
- A true neoplasm with all of the features of malignant neoplasm except invasiveness
- Displays the cytological features of malignancy without invasion of the basement membrane.





Stevens et al: Core Pathology, 3rd Edition.
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Squamous cell Carcinoma Uterine Cervix



Dysplasia