



Neoplasia





Cells normally differentiate, grow, mature and divide.

These are regulated processes, balanced in a healthy system such that cell birth is nearly equal to cell death



- ✦ Study of tumors is called as **Oncology**

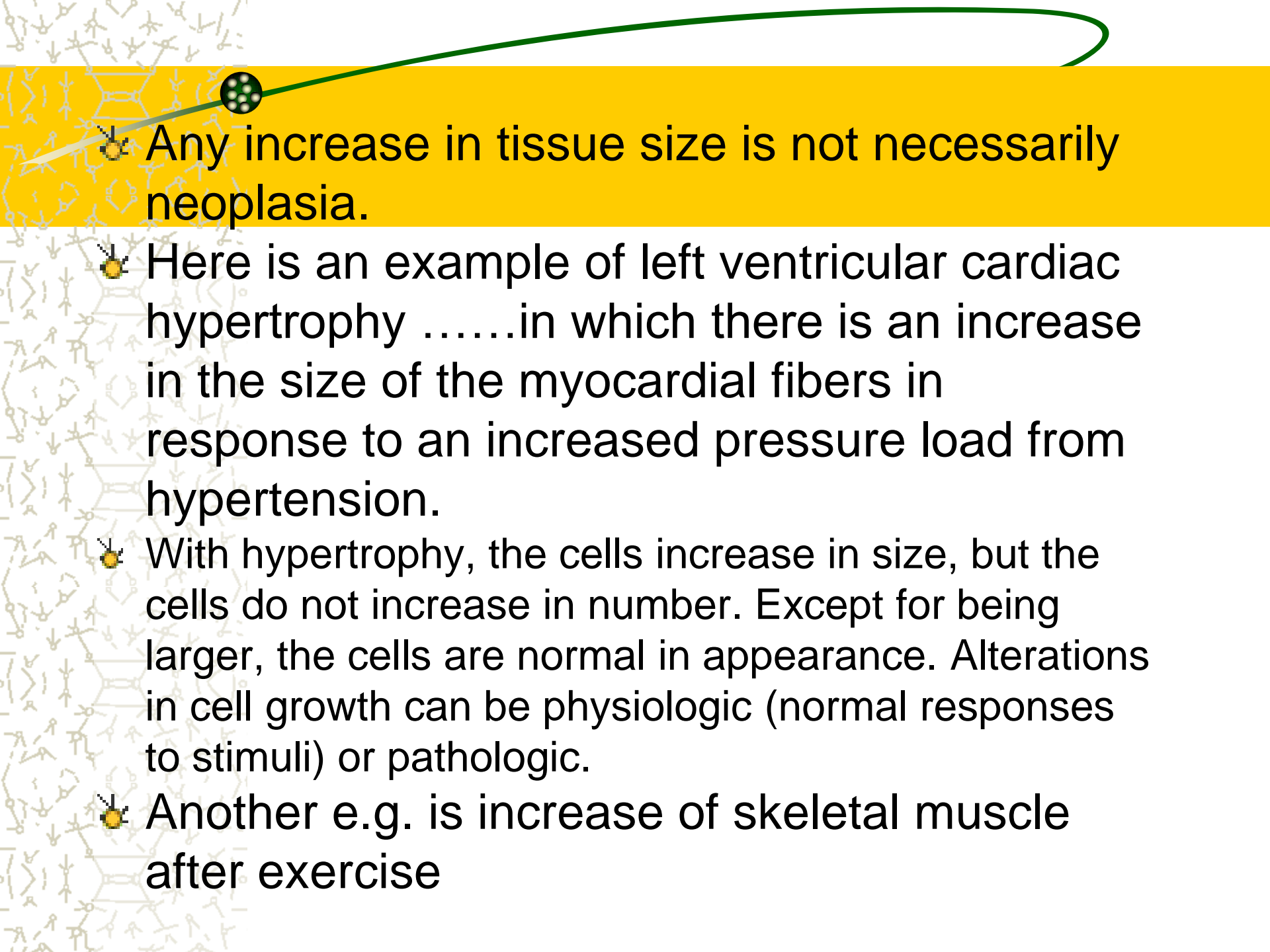
(Greek origin word for tumor)

- ✦ Neo-plasm >> A new growth.

- ✦ ***Definition- A neoplasia is defined as the growth of new cells that proliferates--- without control, ---serves no useful function in body and has no orderly arrangement.***

- ✦ Neopalsia is a tumour means a swelling.

- ✦ But all swellings are not the tumours.....e.g. Abscess



✚ Any increase in tissue size is not necessarily neoplasia.

✚ Here is an example of left ventricular cardiac hypertrophyin which there is an increase in the size of the myocardial fibers in response to an increased pressure load from hypertension.

✚ With hypertrophy, the cells increase in size, but the cells do not increase in number. Except for being larger, the cells are normal in appearance. Alterations in cell growth can be physiologic (normal responses to stimuli) or pathologic.

✚ Another e.g. is increase of skeletal muscle after exercise

Left ventricular cardiac hypertrophy

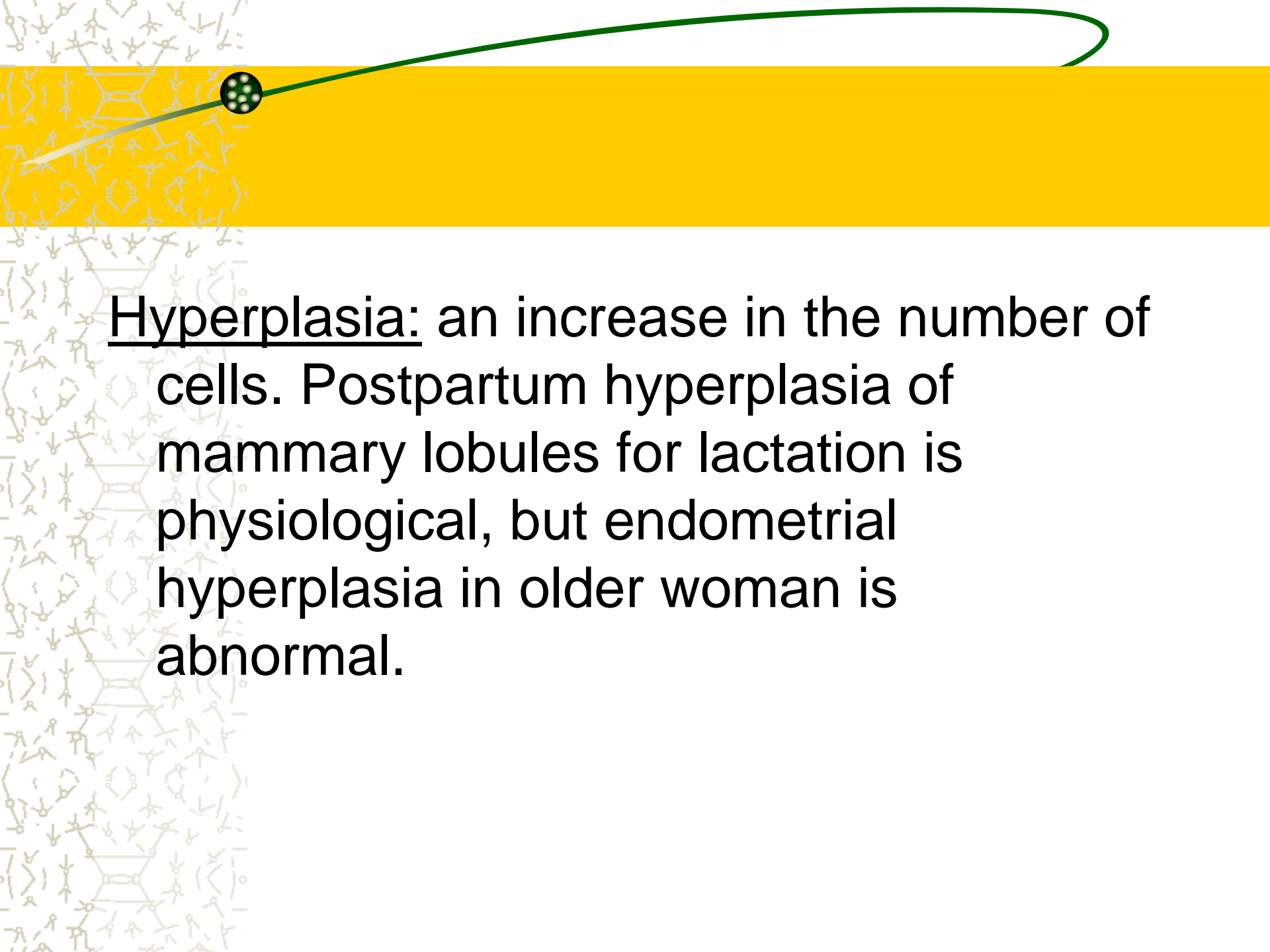




These alterations of cell growth are potentially reversible and include:

Hypertrophy: an increase in cell size.

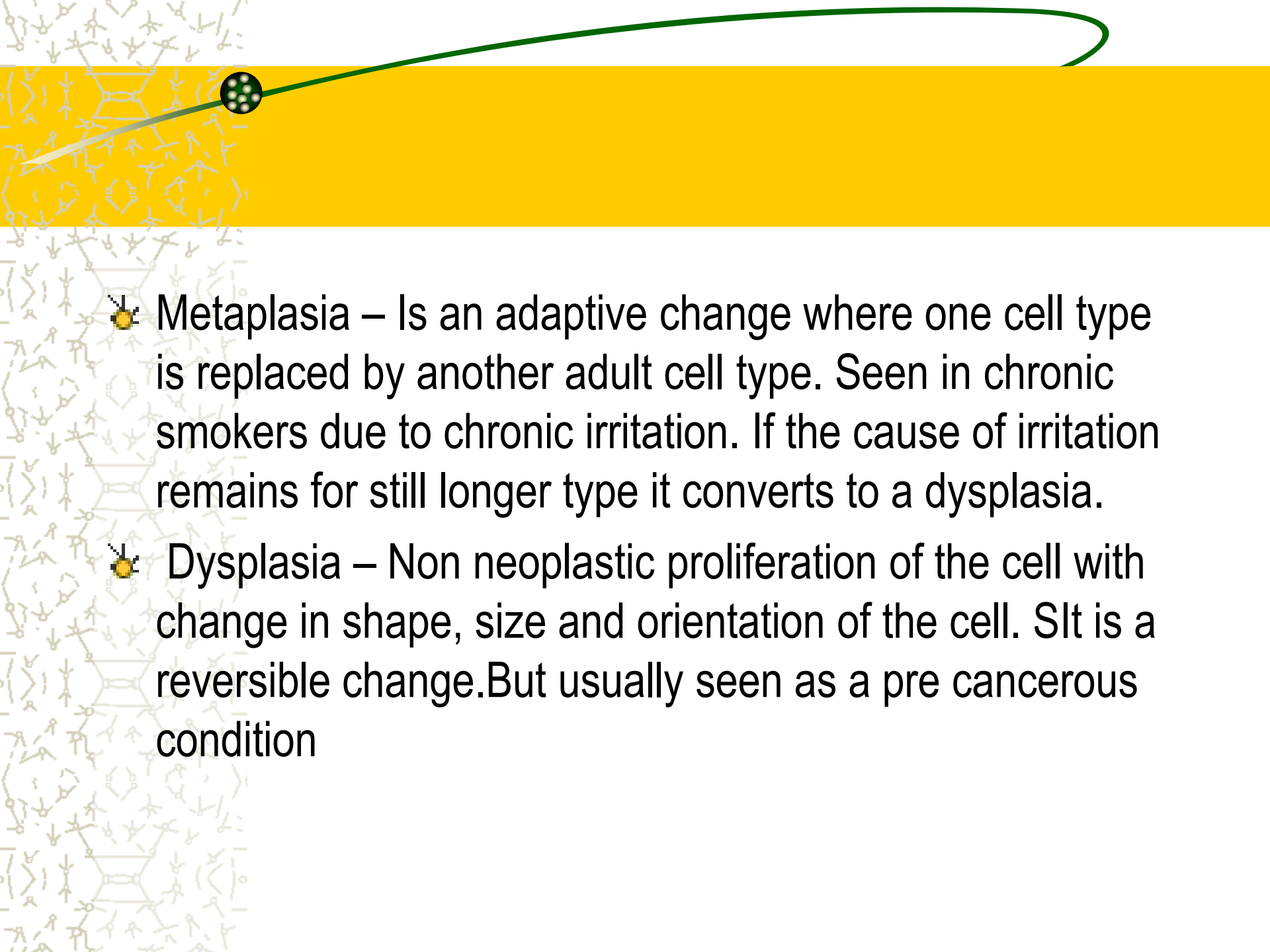
Increase in skeletal muscle fiber size is a physiologic response to exercise, but the cardiac hypertrophy shown above is a pathologic response to abnormally elevated blood pressure.

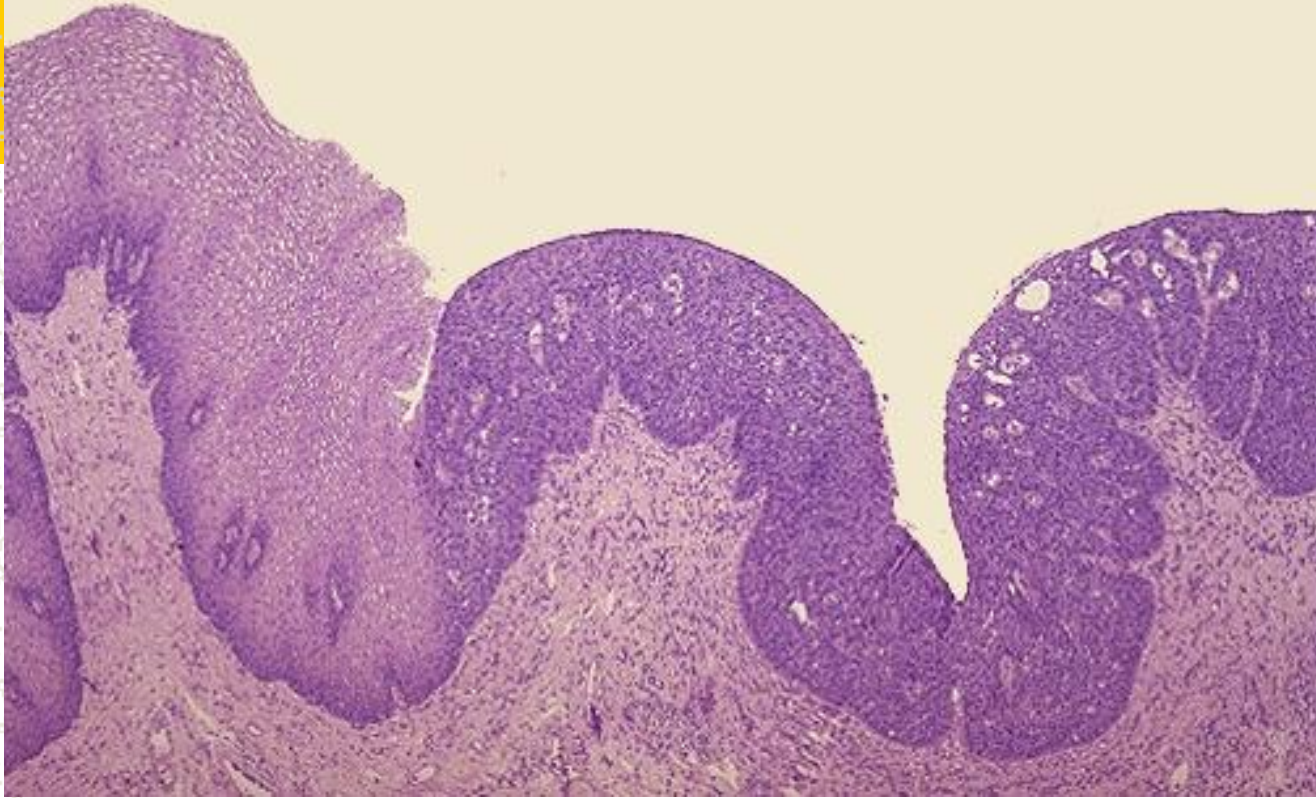


Hyperplasia: an increase in the number of cells. Postpartum hyperplasia of mammary lobules for lactation is physiological, but endometrial hyperplasia in older woman is abnormal.

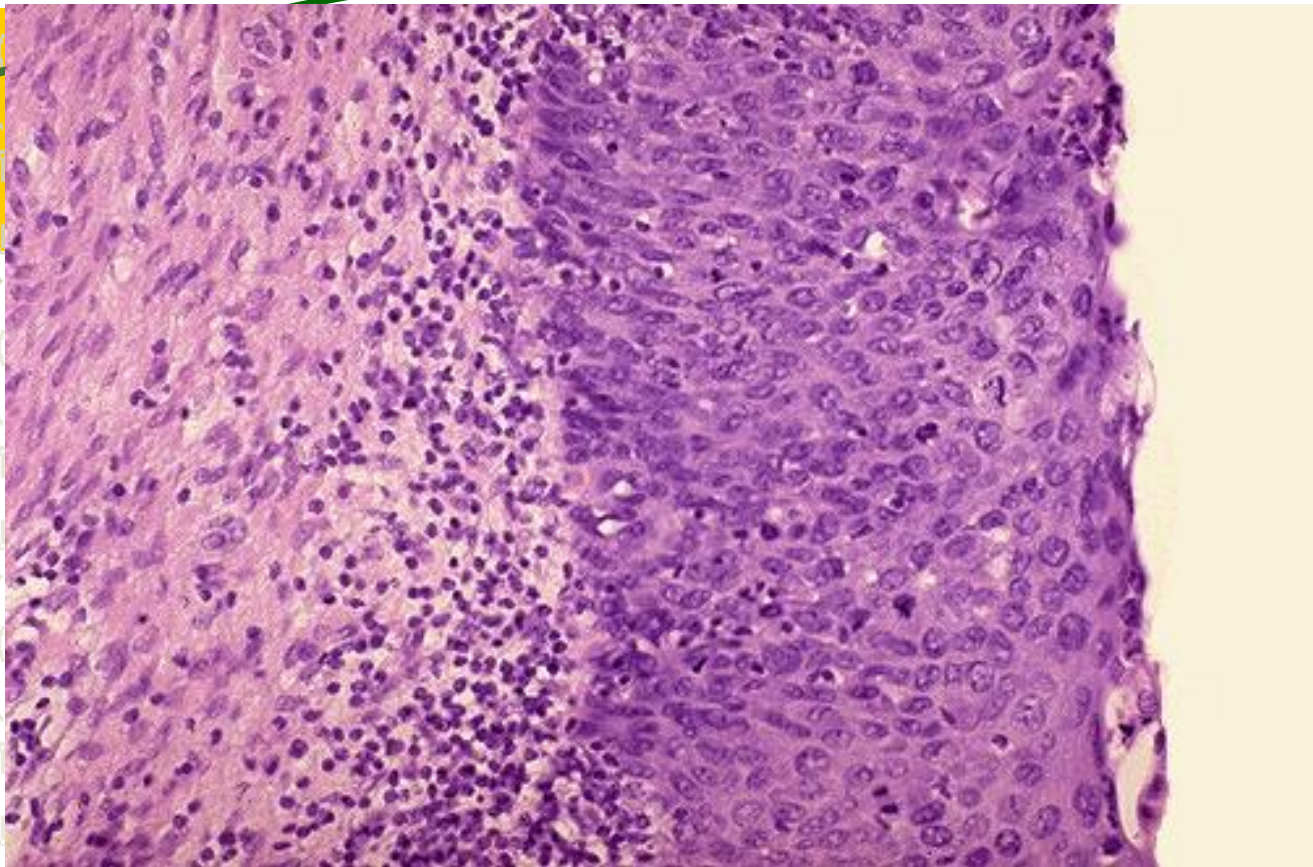


The large fronds of endometrium seen in this uterus opened to reveal the endometrial cavity are a result of hyperplasia. This resulted from increased estrogen. With hyperplasia, there is an increase in cell numbers to produce an increase in tissue size. However, the cells are normal in appearance. Sometimes hyperplasias can be "atypical" and the cells not completely normal. Such conditions can be premalignant.

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- ✦ Metaplasia – Is an adaptive change where one cell type is replaced by another adult cell type. Seen in chronic smokers due to chronic irritation. If the cause of irritation remains for still longer type it converts to a dysplasia.
 - ✦ Dysplasia – Non neoplastic proliferation of the cell with change in shape, size and orientation of the cell. It is a reversible change. But usually seen as a pre cancerous condition



This is the next step toward neoplasia. Here, there is normal cervical squamous epithelium at the left, but dysplastic squamous epithelium at the right. Dysplasia is a disorderly growth of epithelium, but still confined to the epithelium. Dysplasia is still reversible.



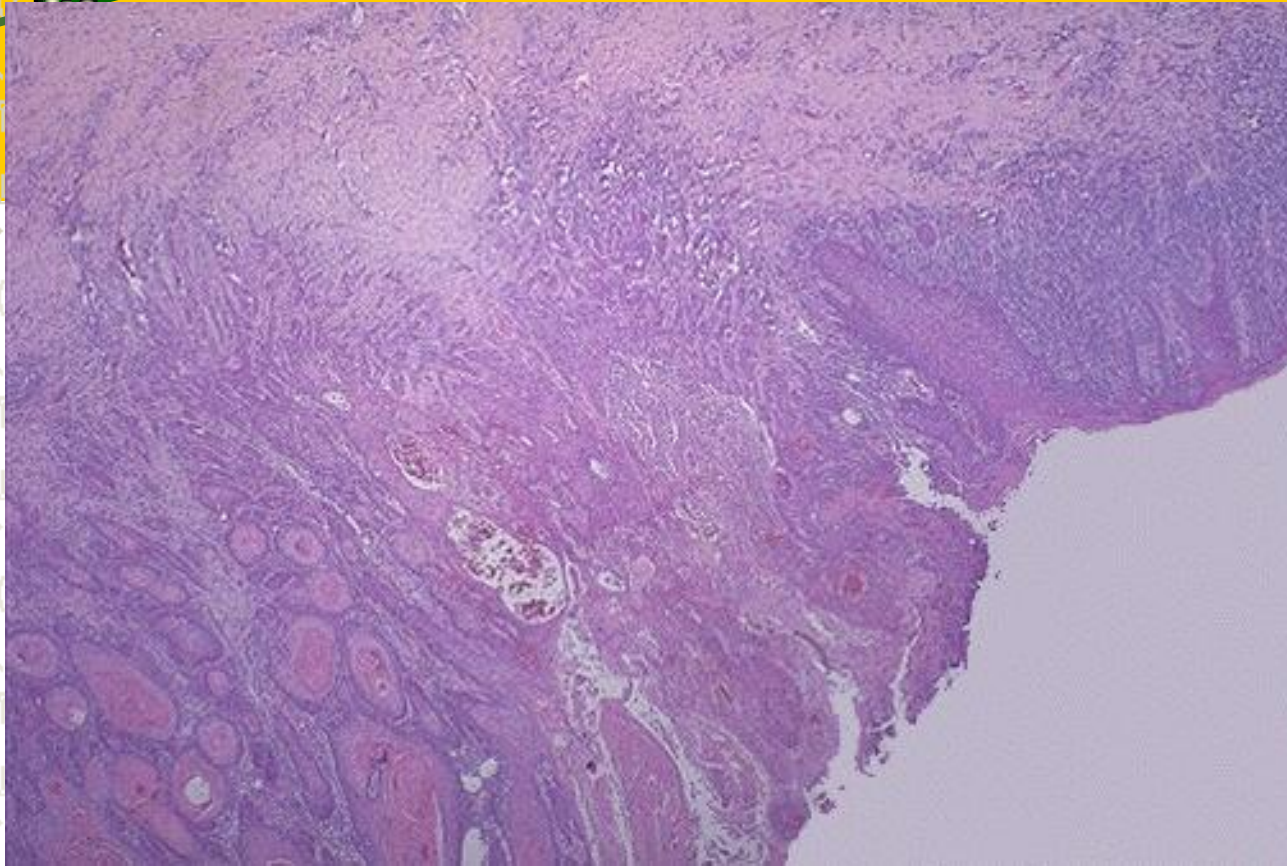
When the entire epithelium is dysplastic and no normal epithelial cells are left, then the process is beyond dysplasia and is now neoplasia. If the basement membrane is still intact, as shown here, then the process is called "carcinoma in situ" because the carcinoma is still confined to the epithelium.

Neoplasia

- ✘ Proliferates autonomously without control.
- ✘ Resembles normal cells both morphologically and functionally.
- ✘ Serves no useful function.
- ✘ They are not under the regulatory influences of the body.
- ✘ They acts as parasites.



This is a neoplasm. Neoplasia is uncontrolled new growth. Note the mass of abnormal tissue on the surface of the cervix. The term "tumor" is often used synonymously with neoplasm, but a "tumor" can mean any mass effect, whether it is inflammatory, hemodynamic, or neoplastic in origin. Once a neoplasm has started, it is not reversible.



This is the microscopic appearance of neoplasia, or uncontrolled new growth. Here, the neoplasm is infiltrating into the underlying cervical stroma.

Benign and Malignant

- Two major types of neoplasm: Benign and Malignant

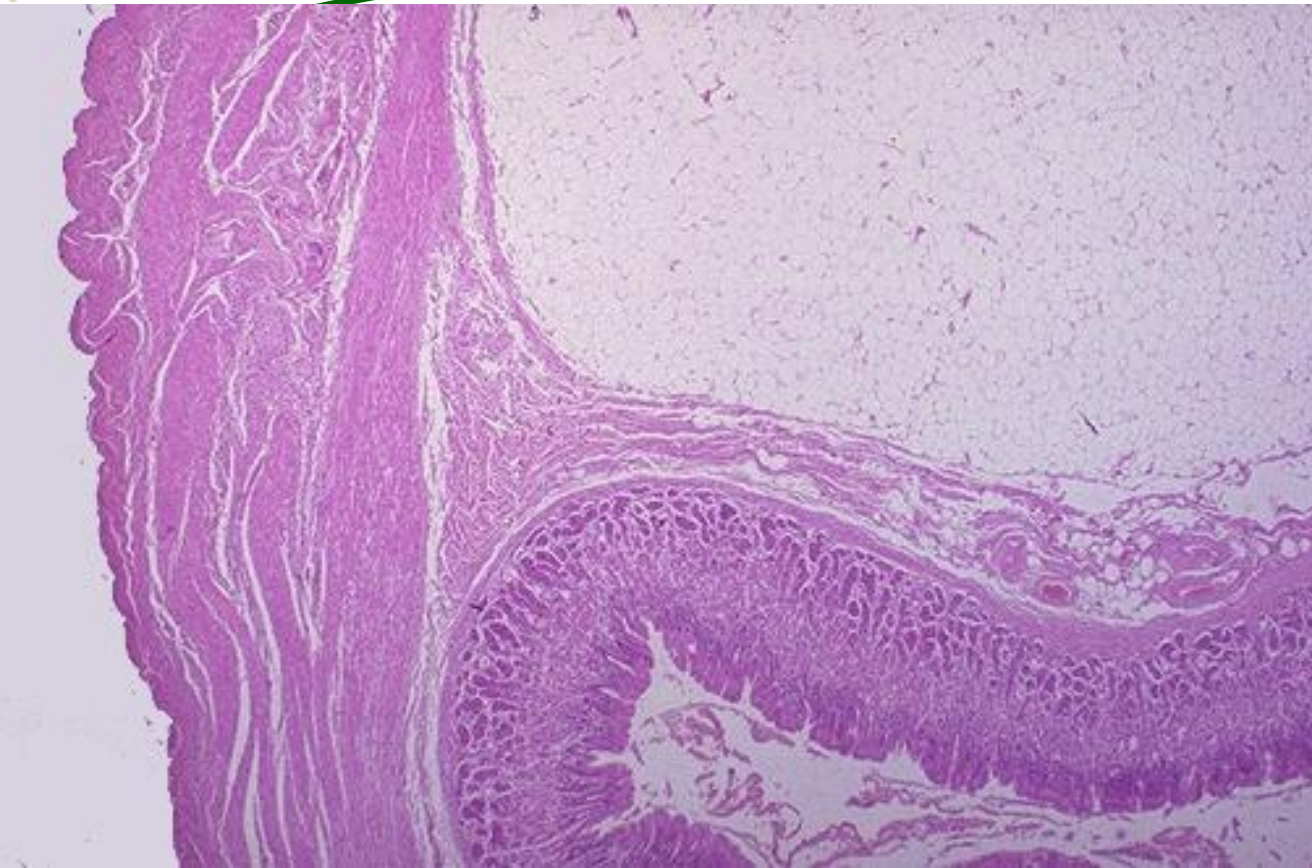
Benign:

- grow slowly
- low mitotic rate
- well differentiated
- not invasive; well-defined borders
- remain localized; do not metastasize



Of course, neoplasms can be benign as well as malignant, though it is not always easy to tell how a neoplasm will act.

Here is a benign lipoma on the serosal surface of the small intestine. It has the characteristics of a benign neoplasm: it is well circumscribed, slow growing, and resembles the tissue of origin (fat).

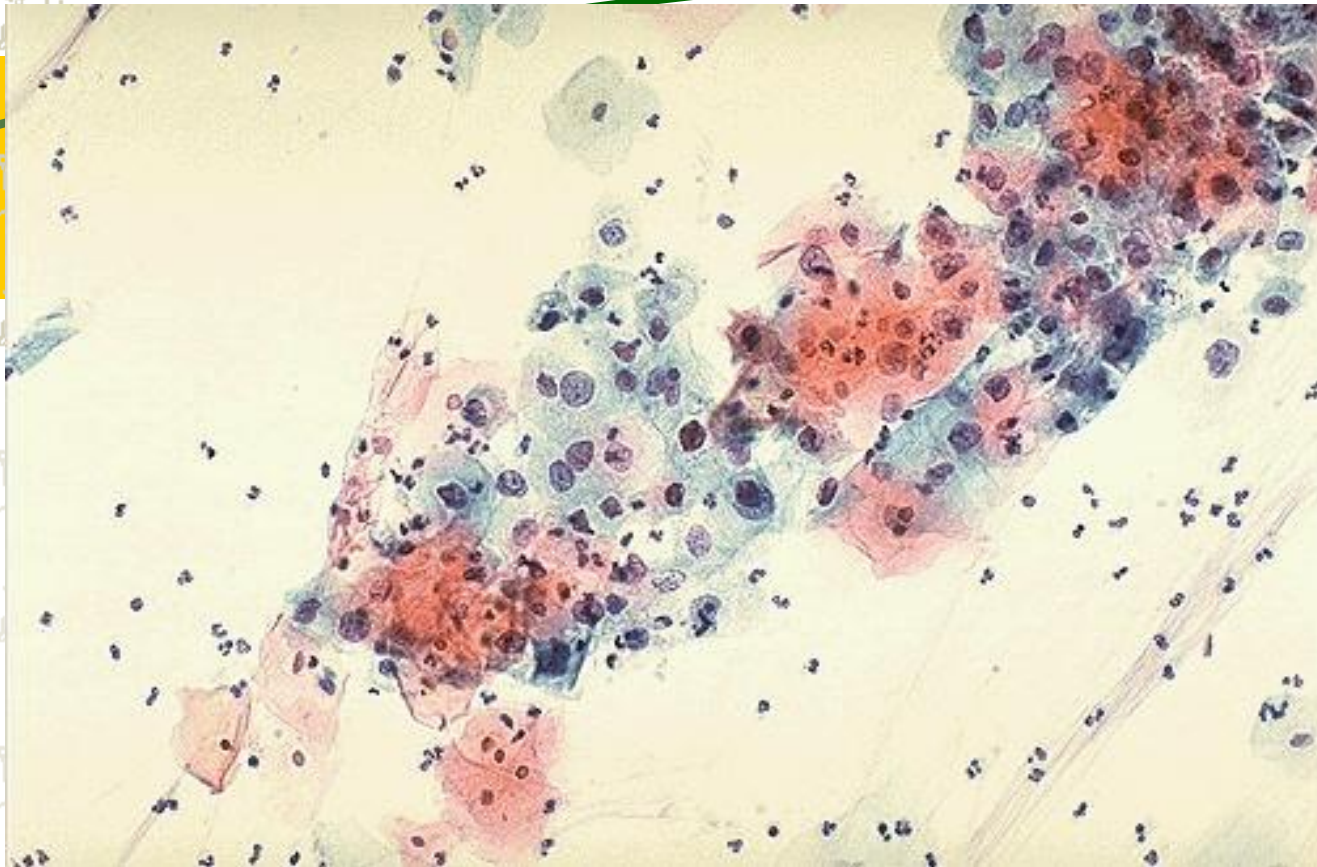


At low power magnification, a lipoma of the small intestine is seen to be well demarcated from the mucosa at the lower center-right. This neoplasm is so well-differentiated that, except for its appearance as a localized mass, it is impossible to tell from normal adipose tissue.



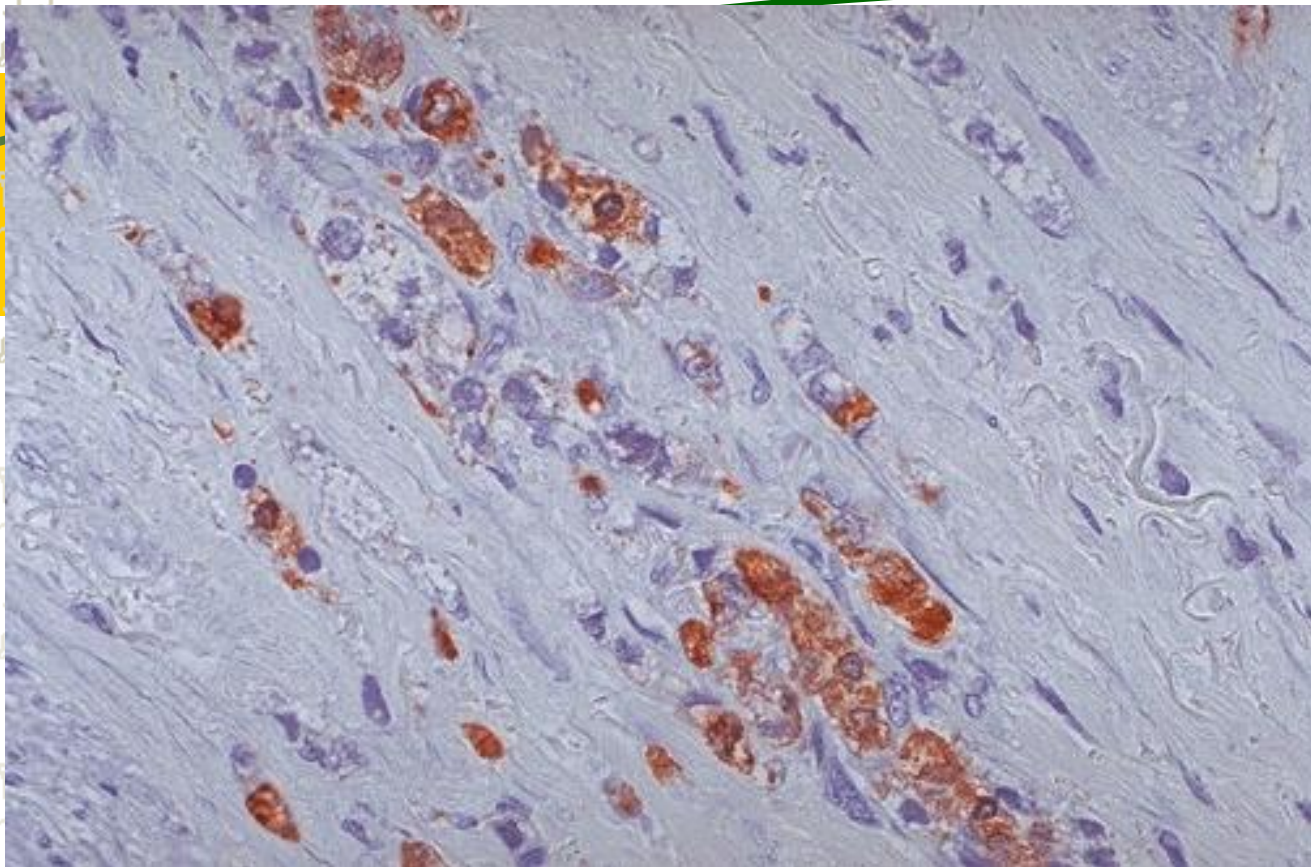
Malignant meaning cancer – from Latin for crab. They shows autonomy and anaplasia

- ✱ Grow rapidly ;
- ✱ high mitotic index,
- ✱ poorly differentiated;
- ✱ do not have a capsule;
- ✱ invade surrounding structures;
- ✱ can metastasize from the primary to a secondary site (metastasis).

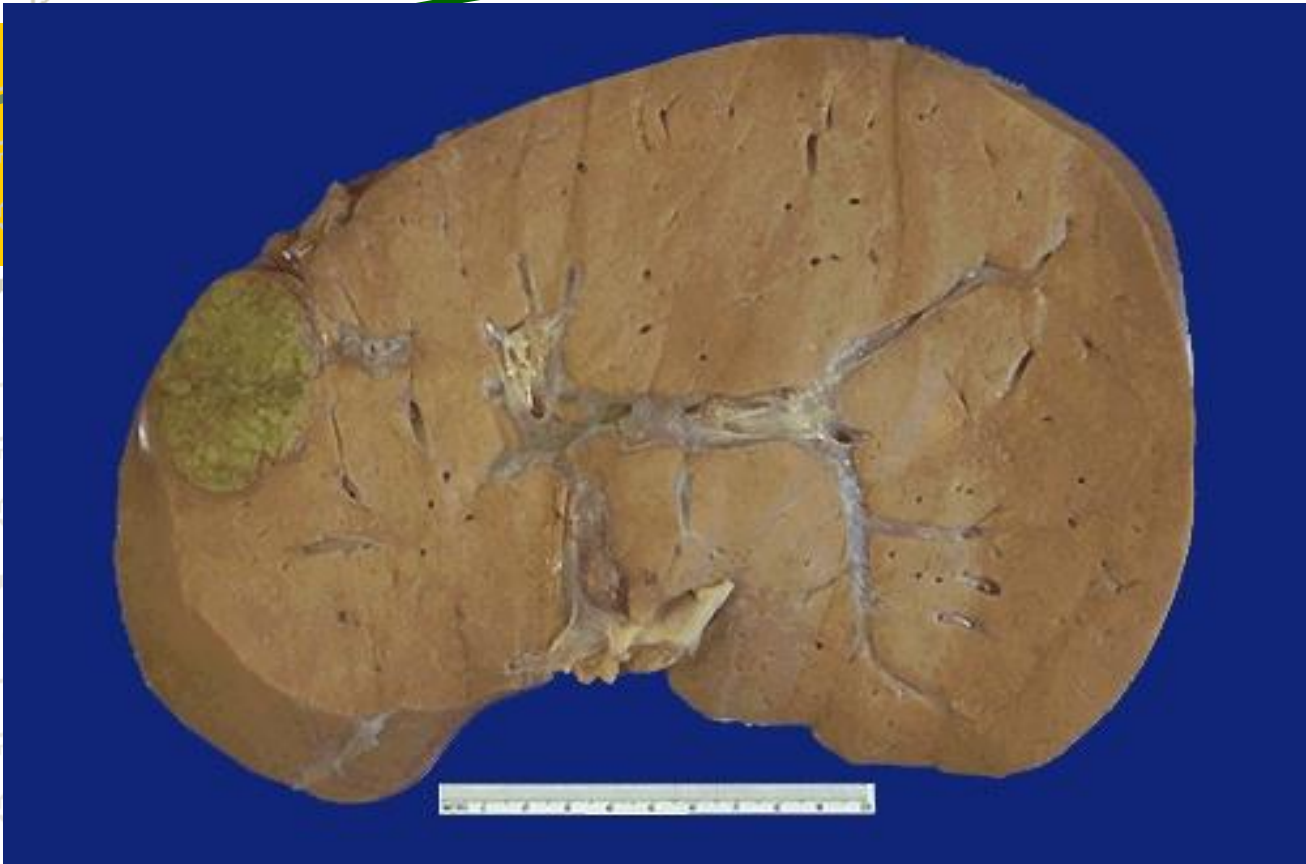


Some epithelia are accessible enough, such as the cervix, that cancer screening can be done by sampling some of the cells and sending them to the laboratory.

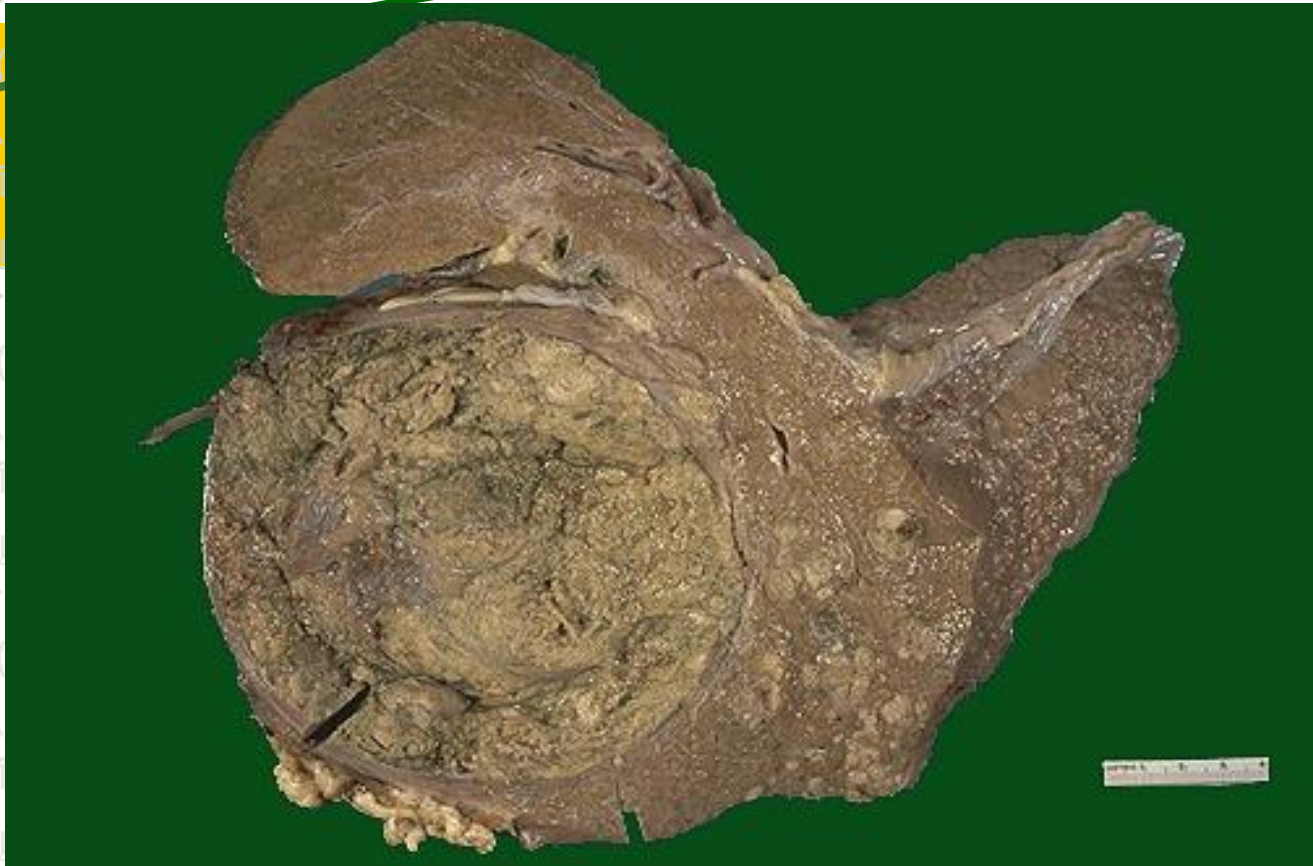
Here is a cervical Pap smear in which dysplastic cells are present that have much larger and darker nuclei than the normal Squamous cells with small nuclei and large amounts of cytoplasm.



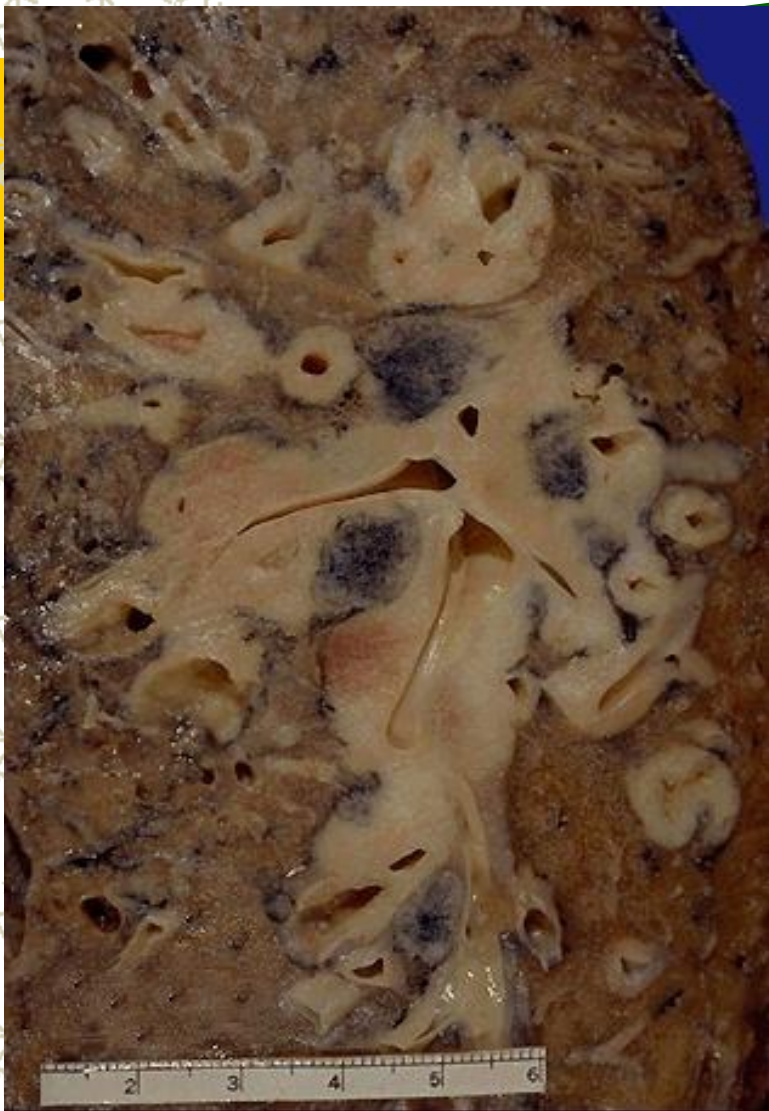
This gastric adenocarcinoma is positive for cytokeratin by immunoperoxidase. **This is a typical staining reaction for carcinomas and helps to distinguish carcinomas from sarcomas and lymphomas.** Immunoperoxidase staining is helpful to determine the cell type of a neoplasm when the degree of differentiation, or morphology alone, does not allow an exact classification.



Here is a small hepatic adenoma, an uncommon benign neoplasm, but one that shows how well-demarcated an benign neoplasm is. It also illustrates how function of the normal tissue is maintained, because the adenoma is making bile pigment, giving it a green color.



In contrast, this hepatocellular carcinoma is not as well circumscribed (note the infiltration of tumor off to the lower right) nor as uniform in consistency. It is also arising in a cirrhotic (nodular) liver.

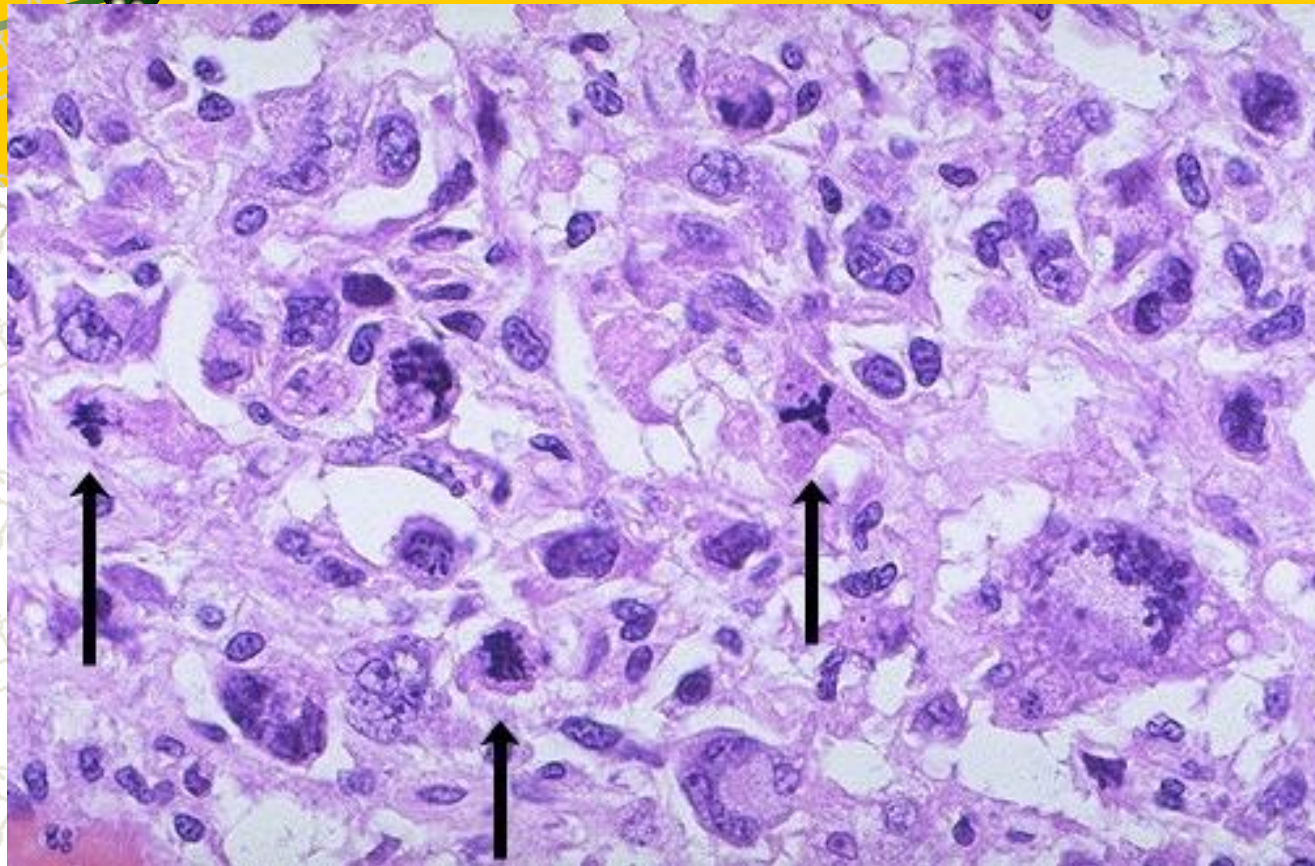


Malignant neoplasms are also characterized by the tendency to invade surrounding tissues.

Here, a lung cancer is seen to be spreading along the bronchi into the surrounding lung.



This is an example of metastases to the liver. Note that the tan-white masses are multiple and irregularly sized. A primary neoplasm is more likely to be a solitary mass. Metastasis is the best indication that a neoplasm is malignant.



Here are three abnormal mitoses. Mitoses by themselves are not indicators of malignancy. However, abnormal mitoses are highly indicative of malignancy. The marked pleomorphism and hyperchromatism of surrounding cells also favors malignancy.

Nomenclature

Benign tumor - Tissue of origin + “-oma”

Malignant tumors – use embryonic origin of tissue

---**Carcinomas** come from ectoderm and

Endoderm - epithelial and glandular tissue

---**Sarcomas** arise from mesoderm

connective tissue, muscle, nerve and endothelial tissues

● Classification is based on origin of the cells >> e.g. Connective tissue

● **Benign**

Fibroma

Myxoma

Chondroma

Osteoma

Lipoma

Malignant

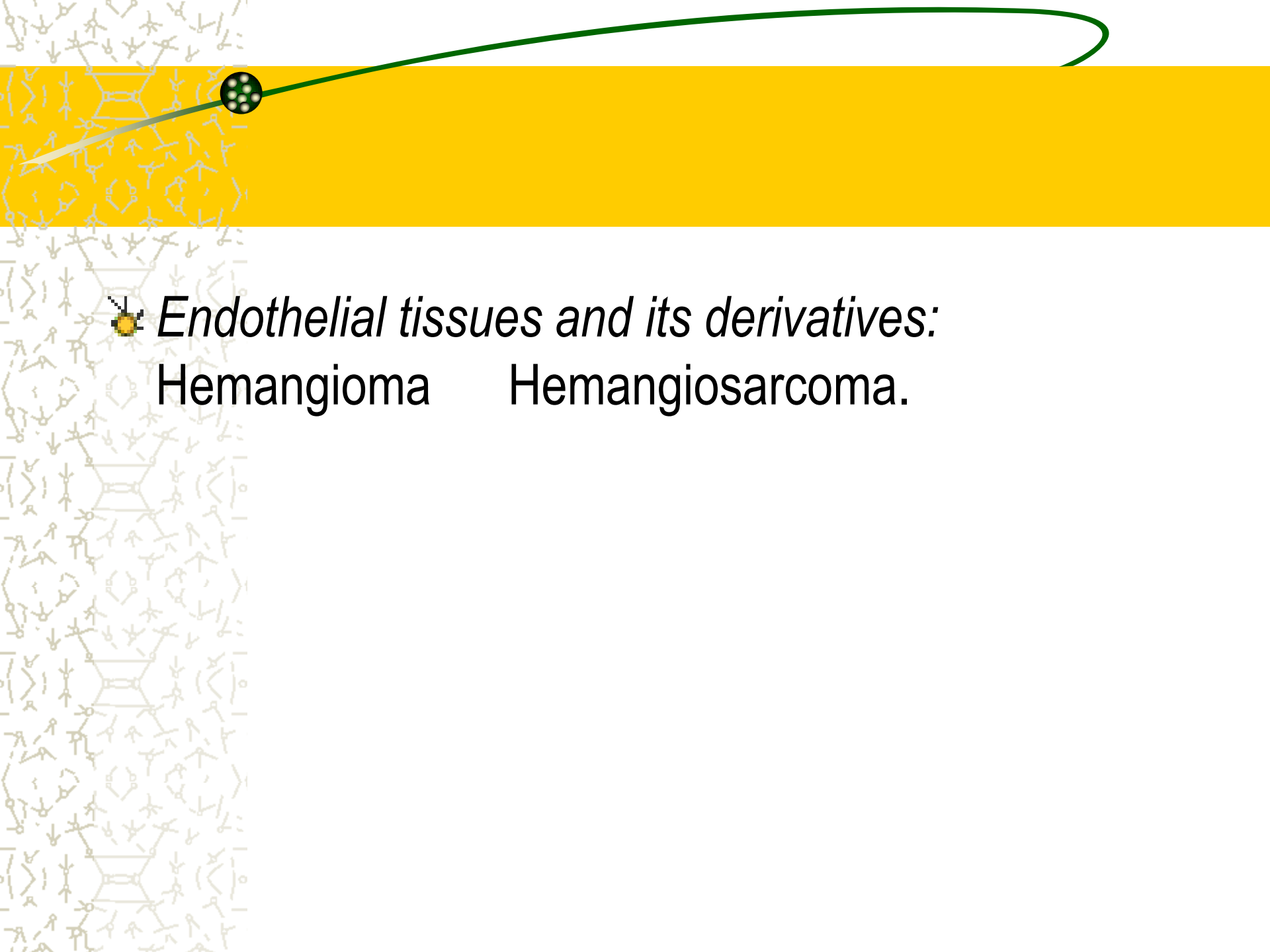
Fibrosarcoma

Myxosarcoma

Chondrosarcoma

Osteosarcoma

Liposarcoma.



• *Endothelial tissues and its derivatives:*
Hemangioma Hemangiosarcoma.



✦ Benign lymphomas

✦ Lymphosarcomas (with or without leukemia.)

✦ Myelogenic leukemia

✦ Erythroblastosis.

✦ Plasma cell myeloma etc.



• *Muscles:*

Leiomyoma

>>> Leiomyosarcoma

Rhabdomyoma

>>> Rhabdomyosarcoma.



Elements of nervous system:

Schwannoma & Malignant Schwannoma

Pheochromocytoma &

Malignant pheochromocytoma



✦ **Epithelial cells:**

Papilloma -- Squamous cell carcinoma

Basal cell tumour --Basal cell carcinoma

Melanoma --Malignant melanoma/ melanocarcinoma.

Transitional cell papilloma-- Transitional cell carcinoma.

Glandular tissue :

Adenoma ---Adenocarcinoma.

e.g.

Mammary gland adenoma- Mammary gland adenocarcinoma

Anal gland adenoma – anal gland adenocarcinoma



✿ Myoepithelioma

✿ Malignant Myoepithelioma.

✿ *Miscellaneous tumours:*

✿ Hemangipericytoma Malignant Hemangipericytoma

✿ Epulis

✿ Adenomatoma

✿ Transmissible venereal tumours

✿ Sertoli cell tumour