

**Lecture Five: Smart Medical Systems Department - Second Stage - Human Diseases /  
Cancerous Tumors  
Prof. Ph.D. Khairy Abdullah Dawood**

**M.Sc .Najat Hmeed Jasim**

**Tumors ( Neoplasia ) :** It is new growth abnormal growth of cells , uncontrolled growth ( Crazy or mad cell ).

**Causes :** The following causes of tumors that induce mutations .

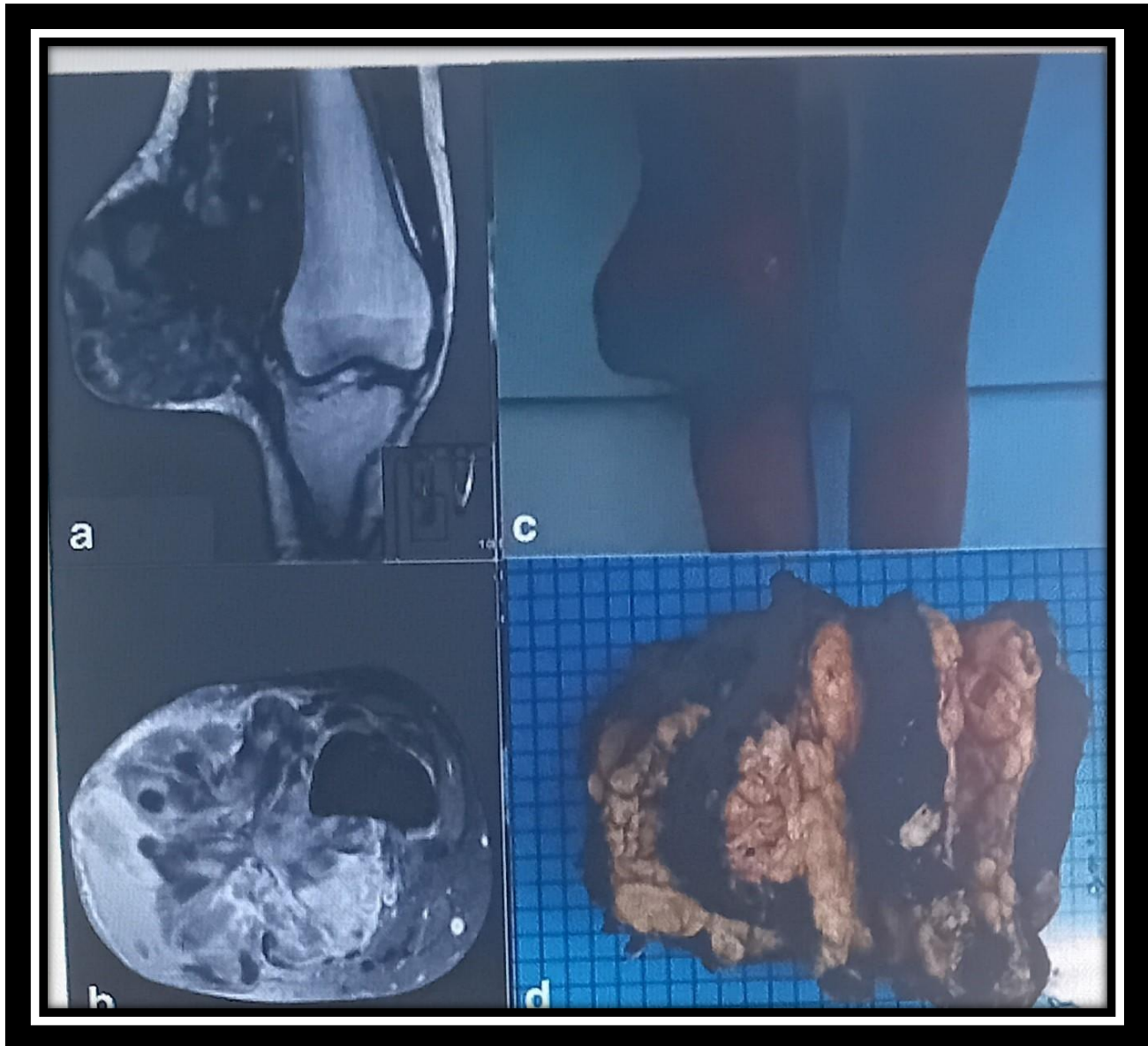
- Spontaneous errors in DNA replication , including chromosomal translocations (genetic disorder of cells ) as in repair of chronic diseases .**
- Radiations as with X- Rays and Ultraviolet.**
- Chemicals : Carcinogenic chemicals ( Hydrocarbons such as Formalin and Xylene .**
- Oncogenic Viruses : as in Hepatitis B – Virus , Pox virus , Herpes simplex .**

**Tumors Nomenclature :** Tumors divided to Benign and Malignant tumors :

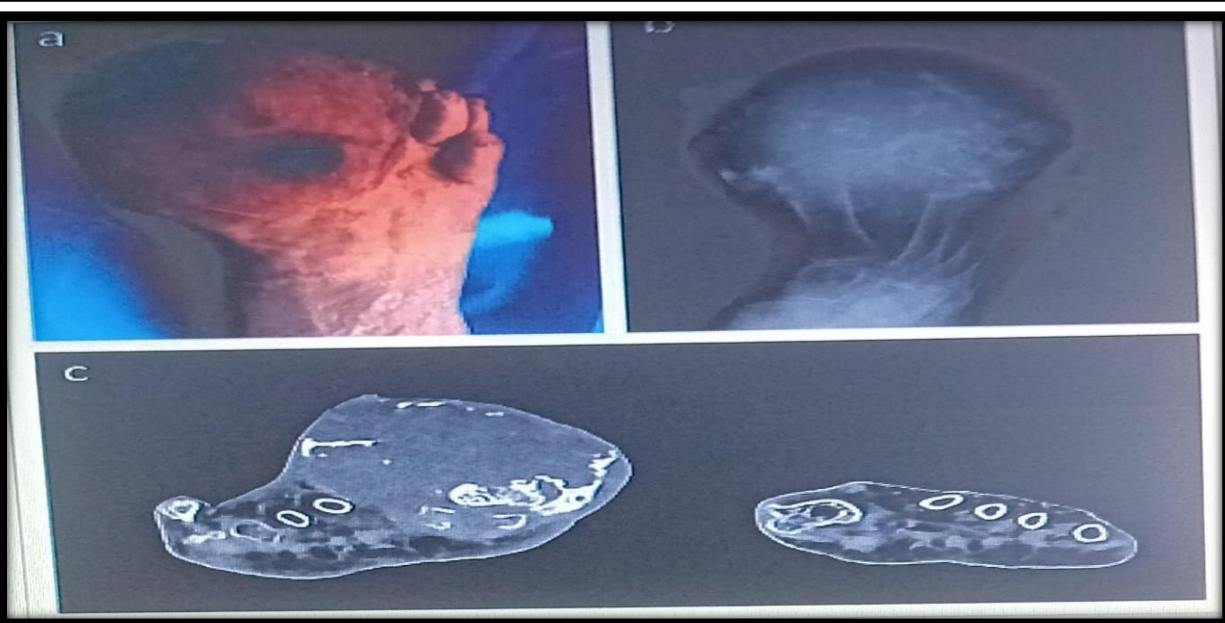
- The terms of Benign tumors ended with suffix ( oma ) such as Fibroma , Adenoma .**
- The terms of Malignant tumors ended with suffix ( Carcinoma ) It means tumors originated from Epithelial**

tissues , such as Adenocarcinoma , Squamous cell carcinoma .

– The term of malignant tumors ended with suffix ( sarcoma ) It means tumors originated from connective tissues . such as Fibrosarcoma , Osteosarcoma , Chondrosarcoma .



Cancer : It is a term used for malignant tumors only .





*papilloma*

## Comparison between Benign and Malignant .

Benign	Malignant
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- |                   |         |                     |
|-------------------|---------|---------------------|
| – Growth          | slow    | rapid               |
| – Metastasis      | No      | invasive            |
| – Shape           | regular | circular irregular  |
| – Mitotic figures | No      | high number         |
| – Blood vessels   | rare    | highly vascularized |
| – Capsule         | yes     | No                  |
- 

## Grading and staging of Cancer :

The stage of cancer describes its size , spread or not , from where started ? .

Grade X isn't known

Grade 1 : Well differentiated and tumor cells like normal Grade 2 : Moderately differentiated / intermediate grade . Grade 3 : Poorly differentiated / tumor cells not similar

To normal / high grade .

Grade 4 : Undifferentiated cells / high grade .

Tumors Occurrence :

There are many factors play important role in occurrence of Tumors ??

– **Age:** In general the frequency of cancer increases with age between 55 - 75 years , the rate declines with population after 75 years old . More than 10 % in children below 15 years old ( Leukemia, Lymphoma , bone sarcoma ) .

– **Sex :** There are some differences between male and females tumors . Prostate tumors 28 % in males ( highest tumor ) while Breast tumors were 28 % in females

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– **Heredity :** There are many types of cancer influenced by hereditary predisposing factors in the same family .

– **Environmental factors ,** for example death due to breast cancer in Europe more than in Japan . Sometimes dietary ( Food ) led to Colon cancer .

**Tumor Markers :** It is a substances found in blood , urine , body tissues .

It is refer to proteins that are made by healthy cells and cancer cells . It has relation to mutation , changes in DNA

( Tumor markers also called biomarkers ) .

High level of these substances help in diagnosis and treatment of cancer ( Chemotherapy or immunotherapy ).

Carcinogenesis : ( Oncogenesis) , Formation of cancer , It is a process triggered produce mutation , transformed normal cell to cancer cell .

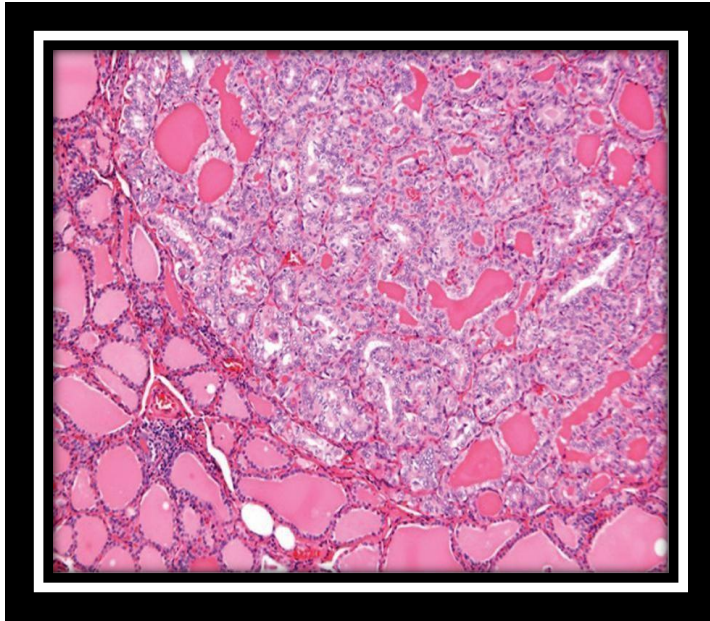
### **Irradiation effects**

It depend on size of dose of radiation and time of exposure .

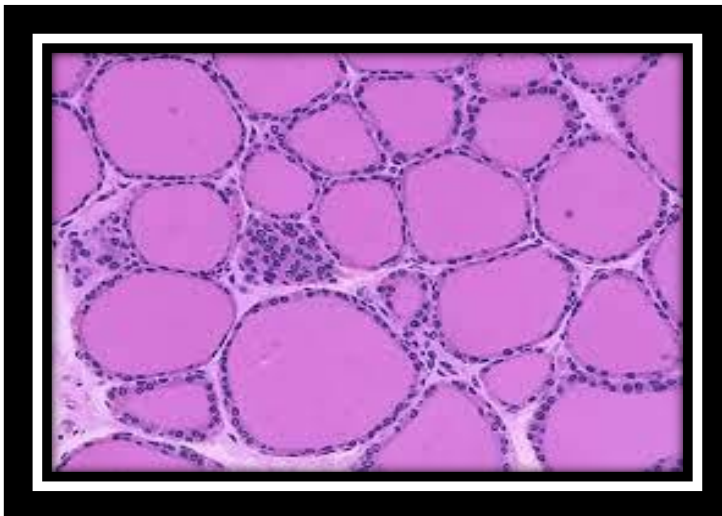
At 1000 – 5000 rem would do immediate damage to blood vessels ,heart failure then death .

Hair losing quicly at 200 rem . Damage of brain cell .

Thyroid Susceptible to radioactive Iodine .



Adenocarcinoma in thyroid gland



Normal histology of thyroid gland