Tanta University
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Chemistry Department

Medical Applications of Nuclear Chemistry
"Cancer treatment "

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Medical Applications of Nuclear Chemistry

- Cancer treatment
- Sterilization
- Radio-Immuno- Assay
- Radiation scanning

Cancer

- *Is a disease where cells grow out of control and damage the healthy cells.*

Treating cancer

- The radiation can damage the cancer cells when it gives of large amounts of energy like: gamma photons .

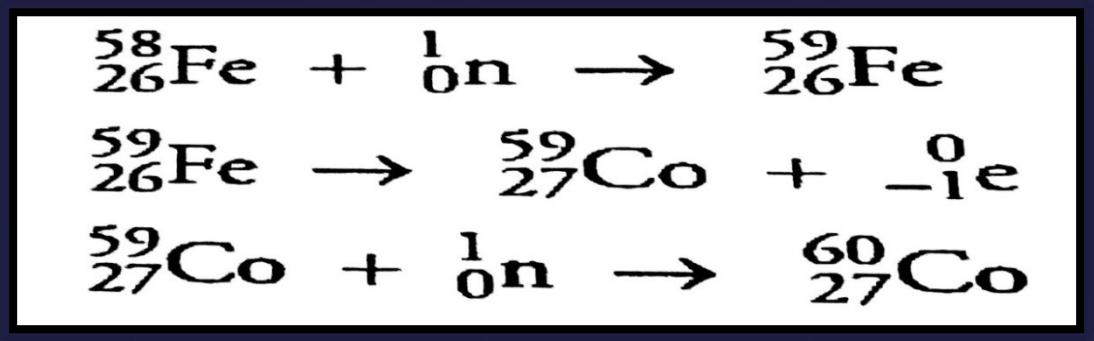
- There are two type to use the radiation to damage the cancer cells:

  1) External beam radiation:

  - use low amount of energy radiation, focuses it on the cancer cells and we can used to treat the skin cancer .

2) Internal beam radiation:

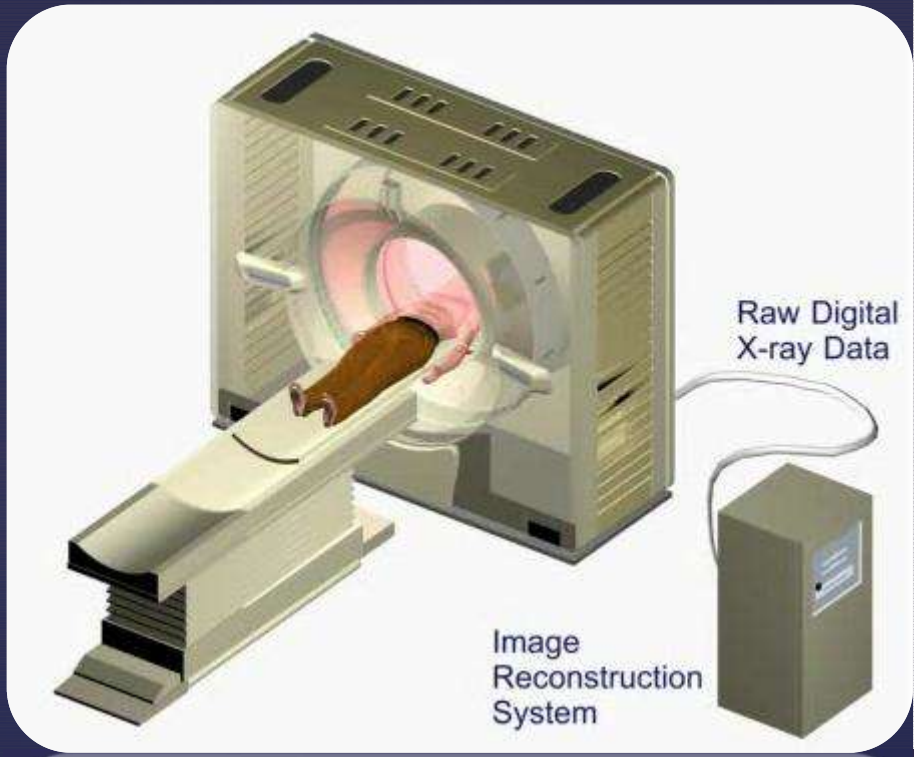
- in which we use radioactive materials (to be injected in the cancer cell) that have short half life time. e.g. ^{60}Co.
- ^{60}Co can be obtained from ^{58}Fe



- ^{60}Co produce gamma photons that are directed at tumor cells.
- The ions and free radicals that the gamma photons produce inside the tumor damage its cells.
- Internal beam radiation can be used for eye, head and neck cancers

(1) *Planning* Room

- It is a very modern device which gives a very accurate high quality images.
- This device is provide with three laser devices which directed on the patient's body to the places of tumor with high accuracy .
- With these images and with use of the computer , we can determine the angles that we need to directed the radiation on the tumor



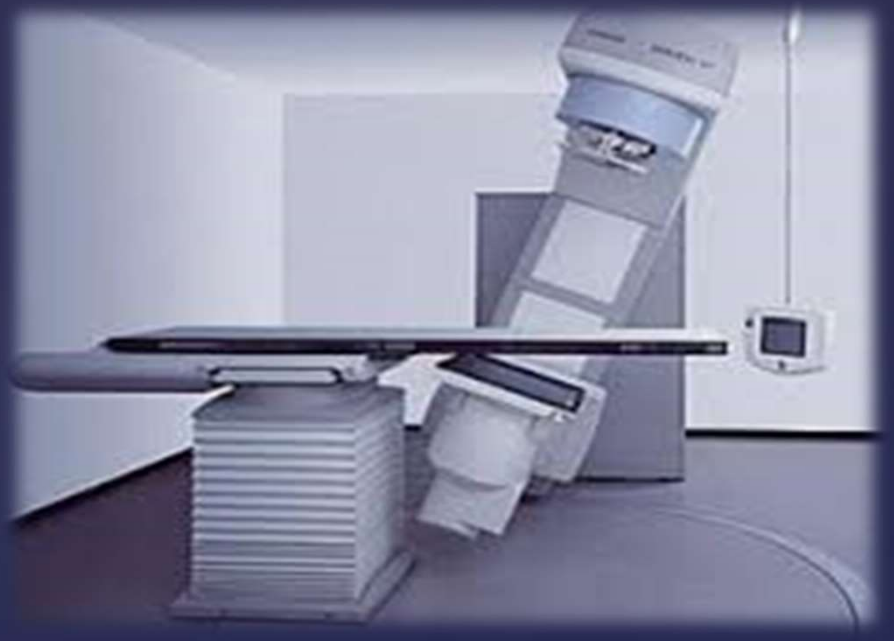
CT - scan

I M R T

- It is "Intensity Modulated Radiation Technique".
- This technique used to show the size and shape of the tumor.
- This technique reduces the damage to neighboring healthy tissue tumor.
- Through this technique we determine the amount of radiation needed to treat .

(2) Central Treatment Room

- It is a device which gives the gamma rays on the patients body .
- Through this device we can control in the intensity of gamma rays.
- Inside this device ,there is a tomography which takes pictures from all directions to know us , if the directed of the rays is correct or wrong.



Linear Accelerator