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Q No 1, What are the side effects of Therapeutic radiology on Human Body?

ANS: Therapeutic Radiology side effects:

IT is very important to remember that every person reacts differently to a treatment. Any side effects you might have depends on the type and location of cancer. Some people have few or no side effects, while have a quite few

How long do side effects last?

Remember that the type of radiation side effects might have depends on the prescribed dose and schedule. Most side effects go away with a few months of ending treatment.

because it take time for the healthy cells to recover from radiation.

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Side effects might limit your ability to do things. What you can do will depend on how you feel. Some patients are able to go to work or enjoy leisure activities. They get radiation therapy.

Early Side Effects

Happen during a short treatment. These side effects tend to be short time mild and treatable. They are usually gone with a few weeks after treatment ends. The most common early side effects are fatigue (feeling tired) and skin changes. Other early side effects usually related to the area being treated. Such as hair loss and mouth problems and when radiation treatment is given to this area.

Late Side Effects:

Late side effects can take months or even years to develop. They can occur in

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any normal tissue in the body that has received radiation the risk of late side effects depends on the area treated as well as the radiation dose. That was used careful treatment planning can help avoid serious & long term side effects. It's always best to talk your radiation oncologist about the risk of long term side effects.

Treat these side effects:

Yes, your health care team can help you prevent or treat many side effects. Preventing and treating side effects is an important part of cancer treatment. This is called (Palliative Care) or Supportive Care.

Q No 2: What do you know about Linear Accelerator works?

Linear Accelerator used for External-beam Radiation Therapy. Many types of external-beam radiation therapy are delivered using a machine called a Linear Accelerator (also called a Linac). A Linac uses electricity to form a stream of e^- moving superluminally particles. This creates high energy radiation that may be used to treat cancer.

Patients usually receive external-beam radiation therapy in daily treatment sessions over the course of several weeks. The number of treatment sessions depends on many factors including the total radiation that will be given. One of the most common types of external-beam radiation therapy is called three-dimensional conformal therapy. 3D CRT. 3D CRT uses very sophisticated computer software and advanced treatment machines to deliver radiation to very precisely shaped target areas.

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many other methods of external beam radiation therapy are currently being tested and use and cancer treatment - these methods include intensity modulated radiation therapy. IMRT.

IMRT uses hundreds tiny radiation - beam shaping devices called collimators. This deliver a single dose of radiation - the collimator can be stationary or can move during treatment allowing the intensity of the radiation - beams to change during treatment session. This kind of dose modulation allow different areas of a tumor are nearby tissues to receive different dose of radiation. Unlike other types of radiation therapy. IMRT is planned in reverse (called inverse treatment planning).

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Q No 3:- Write the interconnection of matter photoelectric effect and Compton effect.
Ans:- Photoelectric Effects:-

The ejection of electrons from a metallic surface when the light of suitable frequency is allowed to fall on the surface.

Work function:- The work function is the energy required to remove an electron from the highest filled level in the Fermi distribution of solid metal.

Last of photoelectric effects:-

Photoelectric effect is directly proportional to intensity.

If the frequency of the incident light is less than threshold frequency, then no electron is ejectable. No matter what the intensity.

The maximum kinetic energy of the electron depends on the frequency of incident light. The selection wave

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emitted immediately no time lag. @

Einstein's Equations for the photoelectric effect:-

cc Einstein's interpretation of the photoelectric effects results in the equation which are valid for visible and ultraviolet. Light energy photon = energy needed to remove and electron + kinetic energy of the emitted electron.

$h\nu = W + E$. where h is Planck's constant ν is the frequency of incident photon @ W is the work function which is the maximum energy required to remove and electron from surface of given metal E is the maximum kinetic energy of ejected electron's

$h\nu_0$ is the minimum kinetic energy of ejected electron's

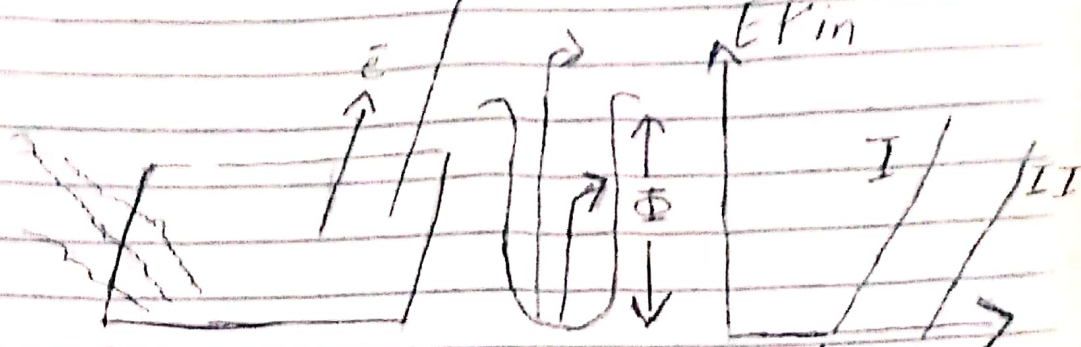
ν_0 is the threshold frequency for the photoelectric effect.

M is the rest mass of the ejected electron.

v is the speed of the ejected electron.

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The particle nature of light



$E_{\text{photon}} = h\nu$ $E_{\text{kin}} = h\nu - \Phi = h\nu - h\nu_0$

Compton effect is the name given by the physicists to the collision between photon and an electron. The photon bounces off a target electron & loses energy. These collisions referred to as alastic collisions with the photoelectric effect when gamma rays pass through matter. Photon as projectiles and the electrons as targets.

The effect was discovered in 1922 and by the American physicist Arthur H. Compton.

Compton received the Nobel Prize in physics in 1927.

He demonstrated the particle nature of electromagnetic radiation. and was a sensational discovery at the time.

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Q No 4: Write note on
Brachytherapy?

ANS: Brachytherapy is
a type of radiation
therapy used for to
treat the cancer. It
places radioactive
sources inside the
patient to kill cancer
cells and shrink tumors.
This allows the doctors
to use a higher dose
of radiation to treat a
smaller area in less
time.

The doctor will tell
how to prepare and
whether you will need
medical imaging. The
doctor may use the
computer program to
plan your therapy.

Brachytherapy treats
cancer throughout the body
including the
i.e. (1) prostate (2) cervix (3) skin
(4) head and neck (5) breast

Pg (10)

(5) Gall bladder (7) Uterus
(8) Vagina (9) Lung (10) Rectum
(11) Eye.

Brachytherapy is seldom used in children.

However Brachytherapy has the advantage of a high localized dose of radiation. This means that less radiation is delivered to surrounding tissues. This significantly decreases the risk of radiation induced second malignancies, a serious concern in children. The treatment is most often used for pediatric cancer (Rhabdomyosarcoma).

What equipment is used?
The type of radioactive material used (Iodine, Palladium, Cesium or Iridium) depends on the type of treatment. The radiation dose is encapsulated. This means it is enclosed within a non-radioactive metallic capsule often referred to as a seed. This helps prevent the material from moving to other parts of the patient's body.

Q No 5 :- Explain how volumetric modulated arc therapy work for the cancer body?

Ans- Volumetric Modulated Arc Therapy (VMAT) :-

Volumetric modulated arc therapy (VMAT) is a novel radiation therapy technique that delivers therapy that radiation dose continuously as the treatment machine rotates. This technique accurately shapes the radiation dose to the tumour while minimising the dose to the organs surrounding the tumour.

VMAT used for :-

VMAT is particularly useful for delivering radiation therapy to tumours near sensitive body organs, and can be an effective treatment for many types of cancer.

What does VMAT Mean :-

VMAT is a planning and treatment is technically demanding and requires a high level of precision. The VMAT procedure typically takes around 20 minutes. Much like a three-dimensional

Conformal treatment. At this time is positioning accurately, X-ray images are taken daily to check that everything is lining up as planned and then treatment can be given. VMAT uses the same type of radiation as other radical therapy treatments.

The VMAT TEAM:

Treatment is planned and delivered at four of our Peter Mac radiation therapy sites.

Melbourne, Monabbin, Sunshine and Bendigo.

A team of specialise are required to plan and deliver VMAT, including radiation oncologists, radiation therapists and medical physicists. You will also be supported by a range of other professionals including nurses and allied health practitioners.

The Peter Mac radiation therapy team is proud to offer this treatment and we are dedicated to developing progressing treatment

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options for the people
of victoria.

please speak to
your doctor to determine
if ~~the~~ what is the
appropriate treatment &
choice for you.