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Radiation: Cure or Killer

 Radiation is a constant presence in our lives. The air we breathe daily is filled with radiation, but in recent years scientist have found new uses for this energy. Medical technology has advanced to the point where radiation is used as a treatment for diseases such as cancer. What is radiation and why is it used in the treatment of cancer? While it is known too much radiation can influence major organs,the treatment stops the cancerous cells from dividing, because radiation therapy is a highly targeted treatment, aimed accurately and directly at the cancer wherever it might be in the body, and the treatment also relieves the pain and other symptoms by killing the tumor.

 “Radiation is energy that travels in the form of waves (electromagnetic radiation) or high-speed particles” (Ronaca, Debra). There are three levels of radiation depending on their penetration level. “Alpha radiation is the least penetrating. It can be stopped (or absorbed) by a sheet of paper.” (BBC). This type of radiation cannot penetrate the skin therefore having no harm to major organs. The next level is Beta radiation. “Beta radiation can penetrate air and paper. It can be stopped by a thin sheet of aluminum.” (BBC). Then the last level of radiation is Gamma radiation. “Gamma radiation is the most penetrating. Even small levels can penetrate air, paper or thin metal. Higher levels can only be stopped by many centimeters of lead, or many meters of concrete.” (BBC). All these levels have different jobs.

 Alpha radiation is not normally used in treating cancer. This small amount of radiation is not able to penetrate human skin making it useless to cure a disease inside the body. Though alpha radiation cannot enter the body through the skin, however, “if an alpha emitting substance is ingested in food or air, of causing serious cell damage”. This type of radiation though the amount is small does not mean it couldn’t do some harm. Alpha radiation is used to create chemical reactions to trigger different machines. “Radioactive americium releases **alpha radiation**, which ionizes the air inside the detector. Smoke from a fire absorbs alpha radiation, altering the ionization and triggering the alarm.” (BBC).

 Beta radiation is also not used in the treating of cancer, but it is used in the medical field. “Beta radiation is used for tracers and monitoring the thickness of materials” (BBC). In the medical field tracers help doctors to diagnose a patient so that they get the necessary treatment needed. “Some tracers employ molecules that interact with a specific protein or sugar in the body and can even employ the patient’s own cells. For example, in cases where doctors need to know the exact source of intestinal bleeding…” (NuclearMedicine). Beta radiation is also used in an industrial way. “Radiation is used in industry in detectors that monitor and control the thickness of materials such as paper, plastic and aluminum. The thicker the material, the more radiation is absorbed and the less radiation reaches the detector. It then sends signals to the equipment that adjusts the thickness of the material. Check your understanding of this by watching the simulation” (BCC).

 The third type of radiation is called Gamma radiation. Gamma is a type of radiation that is used in the cancer treatment process. “Gamma rays can kill living cells, they are used to **kill cancer cells** without having to resort to difficult surgery” (GammaRays). Gamma rays are found in different machines such as X-rays and MRIs. Gamma radiation is the most powerful type of radiation and can penetrate through many metals. “Gamma waves can be stopped by a thick or dense enough layer material, with high atomic number materials such as lead or depleted uranium being the most effective form of shielding” (Mirion). If gamma radiation is the most powerful and can only be stopped by a thick, dense metal, is this radiation safe to use as a treatment. With gamma radiation being very radioactive what made is become a choice in treating cancer safely.

 “At the beginning of the 20th century, shortly after radiation began to be used for diagnosis and therapy, it was discovered that [radiation could cause cancer](https://www.cancer.org/cancer/cancer-causes/radiation-exposure.html) as well as cure it” (Evolutionofcancertreatments). There are many cases in which radiation therapy is used. This treatment could also be used along with other treatments. “Most often, you will have radiation therapy with other cancer treatments, such as [surgery](https://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=CDR0000045570&version=Patient&language=English), [chemotherapy](https://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=CDR0000045214&version=Patient&language=English), and [immunotherapy](https://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=CDR0000045729&version=Patient&language=English). Radiation therapy may be given before, during, or after these other treatments to improve the chances that treatment will work. The timing of when radiation therapy is given depends on the type of cancer being treated and whether the goal of radiation therapy is to treat the cancer or ease symptoms” (RadiationTherapy). With most treatments, radiation therapy comes with its side effects. “Radiation not only kills or slows the growth of cancer cells, it can also affect nearby healthy cells. Damage to healthy cells can cause [side effects](https://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=CDR0000046580&version=Patient&language=English)” (RadiationTherapy). Most of the side effects include Fatigue, nausea and vomiting, and hair loss etc.

Cancer will affect most people in a lifetime and with different treatments available which is the safest and most affective in securing the cancer from returning. With radiation therapy becoming popular within the 20th century, it has brought up many questions on if radiation therapy is safe. Doctors and scientist have and are currently researching all possible harmful cases in the usage of radiation therapy. Is radiation therapy harmful? As of now no one knows for sure, but it has shown affective up until now. With radiation being used in different medical machines how harmful could radiation be if people are being exposed to it through doctors orders. Radiation used in the industrial stand point could become more harmful to humans down the line, because of all that is being released into the atmosphere. If radiation is in the atmosphere and is being inhaled by humans daily, is radiation that harmful or is the future children going to have built up an immunity to radiation.

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