

## Radiation Therapy:

### What is it?

1. IT IS CONTROLLED RADIATION. It is not like Hiroshima or Chernobyl. These two horrors are good examples of UNCONTROLLED radiation.

2. Radiation therapy (also known as radiation oncology) is a medical specialty. Physicians who study radiation oncology learn how to use a variety of types of radiation and apply this powerful natural energy to control disease, primarily cancers.

### So what exactly is therapeutic radiation?

Radiation is a form of energy: It is in the same family of energy as light, radio signal waves, microwaves, or ultraviolet rays. All of these types of energy are known as

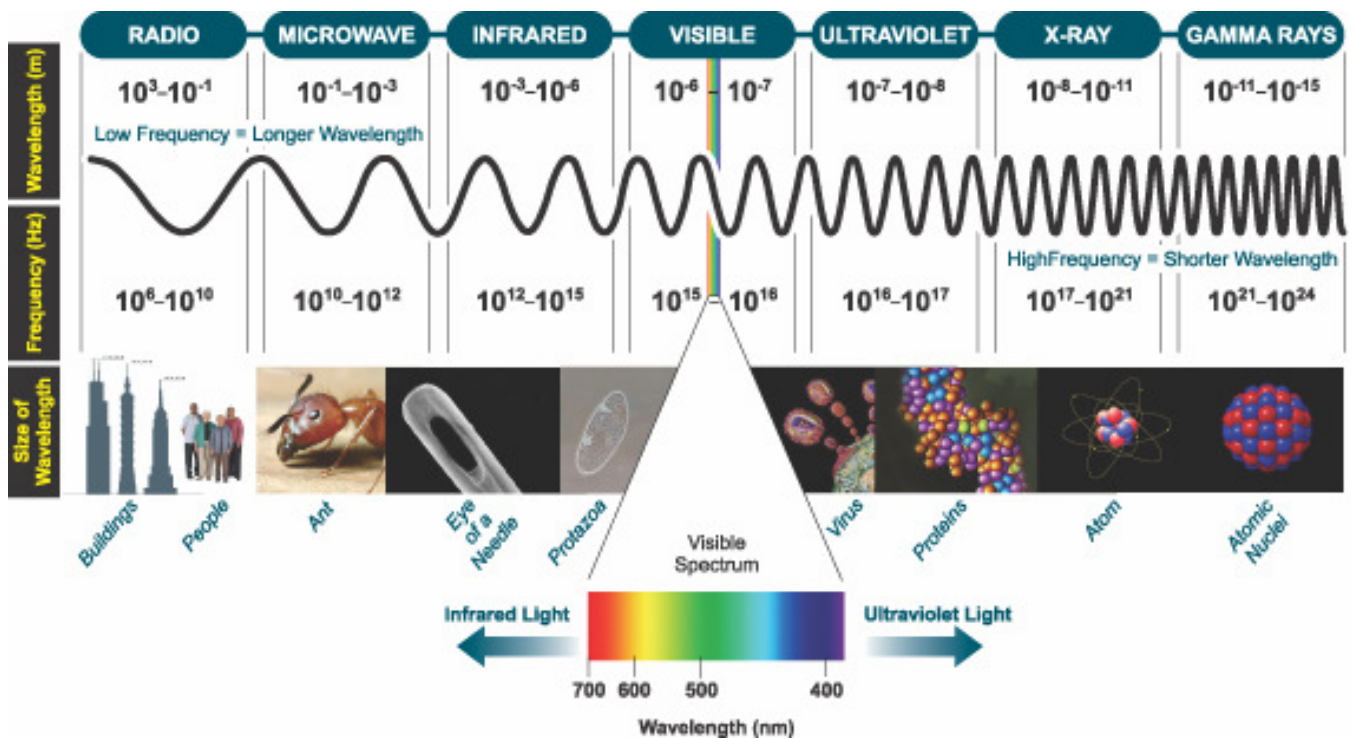
**ELECTROMAGNETIC ENERGY.**

Let's look at the **ELECTROMAGNETIC ENERGY SPECTRUM**

Type of Energy	Amount of energy it has	Length of the energy waves	What kind of effects can it have on Humans?
<b>RADIOWAVES</b>	Very very low	Extremely long	We cannot perceive them, and they do not effect us. They pass around us, and work when they are picked up by a radio receiver, which then translates them into sound.
<b>MICROWAVES</b>	Very low	Long	These have enough energy that they can heat up water. Our microwave ovens produce them, and we can control them with the dials or buttons on the machine. Can they hurt humans? Well we've all heard about the poodle...
<b>INFRARED</b>	Low	Shorter	These have enough energy that they produce heat. They certainly can burn human tissue.
<b>VISIBLE LIGHT</b>	Low	Even shorter  Red light has longest wavelength (so it is close to infrared) Violet has the shortest (so it is close to ULTRAVIOLET)	Depending on the length of the waves, we see different colors—the color of a prism Red , orange, yellow, green, blue, indigo, violet.  Other than affecting our vision, visible light has no biologic effect on our tissues.
<b>ULTRAVIOLET RAYS</b>	More powerful	Much shorter wavelength These are the energy (rays) waves in sunlight. They can burn our skin and mutate our skin cells to cause skin cancer	

**THE “RADIATION “ FORMS OF ELECTROMAGNETIC ENERGY:**

<b>X-RAYS</b>	Very powerful	Very, very short wavelengths  <b>Radiation made by electrical machines</b>	In the thousand-volt strength (kilo voltage) we use these to take X-ray pictures. In the Million-volt strength (megavoltage) we used them to kill cancer cells.
<b>GAMMA RAYS</b>	Very powerful	<b>The same as x-rays</b>  <b>These are wave energy released directly from radioactive material that may be naturally made in nature— such as uranium, or man-made-- as plutonium</b>	There are a large number of natural and man-made radiation products (we call them radio-isotopes). Some have the right type of energy that they can be used for cancer therapy, or nuclear medicine scans.



So it is the x-rays and gamma rays that are powerful enough packets of energy cause damage to living tissue. We call these types of radiation “IONIZING RADIATION”.

The term “ionizing” means that the energy is powerful enough to cause changes in the actual molecules of the tissues that are hit with the radiation.

Part Two will discuss how radiation therapy kills cancer cells.

Thanks,

Dr. Marge Barnes