



Al- mustaqbal University College
Anesthesia Techniques Department
First stage /medical physics

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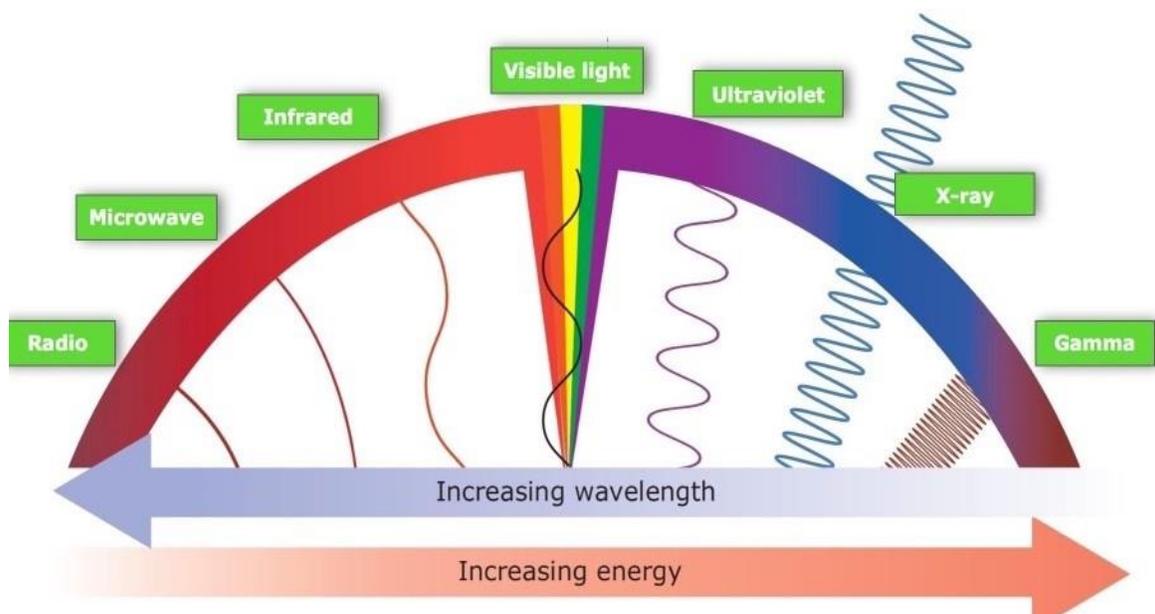
Light in medicine, sound in medicine

Electromagnetic radiation is the movement of wavelike energy through space as a combination of electric and magnetic fields.

Electromagnetic radiations are arranged according to their energies in what is called the electromagnetic spectrum

The electromagnetic spectrum consists

- | | |
|-----------------|--------------------|
| 1-cosmic rays | 2-gamma rays |
| 3-X-ray | 4-ultraviolet rays |
| 5-visible light | 6-infrared |
| 7-television | 8-radar |
| 9-microwave | 10-radio waves |



properties electromagnetic spectrum

- Travel at the speed of light
- Have no electrical charge

Light has some interesting properties, many of which are used in medicine:

1. Refraction: the speed of light changes when it goes from one material into another.
2. Dual behavior: light behaves both as a wave and as a particle. As a wave when it produces interference and diffraction.
3. Heat production: when light is absorbed, its energy generally appears as heat.
5. Reflection: light is reflected to some extent from all surfaces.

Applications of visible light in medicine

- 1-The visible light used in medicine to permit the physician to obtain visual information about the patient (color of skin)
- 2-Endoscopes are used for viewing internal body cavities
 - used to examine the bladder
 - used to examine the air passages into the lungs

Applications of ultraviolet light in medicine

- 1-UV light with wavelength below about 290nm can be used to sterilize medical instruments
- 2-The UV light from the sun converts some of molecular products in the skin into vitamin D
- 3-UV light from the sun affects the melanin in the skin to cause tanning.

Laser Applications in Medicine

1. In surgery
2. In ophthalmology:
3. In dermatology:
4. In dentistry:
5. In ENT

Sound in Medicine

Sound is mechanical energy that propagates through a medium by the compression and rarefaction of “particles” that comprise it.

Sound Waves Properties

1-Frequency: Frequency is measured in hertz (Hz). 1Hz =1 cycle per second

2-Wave length: is the distance between two bands of compression or rarefaction.

-The relationship between the frequency of vibration f of the sound wave, the wavelength λ , and the velocity v of the sound wave is:

$$v = \lambda f$$

Sound Applications in Medicine

1- Percussion in Medicine

Percussion is a diagnostic procedure in which the physician or nurse tap on parts of the body and listen to the elicited sound

2-Stethoscope and Auscultation in Medicine

It is a simple hearing aid permits physician or nurse to listen to sound made inside the body primarily in the heart and lungs