The impact of mobile phone waves on human bodies

The development of mobile phones that today are smartphones also entails many health concerns.

We are living in an era of mobile devices, and mobile phones are not out of the box, but even at the top of the list of the most popular technology devices of the 21st century. Mobile phones that today are smartphones also bring many health concerns, one of which is how harmful the wave on mobile phones can be to the human body?These concerns have led to a large number of studies in both animals and humans.

Mobile phones are also known as 'cell phone systems' because the coverage area is divided into small 'cells', each containing a transceiver antenna of the base station.Mobile phones use electromagnetic radiation within the range of microwaves, within the threshold of about 2.5 GHz.

Electromagnetic Frequency Spectrum (Electromagnetic Frequency Spectrum)

Electromagnetic spectrum is the strip of all possible frequencies of electromagnetic radiation.The "electromagnetic spectrum" of an object is the characteristic distribution of electromagnetic radiation emitted or absorbed by specific objects.

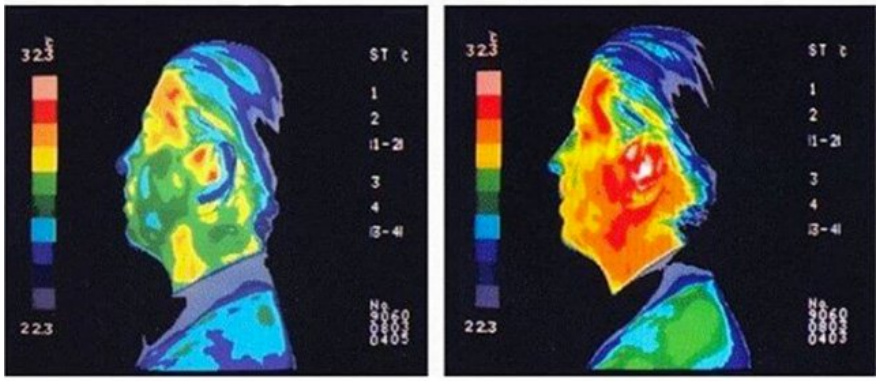
Electromagnetic spectrum extends from low frequency for modern radio communication to gamma radiation at short wavelengths (high frequency), so the electromagnetic spectrum covers wavelengths from thousands of kilometers to one part size of an atom.

When we talk on a mobile phone, it will record sound and encode it into a continuous "sine wave".Sine waves emit from the antenna and vibrate evenly in space.When the encoded sound is placed on the sine wave, the transmitter sends the signal to the antenna, which then sends an output signal.Encoded signals are made up of electromagnetic radiation.These waves are captured by a device in the base transceiver station.After that, the base station antenna will emit continuous radiation to create links with subscribers.

Mobile transceiver tower and base station

Thermal Effects

Heat Generated on the face by 15 minute of cell phone use due to their electromagnetic radiation



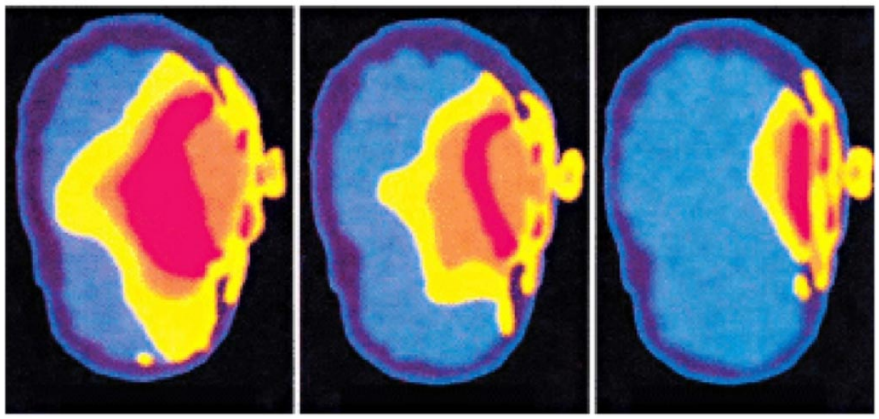
BEFORE USING A MOBILE PHONE | USING MOBILE PHONE FOR 15 MINUTES

Mobile phone technology uses electromagnetic radiation within the Gigahertz (GHz) range.These radiation is close to the microwave range and is similar in behavior to microwave.Part of the radio waves emitted from the mobile phone will be absorbed by our own head.The radiation emitted by a GSM phone can have a maximum power of 2 watts.

The speed at which the human body absorbs these radio waves is measured by the SAR indicator (Specific Absorption Rate - an indicator used to measure the absorption of radio waves by the human body, the lower the better) and the maximum. Its is for a modern phone that ranges from 1.6 to 2W / Kg on average for 1 gram of tissue.If the SAR index exceeds the limit, it can cause both thermal and non-thermal effects on the human body, especially in the ear and head position because these are the areas closest to the radiation.The microwave heat effect is dielectric heat, in which any dielectric material such as living tissue can be heated by rotating polar molecules such as water.

Microwave Cellphone Effects

Absorption in the Brain According to Age



5 Year Old | **10 Year Old** | **Adult**

Image courtesy of Dr. Om Gandhi, University of Utah, 1996, IEE Publication

In case if a person uses a mobile phone to listen for a few hours a day, most of the temperature rise effects will occur in the middle ear, the surface of the head area around the ear and even in the brain.As we all know, the

middle ear has structures filled with liquids that are more susceptible to temperature.While brain tissue is a rather fragile system, it acts as a barrier to limiting the temperature that affects the brain.

Some types of brain waves help determine mood and alertness that is similar to mobile radiation in frequency characteristics.Another structure that can be affected by temperature is the cornea of ??the eye.It is a transparent coating on the front of the eye.If the cornea lacks blood supply, the effect of temperature cannot be eliminated and can cause cataracts early.

Non-thermal effects include changes in the biological cycle, cell metabolism, spermatogenesis, and abnormalities in fetal development, miscarriage . Some mobile phone users experience colds. see symptoms that are not clear during and after using a mobile phone such as burning and tingling sensation, fatigue, sleep disorders, dizziness and mental distractions . All these symptoms This may be due to the effect of phone radiation on the biological field of the body.

In summary, the biological effects of mobile radiation on the human body can be summarized as follows.

Heat effect

Microwaves cause "dielectric heating" in the human body, human tissue is rich in water and exhibits the properties of dielectric (+ and - ion ions), these tissues will heat up through the rotation. of polarized molecules such as water, this friction heats the tissue, the head is also the area under the direct influence of the phone radiation, so it will also be affected by this temperature rise. In the middle, the brain . will increase by 1 degree or more, which negatively affects the operation of these organs because they have fluid compartments. may cause:

1. A burning sensation on the oily skin and the ear area.
2. Mood changes and impaired ability to concentrate.
3. Feeling lethargic and lack of sleep.
4. Tinnitus or buzzing sound in the ear.
5. Early cataracts due to the cornea of ??the eye lack the blood supply and the temperature cannot be processed.
6. Remember to be confused, or forget because microwaves affect brain waves that control mood.
7. Changing physiological sleep and circadian rhythms by causing instability in the levels of hormones Dopamine and Serotonin.

The role of Blood-Brain Barrier - BBB

This system consists of blood vessels in the brain and surrounding tissues, forming a barrier that can easily remove the effect of heat on the brain.But the prolonged heating effect of cellular radiation can alter brain function and hearing ability.

Non-thermal effects

1. Affects the ability of cell response.
2. Release Albumin from blood into the brain due to increased impact of BBB
3. Impact on hearing

4. Heat the middle ear
5. The sound emitted from the voice speaker causes discomfort in the eardrum and sensory cells inside the ear.Human ears are sensitive to waves from 1000 to 6000 Hz.

Effects on sleep and electroencephalogram (EGG)

1. Types of brain waves such as alpha, beta, and delta waves will be affected when exposed to radiation from cellular waves.

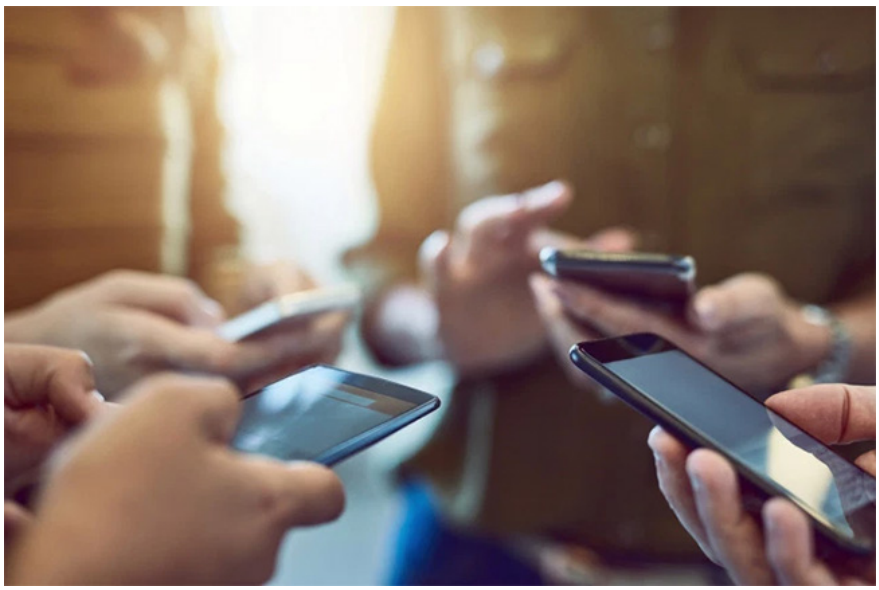
Microwave waves affect hearing:

1. It makes sense to have sounds and cries in your head.
2. Microwave waves cause electrical current in the brain's auditory control center and cause auditory hallucinations.This can also happen if you listen to music with headphones or Bluetooth devices for a long time.
3. The human ear has a maximum sensitivity of 3000 Hz, the sound at this level causes discomfort to the listener.Alarms are often designed to emit sound at 3000 Hz.
4. The ear has a very low hearing threshold for the 3000 Hz frequency.A sound of this frequency has very uncomfortable high pitched sounds and negative hearing effects.
5. Feeling pain in the ear without any specific reasons like infection.This may be due to an increase in pressure on the delicate structures of the middle ear, caused by radiation.

Symptoms are not clear during and after using a mobile phone.

Feelings of tingling, fatigue, dizziness, mental distraction, decreased reaction time, memory loss, forgetfulness, increased heart rate .

Prevent



Mobile phones are an excellent communication device, indispensable in modern life.The harmful effects of cellular radiation only happen if you abuse it for a long time.So make a proper use strategy, in addition, mobile phones emitting radiation below 2 watts are perfectly safe.However, precautions are always needed, trying to use a mobile phone as a communication device rather than an entertainment device.Even if you do not make calls, the mobile phone will still generate a strong signal to keep the base stations connected with the strongest signal around the area.

Consider some of the following precautions:

1. Try not to talk on the mobile phone for more than 10 minutes continuously, because while talking on the mobile phone the radiation radiation to keep connected to the base station will operate at the highest frequency.
2. Try to use your mobile phone for up to one hour per day.If you want to use it more than this number, use Bluetooth or headphones (try to keep your mobile phone away from your body).
3. Keep the mobile phone away from the bed position while sleeping.It may affect the quality of sleep.
4. Limiting for children to use cell phones, children will be much more sensitive to wave radiation than adults (because children have a thin and smaller skull than adults).
5. Use devices to help limit passive wave radiation.
6. Pregnant women avoid carrying their phones with them or next to their bra and men do not leave them in their pockets.

See more:

1. How to prevent harms when using a long-term laptop
2. 3 harms the health of smartphones and tablets
3. 6 simple ways to minimize the harmful effects of sitting for a long time
4. 10 serious harms will happen if you sit for 8 hours a day