

Radio Waves and Life

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1. Introduction

Nowadays a lot of studies are on effects of radiation from mobile tower, and mobile phone hazards, some studies end on the conclusion that mobile phone radiation has some bad effects on life. What about the radio waves we live in for millions of years? Actually we are living in radio shower from outer space. There are millions of radio sources in our universe. If mobile radiation has an effect on life then we cannot neglect the effects of radiation from space. Our atmosphere is transparent to only two rays in electromagnetic spectrum, one is visible light and other is radio waves. In these, visible light is something which sustains life on earth. Then what about the other one, 'the radio waves.....'

'Nature loves symmetry always'

If one has an effect the other will also have an effect.

Radio waves may also be sustaining life on earth.

Some of the radio waves can affect the life of all. This article is trying to explain that aspect.

2. Radiowaves and NMR Spectroscopy

Following are some of the known or proven concepts which can be used for the further discussion.

- DNA and RNA are NMR (Nuclear Magnetic Resonance imaging) active.
- Earth has a magnetic field of about 1/10000 Tesla.
- Radio waves come from outer space (especially from radio galaxies, quasars, interstellar gases, Sun, Jupiter, Venus, etc).

- Frequency for NMR spectra is given by

$\Delta E/h = |g \beta_n B_z| / h$, where

ΔE is energy

β_n is Bohr magneton

B_z is magnetic field

h is Planks constant

$g = G m_p / M$, where

G is a numerical factor known as Lande splitting factor

m is the protonic mass

M is the mass of nucleus

p is the number of protons

g is the characteristic of each nuclei, and this factor has values up to about six

NMR is a spectroscopic technique. The NMR experiment consists of the measurement of the intensity of absorption (or emission) of electromagnetic radiation at each frequency over a specific range. The electromagnetic radiation corresponds with the spin of the atomic nucleus in a magnetic field. If the value of the spin quantum number is a half -integer of a nucleus, for example the nuclei of

hydrogen, phosphorous, carbon 13...etc, the electromagnetic radiation will correspond with those nuclei.

Experimental observation shows that DNA is NMR active.

In the case of living beings on Earth, they are in a magnetic field of 1/10000 Tesla. In this magnetic field if an electromagnetic wave of frequency $|g \beta_n B_z| / h$ reach on Earth the DNA in the living beings on earth would correspond with this much frequency.

That is a transition of nuclear spins between energy levels may be associated with the absorption of energy from the electromagnetic waves in the above said frequency.

Giving values in the equation for frequency,

$h = 6.63 \times 10^{-34}$

$\beta_n = 5.05 \times 10^{-27}$

$B_z = 10^{-5}$ Tesla, the earth's magnetic field.

Then $\Delta E / h = |g \beta_n B_z| / h$.

For $\Delta E / h$, we would get the corresponding frequency in kilo hertz range. This is a low frequency radio wave.

3. Effect of Spin-Spin Coupling & Chemical Shift

If radio waves with this much frequency reach on earth, the DNA of living beings would correspond with this wave. That is nuclear spin energy of DNA will change. This change in DNA of living beings can affect its characteristics. The energy or frequency with which nuclei correspond depends on chemical shift and spin-spin coupling. Spin-spin coupling is interaction of nuclei nearby. Chemical shift is due to diamagnetic property of molecule. That is the corresponding frequency depends on the chemical compound and chemical structure of molecule (DNA). That is the inherited DNA. That is the resonance frequency depends on chemical compound and the direction of magnetic field (that is the place where the living being lives). This change of energy of spin does not happen to all the nuclei in a molecule. According to the radiation energy available and the direction of earths magnetic field and the chemical structure of DNA molecule (inherited gene) this change in spin energy happen to certain nuclei (whose frequency correspond or resonate with the radio frequency field outside).

This changes the characteristics of the living being. According to that its life builds up because DNA bears all the characteristics of living being.

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It is known from human genome map, of the three billion letters, only 1.5% of our genome is associated with protein synthesis. The function of the rest is not clearly known. It is believed that DNA act as a bio computer. The function of junk DNA is not known clearly for years.

4. The Source of Radiowaves

Other than manmade sources of radio waves the main source of radio waves is radio galaxies, interstellar gases, planets, stars, nebula etc. moon is a good reflector of radio waves. Sun and Jupiter are strong radio sources. Saturn is also a strong source of radio waves. Radio waves come from the constellation of Sagittarius, i.e. centre of our galaxy also. From this region for the first time radio waves from space was detected.

5. Conclusion

This argument can be ended like this.

When a living being begins its life, it begins to absorb radio energy. It continues to receive this energy as long as it lives. The DNA emits this energy while with other molecules or other radiations outside.

Following are the two things a living beings life depends on:

- Inherited genes
- Radiation energy available when he begins life and when he lives on earth

In the case of inherited genes (or inherited DNA), the change in spin energy happens to nuclei of DNA. Some inherited genes become active based on the change in spin energy.

The latter case can be explained with some examples.

Radio waves are coming from almost all part of our galaxy. Interstellar gas is a strong source of radio waves. These radio waves will be interacting with DNA making some of its nuclei active according to the radio energy available.

Sometimes earth will be in the cone of Jupiter and its satellite, at that time receives radio waves from Jupiter. Radio waves coming from Jupiter can be divided into two, long bursts and short ones. They appear when particular parts of Jupiter are aligned with its moon Io. The emissions are not dispersed in all directions, but flow in the shape of a hollow cone. Earth should be precisely positioned in the narrow edge of the cone to receive radio signals.

The absorbed energy in kilo hertz range will be emitted while interacting with other molecules or radiations.

This absorption is also possible if mobile radiation absorption is taking place.

We are interacting with the radio waves from space, That we are part of this universe