Electromagnetic and ultrasound waves exchange between DNAs within cells, RNAs within Coronaviruses and towers in 5G technology

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Abstract: A DNA is built from charged electrons and atoms and has the inductor-like structure. This structure could be divided into linear, toroid and round inductors. These inductors interact with external electromagnetic waves, move and produce some extra waves within the cells. The shapes of these waves are similar to shapes of hexagonal and pentagonal bases of their DNA source. These electromagnetic waves interact with charged particles on the nuclear membranes and lead to their vibrations. By these vibrations, nuclear membranes act like vibrators within a speaker/microphone and some new ultrasound waves are emerged. Thus, DNAs within cells emit both electromagnetic and ultrasound waves. These waves produce some holes in liquids within the nucleus and cells. To fill these holes, some extra hexagonal and pentagonal bases are produced. These bases could join to each other and form some viruses like Coronavirus. To produce

these viruses within a cell, its need that wavelength of external waves be shorter than the size of a cell. Thus 5G millimeter waves could be good candidates for applying in constructing Coronaviruses (COVID-19) within biological cells.

Keywords: COVID-19, 5G technology, Millimeter wave, DNA, Inductor

I.Introduction:

Coronavirus disease (COVID-19) is the main problem in this year that involve with all people in the world [1]. This is an infectious disease caused by a newly discovered coronavirus. Totally, this virus is a member of related viruses that cause diseases in mammals and birds. In humans, coronaviruses cause respiratory tract infections that can be mild, such as some cases of the common cold (among other possible causes, predominantly rhinoviruses), and others that can be lethal, such as SARS, MERS, and COVID-19.Among them, COVID-19 is an enveloped viruses with a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry. The genome size of coronaviruses ranges from approximately 27 to 34 kilobases, the largest among known RNA viruses [2,3]. Until now, many scientists have tried to find method to cure this disease [4,5]; however, they didnn't succeed.

Newly, a question arises that is there any relation between 5G technology and COVID-19? The 5G technology is the fifth-generation mobile technology which

its frequency spectrum could be divided into millimeter waves, mid-band, and low-band. Low-band uses a similar frequency range as the predecessor, 4G. 5G millimeter wave is the fastest, with actual speeds often being 1–2 Gbit/s down. Its frequencies are above 24 GHz, reaching up to 72 GHz, which is above the extremely high frequency band's lower boundary. Millimeter waves have shorter range than microwaves, therefore the cells are limited to smaller size [6-8]. Consequently, biological cells also could act like a receiver for these waves. Many researchers have considered the effects of 5G technology on the human's health. For example, it has been shown that 5G mobile networking technology will affect not only the skin and eyes, but will have adverse systemic effects as well [9]. In another research, it has been argued that 5G technologies cause many harms to human health. Cancer is only one problem, and one that is easily solved. 5G cause 720! (factorial) different maladies in human beings, and can kill everything that lives but some forms of micro organisms [10]. To consider the effects of 5G millimeter waves on biological systems, we should propose a model which describes the process of exchanging waves between 5G towers and host cells.

Up to date, some researchers have tried to propose a model for using of waves in extracting information within cells [11,12]. These waves could be transverse electromagnetic fields or longitudinal ultrasound waves. A DNA is built from charged particles and according to laws of physics, by any motion of these

particles, some electromagnetic waves are emerged [13]. Also, the structure of a DNA is similar to the structure of an inductor [14] in a receiver and can produce some waves. Thus, a DNA could emit some waves and interacts with external waves. However, most of waves have a length more than the size of cells and pass them without any effect. Only, limited waves with lengths smaller than millimeter could penetrate into cell membrane and interact with DNA inductors. These wavelengths could be observed in 5 G technology. Thus, towers in this technology could exchange waves with DNAs within cells and produce various types of diseases like COVID-19. In this research, we propose a mechanism for exchanged waves between towers and host cells and obtain effective wavelengths.

The outline of this paper is as follows: In section II, we propose a mechanism for exchanging waves between towers and cells in 5G technology. In section III, we calculate the effective wavelengths for producing COVID-19 in 5 G technology. In section IV, we discuss about the origin of our results. The last section is devoted to conclusion.

II. Method: A mechanism for exchanging waves between towers and cells in 5G technology

A DNA is built from atoms and electrons. These particles have some electrical charges and emit electrical fields. Also, by each motion of a DNA, its atoms and

electrons move. According to laws of physics, by motion of charged particles, some magnetic waves are emerged. Consequently, a DNA emits both electrical and magnetic fields and play the role of electrical devices within a cell. The structure of a DNA within a cell is similar to the structure of an inductor. When a DNA coils around a nucleosome, it takes the shape of a toroid inductor. Also, by coiling around another axes, a DNA becomes very similar to round inductors. (See figure 1).

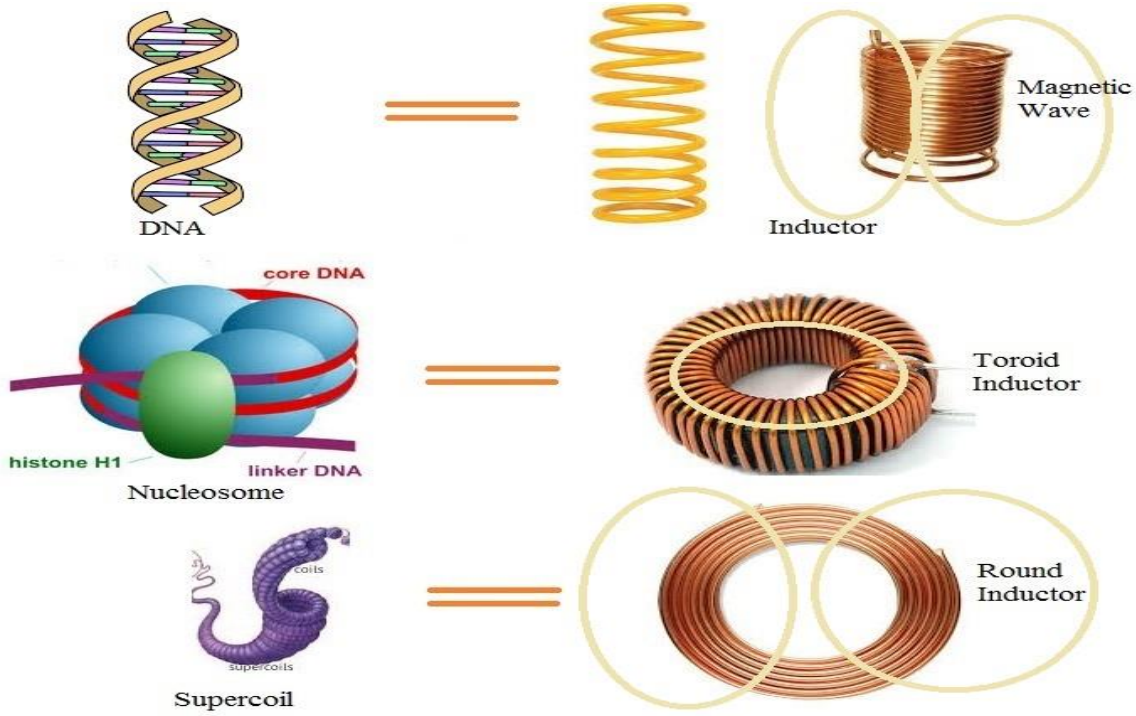

Fig 1: A similarity between different states of DNA with different types of inductors

A DNA coils several times around different exes within chromosomes and produces different types of inductors and electronic devices. Thus, any state of a DNA is similar to a type of an inductor and emits an special wave. Some of these waves are linear, some are curved and some others have toroidal shapes (See figure 2).

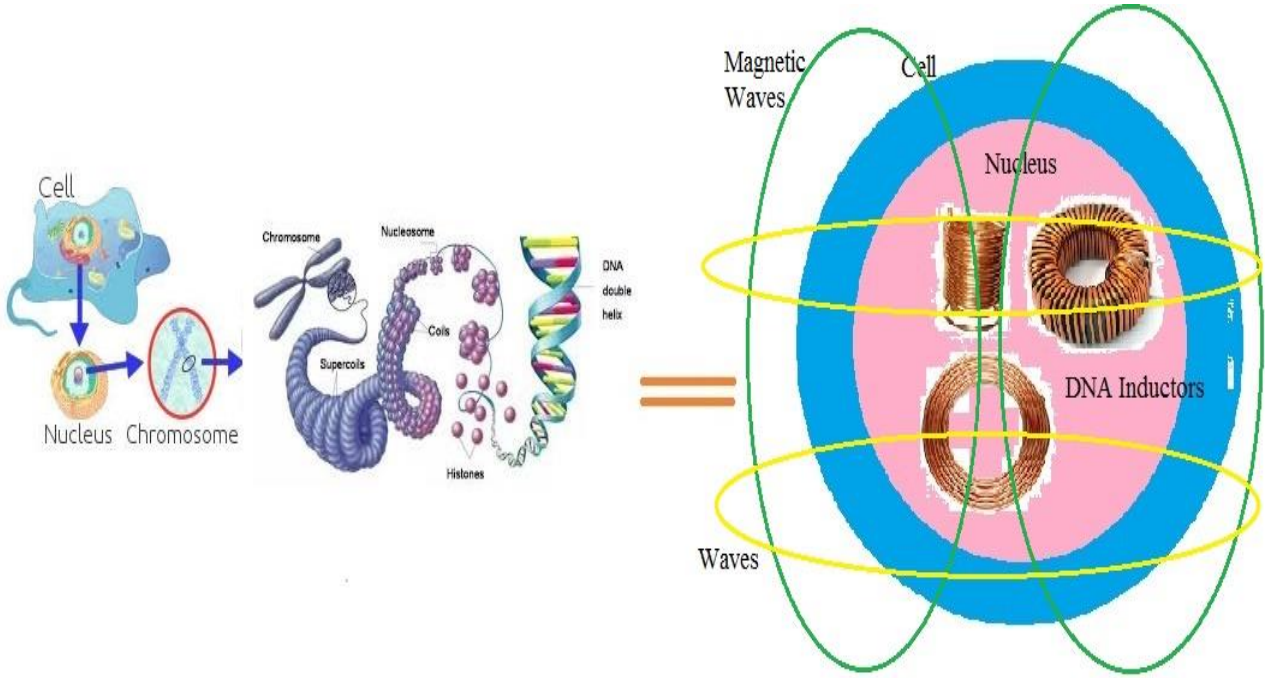

Fig 2: A DNA within the nucleus acts like the inductors and emit magnetic waves

DNA inductors within the nucleus could act like the inductors within a speaker/microphone. They are formed from charged particles and by any motion of these charges, some waves are emerged. These waves interact with charged particles on nuclear membranes and cause to their vibration. These membranes

behave like the plastic or vibrator in a speaker/microphone and their vibrations lead to the emergence of ultrasound waves. These waves have the shape and size of their DNA sources. Each DNA is built from hexagonal and pentagonal bases with sizes smaller than nano-meter and thus, DNA ultrasound waves are very short rays with hexagonal/pentagonal shapes (See Figure 3).

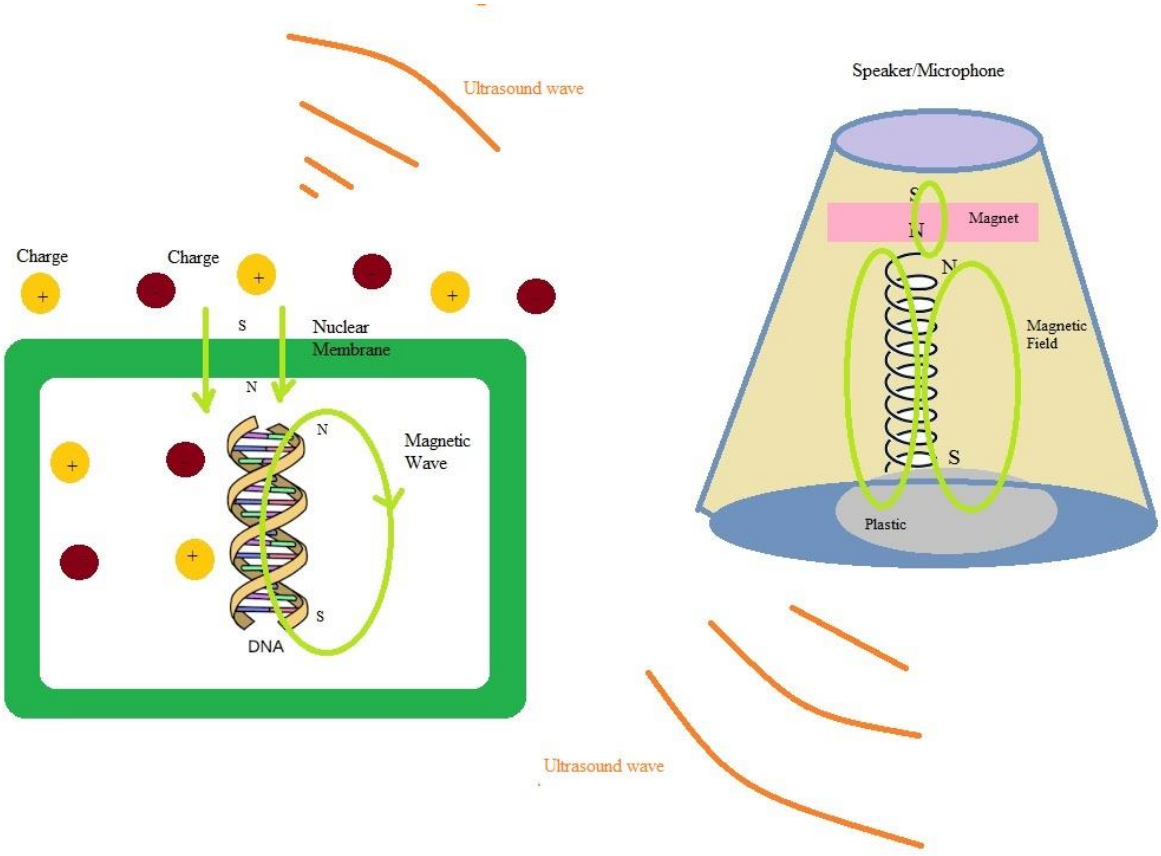

Fig3: Similarity between DNAs within cells and speaker\microphones

A DNA as an electronic device within a cell could exchange waves with medium. Specially, when an electromagnetic wave pass the cell membrane and the nuclear membrane, induces an extra magnetic field within the DNA inductor and interacts

with its fields. This interaction causes to extra motions of this DNA. By motion of this DNA, its charges move and emit electromagnetic waves. Wavelength of emitted waves from a DNA is equal or less than its size within a cell . Also, shapes of radiated waves by a DNA have direct relations with the shapes of their genetic source. A DNA is formed from hexagonal and pentagonal manifolds. Thus, its emitted waves have hexagonal and pentagonal shapes. These waves produce some hexagonal and pentagonal holes within the liquids of a nucleus and a cell. To fill these holes, some hexagonal and pentagonal molecules are built. These extra hexagonal and pentagonal bases may join to each other and form some structures like RNAs of COVID-19 viruses. To produce these viruses, its needed that wavelengths of external electromagnetic fields be equal or less than size of a cell. For this reason, 5G technology waves could have the main role in the emergence of COVID-19, however radio waves couldn’t have any effect on the evolutions within a cell (See Figure 4).

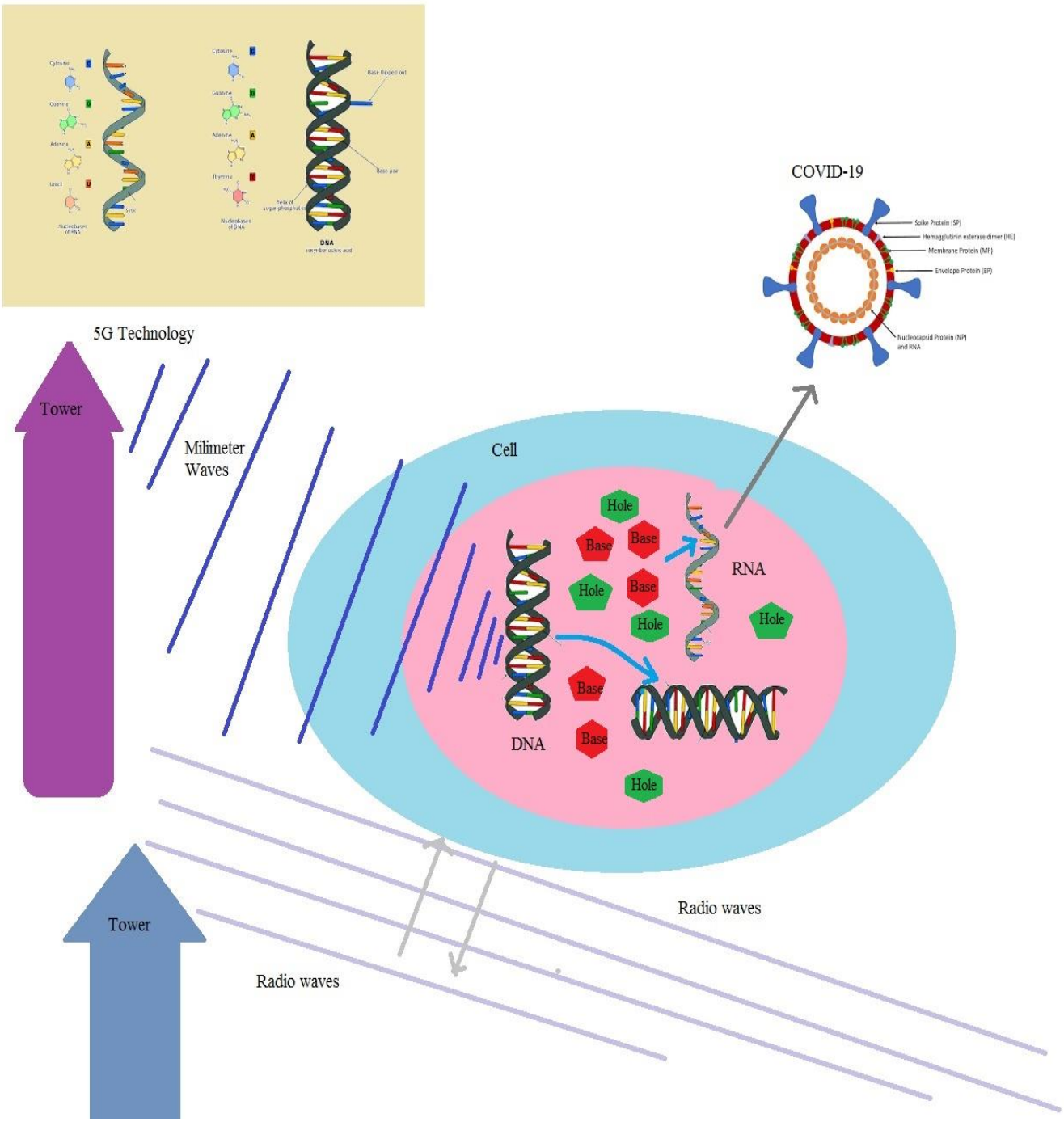

Fig 4: 5 G technology waves could pass the cell membranes and cause to production of COVID-19; however radio waves stop

III. Results: Effective wavelengths within a cell in 5G technology

Now, we propose a model to obtain a probability for the amount of effects of external fields on the evolutions of cells within a cell. This probability is related to number of microstates of a DNA within a cell:

$$\mathbf{P_{DNA} = \Omega_{DNA,\,EM} / \Omega_{DNA,\,tot}} \qquad \mathbf{(1)}$$

Where P_{DNA} is the probability, $\Omega_{DNA,\,EM}$ is number of microstates which are produced by the interaction between DNAs and electromagnetic waves and $\Omega_{DNA,\,tot}$ is total number of microstates. These microstates have direct relations with entropies:

$$\mathbf{S_{DNA} = K_S\ LOG\ (\Omega_{DNA,\,EM})} \qquad \mathbf{(2)}$$

Where S_{DNA} is the entropy and K_S is a constant. On the other hand, entropies have direct relations with energies:

$$\mathbf{S_{DNA} = E_{DNA} / T_{cell}} \qquad \mathbf{(3)}$$

Where E_{DNA} is the excited energy of a DNA and T_{cell} is the temperature within a cell. Excited energy of a DNA depends on the linear and curved energies of hexagonal and pentagonal bases:

$$\mathbf{E_{DNA} = U_{B,\,linear,5}\,V_{B,\,linear,5} + U_{B,\,curved,5}\,V_{B,\,curved,5} + U_{B,\,supercoil,5}\,V_{B,\,supercoil,5} +}$$

$$U_{B,\,linear,6}\,V_{B,\,linear,6} + U_{B,\,curved,6}\,V_{B,\,curved,6} + U_{B,\,supercoil,6}\,V_{B,\,supercoil,6} \quad (4)$$

Where $U_{B,\,linear,5/6}$ is the energy density of a pentagonal/hexagonal molecule, $V_{B,\,linear,\,,5/6}$ is the volume of a pentagonal/hexagonal disk , $U_{B,\,curved,\,,5/6}$ is the energy density of a pentagonal/hexagonal molecule which coils around a nucleosome, $V_{B,\,curved,\,,5/6}$ is the volume of a coiled pentagonal/hexagonal disk, $U_{B,\,supercoil,\,,5/6}$ is the energy density of a pentagonal/hexagonal molecule which is coils around supercoil axes and $V_{B,\,supercoil,\,,5/6}$ is its volume. Volumes can be obtained from below equations:

$$V_{B,\,linear,5} = 5\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})][\,r_{base} + x_{EM}]$$

$$V_{B,\,linear,6} = 5\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})][\,r_{base} + x_{EM}]$$

$$V_{B,\,curved,5} = 5\pi\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})]\times$$

$$[\,r_{base} + x_{EM}][\,r_{histone} + x_{EM}]^2$$

$$V_{B,\,curved,6} = 5\pi\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})]\,)]\times$$

$$[\,r_{base} + x_{EM}][\,r_{histone} + x_{EM}]^2$$

$$V_{B,\,supercoil,5} = 5\pi^2\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})]\times$$

$$[\,r_{base} + x_{EM}][\,r_{histone} + x_{EM}]^2[\,r_{supercoil} + x_{EM}]^2$$

$$V_{B,\,supercoil,6} = 5\pi^2\,[1/2\,(r_{base} + x_{EM})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})]\,)]\times$$

$$[r_{base} + x_{EM}][r_{histone} + x_{EM}]^2[r_{supercoil} + x_{EM}]^2 \quad (5)$$

Where r_{base} is the length of a base ($\sim 10^{-9}$), $r_{histone}$ is the radius of histones ($\sim 10^{-8}$), $r_{supercoil}$ is the radius of a supercoil ($\sim 10^{-7}$), Θ_{hexa} ($\pi/6$) is the central angle of a hexagonal molecule, Θ_{penta} ($\pi/5$) is the central angle of pentagonal molecule, x_{EM} is the oscillating length which has a direct relation with the wavelength of external field:

$$E_{EM} = 1/2\ K_{EM}\ x_{EM}^2 = h\ \upsilon_{EM} = h\ c/\ \lambda_{EM} \quad (6)$$

Where υ_{EM} is the frequency, λ_{EM} is the wavelength of external field, c is the velocity of light and h is the plank constant. Thus, we can write below equation:

$$x_{EM} \sim \lambda_{EM}^{-1/2} \quad (7)$$

Now, we should calculate magnetic energies and magnetic fields. We assume that a DNA acts like an inductor and thus, we write below equation for its magnetic fields:

For linear inductor:

$$B_{DNA,\ linear,5/6} = \mu_0\ n_{gene5/6}\ I_{gene,5/6} \quad (8)$$

For curved inductor:

$$B_{DNA,\ curved,5/6}=\mu_0\ n_{gene5/6}\ I_{gene,5/6}/2\pi[r_{histone}+\lambda_{EM}^{-1/2}] \quad (9)$$

For supercoils:

$$B_{DNA,\ curved,5/6}=\mu_0\ n_{gene5/6}\ I_{gene,5/6}/[4\pi^2\ [r_{histone}+\lambda_{EM}^{-1/2}]\ [r_{supercoil}+\lambda_{EM}^{-1/2}]] \quad (10)$$

Where $n_{gene5/6}$ is the density of genes including hexagonal and pentagonal molecules [15] within DNAs, $r_{histone}$ is the size of histone (3×10^{-10}) [16], $r_{supercoil}$ is the radius of supercoil ($\sim 10^{-9}$) and $I_{gene,5/6}$ is current which moves along pentagonal/hexagonal molecules of genes. We assume that each gene is in fact a long wire that is coiled around the axis of a DNA. A DNA may have 50000 or more gene (N_{gene}) [15] and each gene has around 10^{-12} meter long (L_{gene}) within a cell. Thus, we can calculate density of genes (n_{gene}):

$$n_{gene,\ 5/6}=N_{gene}/L_{gene5/6} \quad (11)$$

$$N_{gene}=50000[15] \quad (12)$$

$$L_{gene}=10^{-12}m\ [17,\ 18] \quad (13)$$

$$L_{gene,\ 5/6}=2\times10^{-12}\ m\ [17,\ 18] \quad (14)$$

$$n_{gene,\ 5/6}=2.5\times10^{16} \quad (15)$$

To calculate the value of the current along genes, we should calculate total effective charge of all genes ($Q_{gene,5/6}$) and their velocity ($V_{gene,5/6}$).

$$\mathbf{I_{gene,5/6} = Q_{gene,5/6}\, V_{gene,5/6}} \qquad \mathbf{(16)}$$

Effective charges of all genes are different from their normal total charges. A gene may have a few normal charges, because its charges cancel the effect of each other in the static state. However, during the gene expression and DNA evolutions, each charge has a separate effect. For this reason, we should regard total charges of all genes. To obtain this charge, we should write:

$$\mathbf{Q_{gene,5/6} = N_{gene,5/6}\ \ q_{gene,5/6}} \qquad \mathbf{(17)}$$

Where $N_{gene,5/6} = 2\, N_{gene}$ is the number of genes including pentagonal/hexagonal molecules and $q_{gene,5/6}$ is the effective charge of pentagonal/hexagonal molecules in a gene. Again, we insist that effective charge of a gene is different from its normal charge. In fact, we should regard all electrons and atoms that contribute in gene expression. For this reason, we should write:

$$\mathbf{q_{gene,5/6} = 4N_{base}\, q_{base}} \qquad \mathbf{(18)}$$

where N_{base} is the number of base pairs within a gene [15, 16] and q_{base} is the effective electrical charge of a base. We can put approximate numbers and obtain the effective charge of all genes:

$$\mathbf{N_{base} = 10^9\ [19,20]} \qquad \mathbf{(19)}$$

$$\mathbf{q_{base} = (10\text{-}20)\ q_{electron} = (10\text{-}20) \times 1/6 \times 10^{-19}} \qquad \mathbf{(20)}$$

$$\mathbf{Q_{gene,\ 5/6} = 4 \times 10^{-4}} \quad \textbf{(21)}$$

Now, we calculate the effective velocity of genes:

$$\mathbf{V_{gene,\ 5/6} = L_{gene,\ 5/6}\ \omega_{gene,\ 5/6}} \quad \textbf{(22)}$$

This velocity depends on the length of a gene ($L_{gene,\ 5/6}$) and its rotating velocity ($\omega_{gene,\ 5/6}$).

$$\mathbf{L_{gene,\ 5/6} = 2 \times 10^{-12}\ m\ [17,18]} \quad \textbf{(23)}$$

The rotating velocity of a gene ($\omega_{gene,\ 5/6}$) can be obtained by summing over rotating velocities of all its effective charges ($\omega_{charge,\ 5/6}$):

$$\mathbf{\omega_{gene,\ 5/6} = n_{charge,\ 5/6}\ \omega_{charge,\ 5/6}} \quad \textbf{(24)}$$

To obtain number of charges, we multiply number of bases and number of atoms/electrons

$$\mathbf{n_{charge,\ 5/6} = 2N_{base}\ N_{atom}} \quad \textbf{(25)}$$

Now, we put approximate values for numbers and obtain velocity of genes:

$$\mathbf{N_{base} = 10^{9}\ [19,20]} \quad \textbf{(26)}$$

$$\mathbf{N_{atom} = 10} \quad \textbf{(27)}$$

$$\mathbf{n_{charge,\ 5/6} = 2 \times 10^{10}} \quad \textbf{(28)}$$

$$\omega_{charge\ ,\ 5/6} = 2\pi/T_{charge,\ 5/6} \quad (29)$$

$$T_{charge,\ 5/6} = [\lambda_{EM}]^{1/2}/c \quad (30)$$

$$\omega_{charge,\ 5/6} = 6.28 \times 10 \quad (31)$$

$$V_{gene,\ 5/6} = 2.516 \times 10^{0} \quad (32)$$

Substituting values of velocity from equation (32) and charges from equation (21) in equation (16), we can obtain the current of genes:

$$I_{gene,\ 5/6} \sim 10^{-3} \quad (33)$$

Putting the current from above equation (33) and density of genes from equation (15) in equations (6-10), we calculate magnetic fields of a DNA within a cell.

$$B_{DNA,\ linear,5/6} \sim 10^{7}\ [\lambda_{EM}]^{-1/2} \quad (34)$$

$$B_{DNA,\ curved,5/6} \sim 10^{16}\ [\lambda_{EM}]^{-1} \quad (35)$$

$$B_{DNA,\ supercoil,5/6} \sim 10^{25}\ [\lambda_{EM}]^{3//2} \quad (36)$$

Using these fields, we can obtain energy density of magnetic fields around a DNA within a cell.

$$\mu_0 = 4\pi \times 10^{-7} \quad (37)$$

$$U_{B,\ linear,5/6} = ([B_{DNA,\ linear,5/6}]^{2}/2\ \mu_0) \sim 10^{21}\ [\lambda_{EM}]^{-1} \quad (38)$$

$$U_{B,\,curved,5/6} = \left([B_{DNA,\,curved,5/6}]^{\,2}/2\,\mu_0 \right) \sim 10^{38}\,[\,\lambda_{EM}]^{-2} \qquad (39)$$

$$U_{B,\,supercoil,5/6} = \left([B_{DNA,\,supercoil,5/6}]^{\,2}/2\,\mu_0 \right) \sim 10^{56}\,\,[\,\lambda_{EM}]^{-3} \qquad (40)$$

Consequently, substituting above results in equation (4), total energy can be obtained from below equation:

$$E_{DNA} = [5\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})][\,r_{base} + \lambda_{EM}^{-1/2}]$$

$$+ 5\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})][\,r_{base} + \lambda_{EM}^{-1/2}]] \times 10^{21}\,\,[\,\lambda_{EM}]^{-1}$$

$$+[\,5\pi\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})]\times$$

$$[\,r_{base} + \lambda_{EM}^{-1/2}][\,r_{histone} + \lambda_{EM}^{-1/2}]^2$$

$$+\;\; 5\pi\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})]\,)]\times$$

$$[\,r_{base} + x_{EM}][\,r_{histone} + \lambda_{EM}^{-1/2}]^2 \times 10^{38}\,[\,\lambda_{EM}]^{-2}$$

$$+\,[\,5\pi^2\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{penta})\sin(\Theta_{penta})]\times$$

$$[\,r_{base} + x_{EM}][\,r_{histone} + \lambda_{EM}^{-1/2}]^2[\,r_{supercoil} + \lambda_{EM}^{-1/2}]^2$$

$$+\;\; 5\pi^2\,[1/2\,(r_{base} + \lambda_{EM}^{-1/2})^2 \cos(\Theta_{hexa})\sin(\Theta_{hexa})]\,)]\times$$

$$[\,r_{base} + \lambda_{EM}^{-1/2}][\,r_{histone} + \lambda_{EM}^{-1/2}]^2[\,r_{supercoil} + \lambda_{EM}^{-1/2}]^2] \times 10^{56}\,\,[\,\lambda_{EM}]^{-3} \qquad (41)$$

Substituting above equation in equations (1-3), we can obtain the probability for the amount of effects of external fields on the evolutions of DNAs within a cell:

$$\mathbf{P_{DNA} = exp\ (K_S\ E_{DNA} / T_{cell}) / \Omega_{DNA,\ tot}} \qquad \mathbf{(42)}$$

Above probability depends on the wavelength of external fields.

In figure 5, we show the probability for producing hexagonal and pentagonal DNA holes within a cell. This figure indicates that by decreasing the wavelength ($< 10^{-3}$m), waves pass the cell membrane and interact with DNAs. This interaction causes to the motions of DNAs. By motions of DNAs, their charges move and emit some strong waves. These waves produce some hexagonal and pentagonal holes within a cell. To fill these holes some extra bases are produced. These bases could join to each other and form some viruses like COVID-19.

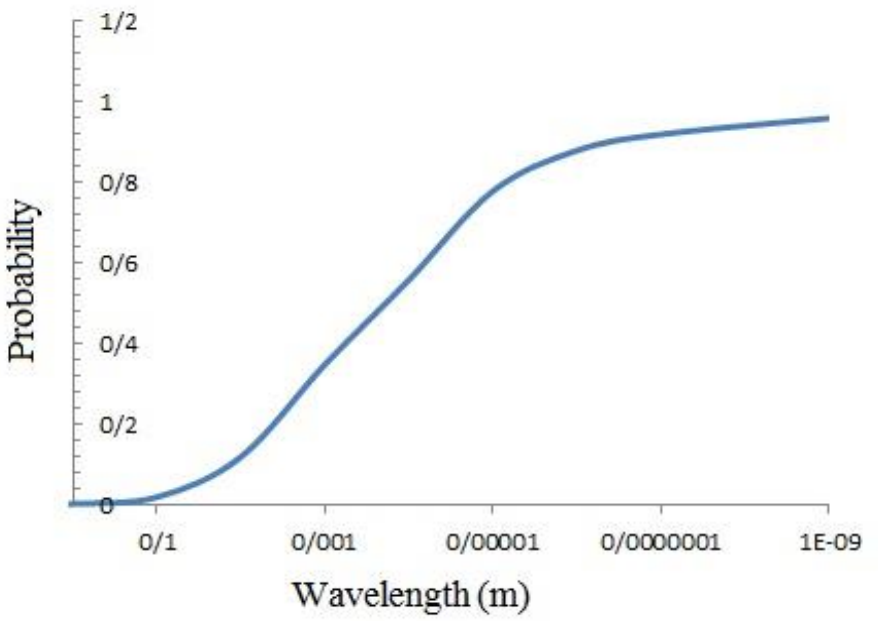

Fig 5: The probability for the effect of waves on the evolutions of a DNA within a cell in terms of wavelength

IV. Discussion:

Our results show that by decreasing wavelength, emitted waves from towers in 5 G and higher technologies could have more effects on evolutions of DNAs within cells. This is because, that cell membranes act like the antenna for these waves. They are built from charged particles like electrons and atoms and could emit or receive waves. On the other hand, an antenna could only take waves which their lengths aren't more than its size. Thus, a cell membrane could take millimeter waves in 5G technology. These waves could pass the membrane and interact with biological matters within a cell. If wavelengths of 5G waves be equal or less than

the size of a nucleus, they can pass the nuclear membrane and interact with DNAs. These DNAs are built from hexagonal and pentagonal bases and by their motions, some holes are emerged. These holes are filled by hexagonal and pentagonal extra bases which are constructed by cells. These bases could join to each other and form some viruses like Coronavirus. It is concluded that in next generation of mobile technology, emitted waves of towers will have more effects on biological cells.

V. Summary:

In this research, we have shown that new generation mobile technology like 5G could have the main role in constructing various types of viruses like Coronaviruses within a cell. Some wavelengths in these technologies are smaller than the size of biological cells and could pass the cell membrane and enter into the nucleus. These waves interact with DNAs and move them. A DNA is formed from charged particles and by its motions, some electromagnetic waves are emerged. These waves interact with charged particles on nuclear membranes and lead to their vibrations. By these vibrations, nuclear membranes behave like the plastic or vibrator within a speaker/microphone and produce some ultrasound waves. Thus, a DNA could emits both electromagnetic and ultrasound waves which their shapes and sizes depend on the shapes and sizes of hexagonal/pentagonal bases of DNAs.

These waves produce some hexagonal and pentagonal holes in liquids within nucleus and the cell. To fill these holes, some bases are produced. These bases join to each other and construct Coronaviruses.

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