

## HOW TO FIGHT CANCER CELLS BY MAKING USE OF MUTATION IN DNA

Dear Editor

Human bodies are made up of trillions of cells and each cell contains about 3 billion bits or gene sequences specifying the quality and type of those cells; out of which 99.9% are identical in all humans, 0.1% of them are not identical.<sup>1</sup>

Some of the cell quality is specified by a single deoxyribonucleic acid (DNA); for example a disease called sickle-cell anemia is caused by a single mutation in a single DNA base pair resulting in replacement of thymine amino acid by adenine amino acid. The result of this is that the shape of red blood cells will look like a sickle instead of donut shape. Red-green blindness is caused also by a single mutation.

But not every trait is specified by a single sequence of DNA; for example red-green cone cells (about 7 millions of them) in the retina sense all wavelengths within the visible light 400-700 nm. Normal people have at least one red opsin gene and usually more than one green opsin genes. Color defective people do not have green opsin gene, but most of the normal people have several copies of green opsin genes (normally three or more) following a single red opsin gene.

There are about 30,000 genes in human genome which direct the production of about 500,000 proteins.<sup>2</sup> There is now a sharp rise in proteomics research to study their interaction with one another.

The sequence of human genome was completed in 2000 by two organizations, National Human Genome Research Institute (NHGRI) represented by Dr. Collins and Celera represented by Dr. Craig Venter, both in USA. Seventeen medical centers around the world contributed to the sequence study.

- **How Cancer sets in:**

Now and then, these DNA get mutated in certain cells for many reasons such as the environment, type of food a person consumes, chemical and medicine he takes and others. But most probably, these mutated DNA cells either get killed or the mutated DNA get back to normal condition.

But sometimes, though rarely, mutated DNA cells produce more cells by dividing each one into two and in this way cancer sets in.

So a person with any type of cancer will have cells with normal DNA and cells with mutated DNA, irrespective of type of cancer.

DNAs in genes are coded messages, which control the behavior of cells including making different type of proteins which control how a cell behaves such as cell multiplying or not. There is a material called carcinogen which induces the cell to be cancerous. While the immune system destroys abnormal cells by recognizing their mutated DNA.

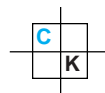
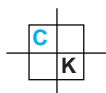
- **Recent Research Work:**

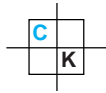
A recent experiment was conducted in which a drug called Olaparib which inhibits an enzyme called poly (adenosine diphosphate ribose) polymerase (PARP), or we can call it PARP-inhibitor. Some cancer cells have mutations called BRCA1 and BRCA2 in their genes which weaken the body ability to repair DNA damage.<sup>3</sup> This drug kills cancer cells through a process called synthetic lethality while healthy cells get their mutated DNA repaired by PARP enzyme through a process called base excision.

This research work which is based on drugs those selectively kill cancer cells without harming normal cells is not easy but it opens the way for future work.

3.2- Srs2 and Rad51: To explain this research work we have first to define<sup>4</sup>

- **Srs2:** protein which is able to slide along a strand of DNA and remove other proteins or separate the two strands of the twisted double helix. It regulates homologous recombination by counteracting the work of another protein Rad51.
- **Rad51:** promotes the exchange of sequences between two related DNA molecules which can be used to repair breaks in DNA, it forms long filaments on DNA.





The research showed how Srs2 removes Rad51 from DNA and thereby prevents it from making repairs to broken strands in cancer cells.

- **Repair Enzymes:** In this research work scientists are investigating how DNA repairs enzymes located sites of damage in a vast excess of normal DNA, the basis for specific removal of damaged DNA and the mechanisms by which multistep enzymatic repair reactions are coordinated to complete the repair process.<sup>5</sup>
- **Bromodeoxyuridine:** Currently, they are investigating the effects of various agents on tumors that contain amplified DNA sequences encoding oncogenes and they have discovered that an agent like bromodeoxyuridine converts a highly malignant small cell lung cancer line to a nonmalignant one when assayed by tumor growth in nude mice.<sup>6</sup>
- **Natural killer (NK) cells:** There are innate immune lymphocytes which are important for host defense against infections and malignant transformation. These NK cells require activation, this research work is investigating about the best enzyme and drug to use appropriate.<sup>7</sup>
- **Our suggestion**

To get rid of cancer is to kill cells with mutated DNA or to get the mutated DNAs back to normal condition. In microwave and all other radio networks and also in optical fiber networks, data are sent in the form of electrical packets, though it is anticipated that optical packets would be used in optical fibers not far in the future. Each packet consists of two parts, header and data. The header has address of source, address of destination, timing, protocols and sometimes cryptographic coding. In a network, it is possible to destroy all packets which have different type of cryptographic coding. So, we have to make use of this type of technology to destroy cancer cells. DNAs in genes are coded messages which control the behavior of cells including making different type of proteins which control how a cell behaves such as cell multiplying or not. There is a material called carcinogen which induces the cell to be cancerous, while the immune system destroys abnormal cells by recognizing their mutated DNA. By making use of microarray which is a device through which one can look at the activity of many individual genes and their interactions<sup>8</sup>, we can study the DNA in normal and cancer cells that are responsible for cell multiplication. The sequence of these particular DNA can be obtained and they can be dealt with in the way I am suggesting. Since the sequence might be different from one person to another and from one part of the human body to another, so the sequence of these DNAs for the person we are dealing with must be determined for that particular part of his body.

Main research work should be directed how to reach this sequence of DNA either to remove the mutation or to kill those cells. Removing the mutation is the best way. By injecting pulses with time sequence equal to the time required to reach the mutation in the DNA and pulse width and amplitude to remove the mutation i.e. to make the cell normal. The above two timings and amplitude voltage have to be reached by research work.

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