ISSN: 2755-0176

Journal of Cancer Research Reviews & Reports

SCIENTIFIC Research and Community

Research Article

Open Access

The Impact of Sequencing Human Genome on the New-World Order

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ABSTRACT

When a new discovery brings a seismic shift in our old thinking, what price do we pay? This abstract describes the creation of Life in the Lab. The day we discovered that the RNA, a molecule that codes for Life, can self-replicate, self-organize and self-evolve, it also has the ability not only to store the information like DNA, can catalyze reaction like protein, we know that we embark on a New-World Order to create Life in the Lab. The New World Order would be based on the truth, experimental evidence, facts, reproducible and verifiable results. The Old Word Order of the seven-day creation of Life on Earth was imagined by our elders based on beliefs, fiction, magic, mystery without any evidence without any verifiable proofs. What the New World Order discovered is that the essence of Life is information, and the information is located on four organic molecules called nucleotides and they are Adenine, Thiamine, Guanine and Cytosine. They are found in the nucleus of all living creatures from a tiny blade of grass to mighty Elephant including, Man, Mouse, Monkey and Microbes. The greatest achievement is that we could not only synthesize these molecules in our Labs, but also, we could arrange them in a specific order of three letter called Codon which codes for an Amino acid. The four-nucleotide text could be arranged in sixty-four different combinations to code for all twenty amino acids to make proteins that perform all our body functions. Thousands of proteins interact to make a Cell. Millions of Cells interact to make a Tissue and hundreds of Tissues interact to make an Organ and several Organs interact to make a Human. Once we synthesize RNA molecule in the Lab, we can create novel microbial life forms, a series of biological machines which carry instructions to produce new food, new fuel, and new medicine to treat every disease known to mankind.

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Received: February 21, 2022; **Accepted:** February 25, 2022; **Published:** March 07, 2022

Keywords: New Worlds Order, DNA, RNA, Nitrogen Mustard, Aziridine, Carbamate, AZQ

Historical Background

When a discovery brings a seismic shift in our old thinking, what price do we pay? We have two major challenges before us: (1) Creation of the World and (2) the Creation of Life on Earth. The far-sighted leaders of the Old-World Order paid a very high price for describing the Creation of the World. What price do the Scientists of the New-World Order pay for Creating Life in the Lab?

If you are a religious person, you believe in God as the supreme leader of the world. God is the ultimate truth and ultimate reality. Different religions are different paths leading to the same reality. We should be complementing each other's religion not competing with each other. No other belief system can compete with religion because religions promise eternal life, life after death and religion promises Heaven. Religions give happiness, satisfaction, and purpose in life. It teaches us if you want to serve God, you must serve humanity. Because of these promises, religions spread like a wild fire. More than ninety percent of the people of the world believe in some form of religion.

of all the religions in the world, Christian religion has about a billion and a half members. The Catholic Church is more powerful, more unified and richer than all the religions of the world put together. Although the seat of its power is Vatican in Rome, Catholic Churches around the world pay allegiance to the Vatican. The power of Vatican exceeds beyond all national and international borders. Catholic Church from all the countries of the world collect money and send to Rome. Today, Vatican's total budget exceeds the national budget of many poor nations of the world. This makes Catholic Church more powerful than all the religions of the world.

The Old-World Order was created by the Catholic Church for its followers. During the 15th and 16th century, Vatican used to maintain a Celestial Army. The Celestial soldiers arrest any Christian who disagrees with the teachings of the Church and throw them in dungeon where they were punished and tortured for years and one day the Inquisition holds a secret trial. If the victims found guilty, they were burn alive in public to teach a lesson to any future rebel.

In this chapter, we describe the story of three such rebels, Nicholas Copernicus, Galileo Galilei and Gordano Bruno. Their findings and observations of the nature of the Heliocentric world system brought a seismic shift in the Catholic Church's teachings of Geocentric World system. Although these three great men paid the ultimate prize with their life, their sacrifice has helped us laid down the foundation of a New-World Order based on experimental observations of the appearance of Life itself.

Today, Holy Father Pope Francis commands more power than all the religious leaders of the world put together. He is a leader of all the Catholic Churches of the world. Compare to all previous Popes, he is well informed, more knowledgeable, and more compassionate. He appoints an army of experts to advise him on the matter of the new scientific discoveries. He leads this flock of followers with mercy, compassion and liberal understanding. Scientists hope that he will sympathetically understand the purpose of creating Life in the labs. We assure him that we don't want to create humans; instead, we want to bring a new World Order by creating novel microbial life forms. We want to produce in the Lab, a series of biological machines which carry instructions to make new food to feed the burgeoning population of the world; new fuel to run the engine of the modern society and to produce new medicines to treat every disease known to mankind.

Creation of the Old-World Order
Historical Background
According to the Old-World Order, Life appeared on Earth and therefore Earth must be the center of the World. The Old-World Order was conceived by ancient intellectual giants like Aristotle and Ptolemy. Aristotle observed that Sun rises, Sun sets, and rises again, it must be revolving around the Earth. Based on this observation, he proposed the Geocentric model of the world in which the Earth is at the center of the cosmos, and the planets, the sun, the moon, and the stars circles around it. The Catholic Church promoted this concept because they believe that since Jesus Christ, the savior was born on Earth, the Earth must be Holy and Geocentric Concept of the world must be true. For centuries, people believed this concept to be the fact.

A seismic shift in our thinking was brought to Europe by a 16th century Catholic Church Polish Administrator, named Nicolas Copernicus. In 1643, he published a book in which he proposed a Heliocentric concept of the World instead of Geocentric concept. The Sus is at the center and the Earth is revolving around it. The concept was based on a Mathematical Model on the Heliocentric foundation that enable him to predict the planetary position with very high degree of accuracy.

The concept of Sun-centered Universe was considered a challenge to the church's teachings and its authority and was unacceptable to Church because the fourth century's Biblical Scholar St. Augustine had forbidden the Egyptian religion of Sun worshiping. In Ancient times, pagan Egyptians did worshiped Sun God., Egyptian Goddess Isis supposed to be the daughter of Sun-God and known to be a magician. Any reference to Sun-centered universe in those days was considered a heresy. A magic and a return to pagan Egyptian religion.

Many well know ancient astronomers of that time refused to accept this model because there were no observations. They found a massive violation of common sense. It also violated the only system available to them presented by Aristotle and Ptolemy. It destroyed the old concept of Heaven above and Earth Below practiced by the masses for the last 2000 years. For about half a century, the Heliocentric model was not rejected. Theoretical elegance is not enough, experimental observations are required.

The Geocentric Concept of the Old-World Order was based on fear, fear of Church, fear of Inquisition, fear of punishment and fear of death. During the Old-World Order the supreme Church leader was His Holiness Pope Urban VIII. During the Old-World Order, the Catholic Church used to maintain a Celestial Army. If you publish your research findings that the church's teaching, the Celestial soldiers will arrest you and locked you in the Dungeon where you are locked in for decades. When your turn comes, there will be a secret trial by the Inquisitors. If you are found guilty, your punishment is carried out in public, to teach others a lesson, and you are most likely to be burned alive. It was a lesson for all would be Heretics that if you are in violation of the church's teachings, you will die at the stake. Today, the Catholic Church faces its greatest challenge by the scientific community; the very first lesson of the Creation of Life in seven days is challenged; the Church can no longer cure disease or cause disease, scientists can. Church cannot claim to give Life nor could it threaten to take Life.

The Geocentric Old-World according to Aristotle, Ptolemy & the Catholic Church
The old view of the world was conceived by two schools of thought. One view was conceived by the Greek philosopher Aristotle about a hundred years before Christ and the other was refined by Ptolemy, a librarian in the great library of Alexandria, Egypt, about two hundred years after Christ. By observing the night sky, Aristotle and Ptolemy conceived the idea that the entire Universe is a dome shaped and all the stars are fixed in the sky and Earth is the center of the Universe. Five hundred years later, Christianity borrowed Aristotelian and Ptolemaic concept of Earth-centered Universe and perfected it. Earth-centered Universe of Ptolemaic view was in harmony with the Catholic Church's view. It says that man is considered as the principal object of divine creation. The entire Universe is conceived to serve man's need and Earth was the center of the Universe and man is made to serve God and Universe is made to serve man. Therefore, man is placed in the center of the Universe so that he may serve and be served. Any change of this concept was considered heresy and against the teachings of Holy Scriptures and against the Will of God. Most priests in those days were afraid that any change in this view will weaken the church's position and will be a threat to the religion.

The Heliocentric World Order according to Mathematical Calculation of Nichols Copernicus and the Telescopic Observation of Galileo Galilei
Galileo Galilei was born on February 1564 and was an Italian natural Philosopher, Astronomer and a Mathematicians who made fundamental contribution to science of motion and Astronomy. He believed that the book of nature was written in the language of Mathematics. He changed natural philosophy from a verbal, qualitative account to a mathematical one in which experimentation became a recognized method for discovering the facts of nature. His discoveries with the Telescope revolutionized astronomy and his experimental observation paved the way for the acceptance of the Copernican Heliocentric system of the world.

Galileo was involved in the Heliocentric model of the world 65 years later. In 1609, The Telescope had been invented by a Dutchman, named Leeuwenhoek, who was the first to observe bacteria and protozoa. Gallio learned from a friend and quickly produced one Telescope for himself. He learned to grind lenses and made a twenty time more powerful magnification Telescope. He then turned his Telescope towards Heaven. He discovered new stars in Heaven. On the surface of the Moon, he observed mountains, valleys and craters. He saw the Phases of Planet Venus and he observed the largest planet Jupiter has satellite moons. He noted that the Planet Saturn has rings, and the Sun has spots. He published all his observation in a book called Stary Messenger describing some of his Telescopic observations. Using these observations, he agreed with Nicolas Copernicus' calculation

for the Heliocentric system of the world. The Heliocentric models consider the Sun as the center, and the planets revolve around the Sun. The most predominant theory of the structure of the universe in the ancient world was the Geocentric model. It says that the Earth is at the center of the universe, and every other celestial body rotates around the Earth.

Copernicus was too afraid of the Church's Fathers to publish his findings when he was alive. His findings were published after his death. On the contrary, Galileo was not afraid of Church's leaders because he thought that he had a great friend, the Holy Father Bellarmines who later became Pope Urban VIII. Galileo openly advocated the Heliocentric Model of the Universe which resulted in his Inquisition which found him guilty of Heresy and was house arrested for the rest of his life.

The highest price for teaching the Heliocentric Model of the world was paid by Giordano Bruno. He paid the price with his life.

(see the accompanying article on, "**The Life and Time of Giordano Bruno – The Conflict Between Science and Catholic Religion**).

According to Bruno, Universe is vast and there are billions of galaxies like ours and the Universe must be teeming with Life. He was a visionary. What he predicted most religious enthusiasts of his time could not imagine.

Today, we believe in the Heliocentric World. Our Sun is a Star, it has nine planets, one hundred and forty moons and millions of comets and asteroids revolving around the Sun forming a Solar System. There are about one hundred billion Solar Systems like ours in the Milky Way Galaxy alone and there are more than four hundred billion galaxies in the visible part of the Universe. According to the science of Cosmology, the Big Bang occurred about 13.72 billion years ago. The Universe was a single mass of energy, May be God said, let there be Light and there was Light, the Universe exploded with a Titanic force. Its material spread in every direction, over billions of years, the material began to cool, gravitational forces attracted, and the material began to condense forming island of galaxies in which was formed billions of Star Systems like ours.

Our Solar System was formed when the revolving burning material condensed to form Sun and the cooler material condensed to form planets. Planets such as Mercury and Venus are too close to Sun and are too hot to support Life. Earth is in the habitable zone neither too hot nor too cold and suitable to evolve Life. Planets such as Mars, Jupiter, Saturn, Neptune, Uranus, and Pluto are too far from Sun and too cold to support Life. Planet Earth is in the habitable Zone. It is neither too hot nor too cold. Life is evolved. The early hot Earth was bombarded with comets which brought water to Earth surface forming oceans. Seventy percent of Earth surface is covered with Water. Planet Earth is a Water World. In Summer Water evaporate and in Winter it condensed. Thunders and lightning storms cooled the planets even further. A million-lightning strike Earth each day. At some remote corner of the Earth, lightning struck at a cloud of gases consisting of Ammonia, Carbon dioxide, Water near a phosphate rock forming the RNA the first information molecule, which can replicate and codes for Life. Our early Earth was an RNA world. RNA store information like DNA and catalyzed reactions like proteins. According to Darwin, life evolved, and nature selected. More stable and more complex life-giving molecules were evolved such as DNA which store information, Proteins when fold, carry out body function, Carbohydrates to provide energy, and Hormones to support Life. These are all scientific facts and can be demonstrated in the Labs.

Not all scientists are Godless heathens. On the contrary, a vast majority of us believe in the existence of a Supreme being who is the Creator of the Laws of Physics, Chemistry and Biological Evolution. We have no intention of competing with the Church. Even some of us try to compete with the Church, they cannot win because the Church promises Life after Death, Eternal Life, and Heaven. In spite of its success, the seventh day creation of the Universe is unacceptable to most scientists. Science and Religions are not competing. They should be complementing each other. New knowledge could create new problems, but knowledge is also superior to ignorance. Most scientists believe that our behavior is enshrined in our Holy Books based upon thousands of years of our Cultural Evolution.to find solution of our problems such as our behavior. Faith strengthens by Genomic studies neither weakens nor threatens by the latest scientific research. We seek wisdom from our Holy Books. DNA is not a dummy; it refuses to make decision on our behalf. The interaction of the 24,000 genes combines and recombine to provide options for our actions. It tells you to take Option A if not take Option B. In other words, it provides you Free Will. Various interaction of genes sets you Free to make a decision. If a criminal commits a crime, his genes are not responsible for his criminal behavior. He commits a crime because he saw a chance and an opportunity to get away with it. He had other options to walk away from the scene.

Creation of the Life- The New-World Order:
Historical Background

To understand the New-World Order, we have to go back in time to study three and a half billion years of evolutionary activity on primitive Earth where millions of lightnings strike each day on its hot surface. At some remote corner of the Earth, lightning struck at cloud of gases containing Nitrogen, Carbon dioxide, near a muddy Phosphate rock whose atoms interact to make the first life giving molecule nucleotide and how nucleotides interact to make the first replicating molecule RNA which code for Life, and which is converted to make a more stable DNA molecule which carries instructions to make us.

The New-World Order smashed the Old-World Order by experimentally proving that Life did not came from Heaven, but it was created over billions of years of interactions of the molecules on Earth. It was the formation of the first organic molecule RNA, a self-replicating, self-evolving and self-organizing molecule that started Life. It was the RNA molecule that brought the seismic shift in our thinking of the appearance of Life coming out not from Heaven, but from the surface of the ancient Earth. We proved in our Labs that RNA was not created by the hands of God, but by the hands of scientists. Once these RNA molecules are formed, they organized themselves to become alive; Life evolves, and nature selects. The best adapted traits are retained and promoted and passed on to the next generations of living creatures over millions of years. Appearance of Life has no miracle, no magic, and no mystery. It was the interaction of atoms that give molecules; it was the interactions of molecules to make a cell and millions of cells interacts to give a tissue and hundreds of tissues interact to give an organ and several organs interact to make a human. The total genetic information to make us is called the Human Genome. We pass the genetic information to our offspring.

Science means knowledge and knowledge is obtained by conducting experiments. It provides reproducible results. For example, Water boils at one hundred degree Centigrade and freezes at zero degree Centigrade. The first experiment we teach our students to conduct is to boil and freeze the water to see if all of them get the same reproducible results. Science is the cleverest form of detective work. There is no magic, no mysticism, and no miracle; it is all scientific facts and can be verified by anyone with some training.

In 1953, Stanley Miller in Chicago University conducted a simple experiment. He mimicked the early atmospheric conditions that existed on Earth. In a round flask containing Ammonia, Carbon dioxide, Methane and Water, he sparked electric current for a week. It turned to a dark mixture. He analyzed the dark mixture and isolated amino acids the essential life- giving molecules. Other more complex molecules like DNA and Proteins were isolated later. Accumulation and rearrangements of these molecules over millions of years resulted in early microbial life on Earth. The early microbial life was trapped in the frozen Earth. No unicellular fossil is available. Fossils began to appear about 550 million years ago during a period called the Pre-Cambrian Era when the first Sunrise appeared on Earth surface; the ice began to melt, and unicellular organisms attacked other unicellular organisms forming multi-cellular organisms. When frozen Earth became the Water World, complex life evolved rapidly. The first early Life must have been the Blue Green Algae which performs photosynthesis. The essential elements such as Carbon dioxide, Methane, Nitrogen and Phosphorus were available for the Blue Green Algae to thrive. For the next billion years, Blue Green Algae must have carpeted all the available surface of planet Earth. Its job is to absorb Carbon dioxide and pump Oxygen. Today, we have 80 percent Nitrogen and about 20 percent Oxygen with trace amount of Carbon dioxide (400 PPM). Life evolved and nature selected. Species best adapted to the environmental condition survive and thrive and the rest die. Life thrived on Earth. Today, we have three million known and thirty million unknown species on Earth.

Four and a half billion years of biological evolution resulted in us. All this information is trapped as fossil records in the layers of rocks. (All fossil records are on display in the Smithsonian Museum in Washington). Radio-active Carbon dating showed that the most ancient rocks have the simplest fossils and the more recent rocks have the more complex fossils. Human fossils were found in three and a half million old rocks found in the Hader Valley, site of paleoanthropological excavations in the lower Awash River valley in the Afar region of Ethiopia. It lies along the northernmost part of Africa's Eastern (Great) Rift Valley, about 185 miles (300 km) northeast of Addis Ababa where Chimps were living for the last twenty-six million years.

Recent DNA sequencing showed that Chimps shared 98.9 percent genes identical to humans. Just 1.1 percent genes in human's brain turned on to give us conscientiousness. Today, there are more than seven and a half billion people live on planet Earth. We are adding 90 million newborn each year. By 2050, the human population is likely to be nine billion. We need to spread human intelligence on other Star Systems. So, we asked the most logical questions: Are we alone? Is there Life out there? Who else is out there? Under similar early Earth conditions, could Life evolve on other Star Systems. Universe is vast; it must be teeming with Life. Oxygen essential for life does not exist among Star Systems. Star Systems are separated by billions of miles of vacuum. If Life exists, it must have been separated by billions of miles apart. How many Star Systems have evolved Life like Earth? As we evolve and grow, we ask ourselves simple questions like Who are we? Where have we all come from and what was it that made us this way? To look forward, we look backward asking how we got to be humans and how different from the rest of the living world?

Human Life also begins with a single cell. You are I are the loving union of our parents. Our mother's egg receives our father's sperm, and we are conceived. The fertilized egg attaches itself to our mother's womb. It draws nourishment; it grows, multiply, replicate and differentiate and in nine months, we are born as a complete human being. By the time, we are matured that same single cell has replicated over a trillion times. The nucleus of all cells carries the same instructions to make us. There are certain characteristics that we inherit from our parents for example color of eyes, color of our hairs, facial features. Based on these observations, the Nobel laurate Physicist, Irwin Schrödinger wrote a book in 1944 called What is Life. In this book Schrodinger observed that the embryo of the man, mouse and monkey all look the same under the microscope, but they carry instructions to make separate species. When a mouse embryo implanted in mouse always gives birth to a mouse, monkey gives birth to a monkey and a human gives birth to a human. Based on these observations, he stated that the features we inherit from our parents are written in a chemical language as a Genetic Code. This code carries instructions to make a man, mouse or monkey. Always to produce their kinds. It was Irwin Schrodinger who coined the phrase the Genetic Code. According to Schrodinger the code to make their own species is written in three parts, the coded information is carried on (1) Chromosome, (2) the Code must be tightly held together by a covalent bond and (3) the code must be copied exactly from Chromosome to Chromosome to produce the same species from parent to offspring. It has taken more than 60 years to confirm Schrödinger's observations.

It was Schrodinger who laid down the foundation for creating the New-World Order by providing the concept of Genetic Code. Over the decades, an army of young intellectuals decode the Genetic Code to find the code of Life. The Genetic Revolution set in motion step by step described below:

The following are the sequence of events of our evolutionary process. According to Charles Darwin, we exist through evolution. He has a unique life story. He carried Bible in one hand and Charles Lyell's book on Geology on the history of Earth in another hand. He observed that the evolutionary development in the beaks of Finches is based on the availability of food in different locations.

In 1859, Charles Darwin published his book The Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life. It is considered to be the foundation of Evolutionary Biology. Based on the appearance of the species, he classified them.

Seven years later, Gregor Mendel conducted his Garden Pea Experiment and drew the rules of inheritance. Mendel observed that when Green Pea plant is crossed with Yellow Pea plant. The first generation of the plant carries all Green and Yellow disappear. when it is crossed in the same generation. The Yellow returns. One in four is Yellow. The Yellow traits return in its entirety. Today, we call these traits or genes as dominant and recessive. In this case, the Green is dominant, and Yellow is recessive. The important fact we observe is that Genes travel from generations to generations in its entirety, never blend and never mix. We inherit genes from our both parents.

In 1869, a Swiss scientist named Friedrich Miescher isolated DNA for the first time. Miescher was studying white blood cells in Pus. From the Pus, he isolated an acidic material rich in phosphorus and called it Nuclein because it was extracted from the Nucleus of the Pus cells. Later it was found to be the Deoxy ribonucleic Acid (DNA). The traits are written on DNA.

In 1881, the German scientist, Albrecht Kossel, identified Nuclein as a nucleic acid and provided its present chemical name, deoxyribonucleic acid (DNA). He isolated the five nucleotide bases that are the building blocks of DNA and RNA. They are adenine, cytosine, guanine, thymine and uracil.

Mandel's work was essentially ignored for over 30 years. At the beginning of the twentieth century, however, Mendel and his laws were "rediscovered" by Hugo Marie de Vries, Karl Franz, Joseph Correns, and his colleagues. They firmly attached Mendel's name to the basic laws of genetics. William Bateson, who came close to rediscovering Mendel's laws through his own experiments, became one of the leading advocates of Mendelian genetics.

In 1903, Walter Sutton, also rediscovered Gregor Mendel's work. He concluded that genes are located on chromosomes. He presented Chromosome theory of heredity. He provided the first conclusive evidence that Chromosomes carry the units of inheritance, the gene.

In 1909, English physician Sir Archibald Garrod associated diseases with genetic defects and explained that the Black Urine is the result of an inborn error of genetic metabolism. He initiated the analysis of inborn errors of metabolism in humans in terms of biochemical genetics. Alkaptonuria, inherited as a recessive, is characterized by excretion in the Urine of large amounts of the substance called Alkapton, or homogentisic acid, which renders the urine black.

In 1910, Thomas Hunt Morgan performed an experiment at Columbia University, in NY that helped identify the role of Chromosomes play in heredity. That year, Morgan was breeding Drosophila, or fruit flies. After observing thousands of fruit fly offspring with red eyes, he obtained one that had white eyes. He identified mutant due to genetic defect.

In 1927, it was Hermann Joseph Muller who conducted three experiments during 1926 and 1927 that demonstrated that exposure to X-rays, a form of high-energy ionizing radiations, can cause genetic mutations, changes to an organism's genome, particularly in egg and sperm cells.

In 1944. It was Avery, MacLeod, and McCarty working in the Rockefeller Institute, NY, isolated a long stretch of molecule from the nucleus of a cell and called it a Nuclein which later turned out to be DNA which is the site of heredity characteristics and gene resides in DNA.

In 1950, it was Irwin Chargaff of Columbia University who published his finding that DNA is made of four chemical building blocks: Adenine, Thiamine, Guanine and Cytosine and they exists in one to one ratio.

In 1953, Morris Wilkins and Rosalind Franklin working in King's College, London University, determined the crystallographic Structure of DNA by X-ray diffraction. Using their diffraction pattern data, Francis Crick and James Watson at the Cambridge University, England, determined the double helix structure of DNA which provides a copying mechanism of replication essential for Life to reproduce. It explained how the information is stored and copied in the double helix of DNA, a property only living creatures possess.

In 1959, Arthur Kornberg isolated from E. coli an enzyme called DNA polymerase which has the ability to joins individual nucleotides to form long polymer building blocks. It can join the two single strands to synthesize a double strand of DNA critical to replication.

Martin Gallagher at NIH discovered enzyme Ligase which connects the two sticky ends of DNA together.

In 1960, Hamilton Smith discovered restriction enzymes which can cut the long string of DNA at a specific site allowing us to make a restriction site map of the DNA.

Sydney Brenner discovered cDNA (DNA without intron) using DNA reverse transcriptase mRNA by removing non-coding nucleotide from RNA and also discovered the START and STOP codons on the m-RNA. There is one start codon and three stop codons. The start codon is AUG condes for amino acid Methionine and there are three stop codons, and they are UAG, UGG, UGA. Once any of the stop codon appears, DNA synthesis stops.

In 1961, Marshall Nierenberg ultimately deciphered the Genetic Code and unlocked the secrets of Life that Crick/Watson had predicted. Marshall Nierenberg in our Lab at NIH demonstrated that long string of RNA carries the information, and it reads three letter code at a time. For example, three letter UUU codes for amino acid Phenyl alanine. He demonstrated that information flows from DNA to RNA which is translated in the Ribosome to Protein. Ribosomes serve as a de-coding machine. Khorana, Gilbert, and Ochoa discovered the three letter codes for all twenty amino acids.

Philip Sharp: Genes exist in pieces on mRNA
Fred Sangar: Di-deoxy DNA stop DNA extension. He made Di-deoxyribose derivatives for all four nucleotides. He could determine DNA at all four bases. This way, he could produce short and long pieces of DNA for sequencing.

Paul Berg: moved strip of mammalian DNA from eukaryote Genome to procaryote Genome. He successfully spliced Frog's genes into E. coli genome. Using plasmid or SV-40 viruses as Vectors.

Herbert Boyer: made Hybrid DNA by using restriction enzymes to cut DNA and paste using ligase enzymes to cut and paste antibiotics Kanamycin and Tetracycline resistant genes into Plasmid

Stanley Cohen: shuttle Hybrid plasmids into E. coli by using Calcium chloride.
Genetic Revolution began with three elements, cut, paste and copy a gene.
Using Berg's techniques, Boyer and Cohen were able to cut and paste and shuttle plasmid carrying human Insulin gene from human to E. coli to copy human Insulin where E. coli could serve as factories to make large scale of human insulin for diabetics. These days, we use PCR to introduce Insulin genes instead of plasmids.

Using the above information, the first and the most successful Gene Therapy experiment was conducted by French Anderson and

Mike Blaise for SCAD (Severe Combined Immune Deficiency Syndrome)

In 1961 Jacob and Monod originated the idea that control of enzyme levels in all cells occurs through regulation of transcription. They demonstrated how genes are switched on in E. coli by removing all Glucose and replacing it with Galactose. E. coli switched on Galactosidase genes to break down Galactose to produce Glucose and Fructose.

In 1969, Jon Beckwith of Harvard University isolated the first gene from the Bacterial Chromosome. Today, we know a gene is a unit of inheritance. It is a strip of DNA which has one start codon AUG (codes for Methionine) and three-stop codons, UGG, UAG, UGA. Between the start and stop codons, a gene has captured several hundred codons to code for a protein.

In 1970, Howard Tieman and David Baltimore demonstrated the existence of Reverse Transcriptase in RNA viruses, an enzyme that synthesizes DNA from RNA. It is the DNA which replicates then it is transcribed into RNA which is translated in the Ribosome into protein.

In 1972, Paul Berg isolated molecular scissors, the Restriction Enzyme which cut DNA at a specific site and splice from one species to another. He spliced Frog gene into E coli. He demonstrated that genes could be transferred from one species into another.

In 1973, Stanley Cohen and Eric Boyer demonstrated how to cut, paste and copy a gene in different species and made it possible to shuttle a gene among different species. They started the science of Biotechnology. They produced large scale Insulin to treat the diabetics of the world.

In 1976, Gilbert and. Khorana's group, culminating a nine□year effort, constructed the gene primer by assembling the four basic molecular units of the genetic code into the sequence.

in 1978, Hamilton Smith was awarded the Nobel Prize for discovering type II Restriction enzymes. A specific molecular scissors to cut and paste DNA.

In 1983, Kary Mullis started the Polymerase Chain Reaction. Using PCR, we could make millions of copies of a single gene within hours.

In 1986, it was LeRoy Hood who computerized reading sequencing rapidly and launched the sequencing the entire Human Genome.

Science of Genetic was progressing slowly. All the elements were ready to start the Genetic Revolution of the Human Genome Project. To start a mega science Project, all it needed It needed was a great visionary leader. The man who conceived the idea of sequencing the entire Human Genome single handedly was Robert Sinsheimer, Chancellor of UC Santa Cruz.

With above information in hands, we are ready to sequence the entire Human Genome. For Craig Venter it was easier to find EST (Express Sequence Tag) in a stretch of DNA to identify Genes. The process of sequences EST without the entire text of DNA is called the short-gun sequencing Using Short-gun sequencing, he came up with a quicker and faster method for whole genome shotgun sequencing. While Venter and his group only sequenced the EST, which constitute less than 2% of the entire Human Genome, Francis Collins of NIH and his International group of scientists sequenced the entire Human Genome consisting of six billion four hundred million nucleotides including the 24,000 genes. While Craig Venter and Hamilton Smith used short-gun approach to read the EST sequence of Human Genome, Francis Collin and his International group read the Human Genome nucleotide by nucleotide that is letter by letter, word by word and sentence by sentence the entire human genome with precision and accuracy.

In May 1985, molecular biologist and UC Santa Cruz Chancellor Robert Sinsheimer shared with a group of eminent biologists a radical proposal to launch a massive project to determine the complete DNA sequence of the Human Genome. Using four nucleotides, could we decipher the entire Human Genome of three billion letters, the entire Book of Life. Among the participants was Nobel Laureate Ronald Gilbert who suggested that to read, analyze and map accurately every nucleotide of the entire Human Genome will be extremely expensive. If we spend one dollar per base pair, it will cost us three billion dollars. Only US Congress could provide such a fund. Congressional Hearings were held, and they concluded that it would be a worthwhile project for the scientific community. Since NIH (National Institutes of Health), the largest biomedical center in the world, has the manpower and expertise to complete the work in a reasonable time frame, the US Congress will approve the funding, if NIH accepts this responsibility. NIH happily accepted the responsibility and work began.

To read the entire Human Genome is a colossal undertaking, it requires billions of additional dollars and years of effort of thousands of scientists from around the world. To read the Human Genome not only requires the funding from multi-national governments, but also requires the effort of thousands of scientists from six industrialized nations and 20 biomedical centers. This effort was led by US followed by Germany, France, England, China and Japan. We at NIH know that this was the greatest biological experiment ever conceived by Human mind. It will answer the most fundamental questions, we asked ourselves since the dawn of human civilization. What does it mean to be human? What is the nature of our memory and conscientiousness? And our development from a single cell to a complete human being? The biochemical basis of our senses and the process of our aging? The scientific basis of our similarity and dissimilarity? Similarities that all living creatures from a tiny blade of grass to the mighty Elephants including Man, Mouse. Monkey, Microbe and all plants from the plant kingdom are all made of the same chemical building blocks. And yet we are so diverse that no two individuals are alike. Even identical twins are not exactly identical, they grow up to become two separate individuals.

In 1990, US Congress authorized three billion dollars to our Labs in NIH (National Institutes of Health – an agency of US Government) to decipher the entire Human Genome to map, identify and locate all genes under the title, "The Human Genome Project." We found that our genome contains six billion four hundred million nucleotides bases half comes from our father and another half comes from our mother. Less than two percent of our Genome contains genes which code for proteins. The other 98 percent of our non-coding genome contains switches, promoters, terminators etc. The 46 Chromosomes present in each cell of our body are the greatest library of the Human Book of Life on planet Earth. The Chromosomes carry genes which are written in nucleotides. Before sequencing (determining the number and the order of the four nucleotides on a Chromosomes), it is essential to know how many genes are present on each Chromosome in our Genome. The Human Genome Project has identified not only the

number of nucleotides on each Chromosome, but also the number of genes on each chromosome.

Our entire genome, the book of our life, is written in four nucleotides. As stated above, they are A, (Adenine) T (Thiamine), G (Guanine) and C (Cytosine). The chain of these nucleotides forms a double stranded string of nucleotides, one strand is inherited from our mother and another from our father, running in opposite directions called the DNA (Deoxy Ribonucleic Acid; a self- replicating, self-evolving and self-organizing molecule). According to Francis Crick's Central Dogma of Molecular Biology, double stranded DNA replicates and is transcribed into a single stranded RNA (Ribonucleic Acid) which is translated in the Ribosome into proteins [1]. The discovery of the double helical structure of DNA explained how the information to create life is stored, replicate, evolved and passed on to the next generation. This discovery opened a New World Order of ideas and buried the old explanation of the magical mystical appearance of life on Earth.

The discovery of the double stranded DNA explained the replication process, a copying mechanism. With discovery of the nucleotides, we found that the essence of life is information, and the information is located on these four nucleotides. Our Genome, the book of Life is written on these four nucleotides. Every set of three nucleotide on the mRNA string forms a codon which codes for a specific amino acid. The four-letter text of nucleotides forms a three letter Codon which codes for an amino acid. There are 64 different combinations of Codons which codes for all 20 amino acids. Sequencing human genome identifies the number of nucleotides and the order in which they are arranged. Less than two percent of our genome contains regulatory region, a piece of DNA, which controls the function of genes. More than 300 regulatory regions have been identified. More than ninety eight percent of our Genome contains non-coding region used to be called the Junk DNA which makes up to sixty percent of our entire Genome. The non-coding regions contains repetitive piece of DNA which is tightly packed and mostly remain silent. The sequencing of this region showed that the non-coding region is the part of Viruses and Bacteria picked up by our Genome during the millions of years of our evolutionary process. During Bacterial or Viral infection, the non-coding DNA could unfold transcribing into RNA resulting into hazardous protein which could create havoc for our health.

Gene, a strip of DNA, is the unit of inheritance. As I said above, out of four-letter text, that is A-T and G-C, and three letters code for an amino acid called the Codon. The starting Codon in a gene is the Codon AUG (instead of T nucleotide in DNA, we use U nucleotide because Thiamin is converted to more water-soluble Uracil in RNA) which codes for amino acid Methionine. Long chain of DNA synthesis begins. Bacteria and Viruses have short codon chain. The longest chain is present in a gene of Ducharme Muscular Dystrophy, a neurological disease whose chain extends to two and a half million codons. Once a gene is identified, using Restriction Enzymes (molecular scissors) like EcoR1, we can cut, paste and copy all genes individually making a Restriction Site map. Once a single gene is isolated, we could compare the Reference Sequence of this gene and with the Thousand Genome Project to identify differences called mutations which are responsible for causing diseases. Once mutated gene is identified, we can design drugs to shut off that gene. Sequencing Genome is like extracting Gold from its Ore.

The Human Genome Sequencing:

Although life begins with a single cell, by the time we grow up that single blue print of Life is copied over 100 trillion times. In a grown-up person, the human body is made up of about 100 trillion cells; brain alone contains about 300 billion cells. Even though every cell in our body contains all 24,000 genes, only a few specific genes express themselves in Kidney to make Kidney function; only a few specific genes express themselves in the Liver to make a Liver function. All other genes are shut off.

The following list provide the details composition of human genome. It also provides the number of nucleotides and the number of genes present on each Chromosome [2-6]. We found that the Chromosome-1 is the largest Chromosome carrying 263 million A, T, G and C nucleotides bases and it has only 2,610 genes. The Chromosome-2 contains 255 million nucleotides bases and has only 1,748 genes. The Chromosome-3 contains 214 million nucleotide bases and carries 1,381 genes. The Chromosome-4 contains 203 million nucleotide bases and carries 1,024 genes. The Chromosome-5 contains 194 million nucleotide bases and carries 1,190 genes. The Chromosome-6 contains 183 million nucleotide bases and carries 1,394 genes. The Chromosome-7 contains 171 million nucleotide bases and carries 1,378 genes. The Chromosome-8 contains 155 million nucleotide bases and carries 927 genes. The Chromosome-9 contains 145 million nucleotide bases and carries 1,076 genes. The Chromosome-10 contains 144 million nucleotide bases and carries 983 genes. The Chromosome-11 contains 144 million nucleotide bases and carries 1,692 genes. The Chromosome-12 contains 143 million nucleotide bases and carries 1,268 genes. The Chromosome-13 contains 114 million nucleotide bases and carries 496 genes. The Chromosome-14 contains 109 million nucleotide bases and carries 1,173 genes. The Chromosome-15 contains 106 million nucleotide bases and carries 906 genes. The Chromosome-16 contains 98 million nucleotide bases and carries 1,032 genes. The Chromosome-17 contains 92 million nucleotide bases and carries 1,394 genes. The Chromosome-18 contains 85 million nucleotide bases and carries 400 genes. The Chromosome-19 contains 67 million nucleotide bases and carries 1,592 genes. The Chromosome-20 contains 72 million nucleotide bases and carries 710 genes. The Chromosome-21 contains 50 million nucleotide bases and carries 337 genes. Chromosome-22 contains 56 million nucleotides and carries 701 genes. Finally, the sex chromosome of all females called the (X) contains 164 million nucleotide bases and carries 1,141 genes. The male sperm chromosome contains 59 million nucleotide bases and carries 255 genes.

If you add up all genes in the 23 pairs of Chromosomes, they come up to 26,808 genes and yet we keep on mentioning 24,000 genes needed to keep us function normally and the rest are Pseudogenes. Out of 24,000 gene, 16,000 are good genes which keep us healthy and 6.000 are mutated or bad genes which are responsible for causing six thousand different diseases and more than 2,000 pseudogenes which have lost their functions. As I said above, a gene codes for a protein, not all 24,000 genes code for proteins. It is estimated that less than 19,000 genes code for protein. Because of the alternative splicing, each gene codes for more than one protein. All functional genes in our body make less than 50,000 protein which interact in millions of different ways to give a single functional cell. Millions of cells interact to give a tissue, hundreds of tissues interact to give an organ and several organs interact to make a human.

We have sequenced the Genomes of several other species for comparison with Human Genome. The following section describes the similarities and differences with various genomes:
Our Genome contains over three billion nucleotide (AT/GC) base pairs. A gene is a strip of DNA which consists of about three thousand nucleotide base pairs. A gene size varies greatly with the largest human gene called Dystrophin at 2.4 million base pairs. The functions and locations of almost fifty percent of the discovered genes are not known. The Human Genome sequence in all humans are almost 99.9 percent exactly the same in all humans. About two percent of the Genome encodes instructions for the synthesis of proteins. Repeat sequences that do not code for proteins makes up at least fifty percent of the Human Genome. Repeat sequences are thought to have no direct functions, but they shed light on Chromosome's structure and dynamics. Over time, these repeat segments reshape the genome by rearranging it thereby recreating entirely new genes or modifying and reshuffling the existing genes. Compared to other species, The Human Genome has more than 50% of repeat sequence. While the repeat sequence in Mustard Seed is 11%, and Worm has 7% and Fly has 3%. About 40% of the predicted human proteins shared similarity with Fruit Fly or Worm's proteins. Genes appeared to be concentrated in random area along the Genome with vast expanses of non-coding DNA between. Genes have been pinpointed and particular sequences in those genes are associated with numerous diseases and disorders including Breast Cancers, Muscular diseases, deafness and blindness. We have identified 3 million locations where single base DNA differences occur in human. This information promises to revolutionize the process of finding DNA sequences associated with such common diseases such as Cardiovascular diseases, Diabetes, Arthritis, and Cancers.

In 2009, Ramakrishnan and his colleagues determined the structure and function of the Ribosome. Sequencing Ribosome describes the code for life. We learned that RNA carries information in a set of three nucleotide bases. RNA is a single strand polymer; RNA has a Ribose sugar and it has Uridine instead of Thiamine. RNA carries information about genes. T-RNA carries instruction to build proteins; T-RNA is used to provide chemical machinery for linking amino acids together in the exact order dictated by m-RNA. Sequencing RNA opens the gates to the New-World Order. Now, we could create Life in the Lab.

First, we wanted to know the minimum number of genes required to keep a living creature alive. We sequenced the Genome of the tiniest organism called Mycoplasma genitalium. It is a sexually transmitted, small, and pathogenic bacterium that lives on the skin cells of the urinary and genital tracts in humans. This tiny organism carries 470 genes in its entire Genome. We discovered something astonishing; not all 470 genes are essential to keep this organism alive. By knocking out one gene at a time, we found that only 300 genes are needed to keep this organism alive. The additional 170 genes serve as a back-up system. If something goes wrong and the organism is injured, it seeks the help of other extra genes to keep up the machinery working. With this knowledge, we are ready to assemble minimum number of genes to make a tiny living creature in the Lab.

Synthetic Life
On May 13, 2011, Scientists at the Craig Venter Institute conducted one of the greatest biological experiments. They created the first living creature in the test tube. Now, we are entering into New-World Order. Using the above four nucleotides (A-T and G-C) in a special sequencer; with a few enzymes and a computer to design a specific sequence, they were able to put together the Genome of a smallest organism called Mycoplasma Mycoides. This creature has all the properties of a natural living creature; it has the ability to self-replicate, self-divide, self-organize and self-evolve. It has the complete information to make itself. It is made of 10.8 kb of A-T, G-C, base pairs. Naturally occurring Mycoplasma Mycoides causes respiratory diseases in sheep. The creation of synthetic Mycoplasma Mycoides in the Lab will herald an era of explorations and discoveries unsurpassed in the history of mankind. Now, it is possible to create new Life form to produce new food, new fuel, and new medicines to treat every disease known to mankind.

You might wonder why we want to create artificial Life forms when there is so much Life around us. Almost three million species known and ten times as many species are unknown to exist. First let me explain, we have no intention to create another human being. Why do we want to create another human being? It is so inexpensive to have babies in natural way. A couple can have a baby in nine months. What we want to do is to create brainless mindless microbial creatures, a Nano-Life form that will bring the nano-technology revolution and embark on a second industrial revolution. The Nano-Life will carry instructions to perform a specific task to produce biological materials for our use. As a first phase, we want to create a series of biological machines which will carry instructions to perform four tasks: to clean up our environmental pollution, to produce new food, new fuel and new medicine.

The success of the work by a group of scientists at the Craig Venter Institute for creating artificial Life was based on the success of the new technologies developed to read the Human Genome faster and cheaper so that we could read the genomes of all humans. The Human Genome Project has enlightened us in ways; we have never been enlightened before. As I said above, we have a New World Order. Now we know the answers to questions like who are we? Where have we all come from? What was it that made us this way? We can answer these questions with certainty that genetic studies confirm that you and I are the extension of the same single DNA molecule that was formed nearly four billion years ago. The book of life in all of us is written in the same language of DNA.

The Purpose of Life According to both the Old-World Order & the New-World Order
What is the purpose of Life? Religions, Philosophers, Artists have attempted to answer this question. Although more than twenty billion people have come and gone since the first human walked out of Africa about three and a half million years ago, they all attempted to answer this question, and they all heard different answer to this question. Now, it is the scientists turn to answer this question. We believe that we got it right. Scientists provide experimental proof and verifiable results. We know that the essence of Life is information, and the information is located on four nucleotides, and they are AT and GC. Our book of Life is written in these nucleotides. Four letter text carries three letter Codons. Different combinations of four-letter text give sixty-four Codons. Each Codon codes for a single amino acid. Proteins in our body are made of twenty amino acids. Multiple Codons code for a single amino acid. Although nucleotides store and carry information, it is the proteins that perform our body functions. The nucleus of each cell in our body carries all twenty-four thousand genes. As I said above, with four nucleotides text, we get sixty-four Codons combinations, could you imagine how many combinations we

could get with twenty-four thousand genes in each cell. We could get millions upon millions combination which is almost impossible to compute with our latest advanced computers.

As I said above, no two people look alike because if we were to compare the nucleotide sequence of two persons, in each string of thousand nucleotide base pair, one pair is located at a difference place (called the Single Nucleotide Polymorphism or SNP). In a three billion nucleotide text of Human Genome, there are at least three million SNPs. Again, could you imagine how many combinations we could get with three million SNPs. Even with the most advanced Computer, we cannot compute all combinations. Today, we have more than seven and a half billion people on planet Earth. We find no two people look exactly alike. Nether we look alike, nor we think alike. In a class examination, how could we measure the intelligence of students by asking the same set of questions. Although they all learn the same laws of Physics, Chemistry and Biological evolution that govern this world, their answers cannot be identical because of the three million SNP combinations or twenty-four thousand gene combinations.

May be in distant future, say in the next hundred years we would succeed in writing a computer program which sequence a single cell from an embryo and provide the result of these combination predicting the super intelligence of your newborn child in a specific field and what should he study when he grows up. We would dearly love to have such prediction with absolute accuracy.

In the absence of this information, we could simply say that since no two people looks alike, we are differently gifted. The first step to answer this question is to recognize this gift. No one knows better than the person himself. He knows what he loves to study best. He understands the subject effortlessly. He knows that he could solve the most complex problem in no time in a special field. That is his gift. The scientific answer to the purpose of Life is in three parts. First, you recognize the gift. The second step is to master the gift. Learn everything, there is to learn about the subject. In other word work hard and study hard and become the Grand Master of the subject. Third step is to share your gift and serve mankind by sharing your knowledge with the rest of the world. (According to the Old-World Order, serve mankind and serve God). When you teach, you touch the future. It gives the greatest joy and greatest satisfaction in Life. Your ideals will shine through for decades.

After breaking the genetic code and unlocking the secrets of life, we are certain that through a process called Genetic Engineering, we could transfer the essential amino acids coding genes from the farm animals and insert into plants to enrich our vegetables diets with essential amino acids. The process of Genetic Engineering involves altering the genetic make-up of a plant using "Recombinant DNA Technology" which uses molecular scissors called the Restriction Enzymes like EcoR1 to cut, paste and copy pieces of Codons which codes for the essential amino acids and transfer these codons from the animals to plants.

The purpose of describing the sequence of the entire human genome is to map, identify, analyze, and locate all genes and move any gene from animal genome to plant genome including edible vegetables to create a complete vegetarian's diet. Sequencing Human Genome also help us develop new tool kit of enzymes, the molecular scissors, to cut, paste and copy any piece of DNA from one species and insert to another species including animal genes to plants genome. To feed the burgeoning population of the world, the Genetic Engineering tools will help us develop new food, new fuel and new medicine to treat every disease known to mankind.

Genetically Modified Food

To produce new vegetarian food, the genetic engineering procedures have successfully sequenced the Rice genome and have also spliced genes to enrich it producing Vitamin A and Iron rich Rice. Similar methods could also be used to introduce all eight essential amino acids in the cereals including Rice, Corn, Wheat genomes either by splicing a single codon to introduce a single amino acid or multiple codons to generate multiple amino acids in Rice Genome to create most nutritious food for the burgeoning population of the world.

The following two methods are available to introduce novel genes in the plant genome: 1) The use of DNA particle gun for bombardment of an edible plant laced with the desired codon on either Tungsten or Gold pellet Gun, and 2) Transforming transgenic Agrobacterium tumefaciens-mediated codons for producing transgenic plant products carrying the essential amino acids Codons. The specific details of these methods are provided below:

Using Particle Bombardment Method to introduce Desired Genes into Plants:

Particle bombardment is a mechanical method of introducing the desired codon into plants. The desired genetic sequence is cloned into a plant DNA Vector and introduced into the plant using the gene gun or particle gun. As in the common gun, the gene gun uses minute particles of Tungsten or Gold as the bullet. These particles are coated with the desired DNA solution and fired into the plant cells through the force of the Helium gas inside a vacuum-filled chamber. The DNA and the Tungsten/Gold particles get inside the cell, and within 12 hours, the inserted DNA gets inside the nucleus, integrate with the plant DNA and becomes functional. The Tungsten/Gold particles are sequestered to the vacuole and eliminated later.

Using Agrobacterium Tumefactions-Mediated Method to introduce Desired Genes into Plants:

Transformed cells are cultured in vitro and introduced into small plants (regeneration) that express the inserted gene in Agrobacterium tumefaciens-mediated transformation. The "sharing" of DNA among living forms is well documented as a natural phenomenon. For thousands of years, farmers of livestock have been transferring different traits (genes) from one animal to another. For example, Agrobacterium tumefaciens, a soil bacterium known as 'nature's own genetic engineer', has the natural ability to genetically engineer plants. It causes Crown Gall disease in a wide range of broad-leaved plants, such as apple, pear, peach, cherry, almond, raspberry and roses. The disease gains its name from the large tumor-like swellings (galls) that typically occur at the crown of the plant, just above soil level. Ti-Plasmids (tumor induced plasmids) which serves as Vector (a carrier), are extracted from gall and used to make recombinant DNA. When harvested in Yeast, the Vectors make millions of clones (identical copies) for making novel food on large scale.

Basically, the bacterium transfers part of its DNA to the plant, and this DNA integrates into the plant's genome, causing the production of tumors like growth and associated changes in plant metabolism. Molecular biologists have utilized this biological mechanism to improve crops. The genes that cause the galls are removed and replaced with genes coding for desirable traits

(essential amino acids Codons) and it retains its ability to replicate like gall. Plant cells infected with the bacterium will not form galls but produce cells containing the desired amino acids, which when cultured in a special medium will regenerate into plants and manifest the presence of essential amino acids. This will create the most nutritious vegetarian food.

Either by Genetic transformation methods (Biolistic or Gene Gun or by Agrobacterium tumefaciens-mediated transformation methods), the main goal of genetic engineering in any transformation procedure is to introduce the gene of interest from human genome into the nucleus of the plant cell without affecting the cell's ability to survive. If the introduced gene is functional, and the gene product is synthesized, then the plant is said to be transformed. Once the inserted gene is stable, inherited and expressed in subsequent generations, then the plant is considered a transgenic.

Finally, Detection of Inserted Genes. Molecular detection methods have been developed to determine the integrity of the transgene (introduced gene or essential amino acid codons) into the plant cell. Sequencing of the whole genome of the transgenic plant should show the presence of newly introduced codon sequence.

Genomic food is based on the genetic make-up of the plant genome. For future space travelers, achieving Vegetarianism is the ultimate goal for humanity. As plant proteins are the primary sources of all dietary proteins consumed by human and animals and are inexpensive to produce in comparison with meat products; improving plant food quality will make a significant contribution to future needs of the population of the world. To provide most nutritious food to all of us, we have to cut, paste and copy codons of all essential amino acids in edible plants or seeds. There are more than 4,000 molecular scissors called Restriction Enzymes have been isolated from Bacteria. There are more than 3,500 multi-functional Type II Restriction Enzymes which are commercially available to cut, paste and copy fragments of essential amino acid codons either into double stranded DNA, or into a single stranded RNA of various lengths.

Fortunately, there are more than one codon which codes for the same amino acid. If one codon does not transfer easily from animal to plant, we could use the other codons. About a quarter million of flowering plants exist on Earth today. We cultivate just about 150 plants species for Agriculture purposes. To feed over seven billion people of the World, we cultivate a mere nine species of these plants on large scale. They are Corn, Rice, Wheat, Barley, Sorghum/Millet, Potatoes, Tomatoes, Sugar Cane and Soybean. The other vegetables, fruits and nuts are cultivated in smaller amounts. The Genomes of most of these edible plants have been sequenced. Luckily, there are only eight essential amino acids. It would be most useful to splice these codons in their genomes to produce the most nutritious food. The world's population will get all essential amino acids without eating meat or large quantities of vegetables. Besides fruits and vegetables, there are three major plants eaten by most people of the world and they need our immediate attention and they are Rice, Wheat and Corn.

Genes that carry essential amino acids are expressed in a two-step process and they are Transcription and Translation. First, the essential amino acids Codons are spliced or inserted into a double stranded of plant DNA which is later transcribed into a single stranded m-RNA. As I said above, it is the m-RNA which is translated in the Ribosomes into all 20 amino acids. The Cells decode m-RNA in groups of three nucleotides called Codons which carry instructions to produce the amino acids. When double stranded DNA is transcribed into a single stranded m-RNA, the nucleotide Thiamin is converted to Uracil. The Methyl group of Thiamine is replaced by a more water- soluble Hydroxyl group forming the Uracil. The nucleotide T for Thiamin is replaced by U for the Uracil. The m-RNA is translated into amino acids in Ribosomes. The gene expression has a Start Codon (AUG) which codes for amino acid Methionine and there are three Stop Codon which are UGG, UAG and UGA. Once the Stop Codon appears at the tail end of the DNA, its synthesis stops. The Codons for each essential amino acid and their alternative codons are described below:

Valine (GTT, GTC, GTA, GTG), Leucine (CTT, CTC, CTA, CTG; TTA, TTG), Isoleucine (ATT, ATC, ATA), Phenylalanine (TTT, TTC), Tryptophan (TGG), Lysine (AAA, AAG), arginine (CGT, CGC, CGA, CGG; AGA, AGG), Histidine (CAT, CAC), Methionine (ATG), Threonine (ACT, ACC, ACA, ACG).

Rice is devoid of essential amino acids in sufficient quantities. Using Genetic Engineering method, we must splice the essential amino acids codons in the Rice genome first. Rice (Oryza sativa) is one of the most important crops in the world. Rice, Wheat, and Corn, together account for about half of the world's food production, and Rice itself is the principal food of half of the world's population. Rice Genome contains 12 Chromosomes which carry 37,544 genes which are distributed over 400 to 430 Mb nucleotides long DNA. Rice is consumed in most poor countries and more than two billion people around the world eat Rice. It is a good source of carbohydrate, proteins, fiber, lipid and fats, minerals (potassium, phosphorous, magnesium, calcium, sodium, copper and iodine) and vitamins (thiamine, riboflavin, niacin, vitamin B6 and folic acid). Biotech Rice with provitamin A (Golden Rice) has been developed and is being used to transfer Beta Carotene. Using the same Bio-tech methods, we can produce new food and new medicine in plant kingdom. For example, the transgenic Rice carries genes to produce Iron, Vitamin A and E and amino acid Lysine. Lactoferrin gene has been inserted in Rice Genome to provide Iron rich food to feed 400 million individuals to protect them from Iron deficiency and malnutrition. We have also successfully spliced Bacillus thuringiensis gene (Bt.) in the Rice Genome to introduce Bacterial resistant Rice against infectious worms.

Our next challenge is, once we sequence the Rice genome, how many genes of essential amino acids, could we splice in a single Rice genome, one amino acid at a time or all eight in a single Rice genome. It depends upon the ease of insertion of a codon using a specific restriction enzyme. We have one ethical problem which we will discuss later. It is known for centuries that when food supplies increase so does the population.

Genetically Modified Fuel:

Fossil fuel is harmful to our environment. Each year, we collectively release 110 million tons of pollutants in our atmosphere. In addition, during 2017, the Methane emission alone reached 596 million metric tons primarily from agriculture – particularly from red meat and dairy producing animals and to a lesser extent from Rice farming. Although Methane is short-lived in the atmosphere than Carbon dioxide, but it has a stronger Global Warming Effect. Of all the pollutants in the atmosphere, the major stable pollutant is Carbon dioxide. Carbon dioxide gas is responsible for causing Greenhouse Effect. Before the Industrial Revolution, the level of Carbon dioxide in our atmosphere was 175 PPM. After Industrial Revolution, the level of Carbon dioxide has gone up several fold.

Today we have reached 400 ppm Carbon dioxide in our atmosphere and at the current level, it is going up to 800 ppm by 2050. The main source of Carbon dioxide is from burning fossil fuel and from the decomposition of trees, volcanos and Oil refiners. There are more than a billion cars in the world today. Transportation alone produces 20% of the Carbon dioxide. Excessive Carbon dioxide is not only responsible for Global Warming, but also it destroys Coral Reef, Ice Caps and coast lines erosion causing sea level rise. To mitigate emission of this level, we need to develop a massive technological method to liquify Carbon dioxide to lock its emission and release at the ocean floor.

Marine cyanobacteria called Prochlorococcus thrive on the ocean floor. Their Chloroplast in the Chlorophyll Genome is responsible for Photosynthesis converting Carbon dioxide (a pollutant) to Oxygen. By conducting Photosynthesis on the ocean floor, these Cyanobacteria convert Carbon dioxide to their food Carbohydrate and produce Oxygen as a by-product. Fifty percent of the Photosynthesis is performed by these bacteria at the ocean floor and half of the Oxygen we breathe today comes from them. Photosynthesis is carried by billions of Microbes growing layer upon layer forming a thick carpet on the ocean floor near heat producing source like hydrothermal vents.

In the Gulf of California, the Pescadores Basin contains the deepest ocean floor. At a depth of 12,500 feet, it is known to have high-temperature hydrothermal vents in the Pacific Ocean. Dense colonies of Cyanobacteria, and tubeworms cling to rocks near the vents in high heat and noxious water. The chimneys on the ocean floor emits dark fluids that are rich in oil-like hydrocarbons and give off diesel-like smelly gases containing Methane, a fuel. Under deep dark ocean floor under tremendous pressure and extremely cold temperature a Cyanobacteria called Methano-coccus converts Carbon dioxide (a pollutant) to Methane (a Fuel and greenhouse gas). In our Lab, we could sequence the Genome of these bacteria brought from the ocean floor and cut, paste and copy their genes to produce large quantities of Methane in our Labs. Methane could be converted to Propane and Octane as a better fuel.

Genetically Modified Medicine:

Sequencing Human Genome showed that out of twenty-four thousand genes in our Genome, there are six thousand bad or mutated genes responsible for causing six thousand different diseases. The following section shows how normal genes could become abnormal and cause diseases and how can we design novel drugs to treat those diseases.

The kinds of damaged or mutations appear in our genome is explained by Neo-Darwinism which is based upon the combination of Mendelian Genetic and the Darwinian Natural Selection. Neo-Darwinism is also known as the Modern or Synthetic Theory of Evolution which is based on two postulates, and they are Gene Variability and Natural Selection. The first postulate, Gene Variability, states that in any given population there are variation. These variations exist because of genetic changes which are present in that population. The second postulate, the Natural Selection, states that the best adapted organism in an environment is selected by the nature to thrive. In other words, Nature selects the better adapted organisms. The better adapted organisms thrive reproduce or spread and have large number of offspring. The next generation are even better adapted in the current environment. It is the mutated genes that present the greatest challenge.

The sequence of the Human Genome has identified 6,000 mutated genes which produce bad proteins to make us sick. Our real challenge is to develop novel drugs to treat these six thousand diseases which results from the Genetic Variability. The following section describes in detail all possible mutations as a result of Genetic Variability. New drugs must be developed for each mutation. Genomic medicine requires that we develop novel drugs based upon the genetic make-up of the individuals.

There are four main causes of Gene Variability, and they are Mutations, Recombination, Hybridization and Genetic Drift. Mutations in our genomes appear when our genome is exposed to radiations, chemical or environmental pollution, viral infections or genetic inheritance. Mutations are either Chromosomal Mutation or Genetic Mutation. The Chromosomal Mutation could be either Morphological or Numeric Mutation. Morphological changes occur in a genome due to addition of a piece of DNA leading to duplication or deletion when a piece of DNA is removed from the chromosome. Translocation occurs when two pieces of DNA are broken from the homologues Chromosome and exchange from their original positions, or Inversion when a piece of DNA is inverted, and it rotates 180 degree and rejoins the chromosome in an inverted form.

In Numeric Mutation, either one or two chromosomes are added to the genomes called Aneuploidy. It a condition in which a person has one or a few chromosomes above or below the normal chromosome number. For example, three copies of chromosome-21, which is characteristic of Down syndrome, is a form of aneuploidy. On the other hand, Euploidy is a condition when a cell or an organism has one or more than one complete set of chromosomes. For example, when a human cell has an extra set of 23 chromosomes, then it is called euploid. In other words, euploidy occurs whenever a cell has a multiple of the haploid number of chromosomes.

Genetic mutation: is caused by the changes in the nucleotide bases called the point mutation. In this mutation, nucleotide bases are either substituted, deleted or added resulting in the frame shift mutation.

Recombination: occurs during miotic cell division. During cell division, the chromosomes cross over and genetic material is exchanged.

Hybridization: Two different species cross over resulting in the Hybrid offspring which carries the characteristics of both species.

Genetic Drift: Elimination or addition of an allele from a population. Due to an epidemic, a novel gene could be added or eliminated from an entire population. This could be due to Allelic drift or Sewall Wright's effect. It is always identified in a small population. *Sewall Wright effect*, which says that when small populations of a species are isolated, out of pure chance the few individuals who carry certain relatively rare genes may fail to transmit them.

All mutations described above could not be treated with same drug and at this time. A new drug must be developed to treat each disease. On the other hand, we can take precaution to sequence and discard Egg and Sperm not suitable for conception. An Egg carries a single long string of DNA called the X-Chromosome. It is made up of 164 million nucleotides (AT/GC) bases and carries 1,144 genes. On the other hand, the Sperm carries a single long string of DNA called Y-Chromosome. It is made up of 59 million nucleotide bases and carries 231 genes. Now, we have DNA sequencers to sequence the Egg and Sperm genomes before conception to make sure that both Egg and Sperm do not carry

the complimentary copy of the same mutated gene responsible for the disease. If the couple carrying the mutations still want the children, they could conceive by in vitro fertilization by selecting the healthy Ovum and discarding the defected one. We must take care of all those children who are already here and we must develop treatment for their diseases no matter how severe those diseases are. Before we design any drug, first we must sequence the genome of all six thousand mutated genes and compare with the Reference Sequence to identify the kind of mutations responsible for that disease in each gene.

We have also genetically engineered many vegetables including Potatoes which not only carries genes to enrich its starch content, but also to produce new medicine. We have produced edible vaccines in Corn, Banana and Potatoes. Now, we want to create a series of biological machines to produce new medicines to treat every disease known to mankind. Scientists at the Genentech were able to splice a human Insulin gene obtained from Human Pancreas and spliced into a microorganism to produce large scale of pure human Insulin to treat 300 million diabetics around the world. Similarly, we could produce large scale Antibiotics using the same methods. There are some important antibiotics which are used to treat most microbial infections and they are Neomycin, Kanamycin, Puromycin, Tobramycin, Apramycin, Amikacin, Gentamicin, Netilmicin etc. They are expensive because they are difficult to produce in large quantities. All antibiotics genes could be isolated and spliced in the plant genome to produce large quantities of inexpensive antibiotics to treat most microbial disease known to mankind. Could you imagine how much work lies ahead of us?

Ayurvedic Medicine

It is a common knowledge among the practitioners of Ayurveda that with the Ayurvedic treatment half of the patients respond to a certain drug and the other half do not. Now we know the reason, in humans, the genetic profile changes with aging. Our book of life that is our Genome is constantly changing. Genes sensitive to a certain Ayurvedic components are no longer remain active if the genetic profile changes.

As a part of training in Ayurveda medicine at home, I was trained to extract useful drug from a plant called Rauwolfia Serpentina, locally known by different names such as the Indian snakeroot, devil pepper, or serpentine wood; it is a species of flower in the milkweed family. It is native to the Indian subcontinent and East Asia. Rauwolfia is a perennial undershrub widely distributed in the sub-Himalayan regions grown up to 1,000 meters on slope. As a graduate student, I extracted the active ingredient Reserpine from the plant Rauwolfia Serpentina which is obtained from Patna, Bihar. Reserpine is used to treat hypertension in humans. Later, I worked on another plant called P. Harmala, extracting an antimicrobial alkaloid called Harmaline. Four alkaloids are separated from the seeds of P. harmala. Although Harmaline establishes as the chief constituent, the other three fractions were obtained in small quantities. One of the most active ingredients is identified as harmaline. Today, if I am asked to prepare large scale Reserpine, I would sequence Rauwolfia's genome and splice Reserpine gene in a Vector such as Chloroplast genome to harvest in Yeast to produce large scale Reserpine.

Once the specific Ayurvedic component is identified for a specific genetic profile. The specific ingredient of the Ayurvedic plant is isolated. Large scale highly pure drug could be prepared using Polymerase Chain Reaction (PCR). The following ingredients are needed to produce large scale drug by PCR: First, we need a piece of double stranded DNA which codes for the active ingredient of the Ayurvedic medicine. Second, we need the four nucleotides (A/T and G/C). Third, we need a Primer which is a 20-piece long DNA called forward and backward primers. Fourth, to zip the nucleotides, we need the most important enzyme the Taq-polymerase which is heat stable and is needed to complete the reaction. All we need is to heat the solution in water to 94 degree centigrade to break the Hydrogen bonds of double stranded DNA. As soon as the two single strands separate, the forward and backward primers join each strand, and the Taq-Polymer zip the nucleotides to produce two double stranded DNA of the drug. Replication is complete. Simply heating and cooling the solution to 74 degree centigrade and adding the nucleotides, we can produce large quantity of the highly pure drug.

Genomic Medicine

To continue my further studies, I was sent to England. At the London University, I was trained as an Organic Chemist in the Laboratory of Professor WCJ Ross of the Royal Cancer Hospital, a post-graduate medical center of the London University. I graduated from the University of London. After completing my doctorate and post-doctorate, I was offered a permanent job at the University of London. After serving for almost ten years in the London University, I moved to America to join the National Cancer Institute (NCI) of the National Institutes of Health (NIH).

Professor Ross was designing drugs to treat a variety of cancers such as Chlorambucil, Melphalan, Metroplan etc. to shut off genes by attacking both strands of DNA simultaneously by cross-linking using Nitrogen Mustard analogs, which are extremely toxic [7-13].

As a part of my doctoral thesis, I was assigned a different path. Instead of cross-linking DNA, I am to design drugs to attack only one strand of DNA. This class of drugs is called Aziridines. Over the years, I made over 120 Dinitrophenyl Aziridine derivatives. One of them is Dinitro benzamide (CB1954) which gives a CI (Chemotherapeutic Index: ration of toxicity between normal cell to cancer cell) of 70 highest ever recorded. CB1954 wipes out a solid tumor by attacking the DNA of Walker Carcinoma 256, a solid aggressive tumor in Rat [14].

Nitrogen Mustards are highly toxic because they have neither specificity nor selectivity. They attack all dividing cells whether they are normal or abnormal. On the other hand, the analogs of Aziridines remain inactive in the basic and neutral media. They become activated only in the presence of Acidic media. In other words, Aziridines attack specifically acid producing cancer cells.

I used a simple rationale, the Aziridine attacks DNA in acidic medium, particularly the nucleotide N-7 Guanine. The dye Dinitro benzamide has great affinity for Walker Tumor [14-16]. The Aziridine dinitro benzamide (CB1954) stain the tumor. As the tumor grows, it uses Glucose as a source of energy. Glucose is broken down to Pyruvic Acid. It is the acid which opens the Aziridine ring. As the ring opens, it generates a Carbonium ion which attacks the most negatively charged N-7 Guanine of DNA shutting off the Walker Carcinoma gene in Rat.

To continue my work, I was honored with the Institute of Cancer Research Post-Doctoral Fellowship Award of the Royal Cancer Hospital of London University. To increase the toxicity of CB1954 to Walker Carcinoma, I made additional 20 analogs as a postdoctoral fellow. When I attached one more Carbonium generating moiety, the Carbamate moiety, to the Aziridine Dinitrobenzene molecule, the compound Aziridine Dinitro benzamide Carbamate was so

toxic that its Therapeutic Index could not be measured. We stop the work at the London University for the safety concern.

I continued my work on the highly toxic Aziridine/Carbamate combination in America when I was offered the Fogarty International Fellowship Award to continue my work at the National Cancer Institute (NCI) of the National Institutes of Health (NIH). I brought the idea from the London University of attacking one strand of DNA using not only Aziridine, but also Carbamate without using the same dye Dinitro benzamide [17,18].

After working for about ten years at the London University, I moved to America to translate animal work to humans when I was honored by the Fogarty International Fellowship Award by the National Institutes of Health, NIH, and the National Cancer Institute, NCI, of the USA. NIH has been my home for over a quarter of a century, I designed drugs to shut off mutated genes. All three Common Allelic diseases have genetic origin. The rationale I used to synthesize anti-cancer drugs could be used to treat the other two old age diseases like Alzheimer or cardiovascular diseases.

In the following sections, I will describe in detail how anti-cancer drug like AZQ was designed to shut off Glioblastoma genes which cause Brain Cancer in humans. Using the same rational, we will consider how each of the other two diseases namely cardiovascular disease and Alzheimer could be treated by shutting off their genes to save human life: The order of these diseases is arranged based on the level of funding provided by NIH specifically by the NCI.

My greatest challenge at NCI is to translate the animal work which I did in London University to humans. One day, I came across an article which described that radio labeled Methylated Quinone could cross the Blood Brain Barrier in Mice. When injected in mice, the X-ray photograph showed that the entire radioactive Quinone was concentrated in the Mice's Brain within 24 hours. I immediately realized that Aziridine analogs of Quinone could be used to attack Glioblastoma multiforme, the brain tumor in humans, which is a solid aggressive tumor like Walker Carcinoma in Rats. I decided to use Quinone moiety as a carrier for Aziridine rings to attack Glioblastomas. Since cancer cells grow faster than the normal cells, they use more Glucose as a source of energy producing more Pyruvic acid. Both Aziridine and Carbamate are unstable in acidic medium, they broke down to produce Carbonium ions which attack N-7 Guanine of tumor DNA shutting off their genes. Since Quinone has four positions available for substitution, by introducing additional Carbamate and Aziridine moieties, I could increase its toxicity several folds. I planned to use this rationale to translate animal work to human by introducing two Aziridine and two Carbamate moieties to the Quinone to test against Glioblastomas in humans. Highest toxicity was obtained by di-Aziridines and di-Carbamate Quinone, I named this novel compound AZQ. By treating brain cancer with AZQ, we observed that Glioblastoma tumor not only stop growing, but also start shrinking. I could take care of at least one form of deadliest old age cancers that is Glioblastomas. Literature search showed that over the years AZQ is extensively published

As I said above, Glioblastomas, the brain cancers, is a solid and aggressive tumor and is caused by mutations on several Chromosomal DNA. Mutations in Glioblastoma DNA is also the result of damaging to DNA nucleotides by exposure to radiations, chemical and environmental pollution, viral infections or genetic inheritance.

All known Glioblastomas causing genes are located on five different Chromosomes and carries a total of 9,579 genes. It appears impossible to design drugs to attack all mutated genes to treat Glioblastomas since we don't know which nucleotide on which gene and on which Chromosome is responsible for causing the disease. With the completion of 1,000 Human Genome Project, it becomes easier. By simply comparing the patient's Chromosomes with the Reference Sequence, the exact variants or mutations responsible for causing the disease could be identified. Our next challenge is to identify in Glioblastoma which mutated nucleotides on which gene of which chromosome is attacked by AZQ. Radiolabeled AZQ provided the answer. In Glioblastomas, three major changes occur on Chromosomes (C-7, C-9 & C-10) and two minor changes occur on Chromosomes (C-1 & C-19). These mutations are responsible for causing brain cancers in humans. In a normal human cell, Chromosome-7 which is made of 171 million nucleotide base pairs, and it carries 1,378 genes. When Insertion occurs on Chromosome-7. Ninety-seven percent of Glioblastoma patients are affected by this mutation. On the other hand, a different mutation occurs on Chromosome-9 which is made of 145 million nucleotide base pairs, and it carries 1,076 genes. A major Deletion of a piece of DNA occurs on Chromosome-9 which results in eighty- three percent patients who are affected by this mutation. A minor Deletion of DNA also occurs on Chromosome-10 which is made of 144 million base pairs, and it carries 923 genes. Although it is a minor deletion of a piece of DNA and yet it contributes to ninety-one percent patients with Glioblastoma. To a lesser extent, small mutation occurs on Chromosome-1 (the largest Chromosome in our Genome). It is made of 263 million nucleotide base pairs and carries 2,610 genes) and Chromosome-19 (it is made of 67 million base pairs and carries 1,592 genes) is also implicated in some forms of Glioblastomas. Once the diagnosis is confirmed, the next step is how to treat the disease.

With the Quinone ring, I could introduce different combinations of Aziridine rings and Carbamate moieties and could create havoc for Glioblastomas. My major concern was how toxic this compound would be to the normal human brain cells. Fortunately, normal brain cells do not divide, only cancer cells divide.

As I said above, our Rational Drug Design using Aziridine/Carbamate work began in the University of London, England, and completed in the Laboratory of the National Cancer Institute (NCI), of the National Institutes of Health (NIH), in Bethesda, Maryland, USA. Over a period ten years from UK to USA, we conducted over 500 experiments which resulted in 200 novel drugs. They were all tested against the experimental animal tumors. Forty-five of them were considered valuable enough to be patented by the US Government (US Patent 4,146,622). One of them is AZQ. Radiolabeled studies showed that AZQ can cross organ after organ, cross the Blood Brain Barrier, cross the nuclear membrane and attack the nuclear DNA shutting off the gene. X-ray studies showed that the radioactivity is concentrated in the tumor region. Glioblastoma stop growing and start shrinking [19].

A literature search shows that the International Scientific Community recognizes the significance of Dr. Khan's work. Using AZQ, they published more than 300 research papers in scientific literature. NIH considers his work is so valuable and innovative that he was honored with the "2004 NIH Scientific Achievement Award" one of the America's highest awards in Medicine.

He was also honored by the Government of India with the India's National Medal of Honor, "Vidya Ratna" a Gold Medal. (see Exhibits 1,2,3,4.)

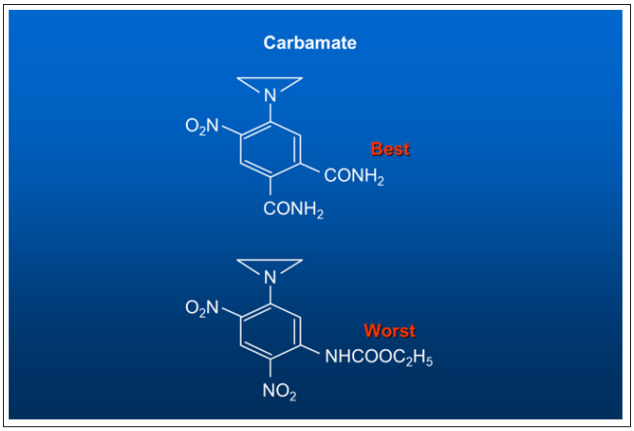
Exhibit # 1
2004 NIH Scientific Achieve
Presented to
Dr. Hameed Khan
By
Dr. Elias Zerhouni,

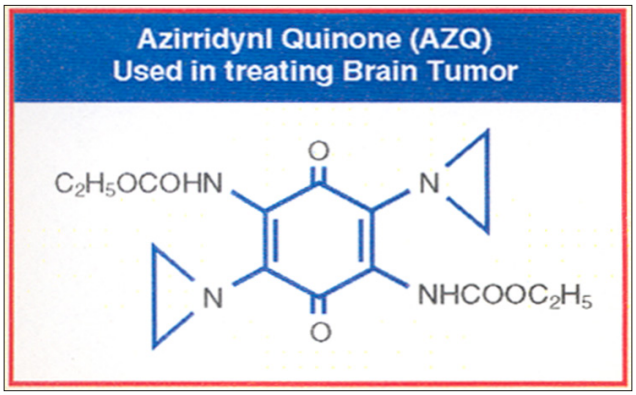
Dr. Khan is the Discoverer of AZQ (US Patent 4,146,622), a Novel Experimental Drug Specifically Designed to shut off a Gene that causes Brain Cancer for which he receives a 17-year Royalty for his invention (License Number L-0I9-0I/0). To this date, more than 300 research papers have been published on AZQ. The award ceremony was broadcast live worldwide by the Voice of America (VOA). Dr. Khan is the first Indian to receive one of America's highest awards in Medicine.

Exhibit # 2
His Excellency, Dr. A.P.J. Abdul Kalam,
The President of India
Greeting
Dr. A. Hameed Khan,

Discoverer of anti-cancer AZQ, after receiving 2004, Vaidya Ratna,
The Gold Medal, One of India's Highest Awards in Medicine
At The Rashtrapathi Bhavan (Presidential Palace), in Delhi, India,
During a Reception held on April 2, 2004.

Exhibit # 3
Single Strand DNA Binding Aziridine and Carbamate





U.S. Patent 4,146,622

Exhibit # 4
Gold Medal for Dr. Khan

Dr. A. Hameed Khan, a Scientist at the National Institutes of Health (NIH) USA, an American Scientist of Indian Origin was awarded on April 2, 2004. Vaidya Ratna; The gold Medal, one of India's Highest Awards in Medicine for his Discovery of AZQ (US Patent 4,146,622) which is now undergoing Clinical Trials for Treating Bran Cancer.

Ethical Issues: (The Unintended Impact of Science on Society)

This section highlights many unsolved ethical problems and particularly the mistakes we made and lessons we learned. We are not allowed to make Human Clone, or conduct Germ-line Gene Therapy, nor we are allowed to work on Stem Cell. We need debate and discussion on these problems, and we need to provide guidelines to scientists and researchers in the field. We have a history of bad decisions made by bad characters and they gave a bad name to the Science of Genetics. Now, the bad characters are dead and gone. We have some real problems before us and we need to think carefully. We not only have to think about the near future, but also distant future.

To begin with, it was Francis Galton, who coined the term Eugenics, meaning "well-born" to improve human race by selectively breeding individuals who have "desired" traits. Eugenics is a bad philosophy that has promoted a bad social movement. Well educated and well-meaning men who did not know full well the developing science of genetics, believed that it is impossible to breed out undesirable traits through systematic or medical processes and by discouraging reproduction by people with undesirable qualities and by enforcing involuntary Sterilization, killed thousands of unborn children. Hitler used this excused to slaughter six million innocent Jewish people. Now the couple not the authority makes the decision to have children. If the family of a couple has a history mental retardation, they could still have children by in vitro fertilization by selecting egg and sperm free from any defect.

The next problem is the population explosion. By producing new food, new fuel and new medicine, we ask ourselves what are the unintended consequences of our work, for example, of over food production? Do we destroy excessive amount of food as the American farmers do each year or do, we control the world population? By 2050, the population of the world will reach nine billion. By that time, we would have developed new food, new fuel, and new medicine to treat every disease known to mankind to protect, preserve and prolong human life beyond one hundred years, what would be the unintended consequences of development in Science on Society. The most nutritious vegetarian food containing all eight essential amino acids, will make world population lean healthy and long-lived. Besides new food, we would have new generations of plants which will serve as factories for producing new medicine based on the genetic make-up of the plants called the Genomic medicine which will treat specific disease based on the specific individual genetic make-up. These class of personalized medicines will further increase human lifespan. As the food supply increases, the population also increases. For example, at the time of India's Independence in 1947, the population of India was 400 million less than 75 years later, the population has increased to one Billion three hundred million. Global Warming has disrupted our regular Weather pattern. What if a single Monson fails to arrive on time?

When we succeed in shutting off genes of all three old age diseases that is Cancer, Cardiovascular disease and Alzheimer, most people on genetically engineered food will live longer and happier life. It raises several additional questions. What happens after we achieve that goal of reaching human lifespan to 100 years? What would be the quality of our life? By exercises and good nutrition, if the body mass is not retained, the Centenarians are most likely to be fragile and weak. They need the help of caretakers to perform the daily routine. By 2050, if we increase the age of about a hundred year of about a billion people, we need another billion caretakers. Will the society be happy with this achievement? I doubt it. The society is hardly likely to accept such a proposal.

Space Travelers

In spite of these drawback, we must continue to prolong human life span, because for deep space travel in search of habitable planets, we need to increase human lifespan beyond one hundred years. To cure diseases to prolong human life, several present and future attempts are described below:

We need to make two rationale approaches: First, to identify rare allele in the Genome of Centenarians responsible for prolonging their lives. Once identified the allele, we need to conduct genetic engineering that is to cut, paste, copy and splice and transfer the allele into the Genome of volunteers to study its function. Second, to design drugs to shut off genes of old age diseases to prolong life.

Next attempt to increase human life would be to prevent the loss of Telomeres, the six-letter code (TTAGGG) found at the tail end of each chromosome that shorten our DNA at each replication and shorten our lifespan. During replication, each Chromosome loses about 30 Telomeres each year. If we prevent the loss of Telomeres by using the enzyme Telomerase Reverse Transcriptase (TRT), we could slow down the aging process. We have already demonstrated in the worm C. Elegance that we could increase its lifespan several fold. Now, we could translate this work in human being; we could try by making a less virulent Flu Virus, which could serve as Vector, carrying TRT gene when injected to a volunteer who comes down with a mild Flu. When he recovers from the Flu, the TRT gene would have inserted in the entire genome of every cell in his body (we can confirm the insertion by sequencing his genome). Suppose at each replication only 15 Telomeres are deleted instead of 30 Telomeres. This person is likely to live twice as long. Also suppose the sequencing of his genome would confirms that we have successfully inserted in every cell of his body the TRT gene and also suppose that the longevity treatment with the Flu virus is safe, inexpensive and would be easily available to everyone, should we provide the treatment to every man, woman and child on the face of the Earth?

Such studies are likely to raise two serious ethical questions. First, we have to ask ourselves, do people have a right to live and second do we have a right to live as long as we wish, no matter how old, how weak or how sick we are? The answer to first question is, according to the UN charter, we all have the right to life, liberty and the pursuit of happiness. It is the second question which is troublesome. Do people have a right to extent their lives as long as they wish? Most people are reluctant to answer this question either no or yes. Both answers have some support.

Those who said No, have a good reason. First, they argue that there are seven and a half billion people live on planet Earth and we are adding 90 million additional people each year. As I said above, according to UN estimate, by 2050, the population of the world is likely to reach nine billion. Does our planet Earth have all resources to support such a population explosion? Our immediate problem is, can we provide food, fuel and medicine to all the people of the world? In poor countries millions of people are starving now. By extending lifespan, we will have serious problems such as unrest, lawlessness, riots and chaos in the streets. Moreover, the current population of Earth have polluted the water, polluted the air and polluted the land. Today, they wonder if the water they drink is safe, the food they eat is safe and the air they breathe is safe. If we continue to pollute the Planet with the current rate which is 110 million ton of pollutant that we release in the

atmosphere each year; how much pollutants, we will accumulate in the atmosphere in ten years or in hundred years?

On the other hand, those who say Yes; we should extend human lifespan have good reasons as well. We have no Plan B to save human life on some other Planet. We look up to Heaven to find another home for humanity. To search for a suitable Planet for human life to survive, we need to train an army of Astronauts to travel into deep space with extended life span. They may have to travel for centuries to find a habitable planet for humans. We do not want them to die on their way to find a new home for humanity. We must continue to search for ways to prolong human life. Some simple-minded people, mostly religious people would say God created this wonderful Earth for us. Why can't we live on Earth forever? Since God has created us, He will protect us. Science say that we cannot stay on Earth forever. We have limited time on Earth. If we want intelligent human life to survive, we must leave Earth. For deep space travel, we need to increase our life span beyond one hundred years.

Despite the population explosion and environmental pollution, we must continue to work to extend human life beyond 100 years. The Universe is vast. Universe must be teeming with life, but the distances are so vast, with the current technological development, it is impossible to travel between star systems within the same galaxy. Traveling between galaxies is unthinkable at this time. There must be star systems which are formed earlier than our Solar System must have planets whose population must be technologically more advance than us. We must continue to develop technologically and must find a suitable home for humanity in another Solar System before our Sun dies.

According to the science of Cosmology, 13.7 billion years ago, the Universe was a single mass of energy. (May be God said let there be light and there was light) The Universe exploded with a Titanic force. Over billions of years, the cosmic dust cooled to form the islands of star systems called Galaxies. Each galaxy carries billions of stars. Our Sun is the only one star in our Solar System. The Solar System consists of 8/9 Planets, 140 Moons and billions of comets and asteroids revolving around our Sun forming the Solar System. There are about 100 billion Solar Systems in our Milky Way Galaxy alone. There are over 400 billion Galaxies in the visible part of the Universe. We have no idea how many more galaxies exist in the invisible part of the Universe.

Our Sun has been burning for the past four and a half billion years. It is a middle age dying star. It burns 700 million tons of Hydrogen every second. It has used up more than half of its energy. Humanity is trapped in the middle age dying Solar System. We have a choice either to stay on Earth and die or to get out of this Solar System and survive. The Universe is a very big place. As Our Sun is mostly made of 74% of Hydrogen, 25% of Helium and one percent the other elements. Under intense temperature and pressure, Hydrogen atoms fused to form Helium and releases subatomic particle like Photons as Sunlight which travels 93 million miles (AU: Astronautical Unit) to reach Earth as light in eight minutes. As it continues to burn, the Helium is converted to Carbon. As more and more Hydrogen is used up, the Sun begins to cool and begins to expand. As it expands, the outer rim of the Sun begins to evaporate, melt and engulfs the nearest Planets Mercury and Venus within the Sun. On further cooling, the Sun will expand its outer rim even further approaching Earth. As its expansion reaches Earth, the intense temperature will boil off oceans, incinerate all life forms including us. As it exhausts its energy, the Sun will expand no further; it will collapse on itself and exploding as Super Nova. The explosion forms all other 120 elements from Iron to Gold including all essential element to make us. We are made of Star Dust. The Titanic explosion will destroy the entire Solar System. Before we are totally destroyed, we must leave this Solar System. Our responsibility is to protect, preserve and spread Human Intelligence in every corner of the Universe. On Religious ground, if we decide to stay and do nothing believing that God has created us, if we pray hard enough and long enough, God will protect us and save us from all dangers. On the other hand, we could say that we must do something like save ourselves. Humanity has come on a crossroad. We have a choice. One path leads to complete annihilation, total destruction, and extinction. The other path leads to escape this Solar System to survive elsewhere in the Universe.

Mother Nature has not been very kind to us. To develop technologically for deep space travel, she should have created us at least a billion years ago. We could have populated many Solar Systems in the Milky Way Galaxy. The great tragedy is that we came out of Africa recently when the Sun has used up half of its energy. The first half Chimp/half human, Lucy, the mother of us all, who walked out of Haggar Valley, Ethiopia, about three and a half million years ago. In spite of this delay, we still have enough energy in the Sun to get out of this Solar System only if we don't destroy ourselves by either going to Nuclear War or inviting Environmental collapse, or Meteorite impact followed by global forest fire or Tectonic plate shift resulting colossal Tsunami drowning life under ocean. We made more scientific discoveries during the last twenty-five years than the entire history of humanity on Earth. We have enough technology to take humanity out this Solar System. We have planned to take the following baby steps:

In 2024, we plan to send men on Mars. It is the first step in the right direction. It will technologically prepare us to survive on Mars under extremely cold condition on a tree-less water-less planet without Oxygen. Once we learn to survive on Mars, we could use Mars as a base to launch un-manned spacecrafts to distant Star Systems in search of habitable planets for humanity. For deep space travel, Vegetarianism will be the order of day. Carrying livestock on a long-distance space journey is unthinkable. The food we consume will be developed based upon the genetic make-up of a specific individual; we have to eat special Genomic food to keep us healthy and to prolong our life span for deep space travel.

For those inhabitants of Planet Earth who chose to stay to see the final end of life on Earth, they could do us a favor; they could stay behind to broadcast live what they witness on Earth the final sunset, the end of life on Earth; the inhabitants will feel the intense heat, witness the worldwide burning of Oxygen, the boiling off the oceans, the massive forest fire. They could broadcast live the final end of the Earth for the space travelers who might be light years away from Earth on the way to Alpha Century Star system in search of habitable planets for humans. As our Sun used up most of its energy, it will expand no further. They could broadcast us how the Super Nova will collapse on itself, and the Sun will explode with Titanic force. The gravity of the planets orbiting around Sun will collapse and all other planets and their moons will fall on each other causing further explosions destroying the entire Solar System. The inhabitants of distant galaxy such as Andromeda Galaxy, five million light year from Milky Way, will see the destruction of our Solar System as a tiny ripple on the third arm of the Milky Way Galaxy.

This lecture addresses to the space age vegetarians who wish to explore the Universe. We began our journey on Earth as

Vegetarians and we will have to end our journey as Vegetarians as we plan to leave Earth. We have a long journey ahead of us. Frank Drake of SETI (Search of Extra-terrestrial Intelligence Institute) is waiting to receive radio-signals for the past 70 years and have not received any reproducible signal so far. It may be that there is no technologically developed society within the 70 light year distance to respond to his radio-signals. Moreover, we have been sending Radio and TV signals for the past 100 years in every direction. We have not received any reply. It tells us that there is no technologically developed intelligent life on any Star System within a hundred Light Years. It also tells us how rare and precious life in the Cosmos is and that we must prepare for a long journey beyond 100 Light Year. We must learn to survive for centuries in our spacecrafts. We must learn to grow food, produce Oxygen and recycle water for the endless journey. Comets are water world. We must learn to capture comets and attach them to our space craft as a continuous source of water and Oxygen for a long journey. To succeed and survive on an endless journey in space, we need outstanding men and women. Who among you will be the vanguard of research and technology to protect, preserve and spread human intelligence in every corner of the Universe? We bequeath the future of humanity in your hands; we know that you will do your best to take humanity out of this Solar System to a safer place in the Cosmos before the Sun dies and spread human intelligence in every corner of the Cosmos.

Conclusion

The intellectual elite of the Old-World Order like Copernicus, Galileo and Bruno sacrificed their lives and laid down the foundation of the New-World Order which brought a seismic shift in our thinking. To encourage this radical thinking, Americans have established NIH (National Institutes of Health), the largest biomedical center in the world. More than 20,000 scientists work at NIH in more than 3000 Labs to develop treatment for all kinds of human diseases to keep us healthy and maintain a high quality of life. To maintain absolute freedom of thoughts to conduct any and all kinds of experiments to improve human health, NIH has removed all authoritative obstacles so their discoveries would be free from fear and retaliation. The discoveries we made at NIH benefit more than seven and a half billion people around the world. It is available to all the peoples of the World free of charge.

What are the immediate problems back on Earth: What if we succeed in prolonging Human Life on Earth? What if we succeed tomorrow in developing treatment of all three old age diseases to double or triple the Human life for the deep space travelers? If we don't succeed tomorrow may be day after tomorrow. Say the treatment is safe, inexpensive and easily available to every man, woman and child on the face of the Earth. We face new Ethical problems. Who decides that person A will receive the longevity treatment and will live for a long-distance travel in space and person B who stays behind will not receive the same treatment and therefore will die?

The sad part is while the annual budget of NIH is more than forty billion dollars, the largest budget of any medical center in the world. But America's Defense Budget is $750 billion. We spend more money on killing than on living. How can we close the gap? Visionary, idealistic institute like NIH could help us lead the way towards creating a framework to establish a better world. We don't want the future generations to say that previous generation of scientists has left behind a dark future for them. Our world has achieved brilliance without wisdom, power without conscience. Ours is a world of nuclear giant and ethical dwarf. We know more about starting the war than we know about achieving the peace. We know more about the killing than we know about the living. We need debate and discussion and come up with guidelines for our society. One person cannot provide answer to all these questions. All I want to do is to raise these questions in your mind. My aim will be fulfilled if I have made you think along these lines.

The Life and Time of Giordano Bruno

The Immortal Giordano Bruno

He was one of the greatest mathematicians and astronomers of the 16th century. He was an outspoken man, a religious man who always spoke the truth and lived a pious life. He wanted to pursue the truth to its ultimate end to uncover the uncomfortable truth. In his zeal to search for truth, he trespassed from the realm of science into the realm of religion and paid the ultimate price with his life. The religious authority felt so threaten by his ability to educate masses that they kidnapped him, tortured him and finally, burned him alive.

This section describes the life and time of Giordano Bruno; I will attempt to answer several important questions about his life. Who was he? What did he say? And why was he killed so brutally? After so many years, why is he so affectionately remembered today? And what powerful message he left for us all.

First who was he? Giordano Bruno was born in 1548 at Nola, a small town on the foothills of Mont Vesuvius, in Italy. His parents later moved to Venice. It was one of the worst and the most tumultuous time in the history of Europe; Europe was going through dark ages. It was the year when Dutch waged war against Spain; 2,000 Frenchmen were slaughtered in the street of Paris on St. Barthelme Day; England's Duke of Norfolk and Northumberland was executed for treason. The English parliament demanded the execution of Queen Mary of Scott. That was the time period when Bruno was born. As a boy, Fryer Giordano Bruno was exceptionally brilliant. His parents wanted to send him to the local monastery. In those days, religious institutions were the center for learning and monasteries were the place where you sent your children because in monasteries either you pray or study. Most of the intellectuals were priests and were the best teachers. Bruno entered the Dominican Order in 1563 at the age of 15. He studied in the monastery for 3 years. He turned out to be the brightest students. In his early age, he read 16th century's greatest work. He graduated at the top of his class. His teachers loved him; they thought one day he would become a famous Venetian. When he graduated from Monastery, it was time for him to go the University.

At the monastery, Bruno read a forbidden book. The book's titled was, "Revolution of Heavenly Bodies" that was written by a polish monk named Nicholas Copernicus and was specifically banned by the church. At the monastery, he learned Aristotle's concept of the world.

That our Earth is the center of this world that was false; then he was taught the Ptolemaic concept of the world that the Universe revolve around the world and that was false; then he was taught by priests that because the Jesus Christ, son of God, was born on Earth; Earth must be the center of the Universe and that was false. He was also taught at the monastery that all heavenly bodies were created to serve us and we are to serve God. To pay respect to us all, heavenly bodies revolve around the Earth. They are all false assumptions. For the first time he learned the truth from Copernicus' book. Now, he knew what he wanted to study.

Copernicus concept had fired his imagination. His mind was made up and he wanted to study Astronomy and was determined to change the world's view about Heaven. Earlier, he had no idea what to do with his life; he was looking for the image of a hero. Copernicus fits that image of a perfect hero. Copernicus' cause became his cause. Copernicus dreams became his dreams. Search for truth became his aim. He pursued the truth to its ultimate conclusions. Sometimes he had to go in favor of the prevailing view some time against, but always took the truth to its logical conclusion. One priest told him that no university in Rome can compete with French universities. He should go to the best university in France, and Toulouse symbolized the center of gravity of all knowledge and learning at that time. Bruno arrived in Toulouse, France, at age 18.

Bruno was proved to be an outstanding student. He received his doctorate at the youngest age. He was only 21. For the following 8 years, he was a prolific researcher, a prolific writer, and a prolific teacher and most important of all he became one of the greatest speakers of the 17th century Europe. He spoke in every major university of the European capitals. With his power of writing and speaking, he did change the world view; he wrote 7 important books. His lectures attracted the attention of nobility and royalties of Europe. The French Nobleman Messieurs Renault introduced him to the French court. King Henri III of France was so impressed by his speeches, he made Bruno Speaker Royale of his court. Bruno in return dedicated one his important books to the King and called him the Most Christian King France ever had.

Bruno expanded the new Copernican philosophy in the book entitled, "Dialogues" published in England. He became very popular in England as well. At the invitation of the Queen Elizabeth I of England, Bruno went to England. He had with him letters of introduction from the French king to the French ambassador in England. The French Ambassador invited Bruno to stay at French Ambassador's residence during the whole time that he was in England.

What did Bruno say? By his calculations, Bruno questioned the old concept of the world. The old view was conceived by two schools of thought. One view was conceived by the Greek philosopher Aristotle about a hundred years before Christ and other was refined by Ptolemy, a librarian in the great library of Alexandria, Egypt, about two hundred years after Christ. By observing the night sky, Aristotle and Ptolemy conceived the idea that the entire Universe is a dome shaped and all the stars are fixed in the sky and Earth is the center of the Universe. Five hundred years later, Christianity borrowed Aristotelian and Ptolemaic concept of Earth-centered Universe and perfected it. Earth-centered Universe of Ptolemaic view was in harmony with the Catholic Church's view. It says that man is considered as the principal object of divine creation. The entire Universe is conceived to serve man's need and Earth was the center of the Universe and man is made to serve God and Universe is made to serve man. Therefore, man is placed in the center of the Universe so that he may serve and be served. Any change of this concept was considered heresy and against the teachings of Holy Scriptures and against the Will of God. Most priests in those days were afraid that any change in this view will weaken the church's position and will be a threat to the religion.

Bruno observed that mathematical calculations of the motion of heavenly bodies places Sun at the center of the Solar System. The Heliocentric concept that is the Sun-centered universe was conceived by Copernicus and confirmed by Bruno. Copernicus was dead and the responsibility of teaching sun-centered universe fell on Bruno's shoulders. The concept of Sun-centered Universe was considered a challenge to the church's teachings and its authority and was unacceptable to Church because the fourth century's Biblical scholar St. Augustine had forbidden the Egyptian religion of Sun worshiping. In Ancient times, pagan Egyptians did worshiped Sun God., Egyptian Goddess Isis supposed to be the daughter of Sun-God and known to be a magician. Any reference to Sun-centered universe in those days was considered magic and a return to pagan Egyptian religion. Copernicus was a priest and Bruno was educated at the monastery. They never considered themselves as anti-Christ. They never thought about religion when they proposed the concept of Heliocentric, sun-centered universe; they were relying on scientific observations based on the mathematical calculations of motion of the heavenly bodies. What did Bruno talk about? He removed the importance of Earth in the Solar System. He accurately demonstrated the central position of the Sun in our Solar System. He shot holes in the Aristotle's dome shaped Universe where Earth occupies the central position. Bruno destroyed entire theory of Ptolemy. Ptolemy had accurately calculated the motion and the position of stars mistakenly assuming that the Earth is the center of the world.

When Bruno mathematically proved that Earth is not the center of the world. Entire theory of Ptolemy fell flat. In fact, it was Bruno who extended the realm of God from one world to another, from one Universe to another, known and unknown and for all space and for all times.

What did Bruno predict? Bruno was not bound by the observation alone; he went further than Copernicus. Nearly four hundred years ago, he predicted an infinite and endless Universe and stated that there are billions of suns like ours, and each sun has its own planetary system and may have inhabitants of their own. The inhabitants of each planet will think that they are in the center of the Universe - the concept of equidistance galaxies with the center of the Universe is a part of the theory of relatively confirmed by Einstein for which Einstein was awarded a Nobel Prize.

What he predicted four hundred years ago astronomers are doing today. For example, The Hubble Space telescope confirmed the restless Universe, birth and death of stars. Astronomers Carl Sagan (who recently died of cancer) and Paul Drake have been sending radio signals to communicate with the extra-terrestrial for the past thirty years. All these views in Bruno's time were considered as heresy.

Bruno once said that people who did not understand his discoveries may call him a heretic. He was as religious as his accusers. They should have been glad what he had discovered. Bruno's discovery expanded the realm of God and the realm of religion from here to the end of the Universe, from one world to another and from one Universe to another and he said that God's laws apply to all the known as well as unknown Universes. The greater the Universe, the greater the glory of God. His limitless Universe is in direct contrast with the teaching of Bible. (Today, we know about parallel universes and that all Black Holes are considered separate Universes, an idea was not even conceived in those days).

Bruno extolled Copernicus, but refuted Aristotle's Heaven and challenged the Ptolemaic view of the Universe. He was invited all over Europe to speak. Although the intellectual community loved him, his views were in direct conflict with the Roman Catholic Church. He was a scientist and a speaker par excellence. He was called an astronomer, a scientist, a philosopher, a teacher and above all one of the greatest speakers of 16th century.

The Conspiracy:

Everything appeared wonderful, but there was a hidden danger that Bruno was not aware. When Bruno was giving lectures in the Versailles Palace at the invitation of King Henri III of France among the audiences was His Excellency, Sir Henry Cobham, the British Ambassador to France. He was a diplomat and had no understanding of scientific principles. He belonged to an ultra-religious group. He completely misunderstood Bruno. He wrote a secret letter which was circulated among the members of a secret society whose members believed that Bruno was reintroducing the forbidden old religion of ancient Egypt of Sun worshipping. Sun worshipping was specifically forbidden by St. Augustine four hundred years after the death of Christ. Members of this society considered science as magic and Bruno as magician. A secret plot was hatched to kidnap Bruno and hand him over to Inquisition. This how the conspirators hatched a plot to kidney Bruno.

Giovanni Battista Giotto was a book seller who kept a shop in Venice. Among his clients was Giovanni Marengo, a descendant of an ancient and noble Venetian family, who bought books written by Bruno and asked the book seller if he knew where the author was as he would like to learn "Secrets of Memory" and other matter from him. Giotto knew Bruno, having met him in Frankfurt, Germany, where he went for the book-fairs, and he transmitted to him an invitation from Marengo to come to Venice. Bruno accepted, and in August 1591, he arrived in Venice.

Why did he take that fatal step of returning to Italy, apparently oblivious of its danger? Bruno was only 29. Bruno had been away from home far too long and was yearning to go home. This invitation was an opportunity that Bruno was waiting for. As soon as he returned to Venice, the Roman Inquisition of Vatican demanded from Austrian government that he be sent to Rome to face the charges of Heresy. The Vatican had no power on the entire Rome. The government of Venice refused the demand of Roman Inquisitors and offered Bruno full protection. Bruno settled down quietly without realizing that a vicious conspiracy was in the making.

Marengo's invitation may have seemed like a divine indication of what his next step should be, but it was not primarily to teach the art of memory to that Nobel-man that Bruno stepped into what turned out to be a death-trap.

Bruno left Padua for Venice in March 1592 and began to live with Marengo and to teach him as originally agreed when he accepted the invitation transmitted by Giotto. It has been said that the invitation was from the first a trap and that Marengo always intended to hand Bruno over to the Inquisition.

Bruno was a visionary and was extremely admired and respected in universities all over Europe. As long as he was in Paris and London, Bruno was beyond the reach of Roman Catholic authority, but they were always aware of his intellectual presence, and they were deeply disturbed by his teaching. Despite his acceptance of higher authority of God, the church authority in Vatican charged him as heretic and demanded his return to Rome to face charges. Bruno ignored those charges as many of his predecessors had done before him. Bruno never realized the danger that lied ahead of him. His yearning for home was his great weakness. The conspirators had clearly set a trap form him.

The Kidnapping

Within two years of his arrival in Venice, Bruno gave dozens of lectures all over Rome. He became one of the most admired and most respected speakers. His fame reached all sections of society. On his latest publication of a book, Bruno was invited to give a public lecture before the dignitaries. He was to explain his new discovery in Astronomy. After the speech, he was to go to Frankfurt, Germany, to attend a Book Fair where thousands were waiting to hear his discoveries. On the night of the speech, the Hall was full of dignitaries including members of Royal families from Europe, noblemen, politicians, and members of university faculties. Bruno was staying at his old monastery not far from the lecture hall. He decided to walk to the lecture hall. He left monastery on time, but he never arrived at the lecture hall. Conspirators finally succeeded. Guests waited for Bruno, but Bruno never came to the lecture hall. After hours of waiting, some rushed out in search for Bruno. They rushed to the monastery where he was staying. They were told that Bruno was always on time, he had already left for the lecture hall. They searched for him from house to house, from street to street, from town to town and finally country to country. Bruno disappeared as if he had never existed. Someone must had seen him. The royalties offered reward for his whereabouts.

On February 15, 1593, when he was only 31 years old, Giordano Bruno disappeared from the face of Earth and nowhere to be found. At the request of the European governments, a massive search started throughout Venice and later the search spread in the entire Europe. His disciples and admirers searched for him in every corner of the world. He was searched for days without success. The search party looked for him for weeks, for months and for years. They were exhausted. For eight years, Bruno's disappearance had shocked the world. Eight years later Bruno's whereabouts was disclosed by the conspirators.

Bruno's Eight Years of Interrogations

The English ambassador in Paris, Henry Cobham, warned the ever-watchful Francis Willingham, in a dispatch dated March 1583, of Bruno's impending arrival: "Doctor Giordano Bruno Nolan, a professor in philosophy, intend to pass into England, whose religion, not his philosophy, is damaging.

He is a Hermetic magician of a most extreme type, is now about to pass into England to expound his "new philosophy." The fact was that the Inquisition Authority never wanted him to give that lecture. The day he was on his way to give the speech, he was kidnapped from the street by Inquisitors at the order of the Catholic church. The Venetian traitor Giovanni Musgino who pretended to be his disciple and admirer, lured him to Venice secretly collaborated with the Roman Inquisition.

This was how the conspirators kidnapped Bruno: As Bruno left monastery to give the public lecture. Giovanni Masino his student was a traitor he lured Bruno to Venice, was waiting in a carriage outside the monastery. He invited Bruno to join him as he was going to listen to the same lecture. Bruno never suspected him. He got on in the carriage. The carriage was already full of plotters. As carriage approached Masino's home, the plotters grabbed Bruno and took him in the basement of Masino's home where Bruno was locked up for days without food and water. When Bruno became extremely weak, they placed him in a wooden box which was hidden among the grocery boxes and delivered him to Vatican. While the whole city was searching for Bruno, nobody suspected that he was being carried in a box through the center of the city. In Vatican, he was handed over to the Inquisition where he was thrown in the Dungeon. He was interrogated for 8 years by none other than His Holiness Cardinal Roberto Bellarmine (Robert Bellarmine was an Italian Jesuit and a cardinal of the

Catholic Church). The Holy Office published these interrogations in several volumes. The Holy office demanded that Bruno retract all references to the Sun being the center of the world from all his books and from all his lectures. Bruno could not accept these demands. The reigning pope at that time was pope Clement the III, Bruno had already dedicated one of his books to the Pope. Pope was getting very impatient; he wanted a quick decision. Eight years of interrogation was too long. Finally, eight charges of Heresy were brought against Bruno. Eight years after his disappearance, the Vatican announced that the Heretic Bruno is in their custody, and he will be put on trial for heresy on February 8, 1600. Entire Europe was shocked at the news of trial. Thousands of Europeans came to Rome to witness the trial.

The Ideological Clash

Cardinal Bellarmine had a bigger problem. He was one the greatest biblical scholar of the 17th century. He said to Bruno, that for the past 15 hundred years, we have been telling our followers that Bible describes the words of God. And they believe us. And the bible states that the Earth is the center of the world.

If we change the words of bible and said that God has changed his mind, now, it is the Sun not the Earth which is the center of the world, people will demand more changes, tomorrow another person will say that the Earth was not created in 7 days but is the result of billion years of evolution, are we going to re-write the bible again? Once we start making changes, we may have to change again and the whole religious system will fall apart."

Bruno maintained that we must pursue truth to its logical conclusion. It is a universal fact that two and two makes four. No matter how you calculate it. This fact cannot be changed. Sun rises and sun sets and rises again. Anyone can measure the angle of the sun's shadow and do the calculations and will tell you that Earth is not the center of the world and that the mathematical equations he had provided were correct and prove that Sun is at the center and Earth is revolving around the Sun like other planets. He could not retract the universal facts.

Cardinal Bellarmine said, "Bruno you choose your own punishment; you retract what you had written, and you go free." Bruno replied If I retract, I have nowhere to go. Wherever I go people will laugh at me. You see father, I have nowhere to go. If I leave this dungeon, I must leave with honor, respect and dignity.

This was not a conflict between good and evil; right or wrong. It was an ideological clash between two religious giants; Cardinal Bellarmine was one of the greatest biblical scholars, he literally took every word of bible as true and wanted no changes in the Bible even if limits the power of God to Earth. On the other hand, Bruno wanted to peruse the truth to its logical conclusion. He wanted to extend the realm of God beyond Earth; beyond the Solar System, beyond the galaxy; beyond the Universe; beyond all known and unknown universes. To Bruno, God's realm extends as far as your imagination go.

Charges Against Bruno

In 1599, an effort was made to clarify the situation by the famous Jesuit, Roberto Bellarmine, who assisted by Tragagliolo, drew up eight heretical propositions taken from his works which Bruno was required to abjure, and Bruno under interrogations known to have said that he was prepared to do so. But later in that year he withdrew all his retractions, obstinately maintaining that he had never written or said anything heretical and that the ministers of the Holy Office had wrongly interpreted his views. He was therefore sentenced as an impenitent heretic and handed over to the secular arm for punishment.

Nine days later, on February 17, 1600, Bruno was found guilty of Heresy and condemned to death. His Holiness, Cardinal Roberto Bellarmine recommended that his method of death must set an example to all heretics. To set an example, the Inquisition decided to burn him alive in a marketplace in the presence of thousands.

The Final Solution for Bruno

Bruno's friends and admirers had hoped that European rulers will rescue him. There was such a move to save Bruno. Then a religious zealot assassinated his best hope King Henri of France. Religious zealots were the supreme rulers of Europe during dark ages. They had been watching European rulers since his kidnapping. After the death of King Henri, Bruno and his friends lost all hopes. Thousand came to get a glimpse of Bruno. People lined up in the street in disbelief that Bruno would be killed. They pray for a miracle. Their prayers were not answered. There was no miracle. Bruno's death was certain.

When they brought Bruno in the street in chains, no one could recognize him. This was not that handsome Bruno who they had seen eight years earlier. He was a bruised faced man in bone and skin. He was almost blind for not seeing sun light for eight years. He was taken to his destination, at the stake.

A defiant Bruno speaks his Last Words:

Before they set him on fire at the stake, he was asked to confess. Although in the dungeon, he was forced to retract all his teachings, the authority was wrong about him. They made a mistake, they allowed him to give his last speech. What they did not realize was that Bruno was also one of the greatest speakers of his time. He began this way, "I am Giordano Bruno; Some of you know me, those who don't know me, let me introduce myself, I am a scientist, a religious man, a teacher and a speaker. As a teacher I always taught the truth. I ceaselessly pursue the truth, no matter wherever it takes me. Sometime the truth took me with the prevailing view of the world and sometimes against the prevailing view of the world. To me, it was unimportant wherever it took me as long as I pursue the truth. And I tell you my friends Copernicus system of Universe is God's own truth. Earth is not the center of the Universe. Man is not placed in the center of the universe. Universe is not conceived to serve man's need; we are the part of that great Universe. God is not the God of this Universe, but He alone is the God of all Universes, known and unknown, we call cosmos. Universes must have billions of Suns and each Sun must have its own planets. It is unthinkable that we are the only living God's creatures. Universe must be teeming with life. We are neither Unique nor special God's creature."

He continued, "I am not afraid of death, those who condemned me have greater fear of death than I have. The time will come when all sees the truth about our universe as I see it today. Farewell my friends, I will see you on the other side of life where truth rules."

Although authority created a carnival atmosphere to celebrate his death; hoping Romans would enjoy watching the Nolan Heretics burned alive in Rome. They were wrong; there was absolute silence among thousands of Romans who came to watch. The authority never expected that his last words would be so absorbing and unyielding; they ordered to set the stake on fire. Thousands watched him burned alive. They watched his body burned to ashes. The authority declared that Bruno burned in Rome momentarily, but will be burned in Hell until eternity. The

authority was expecting celebration after his death, there was none. Thousands who came to celebrate, kneel down and prayed in silence and left quietly.

A Memorial for Bruno

After his body was consumed by fire, the Inquisition officials, could not find his bones. Some of his admirers secretly stole his bones from the ashes. A reward for his bones was announced. Europe plunged in Dark Ages once again. If there ever was a time in history that the church's power begins to decline, that was the time. Martin Luther in Germany broke away from Catholic religion and started the Protestant religion. England broke away and started Church of England. Decades later when church's power declined sufficiently, Bruno's bones were brought out and were buried at the same place where he was burned. Now, is known as the Campo di Fiori. Each February, thousands of scientists, philosophers, teachers, speakers, free thinkers, admirers, and scientists come from all over the world to pay homage to Giordano Bruno. To mourn the death of their hero' they quietly sit, reflect, meditate and pray.

The Moral of the Story

You should never kill an ideologue because his ghost will haunt you forever. About four hundred years ago, Shakespeare wrote, "Julius Caesar." When Caesar was killed, the entire family of his killers was slaughtered. Most European countries have abandoned death penalty as an ultimate punishment. If anyone among us still thinks killing is the final solution, then they must be prepared for their own slaughtered and the slaughtered of their family. Someone knows it; someone has seen it and someone is thinking and plotting to get even with you. Killing solves nothing, it creates more problem in the long run. You kill an ideology, with a better ideology.

During our lifetime, we witnessed the rise and fall of communism. The communist ideology was killed by capitalist ideology. Even Russians found capitalism to be a better way of life than communism.

A Pardon for Bruno

Almost 400 years have passed since the death of Bruno, and Bruno has not yet been pardoned by the Holy Church. In 1995, the Holy Office has so generously pardoned Galileo. Time to pardon Bruno is now. On behalf of the scientific community, I beg the Holy Father, His Holiness, Pope Francis to pardon Bruno if has not already done so, so that his soul may rest in peace. When this happens, I am sure that a new era of cooperation and friendship will begin between science and religions. And the dawn of a new day at last long will shine on all of us.

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