

# The Science of Genetics and Human Origins

## PRAYER TO THE HOLY SPIRIT

Come Holy Spirit, fill the hearts of your faithful and kindle in them the fire of your love. Send forth your Spirit and they shall be created. And You shall renew the face of the earth.

O God, who by the light of the Holy Spirit did instruct the hearts of the faithful, grant that by the same Holy Spirit, we may be truly wise and ever enjoy His consolations.

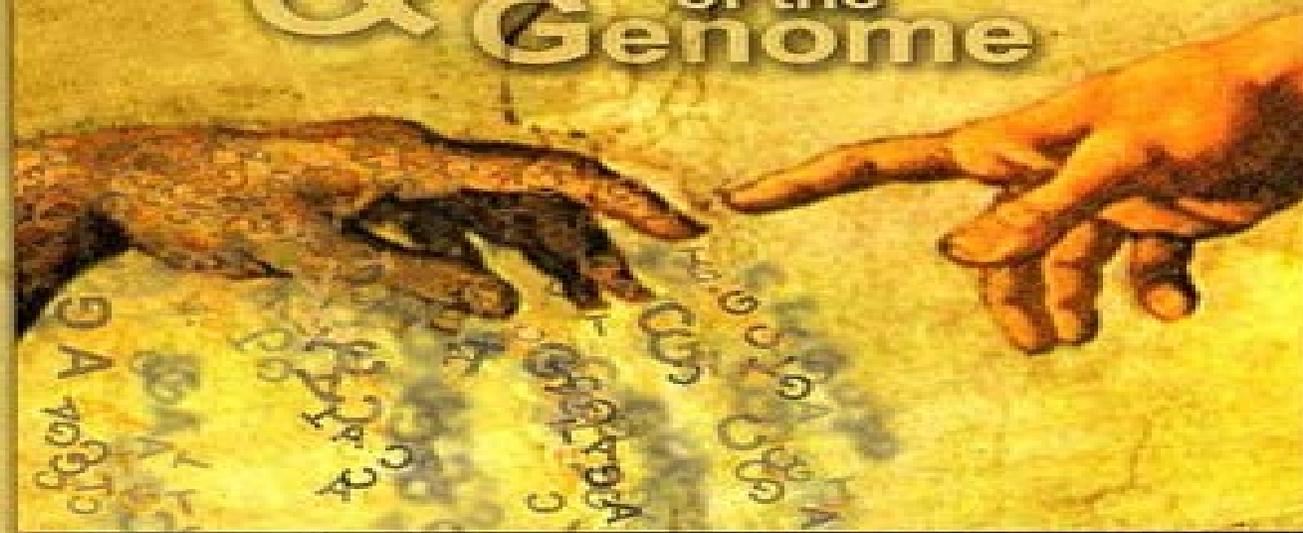
Through Christ our Lord.

Amen.

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# Genetic Entropy

& The Mystery  
of the  
Genome

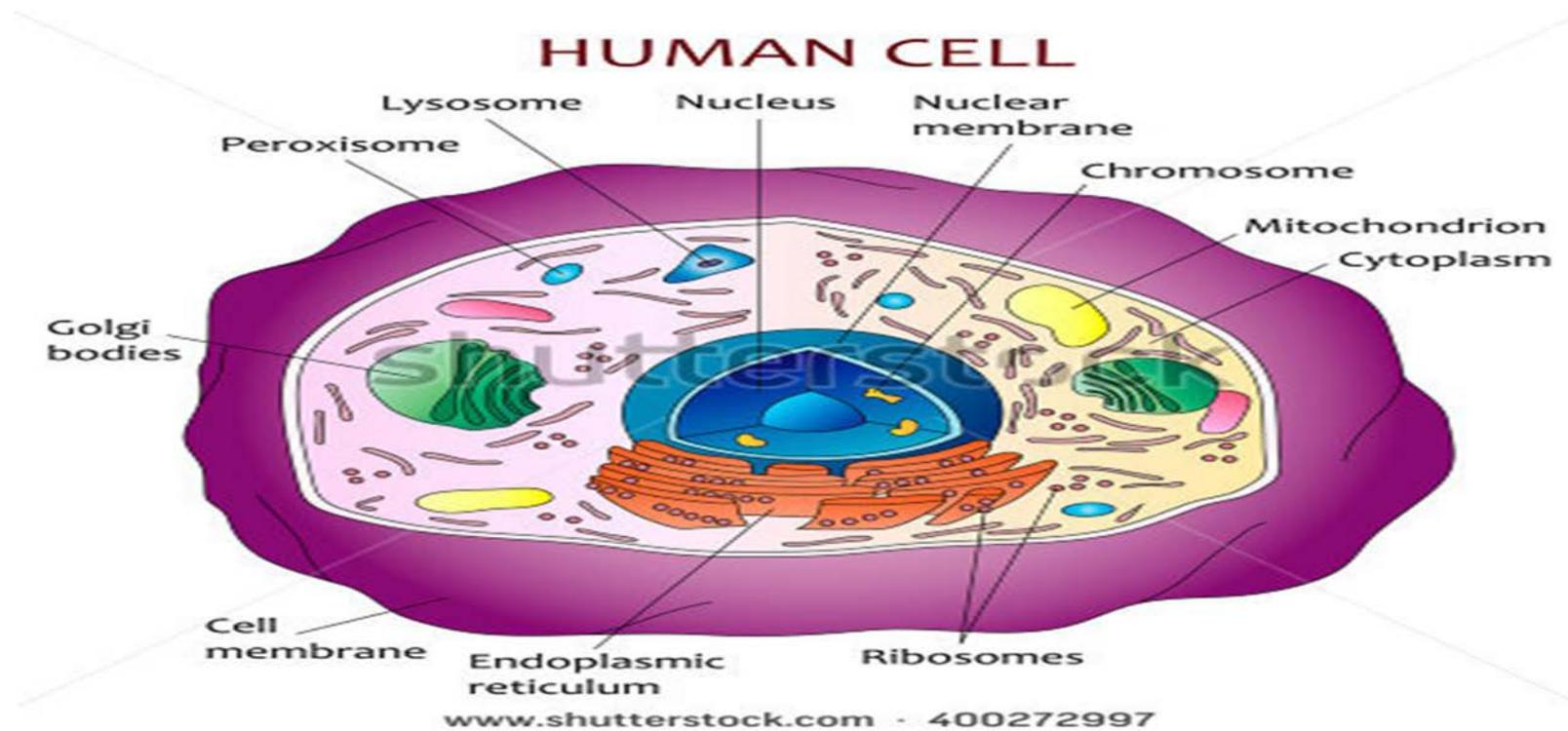


Dr. J.C. Sanford

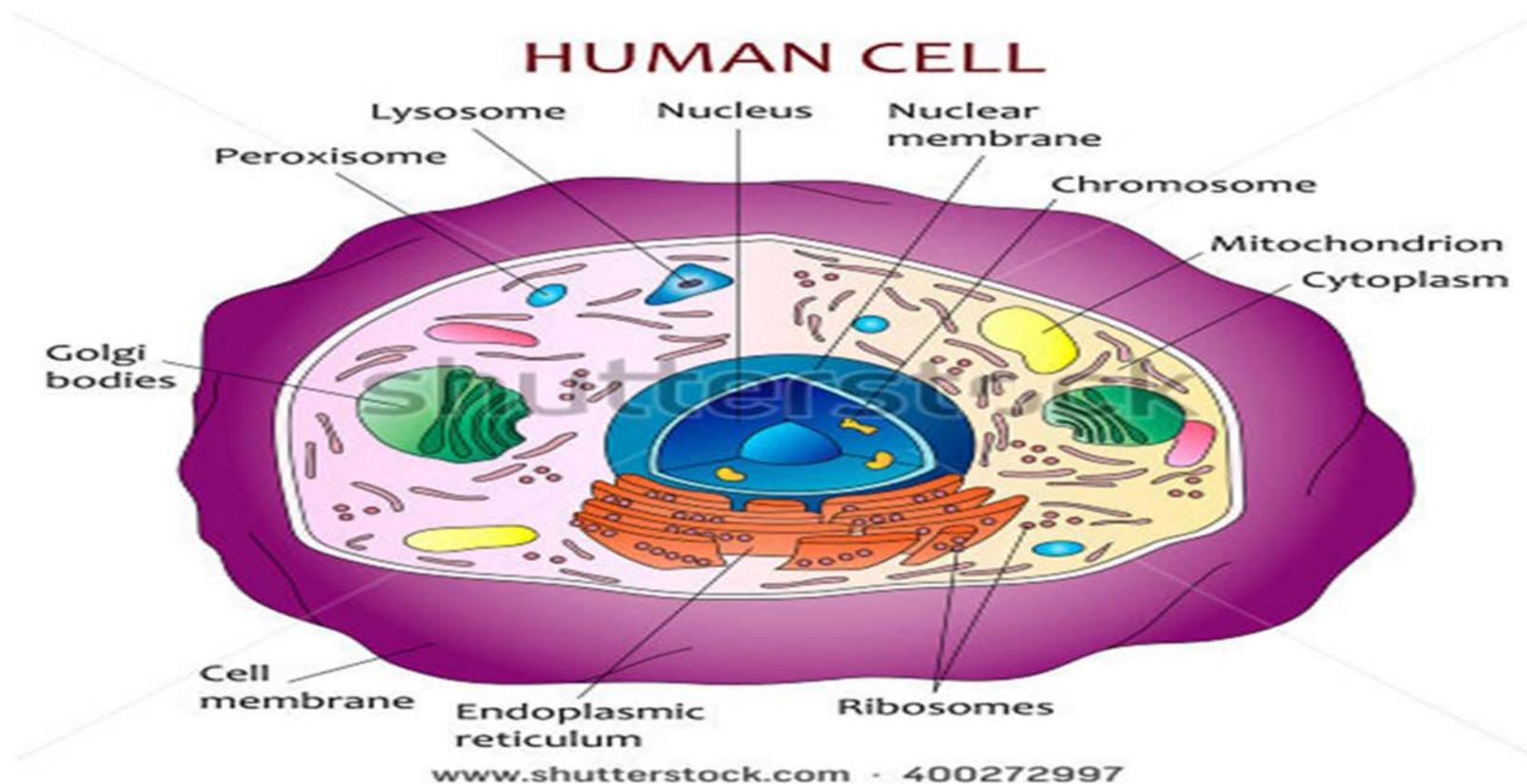
# Genetics



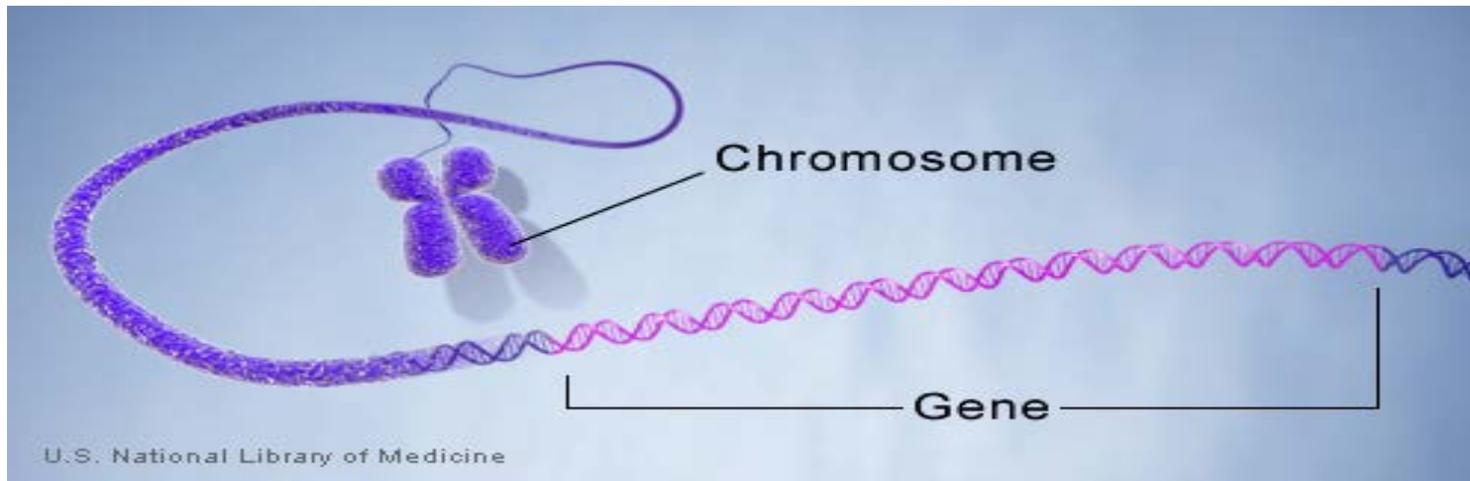
- Genetics is the study of heredity or the study of how traits are passed from parents to offspring. This study is largely based on genes. Genes are structures found in every single cell that contain information about traits that an organism has or carries.
- The adjective genetic, derived from the Greek word genesis—"origin"
- The father of genetics is Gregor Mendel (1822-1884), who was an Augustinian friar and biologist. He discovered the basic principles of heredity through experiments in his garden.
- Through his work on pea plants, he discovered the fundamental laws of inheritance. He deduced that genes come in pairs and are inherited as distinct units, one from each parent. Mendel tracked the segregation of parental genes and their appearance in the offspring as dominant or recessive traits.



- The cell (from Latin cella, meaning "small room") is the basic structural, functional, and biological unit of all known living organisms.
- Cell theory states that all organisms are composed of one or more cells, that all cells come from preexisting cells, and that all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.
- Once a human sperm has fertilized an egg, the resulting embryo begins tumbling down the fallopian tube on its way to the uterus, where it will implant around a week later. As it travels, it starts to divide: first into two cells, then four, then eight.
- While the number of cells in plants and animals varies from species to species, humans contain more than 10 trillion cells.

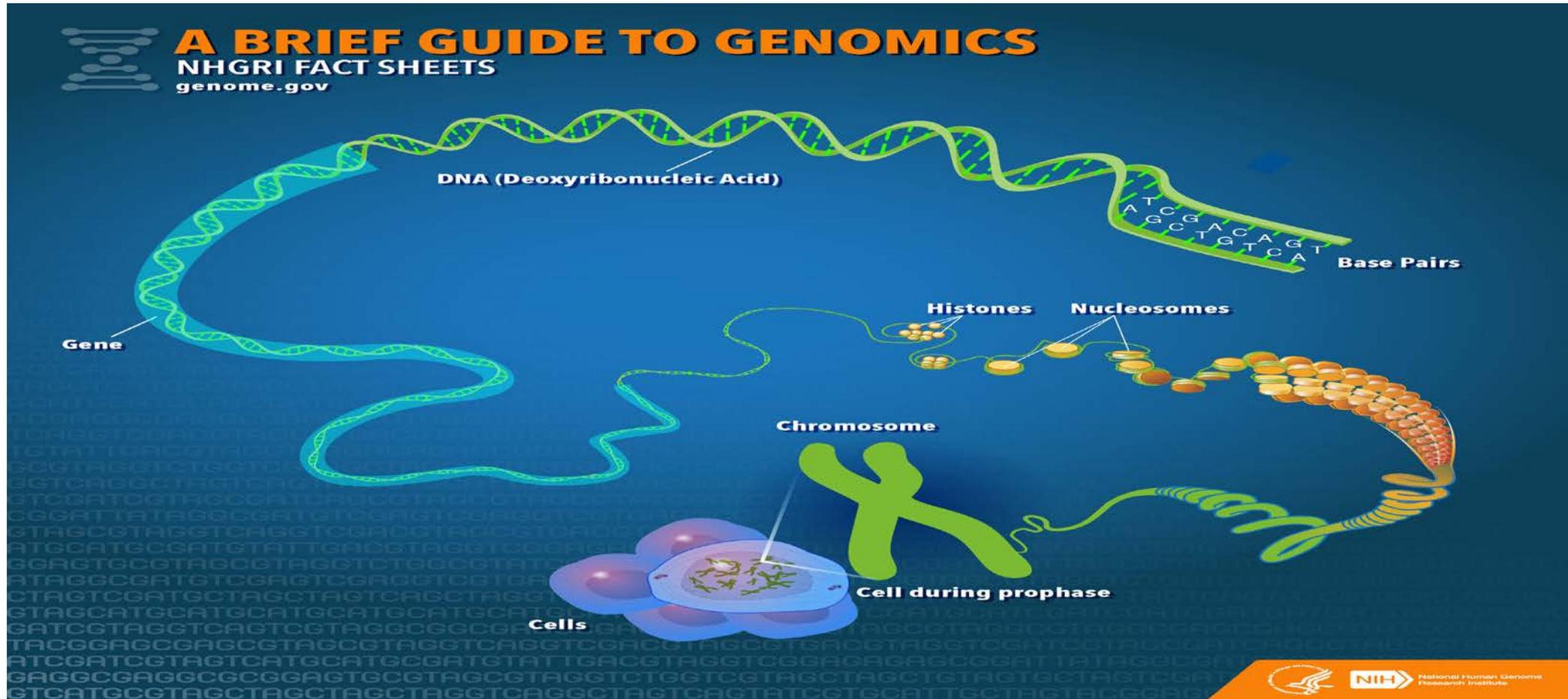


- Chromosomes are thread-like structures located inside the nucleus of human, animal and plant cells.
- Each chromosome is made of protein and a single molecule of deoxyribonucleic acid (DNA).
- Passed from parents to offspring, DNA contains the specific instructions that make each type of living creature unique.
- Every human cell contains 23 pairs of chromosomes, for a total of 46 chromosomes.

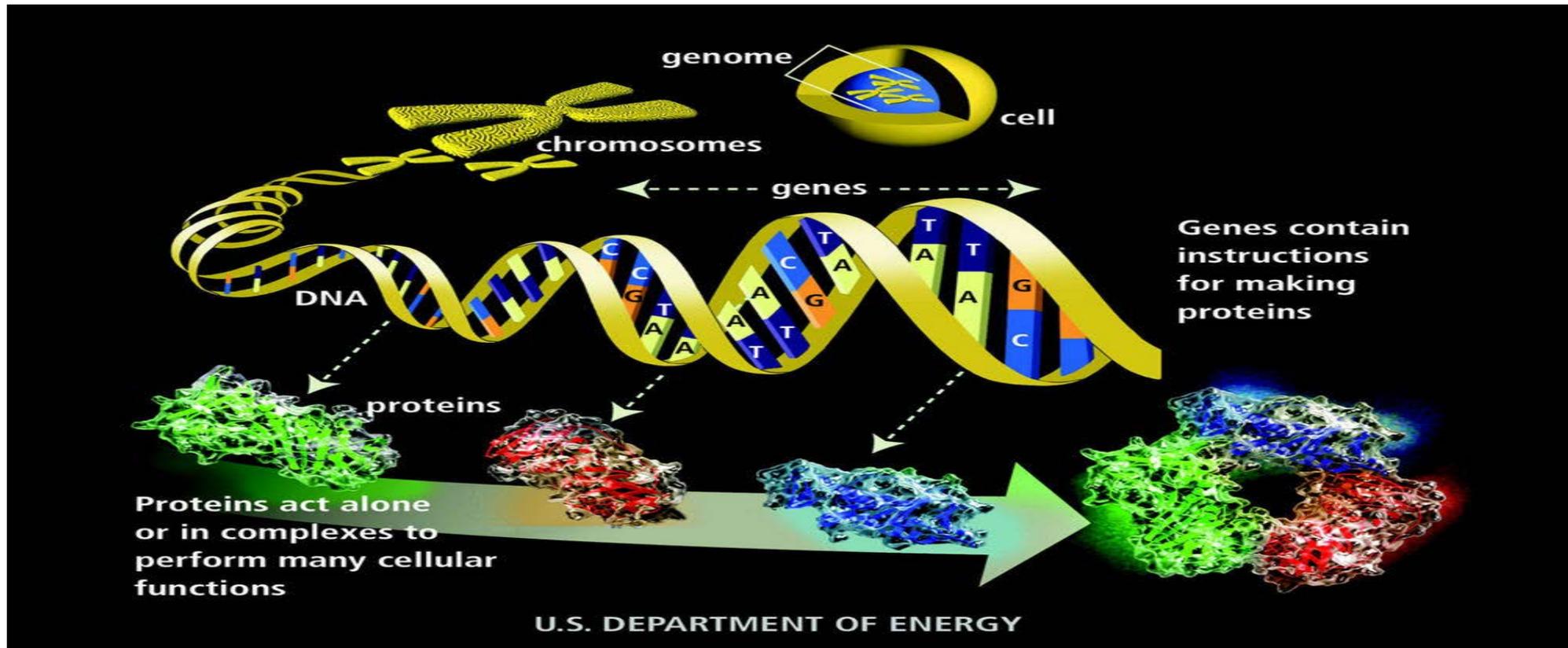


- A chromosome contains hundreds to thousands of genes.
- A gene is the basic physical and functional unit of heredity. Genes, which are made up of DNA, act as instructions to make molecules called proteins.
- In humans, genes vary in size from a few hundred DNA bases to more than 2 million bases. The Human Genome Project has estimated that humans have between 20,000 and 25,000 genes.
- Every person has two copies of each gene, one inherited from each parent. Most genes are the same in all people, but a small number of genes (less than 1 percent of the total) are slightly different between people.
- Alleles are forms of the same gene with small differences in their sequence of DNA bases. These small differences contribute to each person's unique physical features.

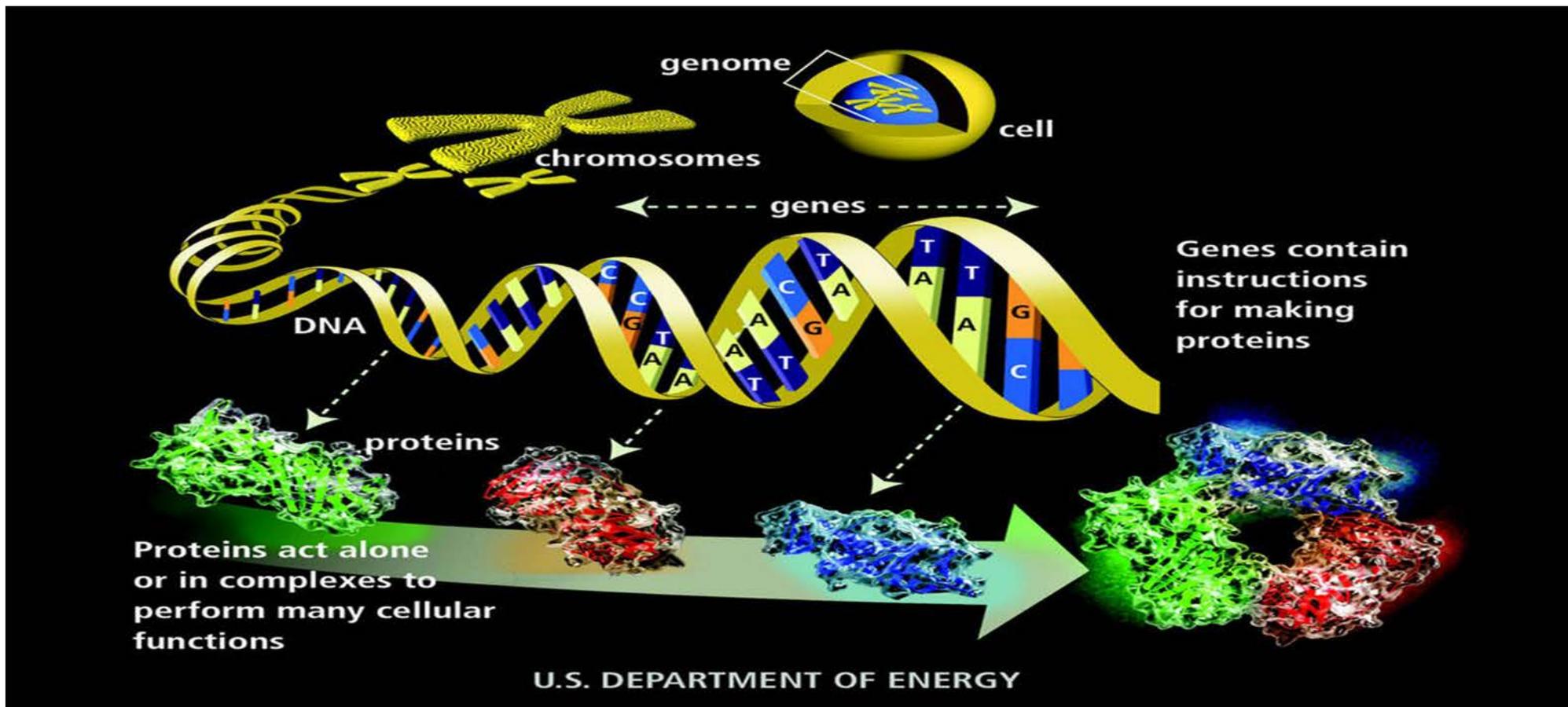
# What is a Genome



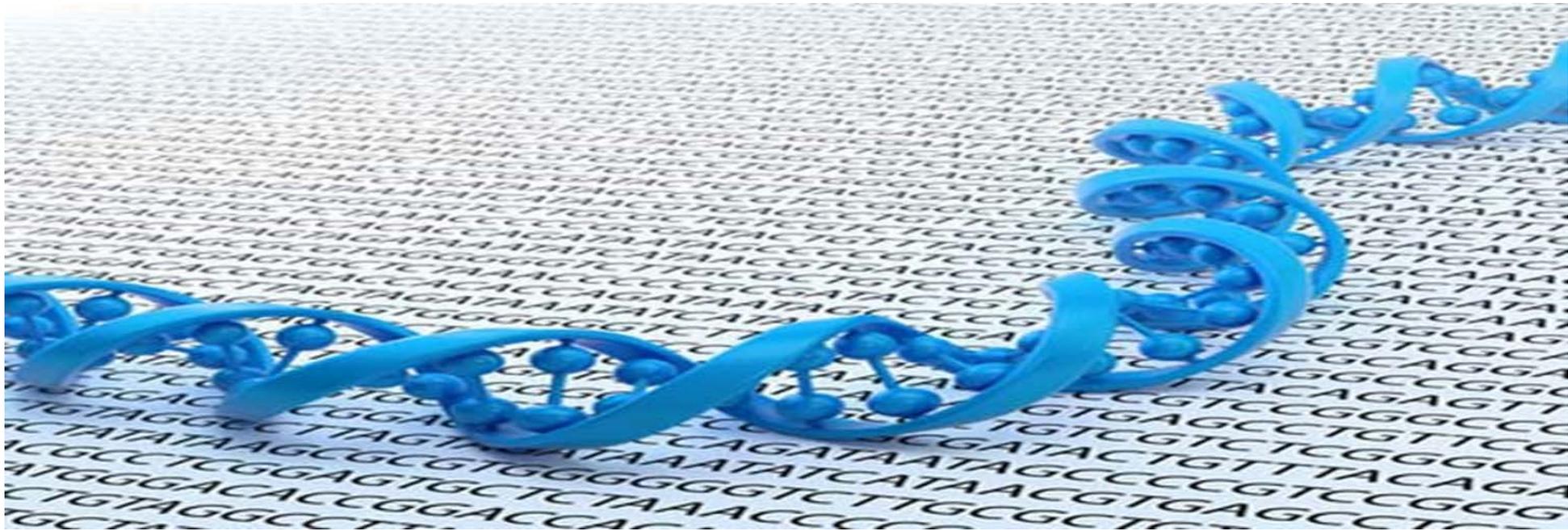
- A genome is an organism's complete set of DNA, including all of its genes. Each genome contains all of the information needed to build and maintain that organism. In humans, a copy of the entire genome—more than 3 billion DNA base pairs—is contained in all cells that have a nucleus.



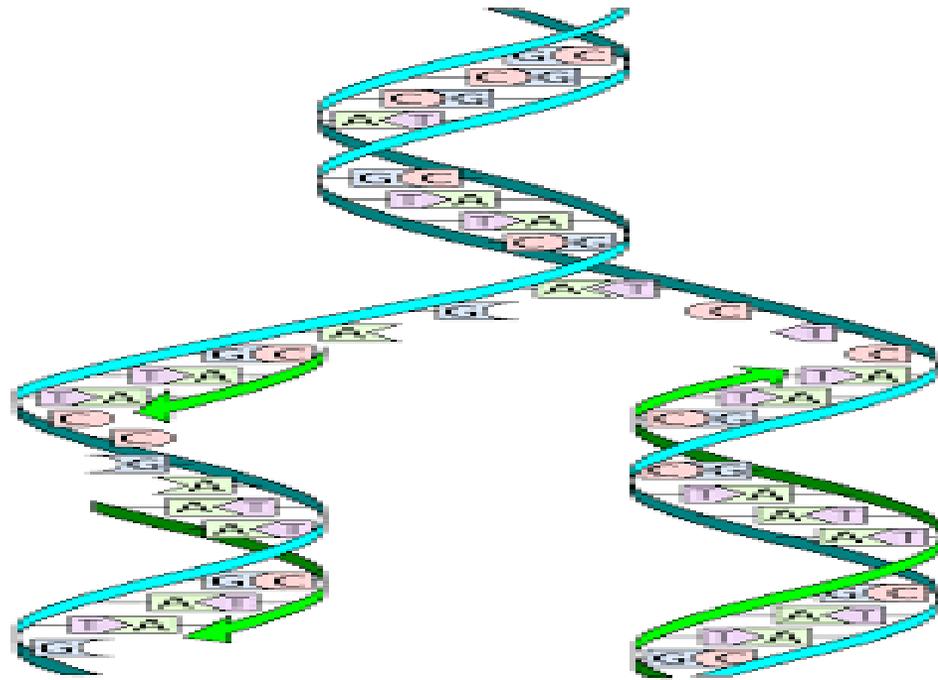
- An organism's genome is the sum total of all its genetic parts, including all its chromosomes, genes, and nucleotides. A genome is an instruction manual that specifies a particular form of life.
- The human genome is a manual that instructs human cells and the human body to be the human body.
- There is no information system designed by man that can even begin to compare to the simplest genome in complexity.
- The complex nature of the genome can only be appreciated when we begin to grasp how much information it contains.



- Nucleotides are a linear sequence of four types of extremely small molecules that make up the individual steps of the spiral-staircase structure of DNA.
- These molecules are the letters of the genetic code, and are shown symbolically as A, T, C, and G.
- These letters are strung together like a linear text, they form the basis of the instruction manual for life in a human being.
- Small clusters or motifs of these four molecular letters make up the **words of our manual**, which combine to form **genes (the chapters of our manual)**, which combine to form **chromosomes (the volumes of our manual)**, which combine to form the whole **genome (the entire library)**.

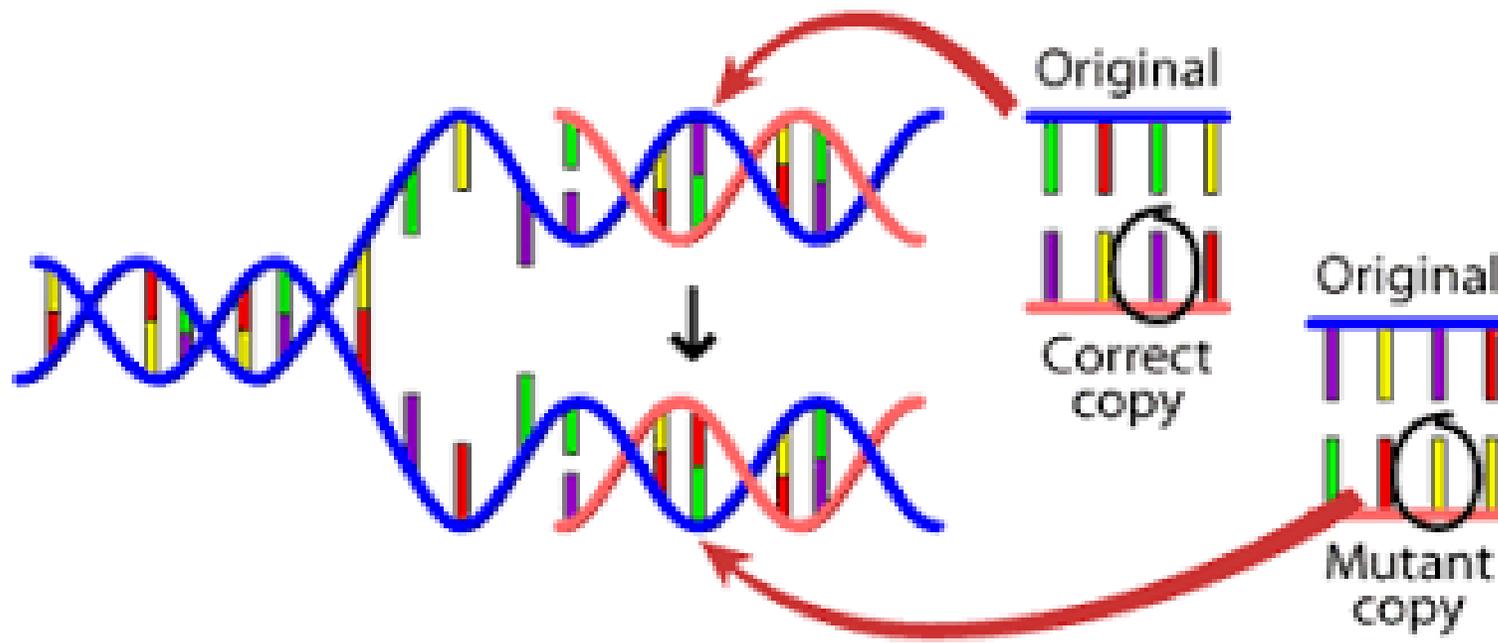


- A complete human genome consists of two sets of 3 billion individual letters each.
- The genome's highest levels of complexity and interaction are probably beyond the reach of our understanding.
- All this information is contained within a genomic package that is in turn, contained within a cell's nucleus—a space much smaller than a speck of dust.



## DNA Replication

- Cells reproduce by splitting in two. Because each new cell requires a complete set of DNA molecules, the DNA molecules in the original cell must reproduce (replicate) themselves during cell division.
- Replication happens in a manner similar to transcription, except that the entire double-strand DNA molecule unwinds and splits in two. After splitting, bases on each strand bind to complementary bases (A with T, and G with C) floating nearby. When this process is complete, two identical double-strand DNA molecules exist.



## Mutation

- Each time a cell divides, there is a chance that some of the genes will be copied incorrectly. This is called mutation.
- Additionally, exposures to toxins, radiation or ultraviolet light can cause mutations in your body's genes.
- The body can correct or destroy most of the mutations, but not all of them.

# What is a gene mutation and how do mutations occur?

A gene mutation is a permanent alteration in the DNA sequence that makes up a gene, such that the sequence differs from what is found in most people. Mutations range in size; they can affect anywhere from a single DNA building block (base pair) to a large segment of a chromosome that includes multiple genes.

Gene mutations can be classified in two major ways:

- Hereditary mutations are inherited from a parent and are present throughout a person's life in virtually every cell in the body. These mutations are also called germline mutations because they are present in the parent's egg or sperm cells, which are also called germ cells. When an egg and a sperm cell unite, the resulting fertilized egg cell receives DNA from both parents. If this DNA has a mutation, the child that grows from the fertilized egg will have the mutation in each of his or her cells.
- Acquired (or somatic) mutations occur at some time during a person's life and are present only in certain cells, not in every cell in the body. These changes can be caused by environmental factors such as ultraviolet radiation from the sun, or can occur if an error is made as DNA copies itself during cell division. Acquired mutations in somatic cells (cells other than sperm and egg cells) cannot be passed to the next generation.

# Are Mutations Good?

- Nearly all health policies are aimed at reducing or minimizing mutation.
- Most personal health regimes are aimed at reducing mutations, to reduce risk of cancer and other degenerative diseases.
- Evolutionary theory however holds that mutations are good because they create the variation and diversity which allow selection and evolution to occur, thus creating the information needed for life.
- Science however has shown that the ratio of deleterious-to-beneficial mutations ranges from one thousand to one up to one million to one.

- Because beneficial mutations are so central to the viability of evolutionary theory, there has been a great deal of effort invested in trying to use mutation to generate useful variation.
- This effort was especially put forth in the area of plant breeding.
- When it was discovered that certain forms of radiation and certain chemicals were powerful mutagenic agents, millions and millions of plants were mutagenized and screened for possible improvements.
- For several decades this was the main thrust of crop improvement research.
- A huge number of small, sterile, sick, deformed, aberrant plants were produced.
- However, from all this effort, almost no meaningful crop improvement resulted.
- The effort was an enormous failure for the most part and was almost entirely abandoned.

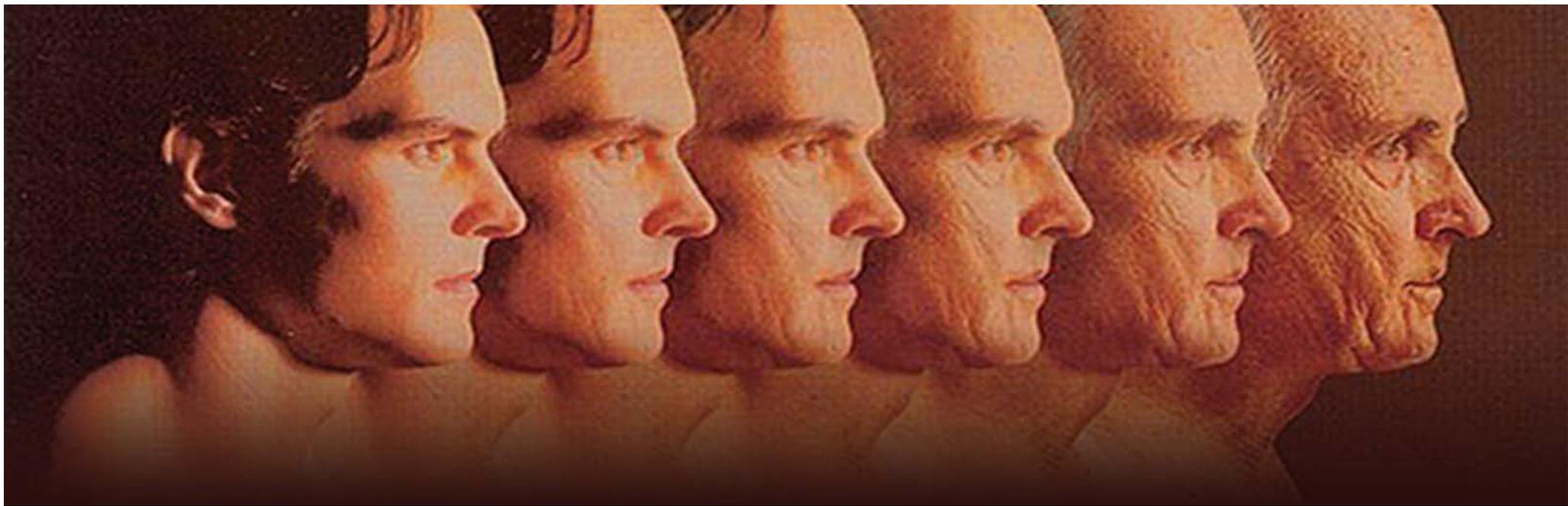
# Impact of Mutations on the Human Population

- For many decades geneticists have been worried about the impact of mutations on the human population.
- There has been a long-standing belief that if the rate of deleterious mutations approached ***one deleterious mutation per person per generation***, long-term genetic deterioration would be a certainty (Muller, 1950).
- This would be logical, since selection must eliminate mutations as fast as they are occurring.
- We need to prevent mutant individuals from reproducing, but we also need to leave enough remaining people to procreate and produce the next generation.
- By this thinking, deleterious mutations in man must actually be kept below one mutation for every three children if selection is to eliminate all the mutations and still allow the population to reproduce.
- One of the most astounding recent findings in the world of genetics is that the human mutation rate (just within our reproductive cells) is at least 100 nucleotide substitutions (misspellings) per person per generation.
- So every one of us is a mutant, many times over. There is no realistic method to halt genomic degeneration.

# Kondrashov's Question

A.S. Kondrashov. 1995 Contamination of the genome by very slightly deleterious mutations: Why have we not died a hundred times over?

- “I interpret the results in terms of the whole genome and show in agreement with Tachida (1990), that very slow deleterious mutations can cause too high a mutation load ..... accumulation of very slow deleterious mutations in a lineage.... acts like a time bomb..... the existence of vertebrate lineages..... should be limited to 10<sup>6</sup>-10<sup>7</sup> generations.”
- There have been @ 150-200 generations since creation. Kondrashov's theory does not take into consideration the beautiful design and error correcting mechanisms that God has engineered into the genome.



- Mutations appear to be overwhelmingly deleterious, and even when one may be classified as beneficial in some specific sense, it is still usually part of an over-all breakdown and erosion of information.
- Genetic entropy is the systematic breakdown of the internal biological information systems that make life alive. Genetic entropy results from genetic mutations, which are typographical errors in the programming of life (life's instruction manuals).
- Mutations are the basis for the aging of individuals, and right now they are leading to our death, both yours and mine.
- Mutations will not only lead to our personal death, they will lead to the death of our species.



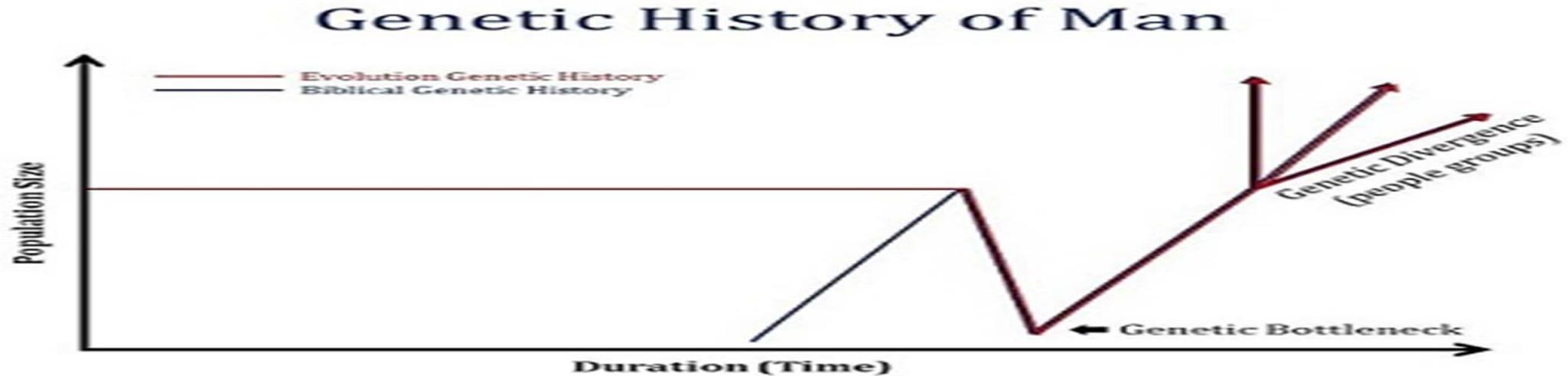
**GENETIC ENTROPY**  
**Recorded in the Bible?**

# Biblical Model



- God created the earth 6,000 years ago with Adam and Eve as the origin of the human race.
- The population increased to some unknown number over @ 1,500 years. Then the population crashes during an event called Noah's flood. Eight people remaining on the earth. Noah, Shem, Ham and Japheth and their wives.
- They began to repopulate the earth and then the Tower of Babel event occurred and humanity was then dispersed throughout the world.

# Evolutionary Model

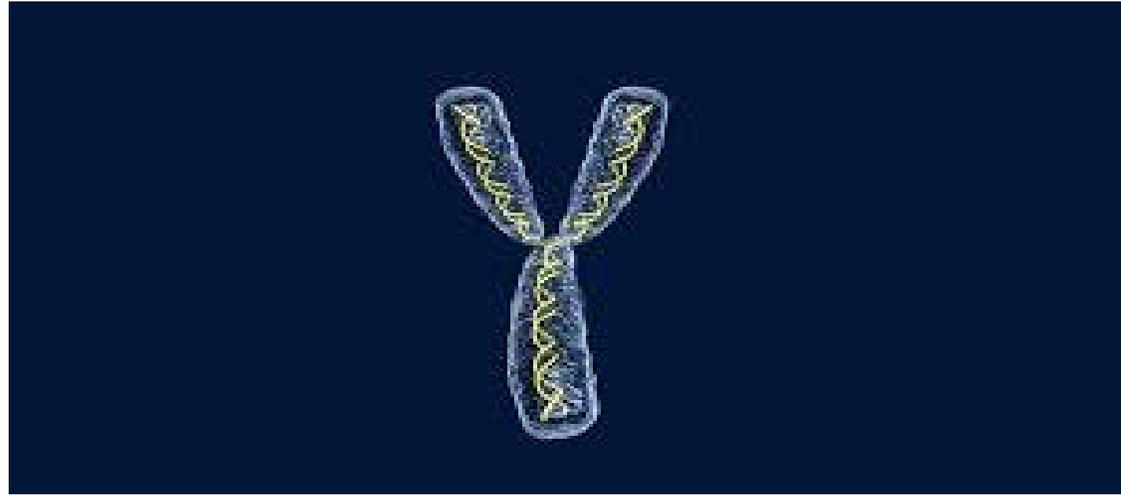


- Out-of-Africa Theory: that all modern humans stem from a single group of Homo sapiens who emigrated from Africa and spread throughout Eurasia over thousands of years. ...
- Out of Africa Timeline – about 1 million people living in Africa for about 1 million years.
- Then something happens, the human population crashes and humanity is reduced to the point where there are only 1,000 to 10,000 people left on earth. This is where modern man evolves. We then leave Africa and spread out across the world.
- No fossil record to substantiate the existence of Homo Erectus for 1 million years.
- If there was a million people that lived in Africa for 1 million years there should have been 50 billion people that lived and died.
- There is no fossil evidence to validate this theory.

# Genetic History of Man



- The evolutionary model claims that humanity originates from thousands of different people. The biblical account claims that all humanity originates from only two people, Adam and Eve.
- With thousands of people you can harbor a lot of genetic diversity, with only two people you can not have a lot of genetic diversity.
- What does the science tell us; There is a surprising lack of genetic diversity worldwide.
- This is the reason for the “population bottleneck” in the evolutionary model. We must have come from a very small ancestral population.

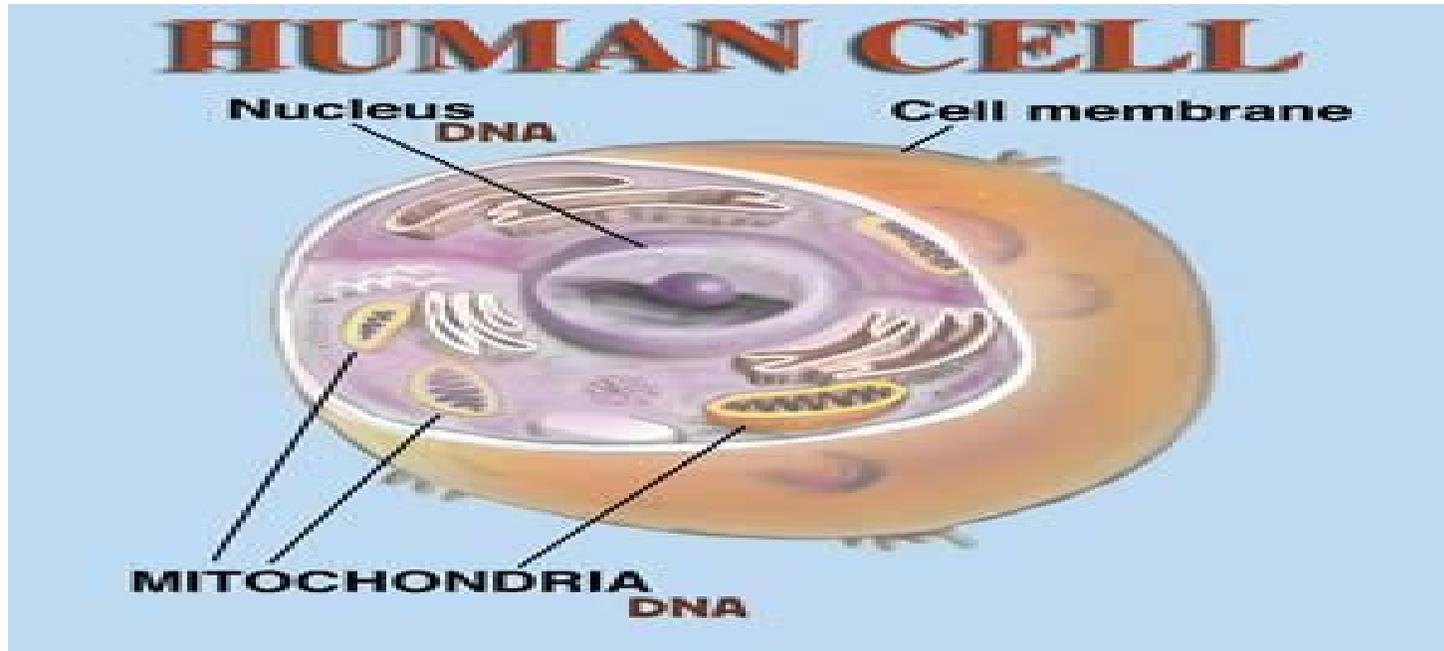


- Males have one Y chromosome and one X chromosome, while females have two X chromosomes.
- From the findings of modern genetics, we have learned that the Y chromosome is a master control switch, affecting genetic expression of thousands of genes on all the other chromosomes.
- Its effects are so profound that it makes the difference between men and women.
- The Y chromosome is also very important for studies of heredity and evolution due to its mode of strict paternal inheritance.



- Using Y chromosome sequence data, one can build a family tree of Y chromosomes and use it to chart historical migration patterns of people across the world.
- Early work discovered that all human males have very similar Y chromosomes.
- This led to the conclusion that there was a single male ancestor for the entire world population, called Y-Chromosome Adam.

# Mitochondrial Eve

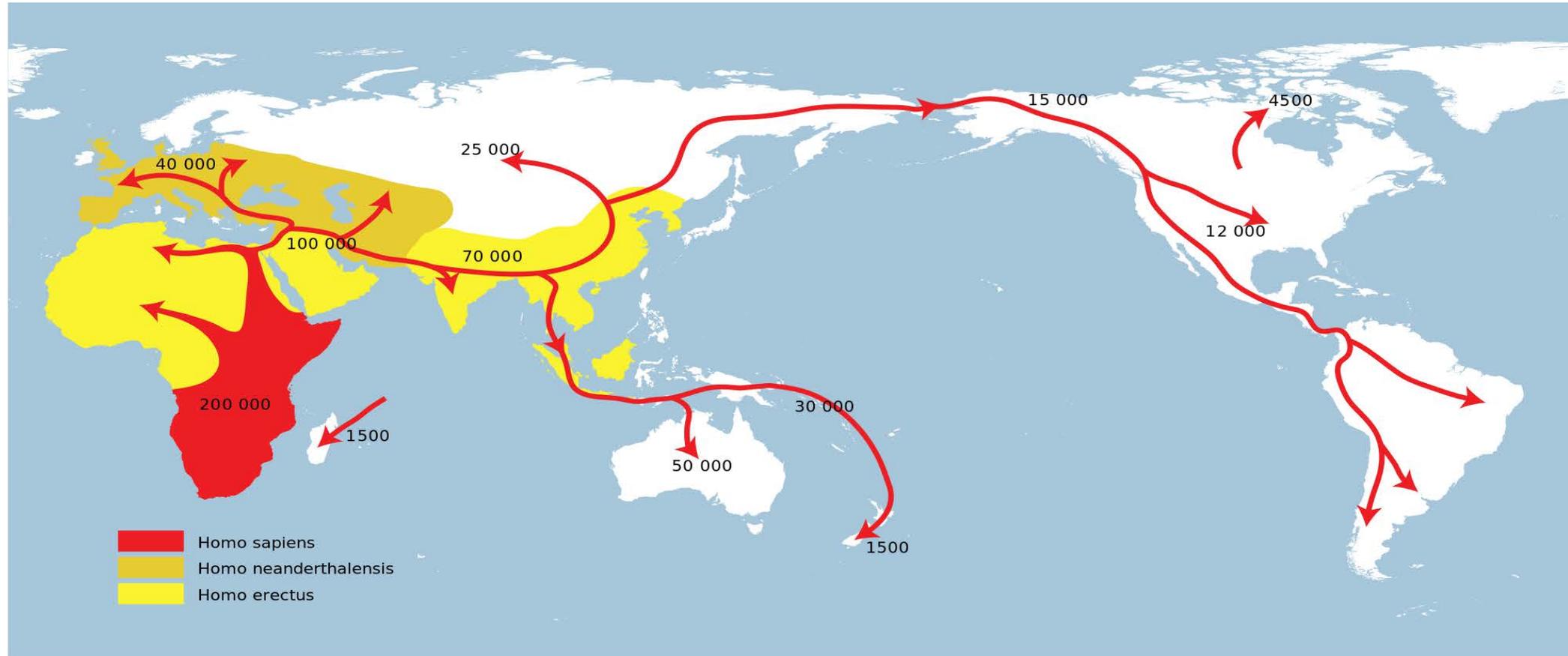


- You only inherit the Mitochondria DNA from your mother.
- The science of genetics can take all of the Mitochondria DNA in the world and build a family tree of all the people in the world based on the female line.
- This family tree finds its origin with one single female, Mitochondrial Eve.
- By rewinding the genetic clock, with the current mutation rate at 100 mutations per generation, Mitochondrial Eve must have lived less than 10,000 years ago.

# The Flood and Genetics

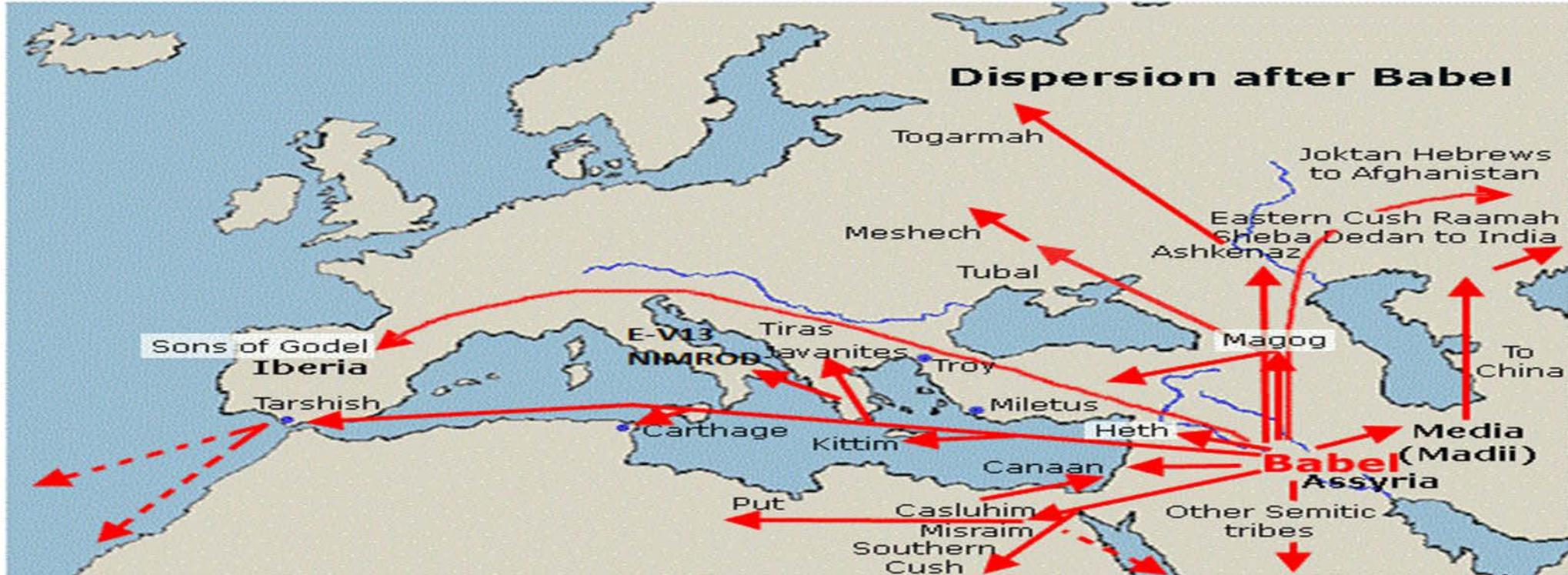
- About 10 generations after Creation, a severe, short bottleneck occurred in the human population. From untold numbers of people, the entire world population was reduced to eight souls with only three reproducing couples.
- How many mitochondrial DNA lineages were on the Ark? The answer: three. Yes, there were four women, but the Bible does not record Noah's wife as having any children after the Flood.
- "These three were the sons of Noah; Shem, Ham, and Japheth and from these the whole earth was populated." (Gen 9:19)
- With no prohibition against sibling marriage, we would expect a maximum of three mitochondrial lineages in the current world population.
- The evidence from mitochondrial DNA fits our model. As it turns out, there are three main mitochondrial DNA lineages found across the world. The evolutionists have labeled these lines "M", "N", and "R".
- They would not say these came off the Ark. They claim they were derived from older lines found in Africa, but this is based on a suite of assumptions. It also turns out that M, N, and R differ by only a few mutations.
- This gives us some indication of the amount of mutation that occurred in the generations prior to the Flood.

# OUT OF AFRICA THEORY



- The Out of Africa (OOA) or African Replacement Hypothesis is a theory that argues that every living human being is descended from a small group of Homo sapiens individuals in Africa, who then dispersed into the wider world.
- Modern genetics has discovered a single dispersion of people across the planet.

# OUT OF BABEL?

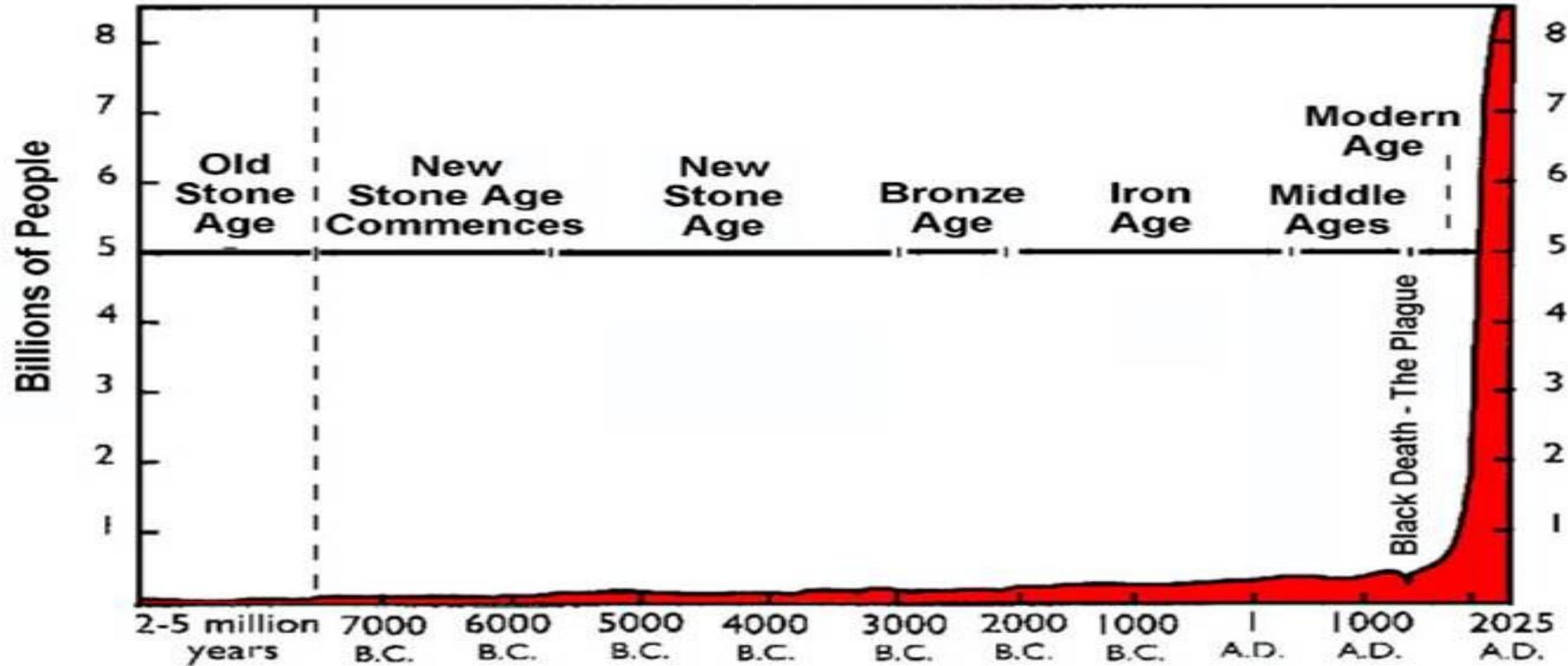


- God made the world one big family Genesis chapter 10.
- These are the descendants of Noah's sons, Shem, Ham, and Japheth; children were born to them after the flood. (10:1)
- These are the families of Noah's sons, according to their genealogies, in their nations; and from these the nations spread abroad on the earth after the flood. (10:32)
- Come, let Us go down and confuse their language, that they may not understand one another's speech.' So the Lord scattered them abroad from there over the face of all the earth, and they ceased building the city." Gen (11:7-8)

# Billions of People in Thousands of Years?

- Let us start in the beginning with one male and one female. Now let us assume that they marry and have children and that their children marry and have children and so on.
- And let us assume that the population doubles every 150 years. Therefore, after 150 years there will be four people, after another 150 years there will be eight people, after another 150 years there will be sixteen people, and so on.
- It should be noted that this growth rate is actually very conservative. In reality, even with disease, famines, and natural disasters, the world population currently doubles every 40 years or so.
- After 32 doublings, which is only 4,800 years, the world population would have reached almost 8.6 billion.
- That's 2 billion more than the current population of 6.5 billion people, which was recorded by the U.S. Census Bureau on March 1, 2006.
- This simple calculation shows that starting with Adam and Eve and assuming the conservative growth rate previously mentioned, the current population can be reached well within 6,000 years.

# World Population Growth Through History



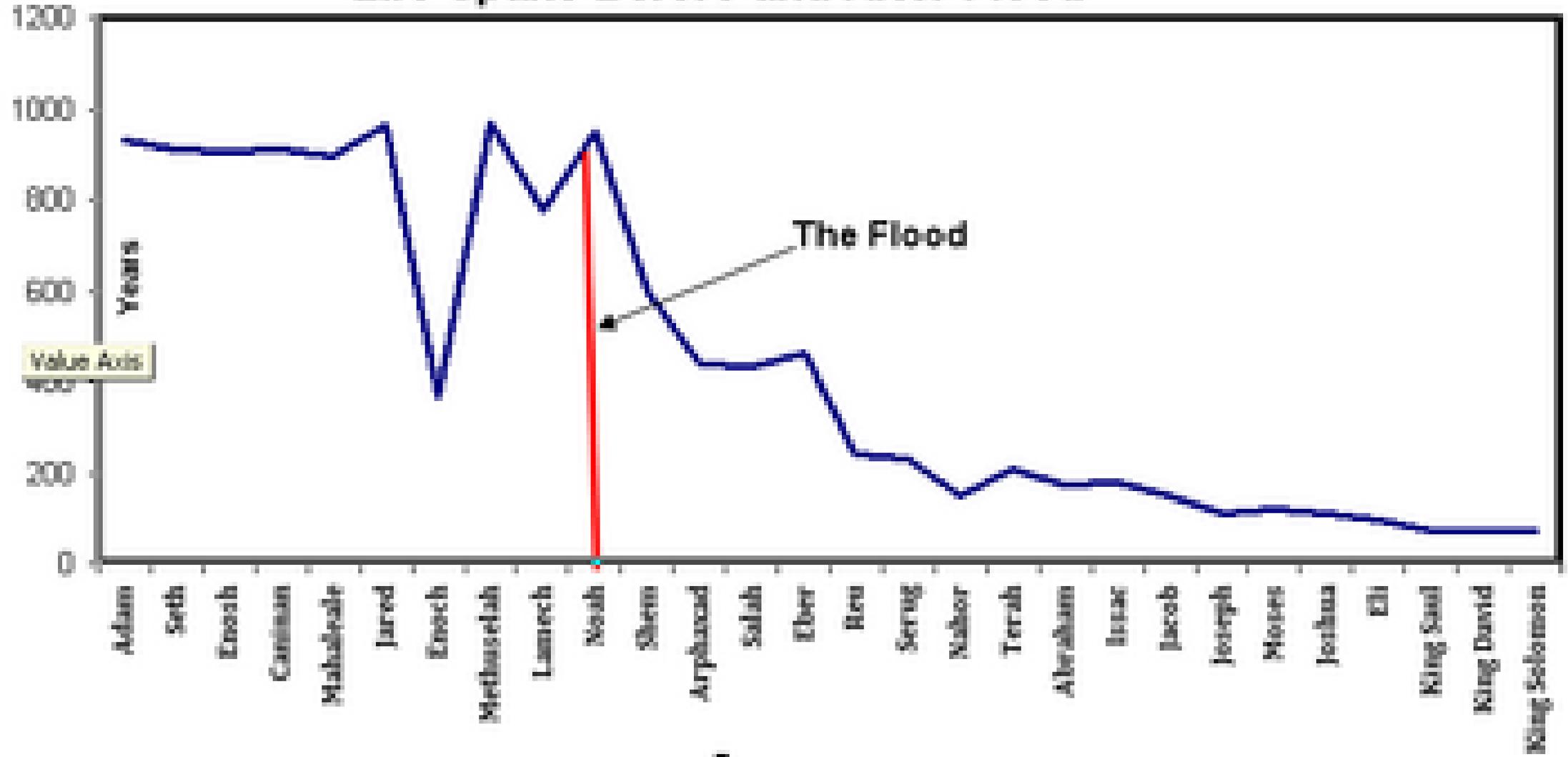
From "World Population: Toward the Next Century," copyright 1994 by the Population Reference Bureau

- It took all of human history up to 1804 for the world's population to reach 1 billion. But the next billion came only 100 years later, in 1927. And after that, the rate of growth accelerated, 3 billion in 1959, 4 billion 1974, 5 billion 1987, 6 billion 1999, and now 7 billion. Oct 27, 2011

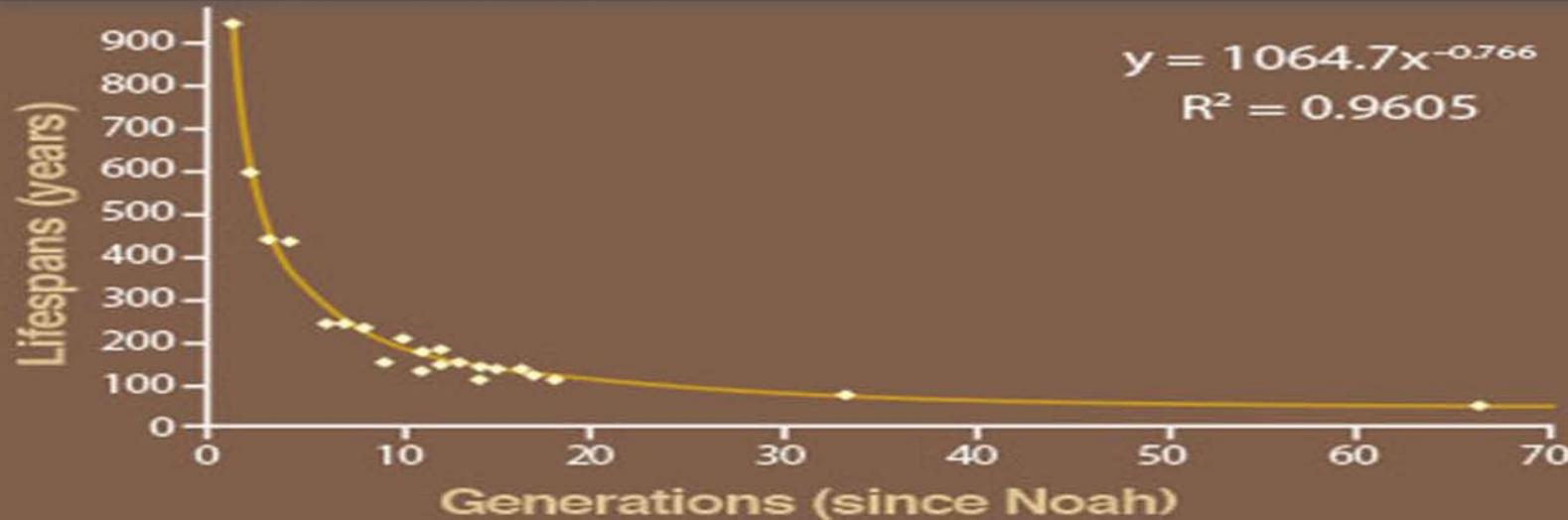
# Ages of the Patriarchs?

- Why did the patriarchs in the book of Genesis lived to be so old? Noah, for example, lived to be 950, according to Genesis 9:29. Given today's lifespans, that seems pretty outrageous. How could Noah possibly have lived that long? Also, even though his descendants didn't live as long as he did, they still lived longer than anyone today.
- Noah's son, Shem, lived to be 600 years old, according to Genesis 11:10-11. Noah's grandson, Arphaxad, lived 438 years, according to Genesis 11:12. If you continue through Noah's line, you will find that (on average) the later a descendant was born, the shorter life he led. Nevertheless, it takes many, many generations for the lifespans of the patriarchs to reach what we would call reasonable based on today's standards.
- Of course, one way to deal with this issue is to say that the ages of the patriarchs in Genesis are not accurate. Instead, as a kind of "hero worship," the writer of Genesis artificially inflated the patriarchs' ages to make them look "larger than life."

# Life Spans Before and After Flood



## Declining Lifespans of Noah and His Descendants



*Figure 2. After the Flood, human lifespans quickly began to decline. Image data credit: Sanford, Pamplin, and Rupe, "Genetic Entropy Recorded in the Bible?"<sup>2</sup>*

- Dr. Sanford correctly points out that this decay looks very typical of many decay patterns we see in biology. People tend to think in linear terms, so if I were the writer of Genesis making up the patriarchs' ages as I wrote, I would probably make the decrease in age more linear. Even if I specifically tried to make the ages look "not made up," it would be extremely difficult for me to produce ages that decay exponentially. It is just very difficult for people to think that way. As Sanford puts it:
- We are forced to conclude that the writer of Genesis faithfully recorded an exponential decay of human lifespans, or the author fabricated the data using sophisticated mathematical modeling. (pp. 148-149)



Do humans and chimpanzees share a common ancestor? Is there genetic evidence for our kinship? Aren't chimpanzees 98% identical to humans?

Humans and chimps are very different and this is born out in comparisons of Y chromosomes.

The chimpanzee Y chromosome only 70% identical to human. This is evidence that humans and chimpanzees are radically different.

# Are There Really Different Races?



- Some people think there must be different races of people because there appear to be major differences between various groups, such as skin color and eye shape.
- The truth is that these so-called “racial characteristics” are only minor variations among people groups.
- If one were to take any two people anywhere in the world, scientists have found that the basic genetic differences between these two people would typically be around 0.2 percent—even if they came from the same people group.
- But these so-called “racial” characteristics that people think are major differences (skin color, eye shape, etc.) “account for only 0.012 percent of human biological variation.”
- In other words, the so-called “racial” differences are absolutely trivial—overall, there is more variation within any group than there is between one group and another.
- If a white person is looking for a tissue match for an organ transplant, for instance, the best match may come from a black person, and vice versa.
- What the facts show is that there are differences among us, but they stem from culture, not race.

- Scientists have discovered that there is one major pigment, called melanin, that produces our skin color. There are two main forms of melanin: eumelanin (brown to black) and pheomelanin (red to yellow). These combine to give us the particular shade of skin that we have.
- Geneticists have found that four to six genes, each with multiple alleles (or variations), control the amount and type of melanin produced. Because of this, a wide variety of skin shades exist.
- Based on the skin colors seen today, we can infer that Adam and Eve most likely would have had a middle brown skin color. Their children, and children's children, could have ranged from very light to very dark.
- No one really has red, or yellow, or black skin. We all have the same basic color, just different shades of it. We all share the same pigments—our bodies just have different combinations of them.

- Melanin also determines eye color. If the iris of the eye has a larger amount of melanin, it will be brown. If the iris has a little melanin, the eye will be blue. (The blue color in blue eyes results from the way light scatters off of the thin layer of brown-colored melanin.)
- Hair color is also influenced by the production of melanin. Brown to black hair results from a greater production of melanin, while lighter hair results from less melanin. Those with red hair have a mutation in one gene that causes a greater proportion of the reddish form of melanin (pheomelanin) to be produced.
- DNA also controls the basic shape of our eyes. Individuals whose DNA codes for an extra layer of adipose tissue around the eyes have almond-shaped eyes (this is common among Asian people groups). All people groups have adipose tissue around the eyes, some simply have more or less.

# Origin of People Groups

- Those with darker skin tend to live in warmer climates, while those with lighter skin tend to live in colder climates. Why are certain characteristics more prominent in some areas of the world?
- We know that Adam and Eve were the first two people. Their descendants filled the earth. However, the world's population was reduced to eight during the Flood of Noah.
- From these eight individuals have come all the tribes and nations. It is likely that the skin shade of Noah and his family was middle brown.
- This would enable his sons and their wives to produce a variety of skin shades in just one generation. Because there was a common language and everybody lived in the same general vicinity, barriers that may have prevented their descendants from freely intermarrying weren't as great as they are today. Thus, distinct differences in features and skin color in the population weren't as prevalent as they are today.

- In Genesis 11 we read of the rebellion at the Tower of Babel. God judged this rebellion by giving each family group a different language. This made it impossible for the groups to understand each other, and so they split apart, each extended family going its own way, and finding a different place to live. The result was that the people were scattered over the earth.
- Because of the new language and geographic barriers, the groups no longer freely mixed with other groups, and the result was a splitting of the gene pool.
- Different cultures formed, with certain features becoming predominant within each group.
- The characteristics of each became more and more prominent as new generations of children were born.

# Summary

- The human genome suffers from an inescapable mutation problem that will eventually cause the human race to become extinct.
- Man is incapable of saving himself. Physical death awaits each of us individually and collectively as the human race.
- Revelation teaches us that the origin of the human race begins with our first parents, Adam and Eve and the science of genetics validates this truth.
- The Worldwide Noahic Flood account in Scripture explains the “population crash” and the “population bottleneck” proposed by the population theorists.
- The Tower of Babel story helps to explain the worldwide dispersion of people and the DNA lineages that are found presently throughout the world.

# Evolutionary Theory



- "The Emperor's New Clothes" is a short tale written by Danish author Hans Christian Andersen, as the third and final installment of Andersen's Fairy Tales Told for Children.
- The tale is about two weavers who promise an emperor a new suit of clothes that they say is invisible to those who are unfit for their positions, stupid, or incompetent.
- When the emperor parades before his subjects in his new clothes, no one dares to say that they do not see any suit of clothes on him for fear that they will be seen as "unfit for their positions, stupid, or incompetent". Finally, a child cries out, "But he isn't wearing anything at all!"

