

Human Genome



The human genome is basically all about DNA, the complete instruction book.

Every organism has a genome. Our genome is 3 billion letters long.

Genome Project is the attempt to define the complete genetic code.



Human Genome



We are made up of 100 trillion cells.

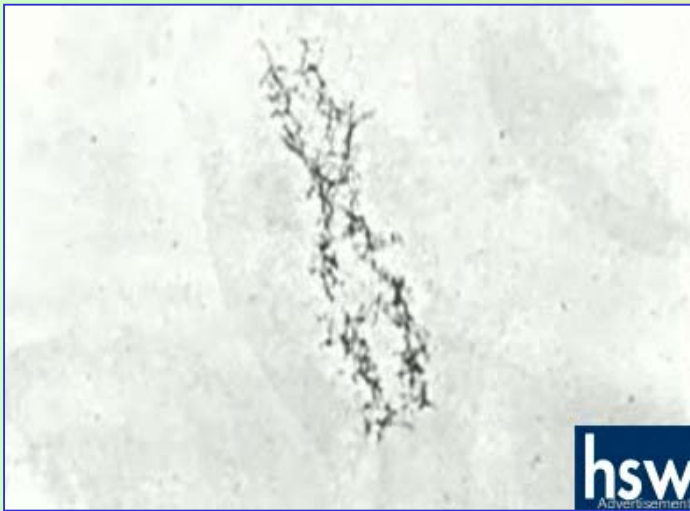
Inside nearly everyone of those cells lies a natural memory bag, more compact and efficient than the best computer's chip.

The human living memory chip is composed of 23 pairs of chromosomes.

That is where our genetic code lies.



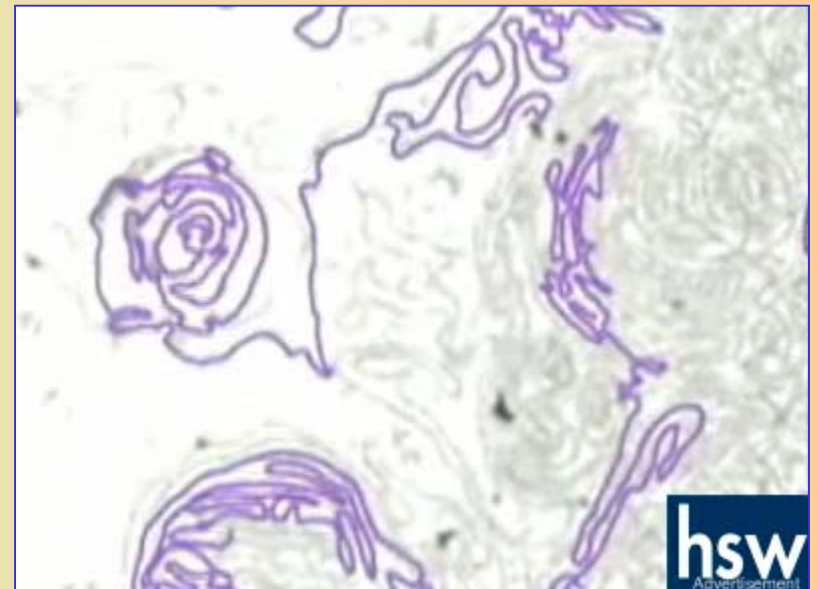
Human Genome



Each chromosome is made up of a seemingly endless single strand of a material called DNA.

Most of this DNA does not seem to do anything at all, but about 5 % of it carries coded instructions.

The scientists expect to find 50 thousand "words". Each of those words is a specific instruction for building one small part of us. Each instruction is called a gene, shown here in purple.



Human Genome

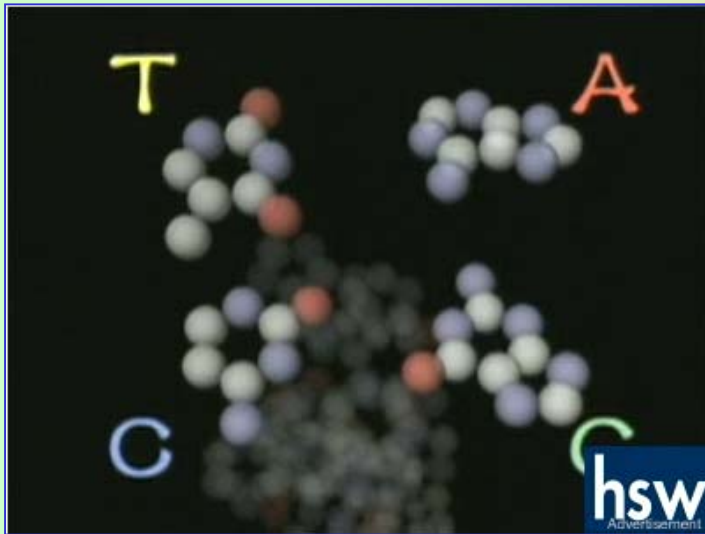


DNA has a hidden structure that makes it ideal for carrying information and also ideal for passing it along from one generation to the next.

The DNA molecule can be unzip down the middle and from each half, a perfect copy can be formed. That is how the information in DNA passes along when cells divide and how the information is moved from one generation to the next.



Human Genome



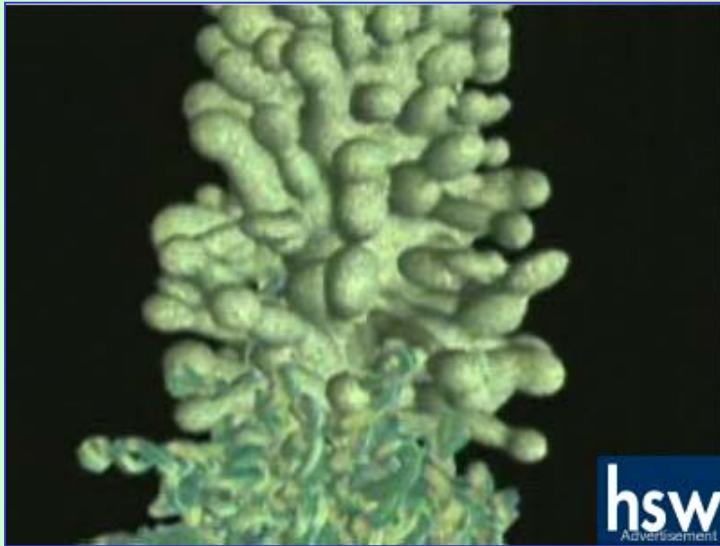
A is bonded with T, C always bonds with G. Our entire genetic code is written in this simple language.

The DNA "melody" is composed of four "notes" or bases: T, A, C, G.

These bases pair with one another to form the DNA rungs of the ladder.



Human Genome

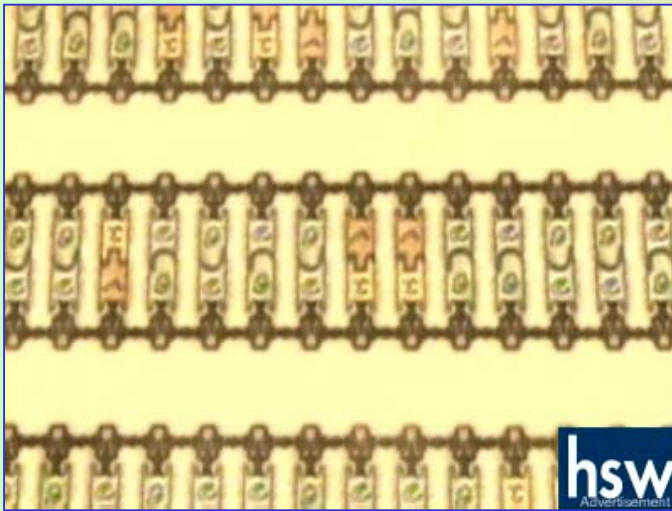


To gather all this information into our cells, the DNA is wrapped around proteins, bundled up and then coiled up into 23 pairs of chromosomes. Our genetic information lies on those chromosomes

The chromosomes are the volumes that make up the book of life.

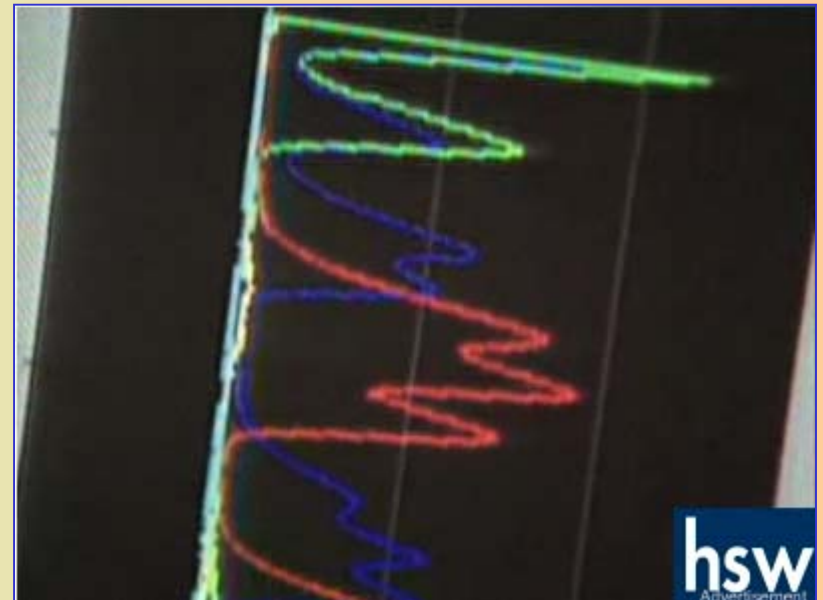


Human Genome



Scientists are now completing the task of reading those volumes.

Here, the scientists have been breaking down the chromosomes into tiny pieces, then they read the DNA that is contained in each of those pieces to identify the exact sequence of As, Ts, Cs and Gs, that is called sequencing.



Human Genome

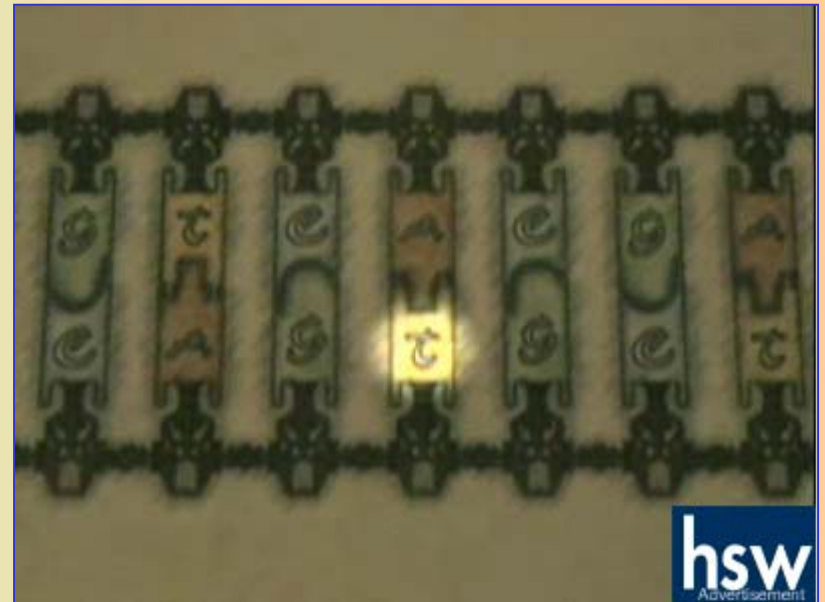


Everyone is 99.9 % identical to DNA level. We are all the same but one letter in a 1000.

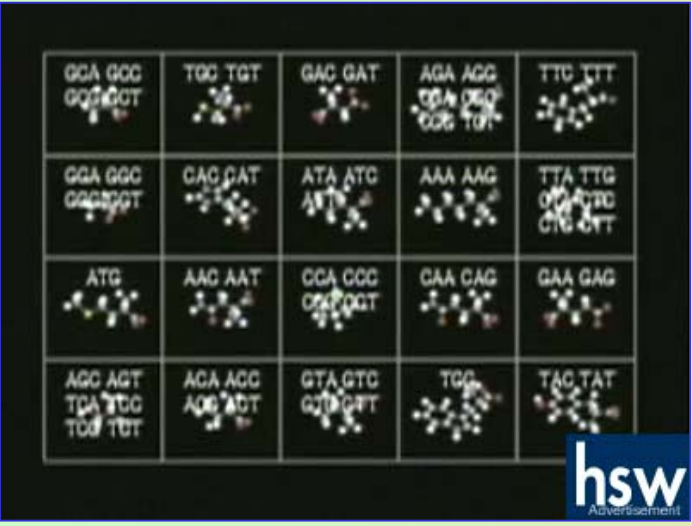
Therefore, our DNA sequence is almost identical (in 99.9 %)

A1-Milano

In chromosome 11, one letter is changed



Human Genome

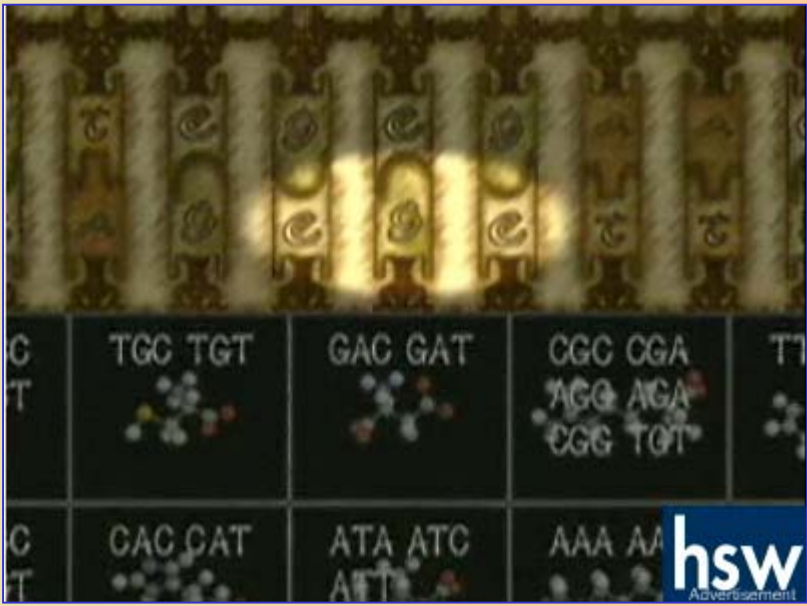


Proteins are the most important part of us: they are the molecular machines within us. DNA tells the body how to make proteins.

Proteins are made of a strain of building blocks called aminoacids.

There are 20 aminoacids which make up a protein by being combined in different orders.
The order of those aminoacids is dictated by the code in our DNA.

Each aminoacid is written with a three letter code.



Human Genome



The cell's inner section, the nucleus, houses our chromosomes. Here a molecular factory works to tap in into genetic information.

Specialized enzymes unravel the DNA, and this machinery splits the DNA ladder in two and reads the code.

Enzymes make image copies of DNA by matching up the As, Ts, Cs and Gs with their appropriate partners.



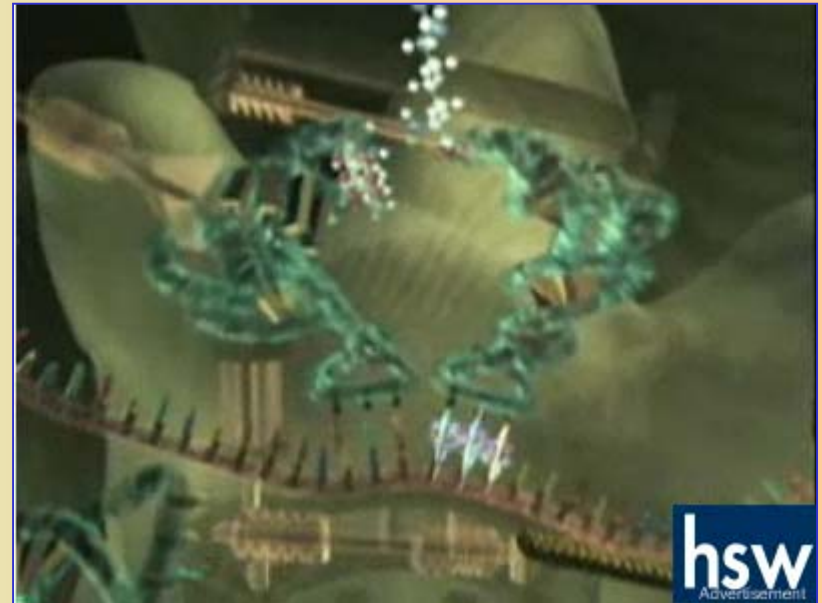
Human Genome



The new copy, called messenger RNA (mRNA) carries the code for a single gene. Once an entire gene has been read, the strand of mRNA is complete, it moves out of the nucleus into the main compartment of the cell.

There, a different set of enzymes takes over. Their job to translate the genetic code.

They read the genetic code three letters at a time. Each three-letter word spells out for one aminoacid.



Human Genome



Other enzymes fetch the aminoacid that is being called for and tuck it to the end of the growing protein.
Aminoacids are added one at a time.

The aminoacids determine how the protein folds up. That folded shape, in turn, determines how the protein would work. Change just one aminoacid and you can change the shape of the whole aminoacid, for better or worse.

