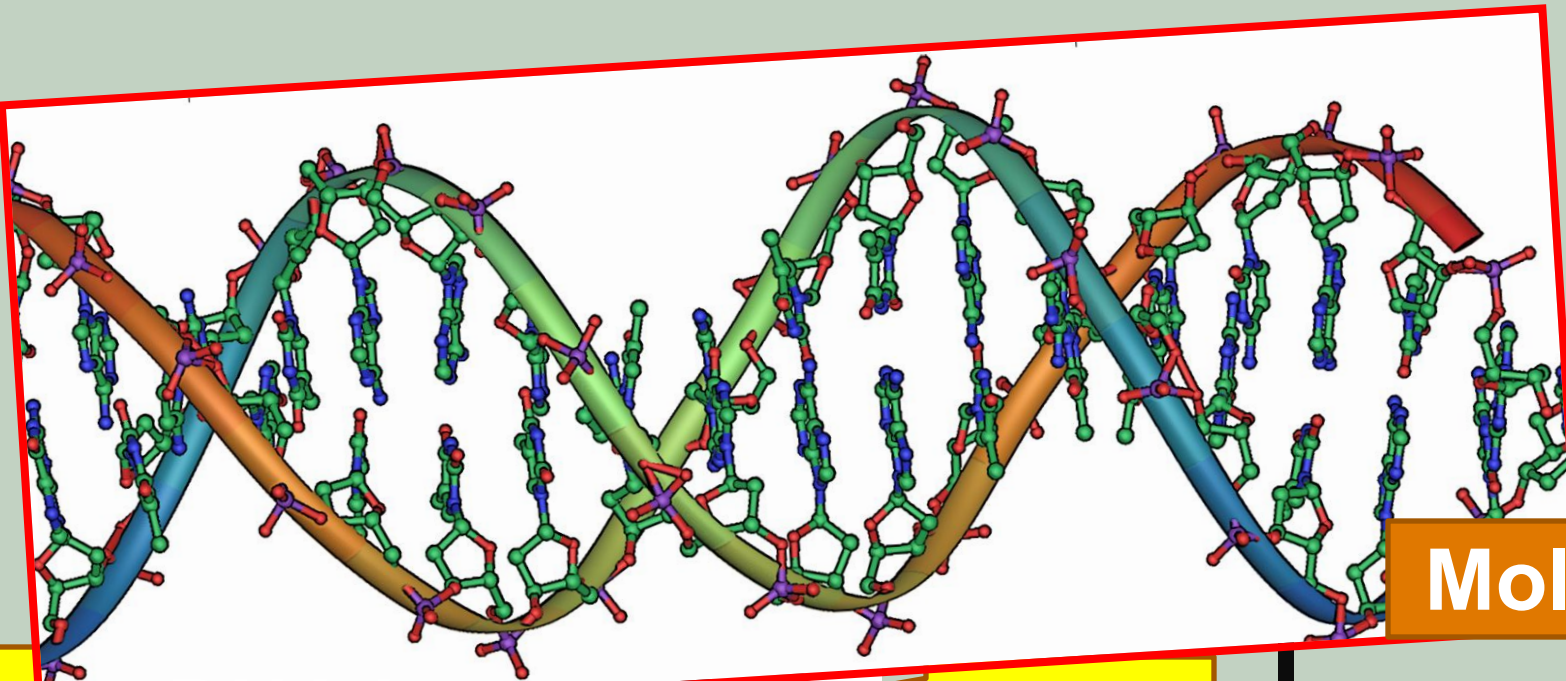


DNA (Deoxyribonucleic Acid) the basis of your inherited traits



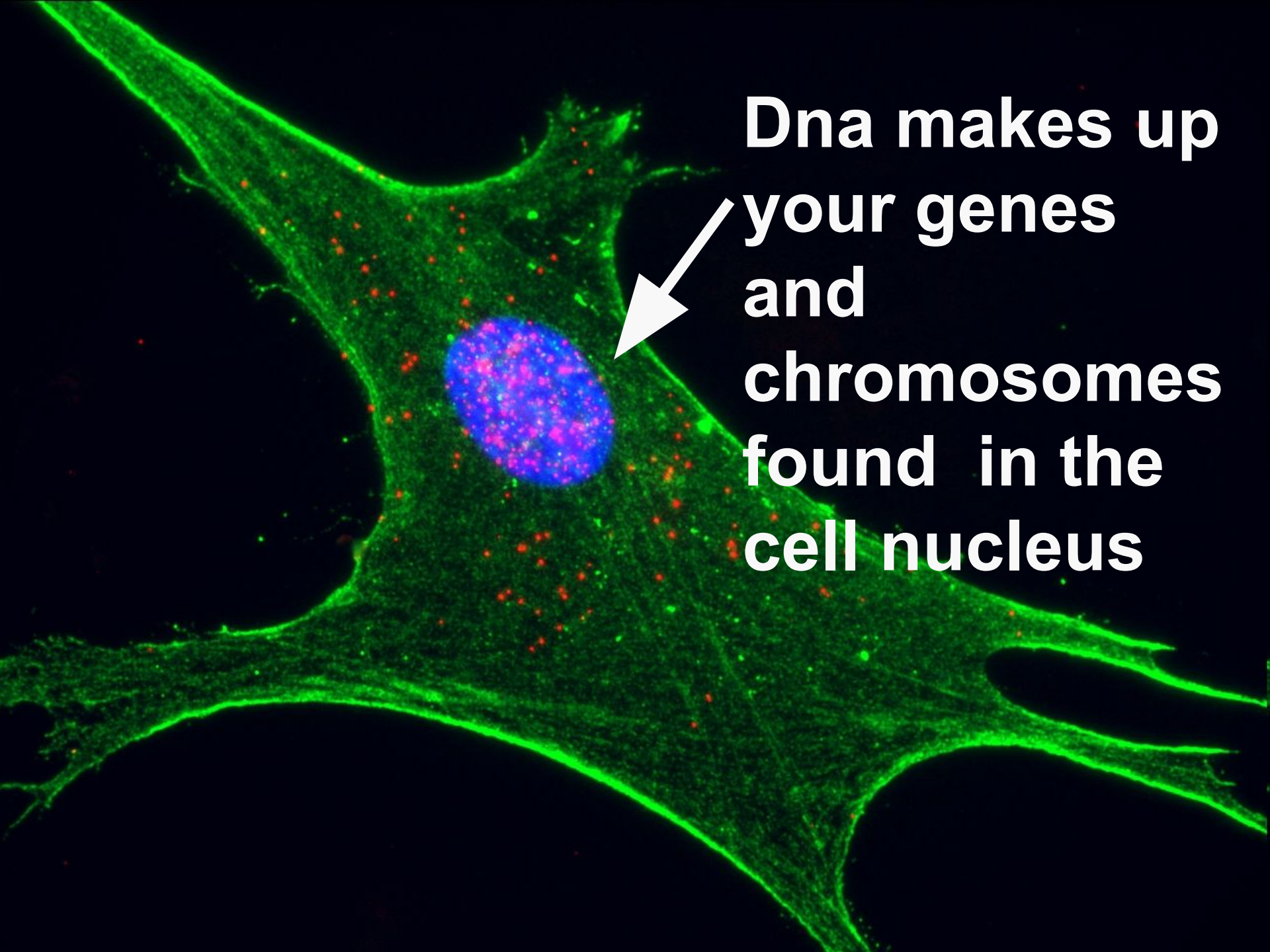
Molecule!

DNA is a very complex molecule

atom

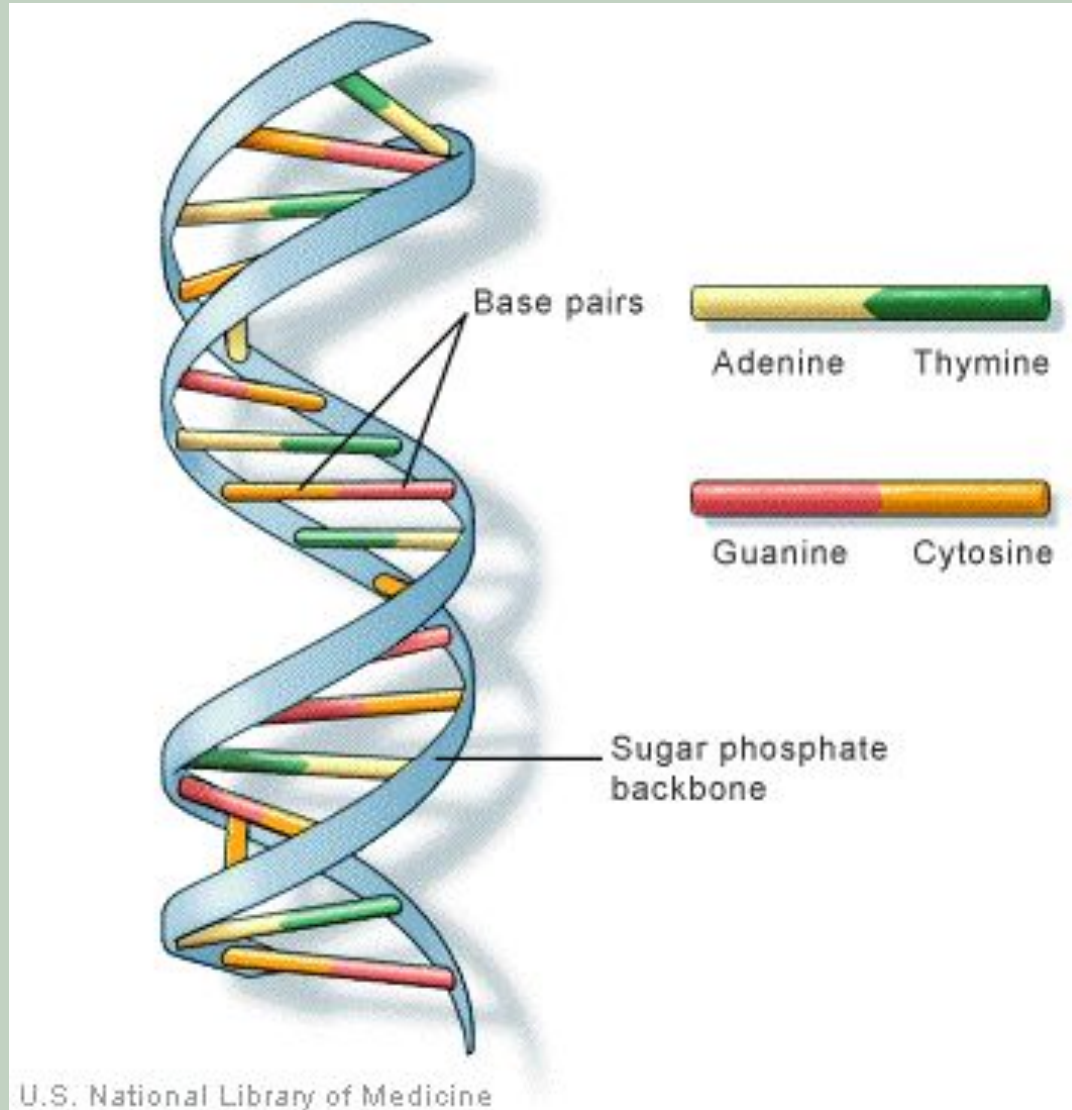
atom



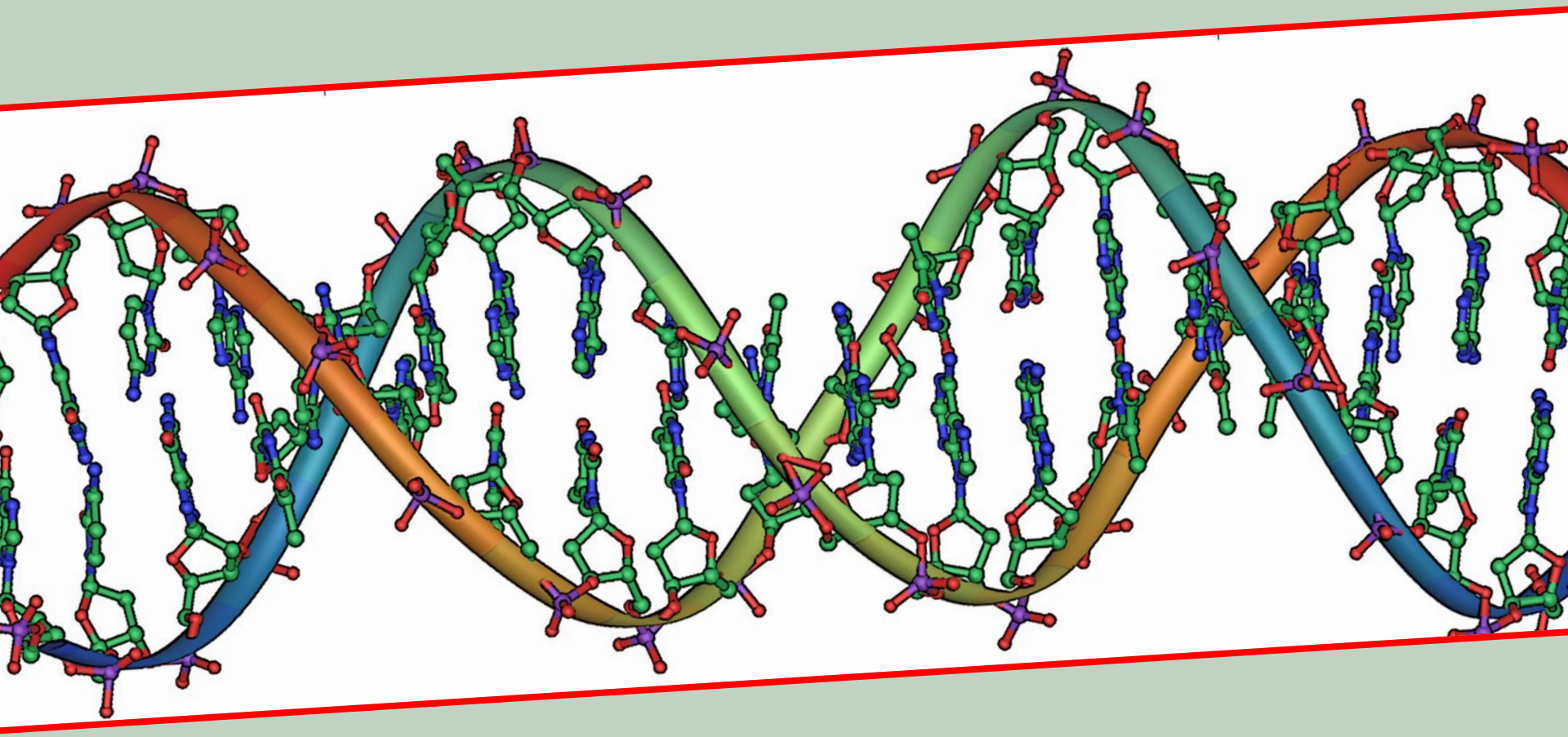


**Dna makes up
your genes
and
chromosomes
found in the
cell nucleus**

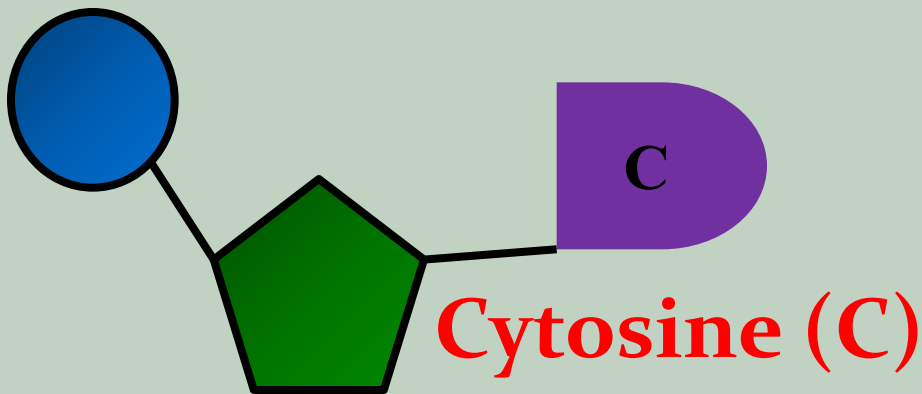
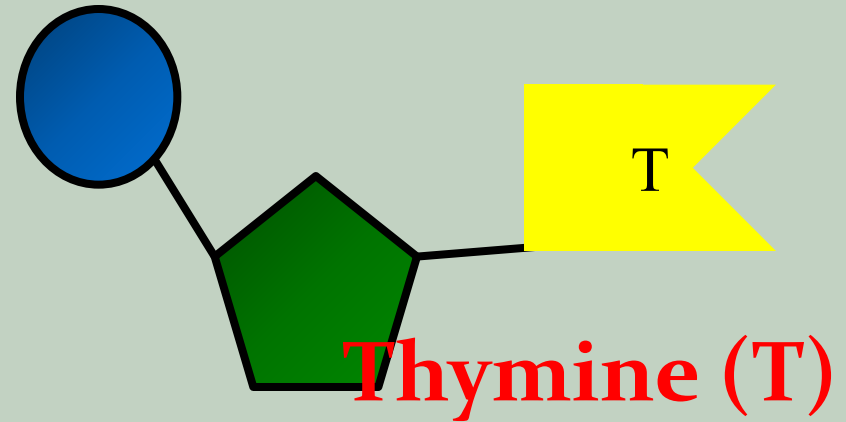
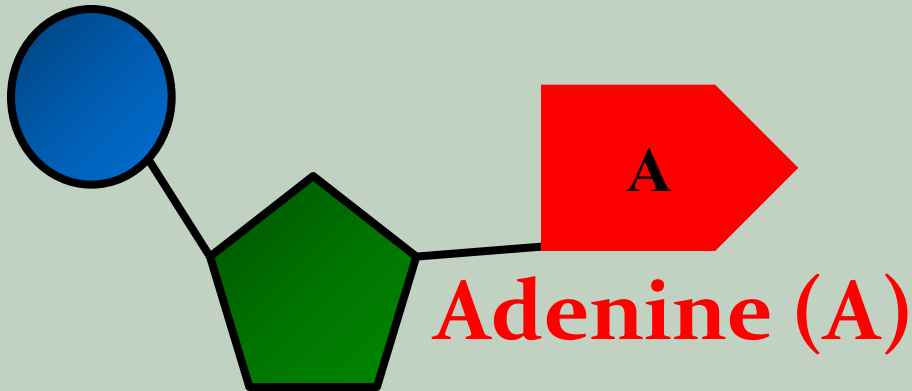
Structure of DNA



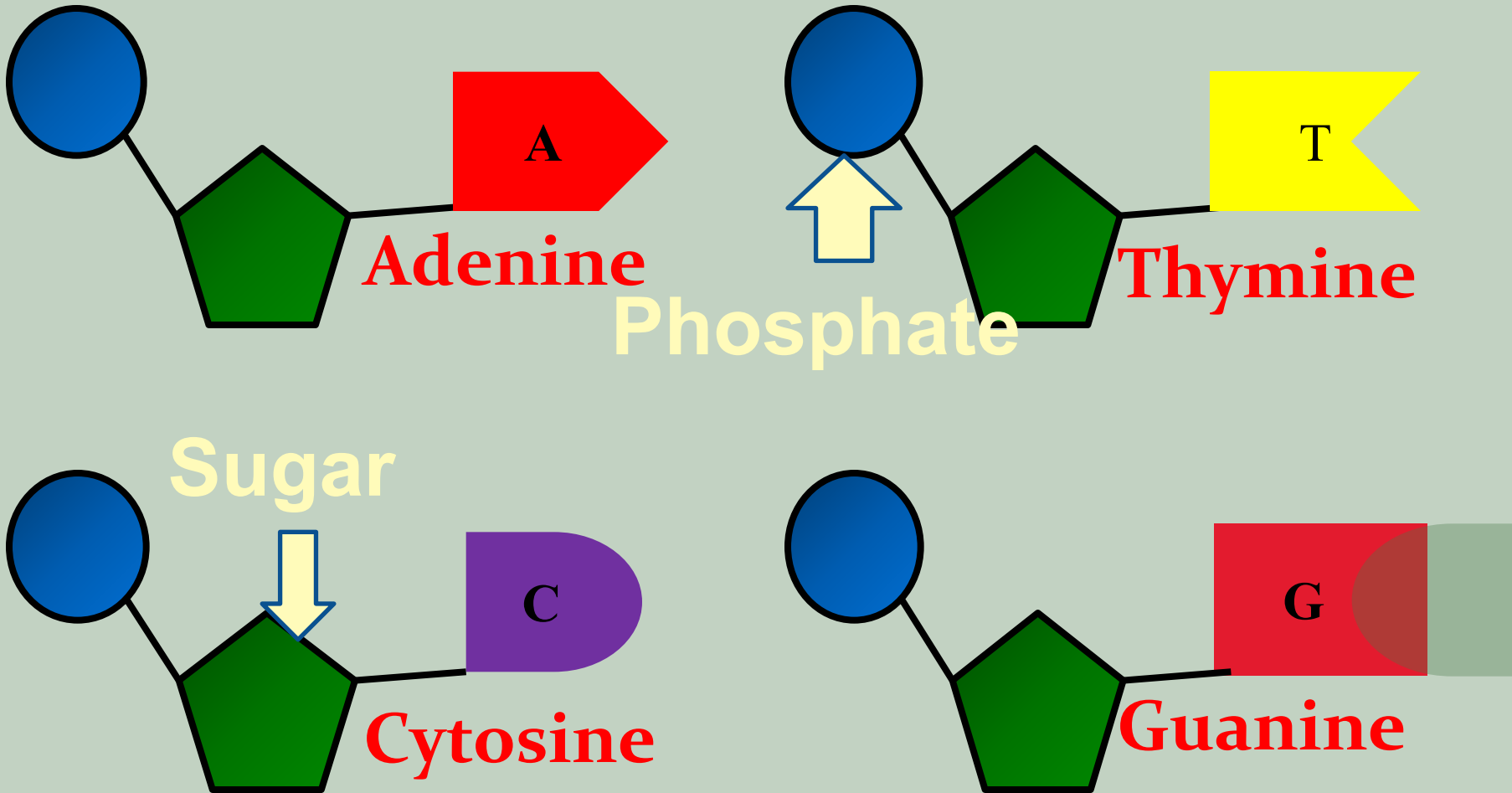
The DNA molecule is made of two strands twisted together in a double helix (a double coil)



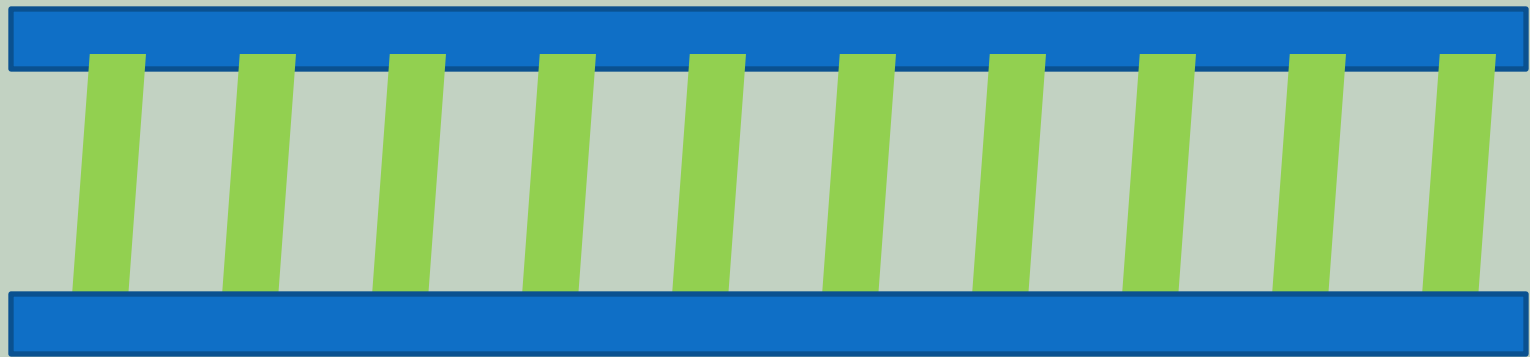
DNA is a little like a Lego building – it is made of 4 kinds of blocks called nucleotides



Each block (nucleotide) has a sugar, a phosphate and a base (ATCG)

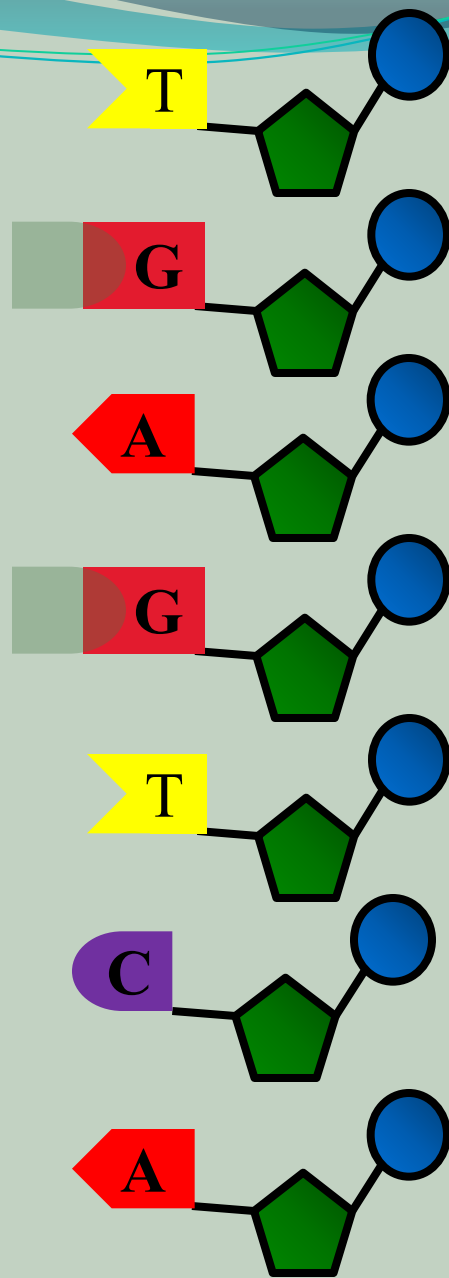
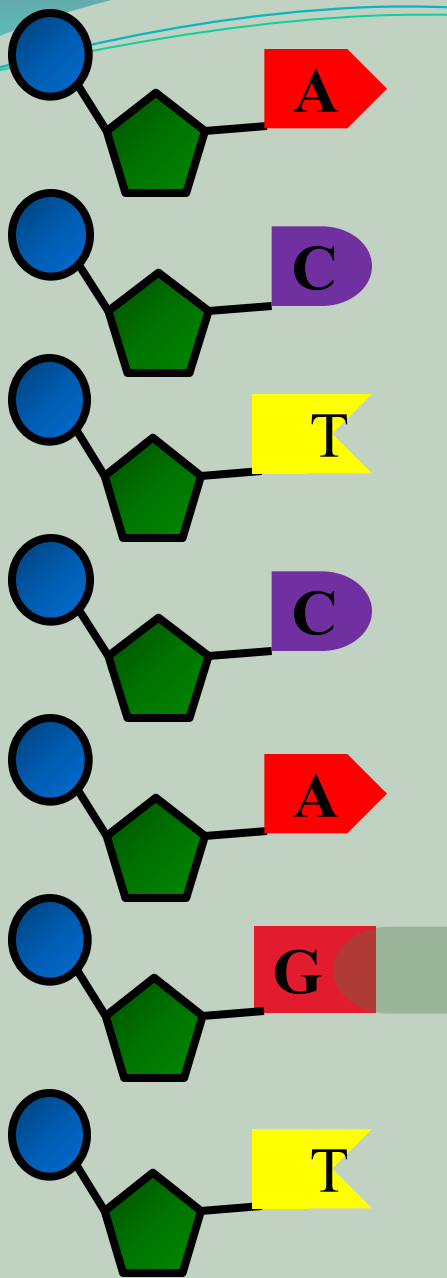


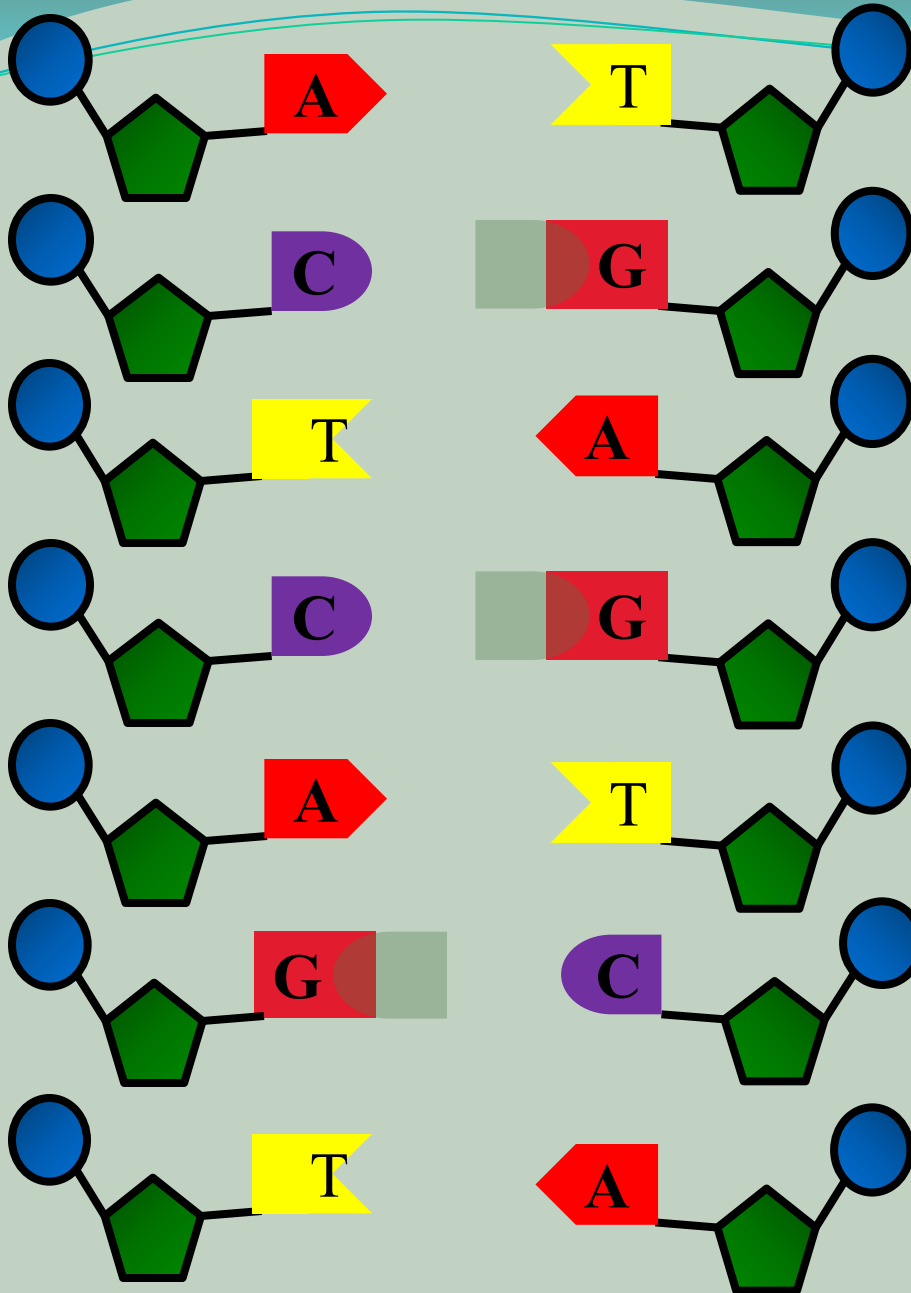
- The phosphate and sugar form the backbone of the DNA molecule, whereas the bases form the “rungs”.



- The four bases are

● ATCG

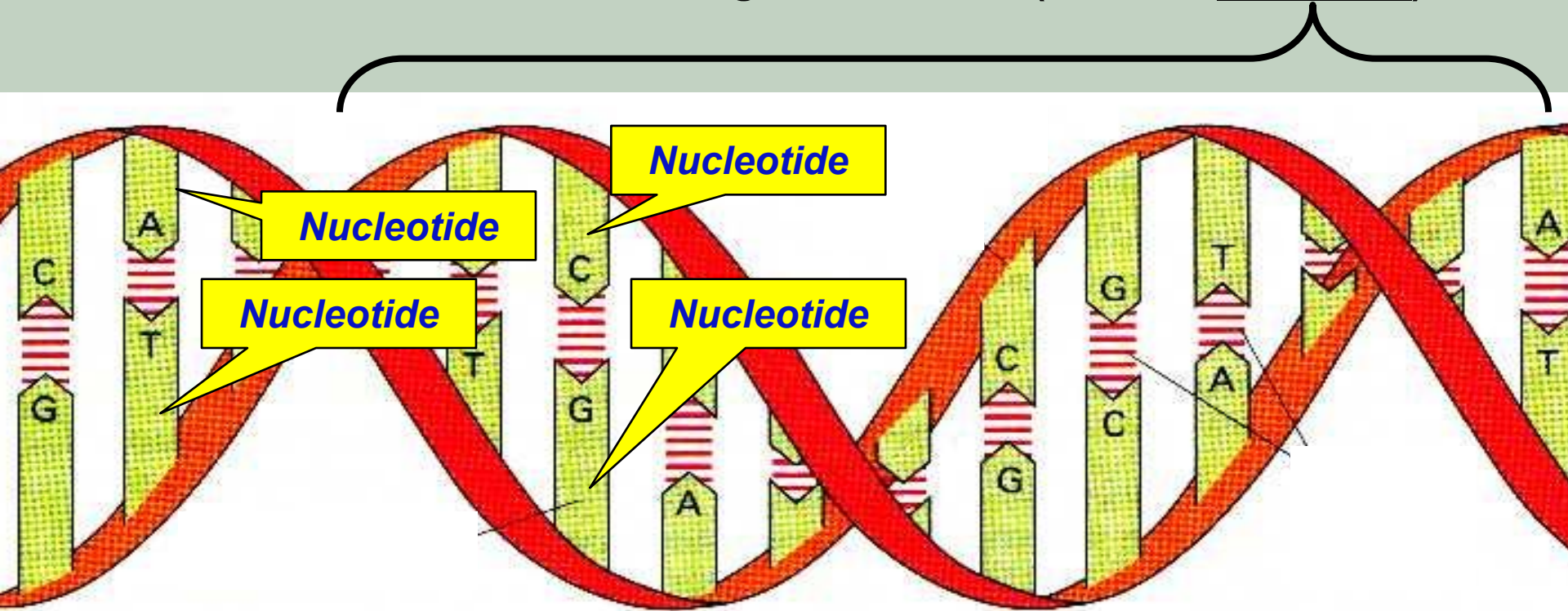




A bonds with T

C bonds with G

a segment of DNA (called a **GENE**)



- **The genetic code** – comes from the order the blocks (nucleotides) are in.
- Each gene has the code (instructions) for putting together one protein



Chromosomes
are like **books**

(Humans have 46
chromosomes)

The words and
letters in the books
are like letters
(nucleotides) in the
DNA.

*(the code or
language of genes)*

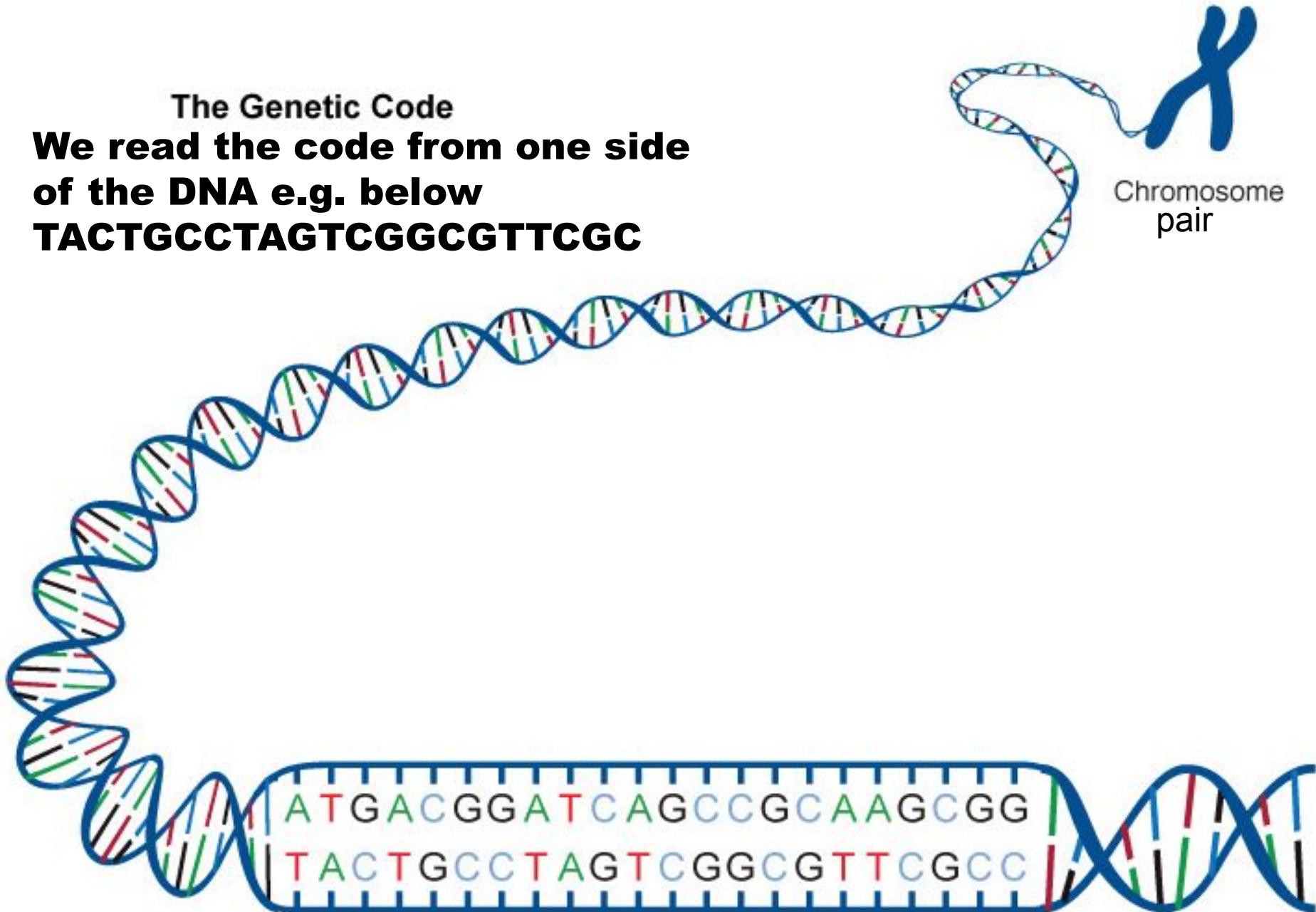
Table of Contents

1. **Eye color**
 - Blue
 - Brown
 - Green
2. **Earlobe Shape**
 - Attached
 - Hanging
3. **Hair Color**
 - Blonde
 - Black
 - Brown
 - Red

Genes are like the
chapters in the books

(Humans have
About 20,000 genes)

The Genetic Code
**We read the code from one side
of the DNA e.g. below
TACTGCCTAGTCGGCGTTTCGC**



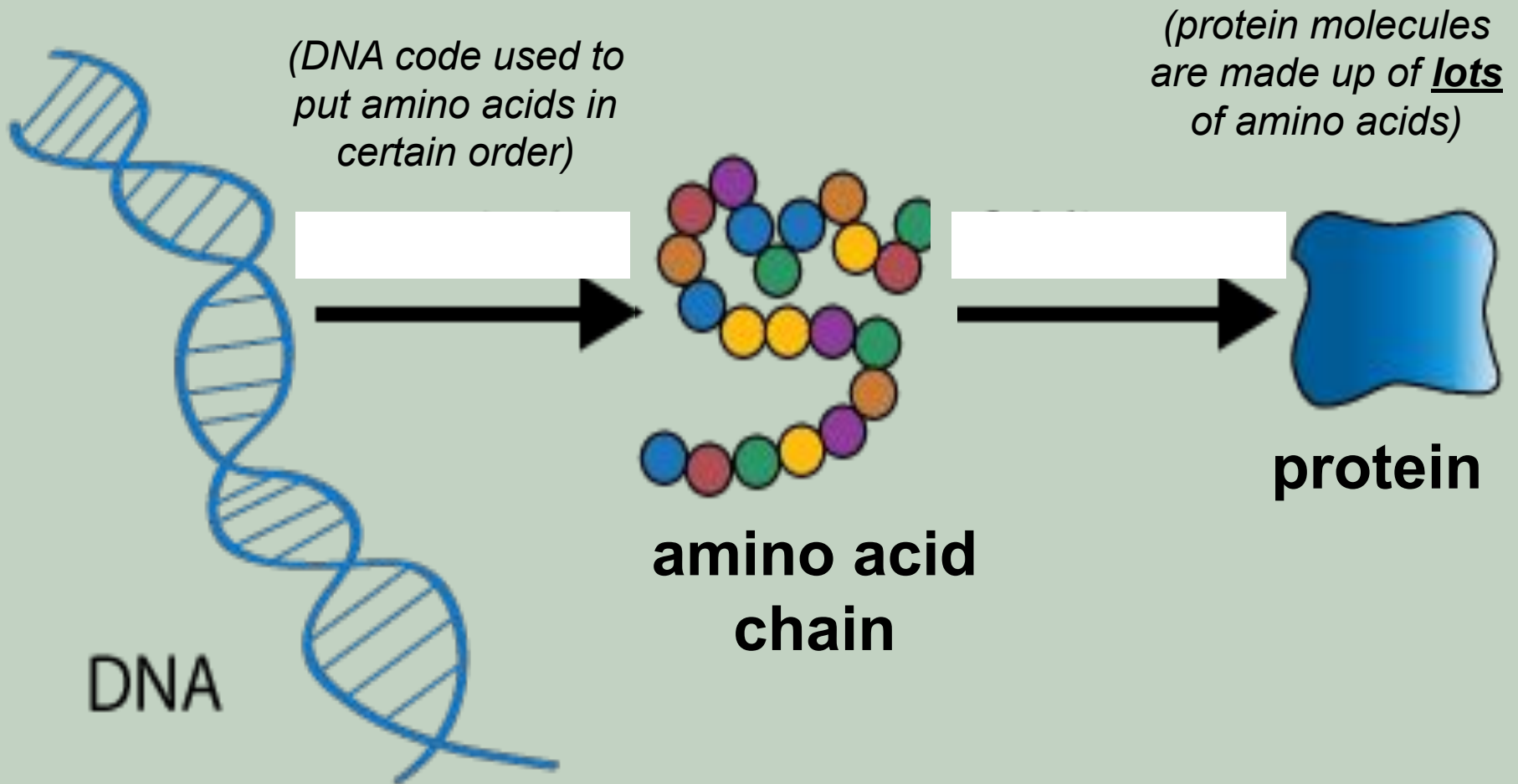
DNA □ amino acid code

		Second Letter					
		T	C	A	G		
First Letter	T	TTT } Phe TTC } TTA } Leu TTG }	TCT } TCC } Ser TCA } TCG }	TAT } Tyr TAC } TAA Stop TAG Stop	TGT } Cys TGC } TGA Stop TGG Trp	T	C
	C	CTT } CTC } Leu CTA } CTG }	CCT } CCC } Pro CCA } CCG }	CAT } His CAC } CAA } Gln CAG }	CGT } CGC } Arg CGA } CGG }	T	C
	A	ATT } ATC } Ile ATA } ATG Met	ACT } ACC } Thr ACA } ACG }	AAT } Asn AAC } AAA } Lys AAG }	AGT } Ser AGC } AGA } Arg AGG }	T	C
	G	GTT } GTC } Val GTA } GTG }	GCT } GCC } Ala GCA } GCG }	GAT } Asp GAC } GAA } Glu GAG }	GGT } GGC } Gly GGA } GGG }	T	C
						A	G
						Third Letter	

Common Amino Acids

Abbreviations for amino acids

<i>Amino acid</i>	<i>Three-letter abbreviation</i>	<i>One-letter symbol</i>
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic acid	Asp	D
Asparagine or aspartic acid	Asx	B
Cysteine	Cys	C
Glutamine	Gln	Q
Glutamic acid	Glu	E
Glutamine or glutamic acid	Glx	Z
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V



DNA is code to make lots of different proteins!



- **Why do Genes contain the code for making PROTEINS?**
- **Because you are made of proteins!**
- Your hormones/ enzymes/
muscles/bones/skin/ hair etc. all are proteins



Example – What does the DNA strip above code for? (use your DNA Chart)

• **TAC TGC CTA GTC GGC GTT CGC**

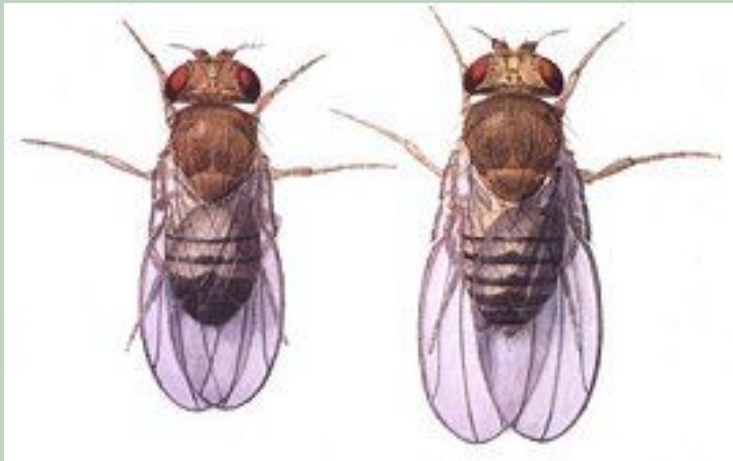
Codes for:

Tyr – Cys – Leu – Val – Gly – Arg

Thyrosine – Cysteine- Leucine – Valine –
Glycine- Arginine

Fun Fact

- Humans share between 40 -50% of their genes with fruit flies [http://www.nature.com/nature/journal/v4 ... 241.html](http://www.nature.com/nature/journal/v4...241.html)).



Fun Fact



8FACT

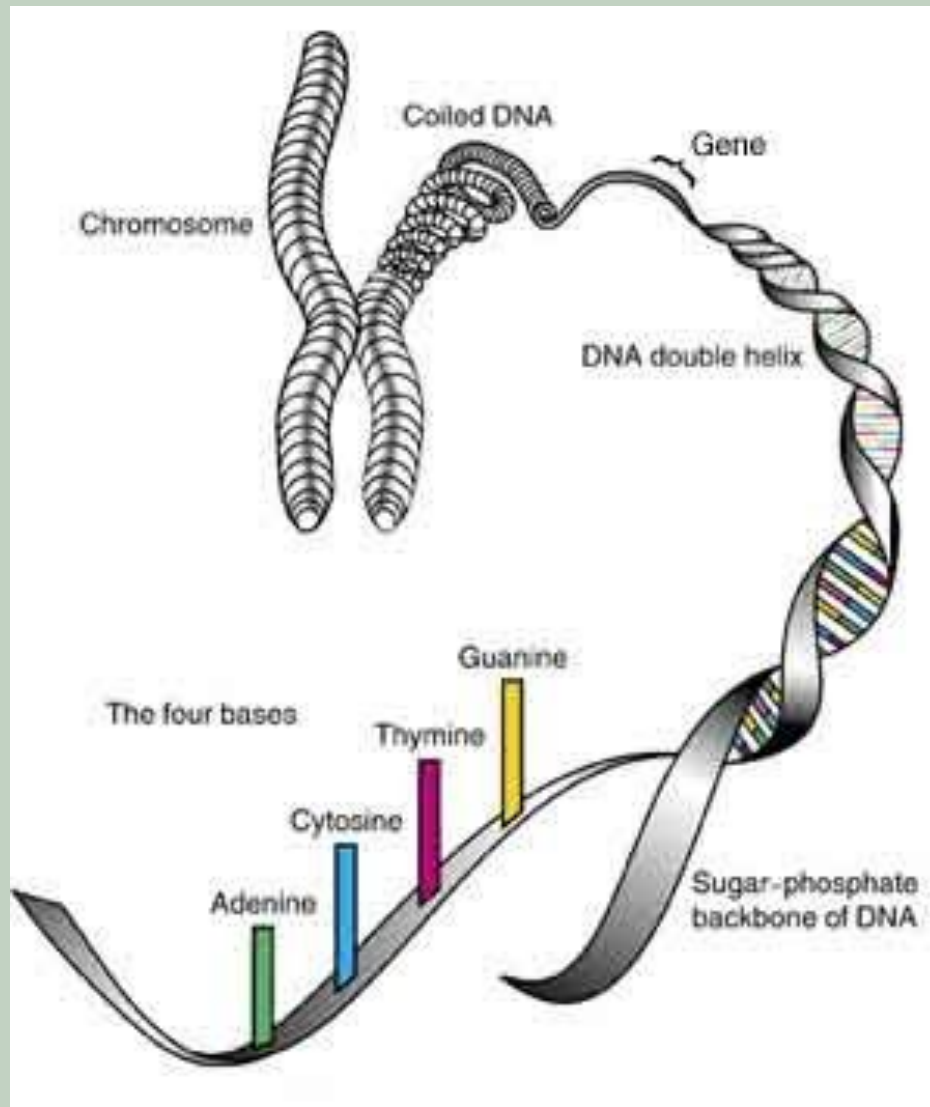
**If your DNA was
to be stretched out,
it would go from
the earth to the moon
and back 6,000 times.**

8FACT.COM

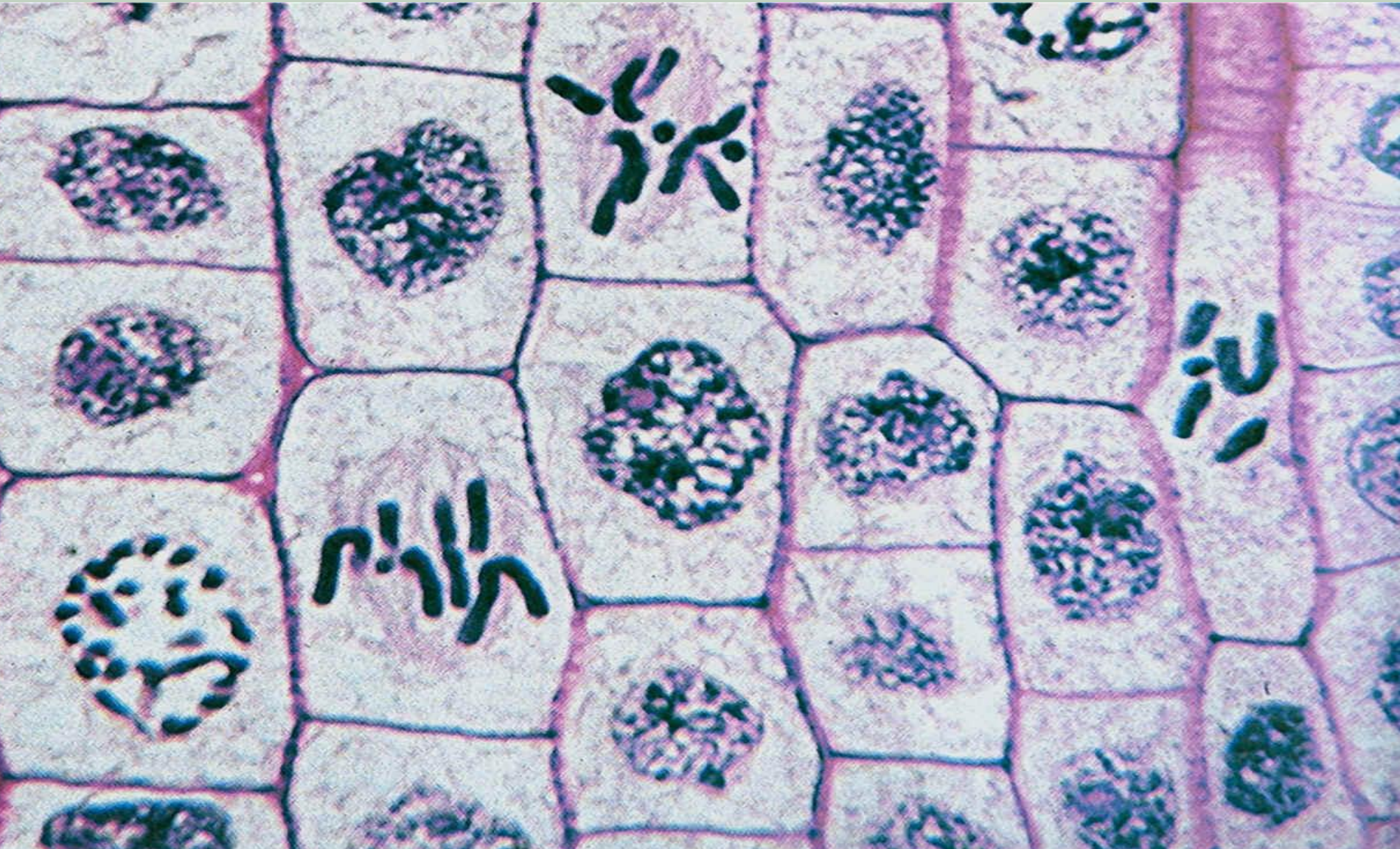
Now solve the mystery!

- Each group should send one person up to get their mystery DNA package.
- In this activity you are going to:
 - Build both sides of a ‘gene’
 - Figure out what amino acids the ‘gene’ codes for
 - Figure out the mystery word your strip of DNA codes for and put it on the board
 - Decode a DNA message

More details of DNA, Chromosomes and Genes



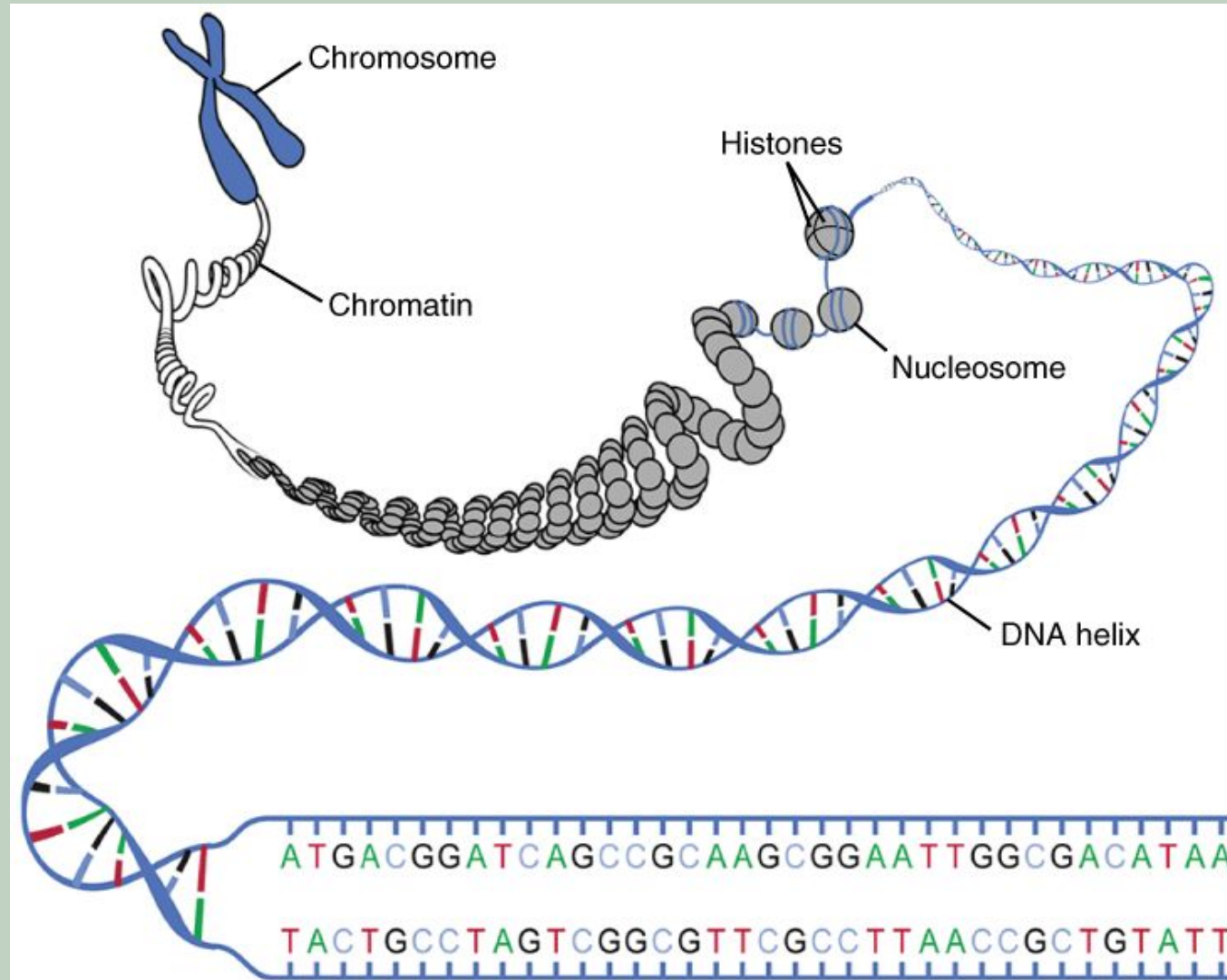
You find your chromosomes (which are made of DNA and proteins (histones)) in the nucleus of the cell.





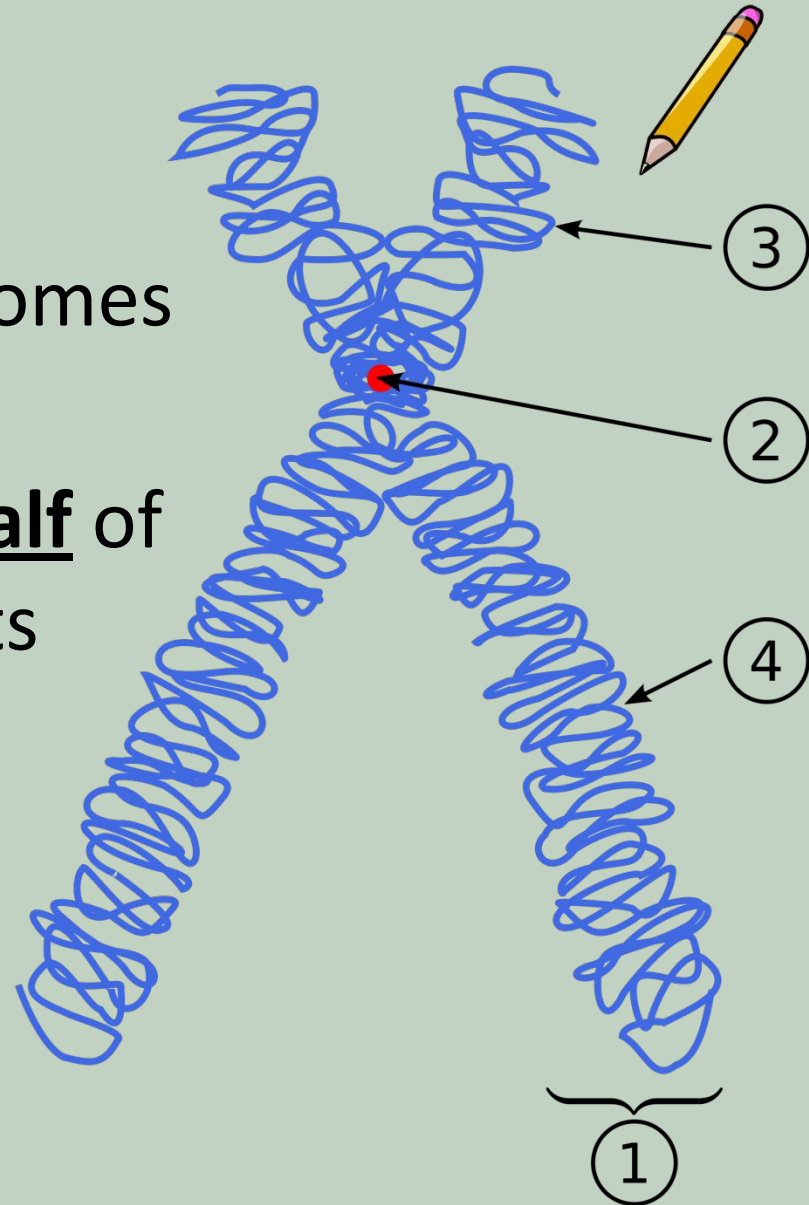
Up close look at a chromosome

A chromosome
is made up of
DNA
coiled-around
proteins
(histones.)
This reduces
tangling



Chromosomes

- Humans have 46 chromosomes in our body cells
- Each parent contributes half of his/her chromosomes to its offspring



What are genes?

- Genes are short segments of DNA which contain the instructions for a trait in an organism
- Each chromosome has on average nearly 1000 genes for a total of approximately 20,000 genes



DeoxyriboNucleic Acid

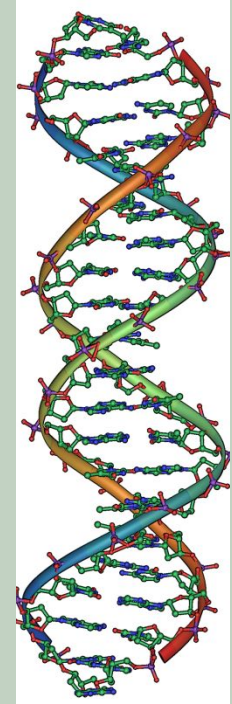
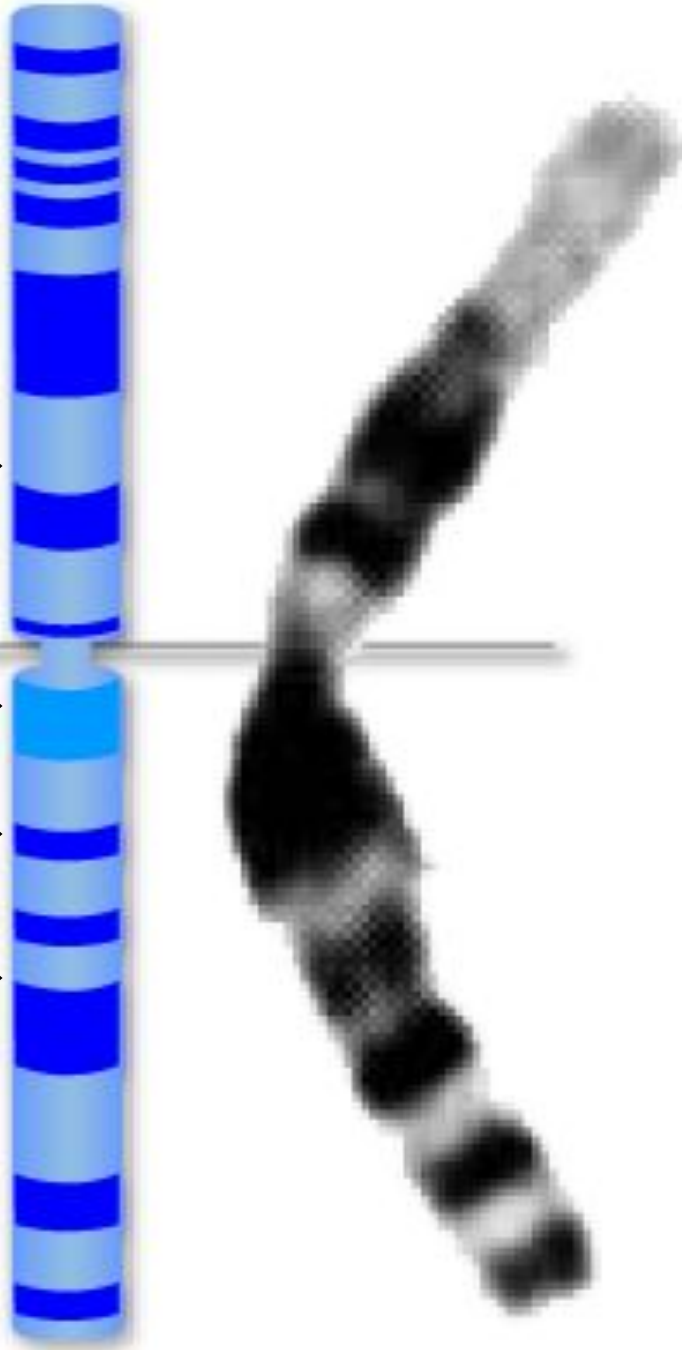
1 chromosome

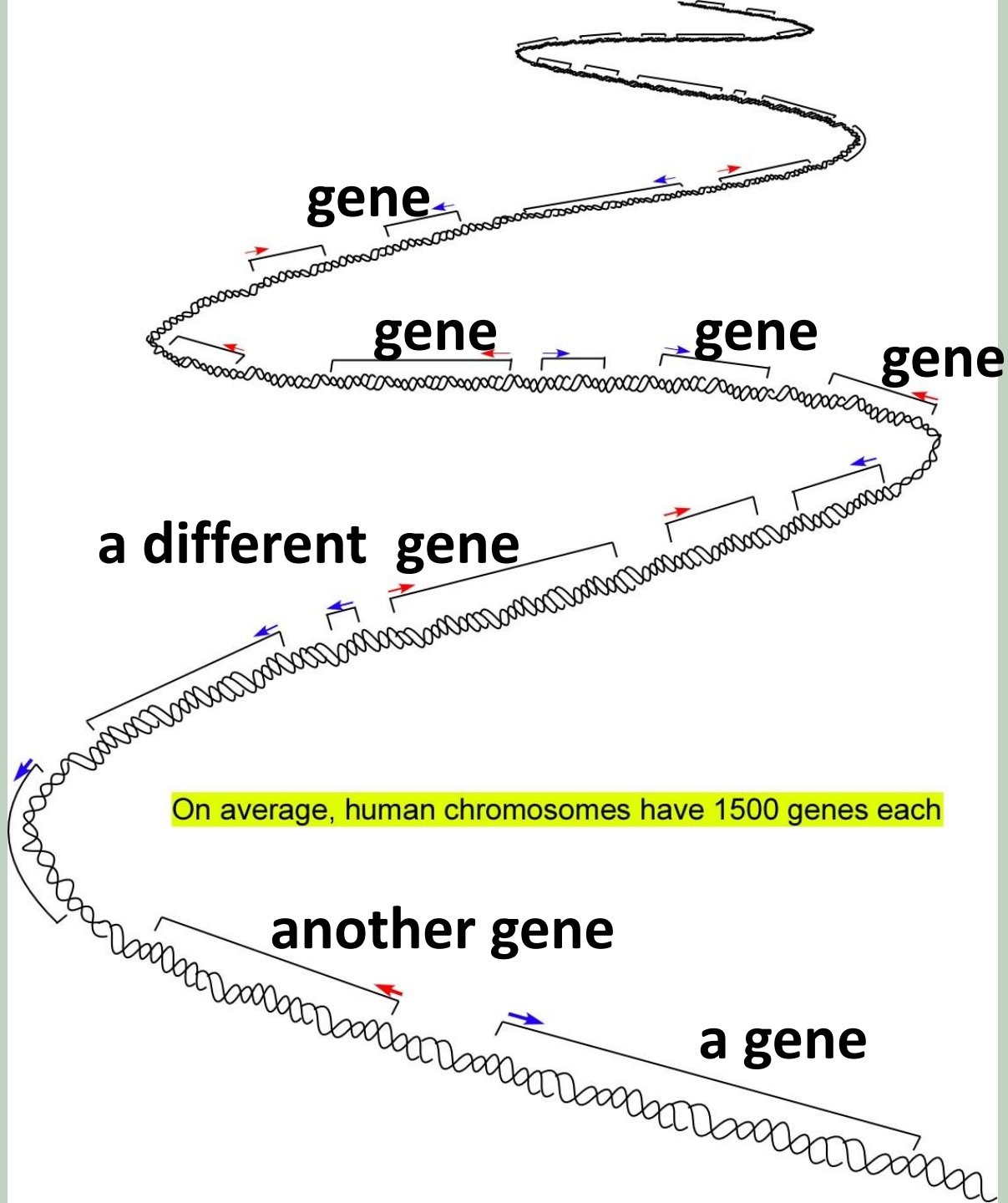
gene

gene

gene

gene





gene

gene

gene

gene

a different gene

another gene

a gene

On average, human chromosomes have 1500 genes each

FUN FACT

**In the next
60 seconds
your body
will produce
enough new
DNA that
if it was
linked
together,
it would
stretch
100,000 km**

