

Slide: DNA Double helix is a stable structure

Hydrogen bond

First: between nitrogen bases (two hydrogen bonds between adenine and thymine and 3 hydrogen bonds between guanine and cytosine)

Between deoxyribose sugar-phosphate with surrounding water

Slide: significance

De = منزوع

Amination = amino group

What is the difference between cytosine and uracil? cytosine has amino group but uracil has oxygen

Any uracil in our DNA comes from deamination of cytosine so do we have uracil in our DNA ? No

DNA contain hydrogen which is not reacted (hydrophobic)

RNA contain -OH which is highly reacted

Slide: heat and alkaline effect on nucleic acid

Melting temperature is the temperature that causes the denaturation (separation) of 50% of the DNA

The most important characteristic of hydrogen bond that is very easy to make and break

Slide: Grooves انحناءات / انبعاجات

Why there is minor and major grooves ?

Because the distance between two glycosidic bond are not equal

Why are you regulatory proteins bind to the DNA through major groove ?

Because major group has a wider space

DNA can differentiate between nitrogen bases but minor groove can't differentiate between n.b

Slide: types of the DNA

All there building blocks are nucleotides

All of them are Spiral

Slide: regulatory proteins

Transcription factors because they regulate transcription means making the mRNA

normally recognize five base pairs that are arranged palindromes sequence

Slide: the helix-turn-helix motif

Bind to the DNA and regulate its activity

Dimmers: two molecules they must connect with each other to be active so a single helix-turn-helix is not active

Slide: The leucine Zipper Motif

It's amino acid + hydrophobic

Alpha-helix make a complete turn every 3.6 amino acid and every 7 amino acid we will find a leucine

(In other words: every 2 rounds of alpha-helix we find leucine)

So at the end of leucine they will be arranged on one side LZ

Slide: Helix-loop-helix

Made up of long helix => loop (hundred of amino acid) => short helix

Slide: Mitochondrial DNA

No chemical difference between DNA in the nucleus and mtDNA

But mtDNA:

Circular

Not cover with histone protein

Doesn't have introns , it has exons

Slide: Why do we study mtDNA

-Because mitochondria contain DNA

There is many genetic diseases a combining with mtDNA

(some genetic diseases from mtDNA function)

- To know the origin of the people every region in the world has some specific sequence in the mitochondrial DNA