

DNA structure

The DNA

- Stores genetic information; double helical structure; easily damaged by radiation
- It's a complex with histones – which forms the chromatin.
- It is a long extended polymer with two groves – due to geometry of the base pairs
- They exist in multiple forms

There are three types of DNA

B – 10 base pairs per turn; the wider major; narrow minor

A – 11 base pairs per turn; deep narrow major; broad shallow minor; tRNA folds in this form

Z- left handed DNA; has a zigzag appearance

Unusual DNA structures

- The left handed ZDNA
- Tetraplex DNA – formed at telomeres; a four-stranded DNA structure adopted by sequences rich in guanine bases; There are 2 forms – the parallel and the antiparallel
- Holiday Junctions – occurs during meiosis when homologous series of chromosomes exchange genetic information; this is where 2 stranded double DNA becomes 4 stranded

DNA structure

Primary stage-sequence of bases

Secondary stage – helical structure

Tertiary stage- DNA supercoiling

Quaternary stage- interlocked chromosomes

Histones

These are alkali proteins found in all eukaryotes

DNA wraps around histone octameres to form a structure called nucleosomes

Nucleosomes compact together into chromatin fibres

DNA damage

DNA could be damaged by three different ways:

Spontaneous = the loss of bases

Chemicals = basic strands could change

Radiation = thymine dimers could be produced; breaks apart the DNA – could cause Leukaemia