

The purines

*** The purines (*A and G*) are the same.

In **DNA**, the **pyrimidine bases** are thymine (*T*) and cytosine (*C*). In **RNA**, the **pyrimidine bases** are uracil (*U*) and cytosine (*C*).

*** The phrase “**CUT down the pyramids**” may help you remember that cytosine, uracil, and thymine are all pyrimidines.

Remember: The backbone of the DNA molecule consists of the deoxyriboses linked by phosphodiester bridges (*i.e.*, the 3'-OH group of the sugar of one is linked to the 5'-OH of the next sugar by a phosphate). The variable part of the DNA is the sequence of the bases, and the precise sequence of the purine and pyrimidine bases carry the genetic information to express the characteristics of the organism.

After the formation of the DNA molecule, there is a polarity with the 5' OH group at one end of the helical structure and the 3' OH group at the other end. The base sequence is written in the 5' → 3' direction. A resulting spiral double helical structure results.



Notes

1. **Purine bases** that are consumed in the human diet in the form of DNA or RNA are mostly excreted in the form of uric acid. **Xanthine oxidase** catalyzes this formation of uric acid from purine bases.
2. The use of **tetrahydrofolic acid (TFA)** by several of the enzymes in purine and pyrimidine synthesis has made TFA metabolism a prime target for a number of **antimetabolites**, such as methotrexate, used in cancer chemotherapy.
3. **Ultraviolet light** produces pyrimidine dimers in DNA, which then interferes with replication and transcription. These lesions are removed via the action of an **endonuclease**, an enzyme that excises a 12 bp (*base pair*) fragment surrounding the dimer. Then **DNA polymerase I** fills in the gap, and **DNA ligase** seals the seams.