

23. Some X-linked disorders include: hemophilia, colour blindness, and muscular dystrophy.
24. Males only receive one X chromosome, and therefore all X-linked disorders are expressed in males, even if they are recessive.
25. Several chromosomal disorders can occur as a result of non-disjunction during meiosis. Cells end up with fewer or extra chromosomes.
26. In Down syndrome, a person receives an extra copy of chromosome number 21.
27. If a person receives only an X chromosome and no Y chromosome, they will develop Turner's syndrome.
28. A person with Klinefelter's syndrome is biologically male, but receives an extra X chromosome.
29. A Karyotype is a picture that provides an organized view of all the chromosomes in a cell.
30. Cells that contain both sets of homologous chromosomes are diploid.
31. The gametes of sexually reproducing organisms are considered to be haploid because they only have a single set of chromosomes.

DNA and Gene Expression

1. Griffith was a bacteriologist studying pneumonia. He discovered 2 types of colonies: rough and smooth.
2. He injected mice with the different types of bacteria and discovered that mice injected with the smooth colonies died.
3. Griffith concluded that the smooth colonies caused disease, and wondered if those bacteria contained a toxin.
4. He then tried heating the bacteria from the smooth colonies, then injecting the heat-killed bacteria into the mice. The mice lived!
5. Next, he mixed the heat-killed, disease causing bacteria with the harmless live bacteria. He found that the mice lived.
6. Griffith concluded that bacteria had transformed from the harmless into the deadly type.
7. Griffith's experiments were repeated by a group of scientists lead by Avery.
8. In Avery's experiments, organic compounds (Carbohydrates, lipids, proteins, RNA and DNA) were destroyed one by one. It was determined that in all cases, R-type bacteria were transformed into S-type unless DNA was destroyed.
9. In 1952, Hershey and Chase set out to prove that DNA was the transforming factor.
10. Hershey and Chase studied bacteriophage, viruses that infect bacteria.
11. In their experiment, colonies were grown with radioactive isotopes of Sulfur and Phosphorus.
12. They concluded that DNA was injected into the bacteria cells, but not protein.
13. DNA is made up of long chains of small molecules called nucleotides.
14. Chargaff discovered that the amount of A = T, and the amount of C = G.
15. Rosalind Franklin used X-ray diffraction to determine the pattern of crystallized DNA.
16. Watson and Crick finally determined the structure of DNA. They called it a double helix.
17. Eukaryotic chromosomes contain both DNA and protein, tightly packed together into a substance called chromatin.
18. In chromatin, DNA is coiled around histone proteins.
19. Together, the DNA and histones form a nucleosome.
20. During DNA replication, the two complementary strands of DNA must unwind from each other.
21. Each parental strand then serves as a template that determines the order of the bases along a new complementary strand.
22. The nucleotides are connected to form the sugar-phosphate backbone of the new strand.
23. DNA replication is done by a number of different enzymes.
24. One of the major enzymes involved is DNA polymerase, which is responsible for building the new strand, and proof-reading, the new copies to ensure there are no mistakes.
25. The two strands of a DNA molecule are anti-parallel; this means that the strands run in opposite directions.
26. Each gene is a sequence of DNA on a particular chromosome. Humans have about 25 000 protein-encoding genes.
27. In order to be able to "read" a DNA sequence, the cell must first create a mRNA copy of the gene.
28. There are three types of RNA: mRNA, rRNA and tRNA
29. The process of creating RNA is called transcription, and is controlled by RNA polymerase.