

Whereas the molecules with PTM may have one species forming the majority of the protein component, the other glycans and components may be just as important in determining the final activity of the product.

1.6 Protein expression variability

A clear understanding of how the recombinant DNA technique works is necessary for the understanding of factors that may contribute to protein structure variability, besides the inherent properties as described earlier. The genes are DNA portions carrying a message that ultimately leads to the production of proteins. They are present in the genomes of all living creatures and are sequences of nucleotides (A, T, G, and C). Each of these genes' sequence is specific for a protein (Figure 1.13).

Cells transcribe the genes (DNA) into mRNA, which in turn are translated into proteins. These steps are represented in the sequence shown in Figure 1.14.

The living entities expressing cytokines and monoclonal antibodies have modified gene encoding to include the human protein sequence of interest. As the genetic code is universal, it will be read the same way by all cellular systems of the animal, plant, or bacterial kingdom (even as the existence of dominant codons per cell system is known). This universality is the basis of the production of recombinant therapeutic proteins of the human sequence into heterologous host systems (bacteria, yeast, plant, mammalian cell, and transgenic animals) to make that host system produce a protein of given sequence.

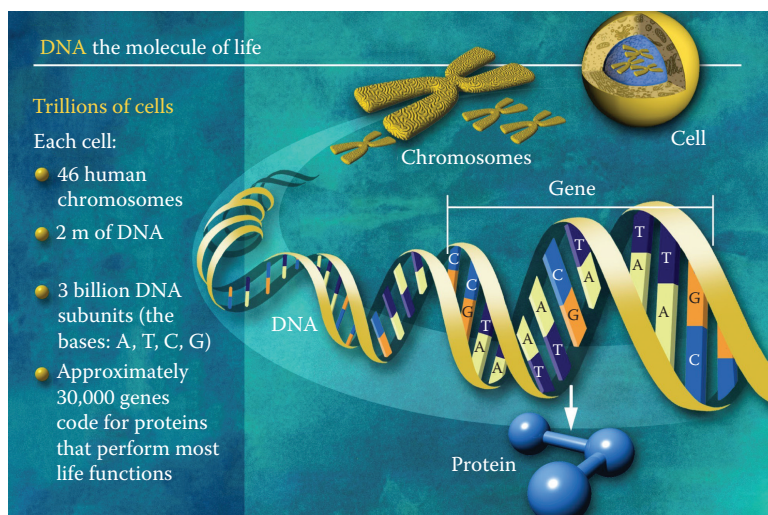


Figure 1.13 Structure of DNA. (From Office of Biological and Environmental Research of the U.S. Department of Energy Office of Science, <https://science.energy.gov/ber/>.)