

Animation Script for Transcription

The numbers on the text passages below correspond to numbered frames in the animation. Look for these numbers in the upper left corner of the animation window.

1. Cells need to make proteins to carry out their day-to-day activities, like processing nutrients and growing. The cell's DNA contains instructions for building these proteins, but reading those instructions directly from the DNA is cumbersome and could damage the DNA. The cell therefore copies information from its DNA into a temporary intermediate, called messenger RNA, or mRNA, a molecule made up of a long sequence of nucleotides. The cell's protein-producing machinery reads this intermediary molecule.
2. Only certain segments of DNA, called genes, contain information about proteins. These genes can be located on either strand. The cell creates mRNA copies of just these parts of the DNA. Sequences of nucleotides called promoter regions signal where the cell should begin copying...
3. ...and other sequences, called terminator regions, tell the cell where to stop copying.
4. RNA polymerase, an enzyme in the cell, is responsible for creating mRNA from the correct gene. RNA polymerase is similar to DNA polymerase, but it makes an RNA strand rather than a DNA strand. RNA polymerase attaches to the promoter region of a DNA helix.
5. It attracts nucleotides that complement those on the DNA strand containing the gene of interest. RNA polymerase copies one strand of DNA to create a lengthening piece of single-stranded mRNA. RNA polymerase creates the mRNA strand in what is called the 5' to 3' direction.
6. Instead of pairing adenosine with thymidine, however, RNA polymerase pairs adenosine with uridine, a nucleotide specific to RNA.
7. RNA polymerase continues transcribing the gene until it reaches a terminator region. All of the components separate, and RNA polymerase is free to find another gene in need of copying. The newly created mRNA is read by the cell's protein-producing machinery, which generates the proteins important to the cell's function. In the upcoming section on translation, you will find out how this protein-making process works.