

In eukaryotes, DNA transcription begins when general transcription factors bind to the promoter region of the gene. Those transcription factors facilitate the binding of the RNA polymerase enzyme to the start position of the gene. RNA polymerase needs to be activated by a type of transcription factor called activator. Some activators recognize and bind to the regulatory region of the DNA near the promoter region. Other activators bind to a distant region of the chromosome called the enhancer region. Activators bound to the enhancer region work with mediator molecules to initiate transcription. Another type of transcription factor, called repressor, inhibits the activation of transcription. Repressors can act in different ways. Some repressors bind to the binding site of activators and prevent activators from binding to DNA. Some interfere with the molecular interaction between the activators and the RNA polymerase. Some activators and repressors act by affecting chromatin structure. These repressors can alter the chromatin structure to make it coil up tightly. Coiled up genes are not available for transcription. Conversely, activators can uncoil coiled section of DNA and make genes in those regions available for transcription. The interactions of all these factors determine the actual rate of DNA transcription.