



## Basic Molecular Biology: Basic Science: Bacterial Transcription

The creation of RNA is made possible by a process called Transcription. Through Transcription, the information contained in a section of DNA is replicated in the form of a new piece of messenger RNA. Since RNA is a single-stranded molecule, only one of DNA's two strands serves as a template for transcription.

The DNA is read by RNA polymerase from the 3 prime end to the 5 prime end during transcription. The resulting RNA is created in the opposite direction, from the 5 prime end to the 3 prime end. This reversed directionality is because RNA polymerase can only add nucleotides to the 3 prime end of the growing messenger RNA chain.

The process of Transcription occurs in three main stages: Initiation, Elongation, and Termination. During the first stage, initiation, RNA polymerase binds to the DNA and finds its start sequence. A sigma protein which assists RNA polymerase in reading start signals from the DNA must be present for the initiation stage.

Next, the elongation stage begins. During this stage, the RNA polymerase reads the template DNA. Only one strand is read for the base sequence.

In the last stage, termination, uracil triphosphate (UTP) is added to the RNA. The polymerase halts and releases both the newly created RNA chain and the DNA template.

The final product of the Transcription process is a mature messenger RNA chain that will serve as a template for the manufacture of proteins during translation.

Link to video job aid: <https://reach.cdc.gov/jobaid/basic-molecular-biology-basic-science-bacterial-transcription>