

DNA Transcription

Transcription

Transcription is the process by which the genetic code on a molecule of DNA is converted into mRNA in the nucleus. For synthesis of mRNA, the two strands of DNA are separated at a given location. Only one of the strands, known as the **sense strand** (the other is the **antisense strand**), is then transcribed into the complementary mRNA. The transcription occurs according to Table 1 below.

Base on DNA	Base on RNA
A	U
G	C
T	A
C	G

Table 1 Complementary bases on DNA and RNA

The precise sequence of the four bases in DNA carries the instructions, or **code**, which makes amino acids combine in the correct order. Each amino acid is specified by a group of three consecutive bases, called a **codon**. As three bases are needed to code for one amino acid, the code is called a **triplet code**. In principle, the code can specify 4^3 (i.e. 64) amino acids. However, as only 20 amino acids are found in proteins, some amino acids can have more than one codon. For example, all four codons which begin with GG in the corresponding mRNA code for glycine. As a result the genetic code is said to be a **degenerate** code, but this probably reduces the risk of transcription errors. One codon (AUG) specifies methionine or the start of a polypeptide chain; three (UAA, UAG, UGA) specify the end of a chain.

First base	Second base				Third base
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	stop	stop	A
	leucine	serine	stop	tryptophan	G
C	leucine	proline	histidine	arginine	U
	leucine	proline	histidine	arginine	C
	leucine	proline	glutamine	arginine	A
	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
	isoleucine	threonine	asparagine	serine	C
	isoleucine	threonine	lysine	arginine	A
	methionine/ start	threonine	lysine	arginine	G
G	valine	alanine	aspartic acid	glycine	U
	valine	alanine	aspartic acid	glycine	C
	valine	alanine	glutamic acid	glycine	A
	valine	alanine	glutamic acid	glycine	G

Table 2 The Genetic Code

By convention, these are the sequences of bases found in mRNA, not the original DNA.