

through translation. Ribosomes are synthesized by the nucleus and are made up of rRNA. These ribosomes are attached to the RER or are free in the cell. The ribosomes contains a small subunit, which contains binding sites for mRNA and a large subunit which contains binding sites for tRNA. tRNA “translates” or matches a codon on the mRNA to a specific amino acid, which are free in the cytoplasm. Each amino acid has a tRNA attached to it and these tRNA have an anti-codon, which is three nucleotides. Each anti-codon unit is specific and is complementary to specific codons on mRNA. It will only pick up the amino acid complementary to its anti-codon sequence.

1. The region of DNA carrying the gene unwinds and unzips. The two DNA strands are separated. One of the DNA strands acts as the template and is used to make the mRNA.
2. mRNA leaves the nucleus through the nuclear pore.
3. mRNA attaches to a ribosome.
4. The first two tRNA and their accompanying amino acids fit into a ribosome’s tRNA binding site. The anti-codons on the tRNA bind to the complementary codon on the mRNA. Ribosome translates the message in mRNA into a sequence of amino acids joined together to form a polypeptide. As the ribosome moves along the mRNA, the polypeptide produced gets longer as more amino acids are joined together by peptide bonds.
5. Amino acids are continually attached until the STOP codon is reached. This is either UGA, UAA or UAG and these have no complementary anti-codon or amino acid. Upon encountering the STOP codon, the ribosome detaches and the polypeptide is released.

RNA is different from DNA as it uses a ribose sugar instead of a deoxyribose sugar and RNA replaces the Thymine base with Uracil. RNA is used in the replication of DNA.

<u>DNA</u>	<u>RNA</u>
Sugar unit is deoxyribose	Sugar unit is ribose
Contains Thymine	Contains Uracil
Double-stranded	Single-Stranded
Complementary bases ratio is 1:1	No fixed ratio between bases
Permanent molecule in the nucleus	Temporary and made only when needed and can move out of nucleus.

A sequence of polynucleotides with different bases makes up a gene. A gene makes up inheritance units and carries genetic information. DNA consists of many genes. Each gene is different based on the sequence of bases and each sequence contains a different message, known as the genetic code. In each gene, one chain makes up the template for DNA. Three base sequences code for one amino acid.

The nucleus in every cell in the body contains all the genes necessary to construct the human body. Genes can be switched on and off to control them and if they are on a cell of that type will be produced, and this is known as differentiation.