

## Concept 11.4

A Gene provides the information for making a specific protein.

### One Gene, One Polypeptide:

- An organism's *genotype* is a sequence of nucleotide bases in its DNA. The molecular basis of the *phenotype*.

**One gene - one polypeptide** : the function of an individual gene is to dictate the production of a specific polypeptide.

polypeptide - a chain of linked amino acids.

### Information Flow: DNA to RNA to Protein

The language of genes is written as a sequence of bases along the length of a DNA chain. If the bases are the language's letters, each gene is like a sentence. Specific strings of bases make up each gene "sentence" on one DNA strand.

RNA (ribonucleic acid)

- is any nucleic acid whose sugar is ribose rather than deoxyribose of DNA.
- contains uracil (U) instead of the thymine of DNA. Uracil pairs with Adenine
- RNA typically forms a single strand not a double helix.

Several RNA molecules play a part in the intermediate steps from gene to protein.

1. DNA's nucleotide sequence is converted to the single-stranded RNA. In the process called **transcription**.
  - The transcribed message leaves the nucleus and directs the making of proteins in the cytoplasm, while the DNA remains in the nucleus.
2. Translation converts nucleic acid information into amino acid language. The flow of information from gene to protein is based on codons.

- Codon is a three-base “word” that codes for one amino acid. Several codons form a “sentence that translates into a polypeptide.

## The Triplet Code:

- Notice that some amino acids are coded for by more than one codon, but no codon represents more than one amino acid.
- The three codons that do not code for amino acids are “stop Codons” that come at the end of each gene sequence.
- The same genetic coding system is shared by almost all organisms. Genes can be transcribed and translated after being transferred from one species to another, even when the species are as different as a human and a bacterium!