**Genes are expressed in a 2 step process:**

First, an RNA copy of a single gene is made (transcription).

Then, the nucleotide sequence of the RNA copy (messenger RNA) is translated into the amino acid sequence of the polypeptide.

**Main challenge of translation**

• The genetic information in mRNA cannot be recognized by amino acids.

• The genetic code has to be recognized by an adaptor molecular (translator),

and this adaptor has to accurately recruit the corresponding amino acid.

**The structure and function of four components of the translation**

**Machinery.???**

**functions of RNA**

tRNA are adaptors between codons and amino acids

tRNAs share a common secondary structure that resemble a cloverleaf which shows the base pairing of various regions to form four stems (arms) and three loops.

Aminoacyl tRNA synthetases :Amino acids should attach to tRNA first before adding to polypeptide chain.

**mRNA**

The protein-coding region of the mRNA consists of an ordered series of 3-nt-long units called codons that specify the order of amino acids.

1 Prokaryotic mRNAs have a ribosome binding site that recruits the translational machinery

2 Eukaryotic mRNA are modified at their 5’and 3’ends to facilitate translation.

**the ribosome is composed of a large and a small subunit**

• The large subunit contains the peptidyltransferase center, which is responsible for the formation of peptide bonds.

• The small subunit interacting with mRNA contains the decoding center,in which charged tRNAs read or “decode”the codon units of the mRNA.

**Translation initiation, elongation and termination???**

Translation initiation factors hold eukaryotic mRNAs in circles

**How do prokaryotes and eukaryotes find the translation start sites ?**

Eukaryotic mRNA uses a methylated cap to recruitthe ribosome. Once bound, the ribosome scans themRNA in a 5’-3’direction to find the AUG start codon.

**Prokaryotes???**