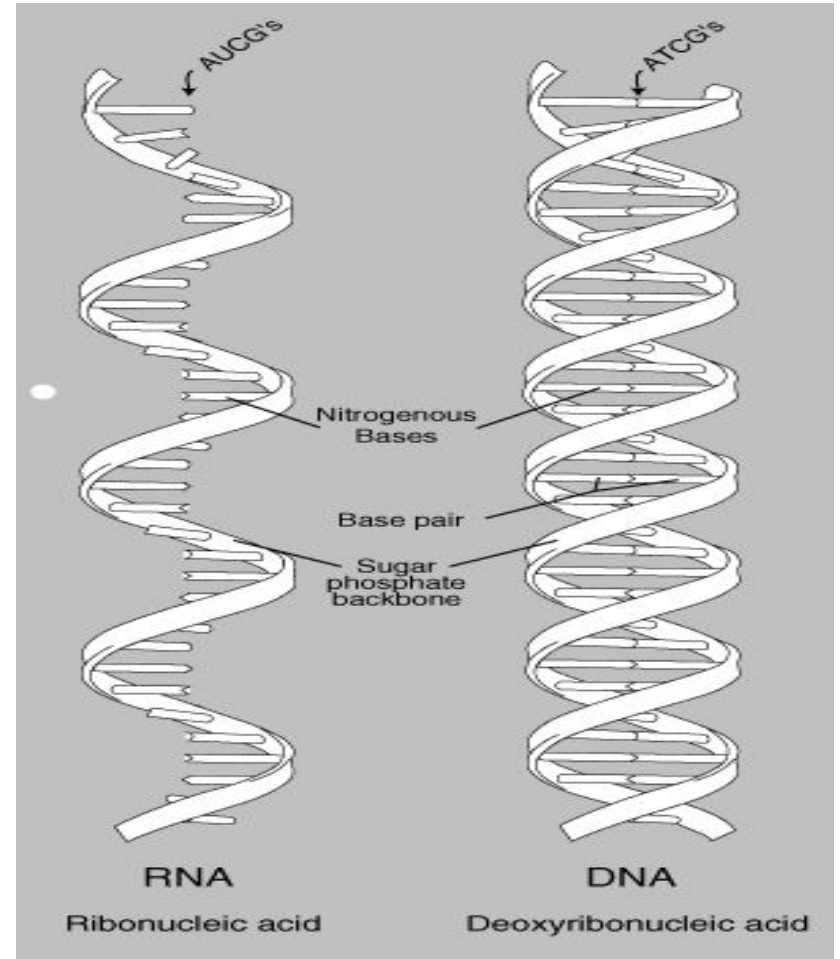


RNA: Transcription and Translation

RNA

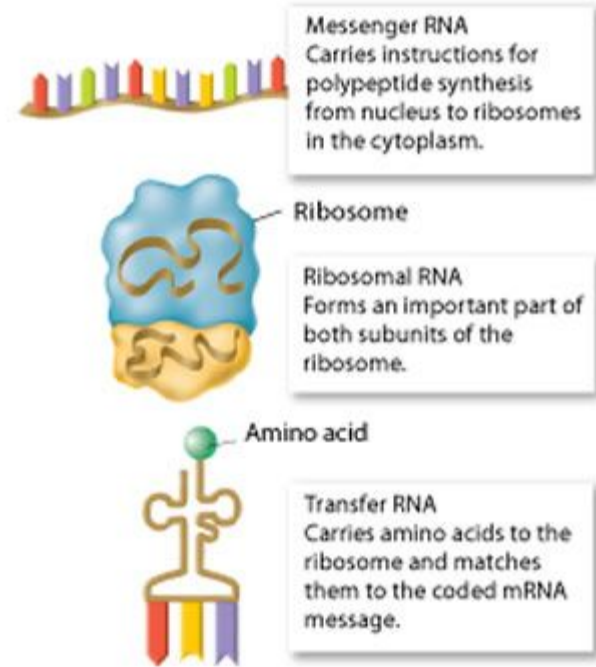
- **RNA**: ribonucleic acid
 - Carries out *protein synthesis*
- Differences from DNA:
 - different sugar (*ribose*)
 - single strand
 - different base
 - no *thymine*
 - **URACIL** instead



Which organelle produces
proteins?

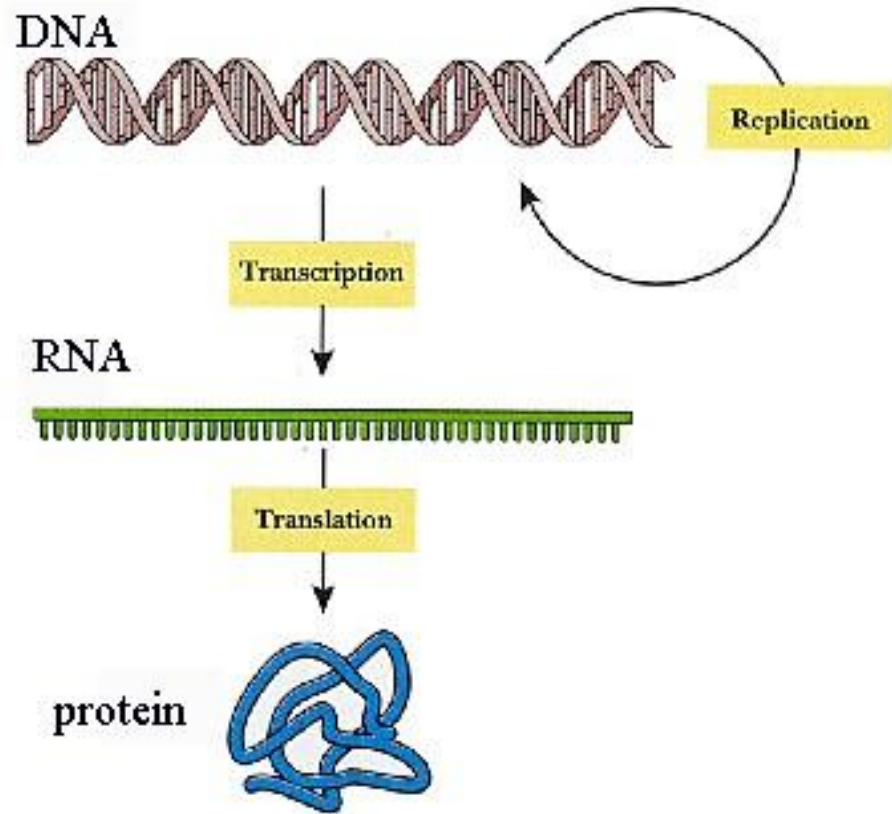
Different Types of RNA

- **Messenger RNA**: (*mRNA*) carries nucleotide sequence from nucleus to ribosome
- **Transfer RNA**: (*tRNA*) picks up amino acid in cytoplasm and carries them to ribosome
- **Ribosomal RNA**: (*rRNA*) found in ribosome, joins mRNA and tRNA; forms protein



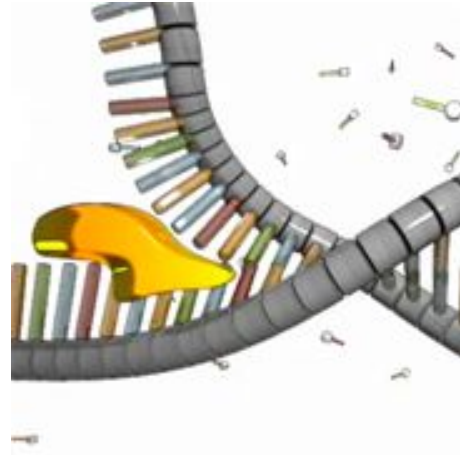
Transcription

- Transcription-
process that makes
mRNA from DNA



Transcription: Step 1

1. DNA *unzips (deshacer)* into **2** separate strands
 - **DNA Helicase** is the **enzyme** that breaks hydrogen-bond



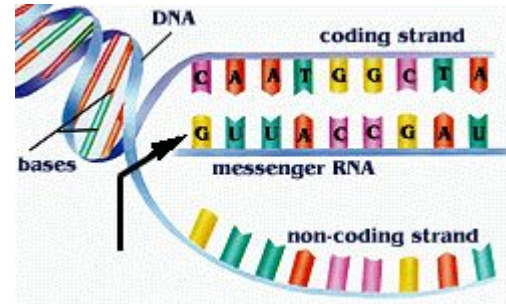
Transcription: Step 2

Free-floating **mRNA** NITROGEN BASES in the nucleus attach to unzipped DNA

Base Pairing:

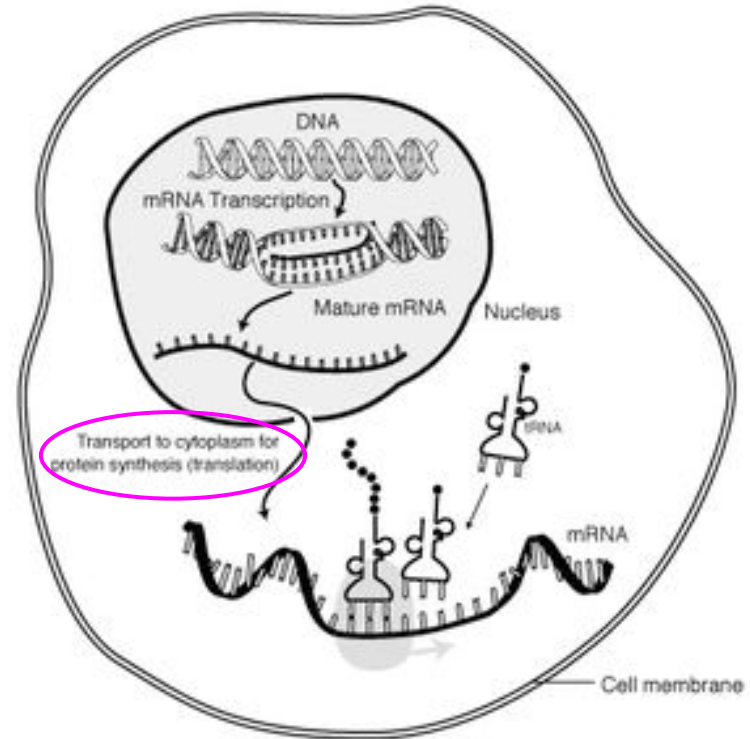
- A. Cytosine(C) pairs with Guanine(G)
- B. **Uracil***** (U) pairs with Adenine(A)
- C. Thymine (T) pairs with Adenine (A)

*****remember (T) is only with DNA**



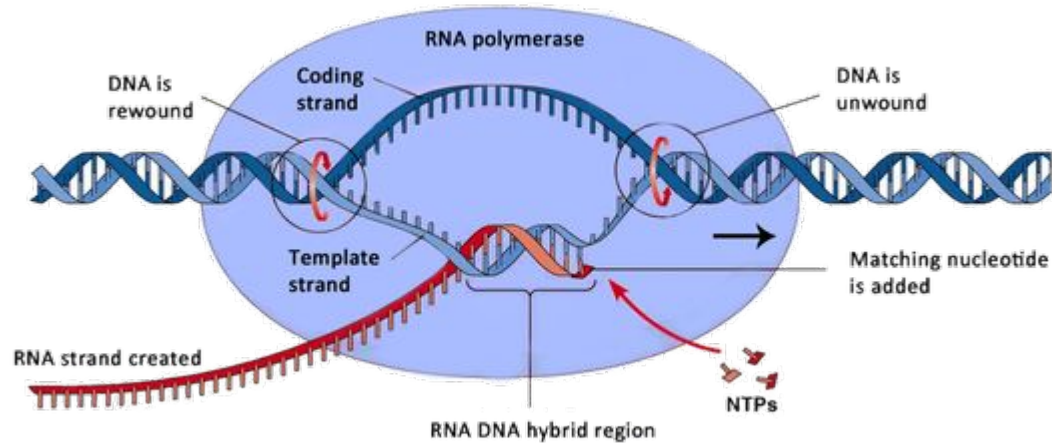
Transcription: Step 3

mRNA travels to ribosome.



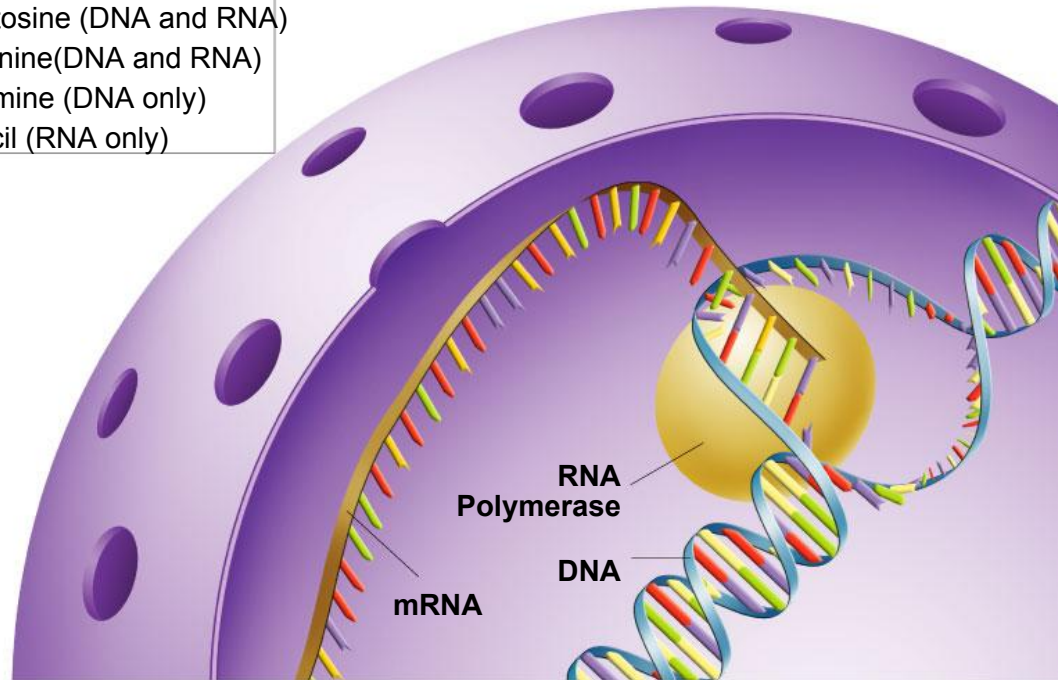
Transcription: Step 4

DNA zips up again.



Transcription

Green	Adenine (DNA and RNA)
Purple	Cytosine (DNA and RNA)
Red	Guanine (DNA and RNA)
Yellow	Thymine (DNA only)
Orange	Uracil (RNA only)



Transcription

Transcription of DNA Inside the Nucleus

- 1. DNA unzips.**
- 2. mRNA bases attach.**
- 3. mRNA goes to ribosome.**
- 4. DNA zips up again.**

Results of Transcription

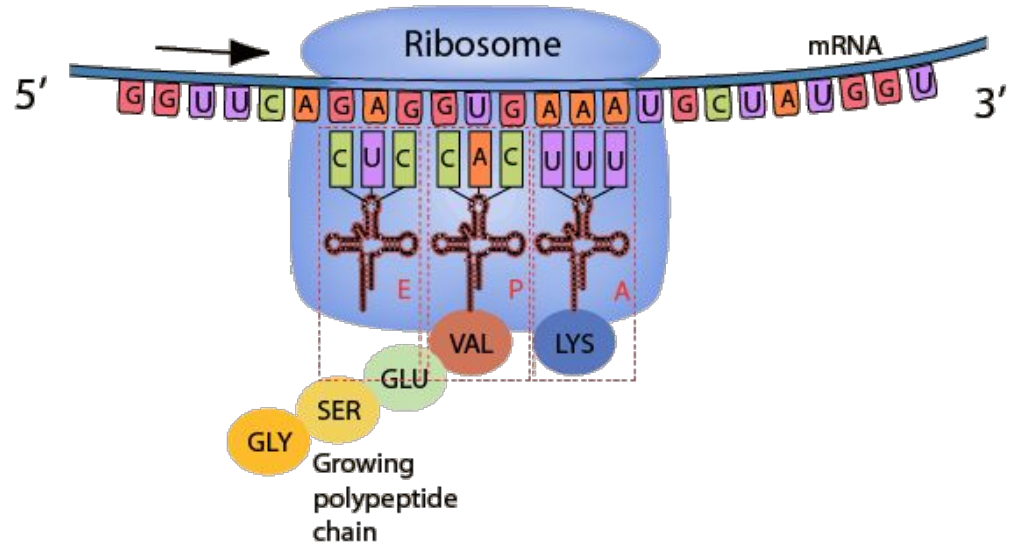
After all the pairing is done:

- a *single strand* of RNA has been produced.
- Genetic code from DNA has been *transferred* to *mRNA*
- The code obtained from *DNA* lets the *mRNA* know which amino acids to pick up:
 - code is a set of *3 nitrogen bases* = Codon

Translation

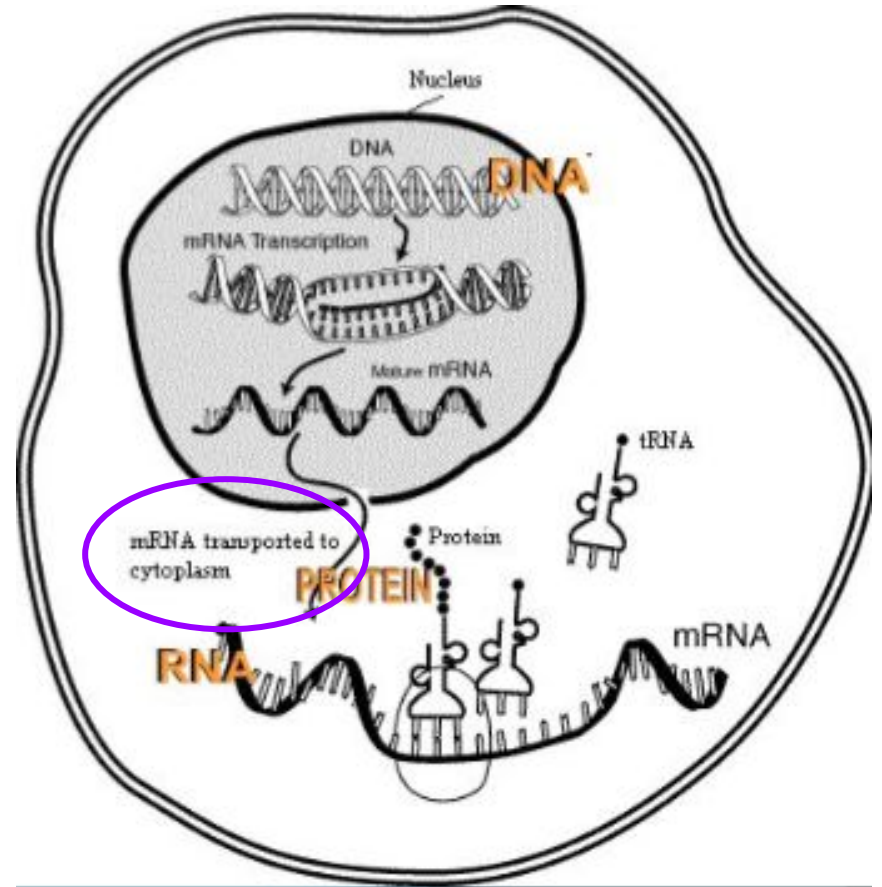
- 1) The *mRNA* leaves the nucleus and enters the cytoplasm
- 2) **Ribosomes** attach to mRNA
- 3) *tRNA* (carrying *anti-codon*) picks up the correct amino acids and carries them to the *mRNA* strand
- 4) The *protein* is formed

Ex: tRNA carries GAU (anti-codon) & looks for CUA on mRNA



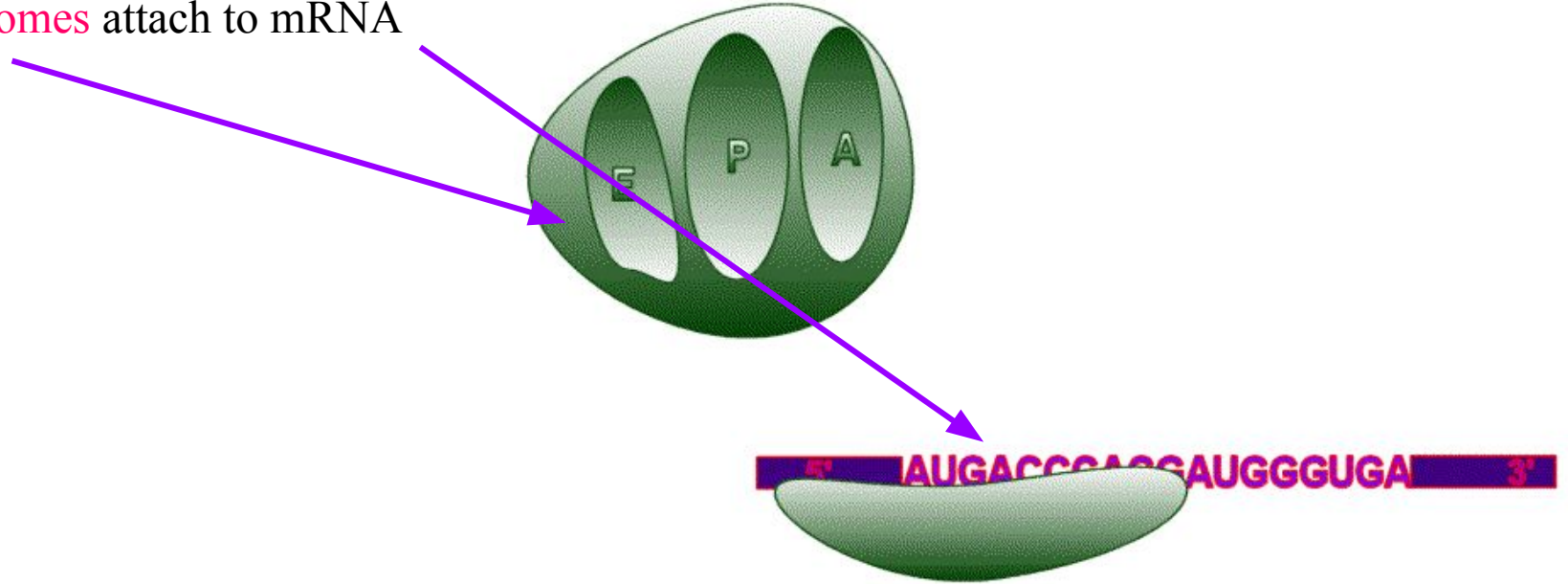
Translation: Step 1

The *mRNA* leaves the nucleus and enters the cytoplasm



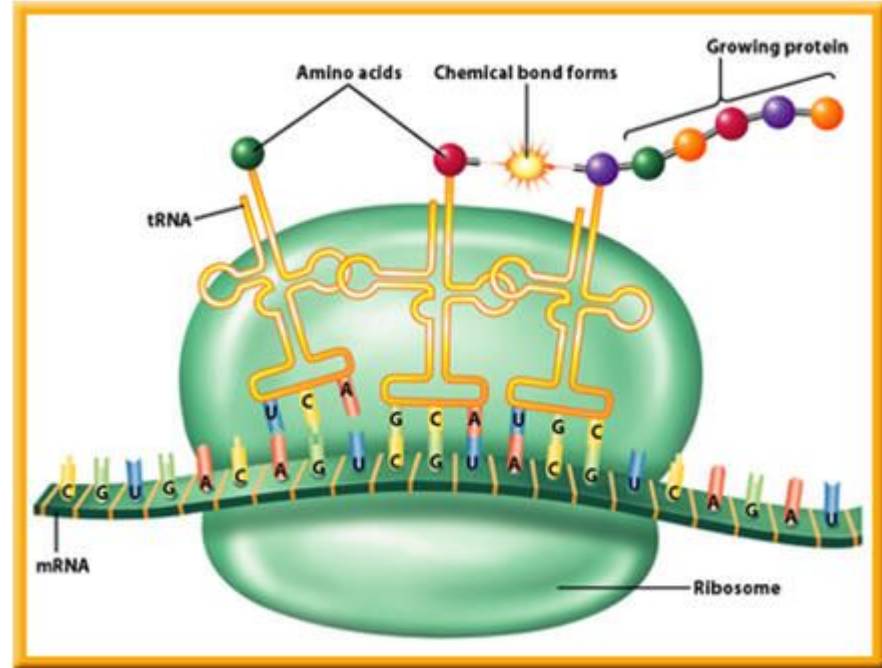
Translation: Step 2

Ribosomes attach to mRNA



Translation: Step 3

- One end of *tRNA* binds to the mRNA codon.
 - *tRNA* has an **anti-codon**, which binds with the CODON of mRNA
- The other end of *tRNA* is carrying **amino acids** (this match the **anti-codon**)



Translation: Step 4

The amino acid chain is connected (linked) by peptide bonds to form a polypeptide chain

This polypeptide chain forms the protein

