

## Translation and codons

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### Letter to Editor

In molecular biology, Central Dogma is defined as the process by which the instructions of the DNA are converted into a functional product, primarily proteins. Francis Crick first proposed it in 1958. In this sequential process, the translation is the final stage, where genetic code contained within a messenger RNA (mRNA) molecule is decoded to produce a specific sequence of amino acids in a polypeptide chain.<sup>1</sup> It is a complex three-stage process requiring a set of different factors in each stage: initiation, elongation, and termination. Mainly the execution of this occurs in the cytoplasm. Albeit some variations of this process in eukaryotic and prokaryotic, the essential features and results remain the same.

When DNA is transcribed to RNA, its complementary nucleic acid is paired with it. DNA codes A, G, T, and C are transferred to RNA codes U, C, A, and G, respectively. The encoding of proteins is done in groups of three, known as codons. These codons represent the sense DNA strand and are arranged in a 5'-to-3' direction in a linear sequence of genes, which is then transcribed to RNA from the antisense strand of DNA. The standard codon table of RNA is shown below, along with the 20 respective amino acids. As seen in Table 1, the amino acids can be specified by different codons.

**Table 1** Table of codon translation.

		Second Letter					
		U	C	A	G		
1st letter	U	UUU   Phe UUC   UUA   Leu UUG	UCU   UCC   Ser UCA   UCG	UAU   Tyr UAC   UAA Stop UAG Stop	UGU   Cys UGC   UGA Stop UGG Trp	U C A G	
	C	CUU   CUC   Leu CUA   CUG	CCU   CCC   Pro CCA   CCG	CAU   His CAC   CAA   Gln CAG	CGU   CGC   Arg CGA   CGG	U C A G	
	A	AUU   AUC   Ile AUA   AUG Met	ACU   ACC   Thr ACA   ACG	AAU   Asn AAC   AAA   Lys AAG	AGU   Ser AGC   AGA   Arg AGG	U C A G	
	G	GUU   Val GUC   GUA   GUG	GCU   Ala GCC   GCA   GCG	GAU   Asp GAC   GAA   Glu GAG	GGU   GGC   Gly GGA   GGG	U C A G	
						3rd letter	

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In the translation, each codon specifies specific amino acid; therefore, the word "codon" is described as "a specific sequence of three consecutive nucleotides which is part of the genetic code on RNA molecule, and that specifies a particular amino acid sequence in protein synthesis." This term is accurate for the start codon (AUG), which always codes methionine or f-methionine in eukaryotic and prokaryotic, respectively.

Similarly, all the other codon that follows on the mRNA strand gives a specific amino acid sequence. However, toward the termination stage of this process, one of the three different “codons” UAA, UAG, and UGA, will terminate the translation process without adding any amino acid. In DNA, these stop “codons” are TAA, TAG, and TGA, respectively. The historical basis for ordaining the stop codons as amber, ochre and opal was initially described by Brenner S and Bob E.<sup>2,3</sup> Therefore, when it comes to a stop “codon”, this term nullifies its definition “codon specifies amino acid”.

Consequently, I strongly suggest that a stop codon should be referred to as a stop “signal” as it does not specify any amino acid. It is just a signal for the translation to stop. Henceforth appropriate terms are “start codon” and “stop signal.”

#### **Conflict of interest**

The author declares that there is no conflict of interest regarding the publication of this paper.

#### **References**

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