

Transcription/Translation VENN

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2020 CED LEARNING OBJECTIVE

IST-1.N Describe the mechanisms by which genetic information flows from DNA to RNA to protein.

ESSENTIAL KNOWLEDGE

IST-1.N.1 The sequence of the RNA bases, together with the structure of the RNA molecule, determines RNA function—

a. mRNA molecules carry information from DNA to the ribosome.

b. Distinct tRNA molecules bind specific amino acids and have anti-codon sequences that base pair with the mRNA. tRNA is recruited to the ribosome during translation to generate the primary peptide sequence based on the mRNA sequence.

c. rRNA molecules are functional building blocks of ribosomes.

IST-1.N.2 Genetic information flows from a sequence of nucleotides in DNA to a sequence of bases in an mRNA molecule to a sequence of amino acids in a protein.

IST-1.N.3 RNA polymerases use a single template strand of DNA to direct the inclusion of bases in the newly formed RNA molecule. This process is known as transcription.

IST-1.N.5 The enzyme RNA polymerase synthesizes mRNA molecules in the 5' to 3' direction by reading the template DNA strand in the 3' to 5' direction.

IST-1.N.6 In eukaryotic cells the mRNA transcript undergoes a series of enzyme-regulated modifications—this is known as alternative splicing.

IST-1.O.1 Translation of the mRNA to generate a polypeptide occurs on ribosomes that are present in the cytoplasm of both prokaryotic and eukaryotic cells and on the rough endoplasmic reticulum of eukaryotic cells.

IST-1.O.2 In prokaryotic organisms, translation of the mRNA molecule occurs while it is being transcribed.

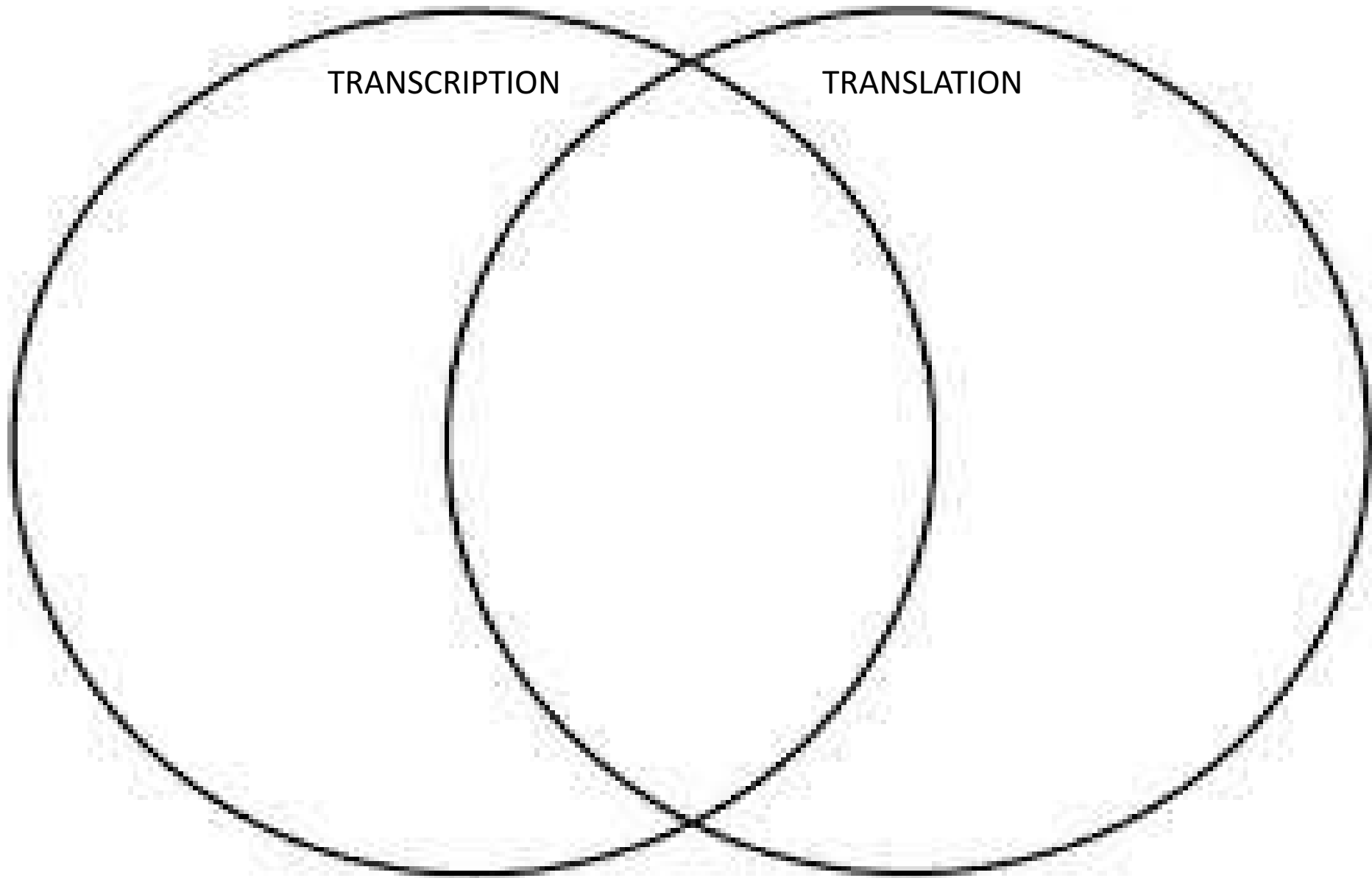
IST-1.O.3 Translation involves energy and many sequential steps, including initiation, elongation, and termination.

IST-1.O.4 The salient features of translation include— a. Translation is initiated when the rRNA in the ribosome interacts with the mRNA at the start codon. b. The sequence of nucleotides on the mRNA is read in triplets called codons.

c. Each codon encodes a specific amino acid, which can be deduced by using a genetic code chart. Many amino acids are encoded by more than one codon. d. Nearly all living organisms use the same genetic code, which is evidence for the common ancestry of all living organisms. e. tRNA brings the correct amino acid to the correct place specified by the codon on the mRNA. f. The amino acid is transferred to the growing polypeptide chain. g. The process continues along the mRNA until a stop codon is reached. h. The process terminates by release of the newly synthesized polypeptide/protein.

SP 2.C Explain how biological concepts or processes represented visually relate to larger biological principles, concepts, processes, or theories.

MAKE A MINI VENN



TRANSCRIPTION/TRANSLATION VENN

What happens?

Where does it happen in prokaryotes/eukaryotes?

When do these happen in relation to each other?

What subunits are used?

What joins the subunits?

Other molecules involved?

What "language" is used?

Purpose?

Products?

What happens next?

Connection to Central Dogma ?