

CHAPTER 18	Thought Lab 18.2: Transcription in Reverse	BLM 18.2.6
HANDOUT		

Purpose: Work backward from a polypeptide chain to construct a stretch of DNA that might code for it.

Key enzymes in DNA replication

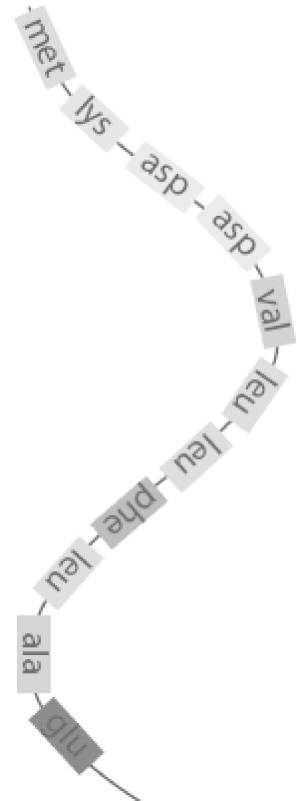
Enzyme group	Function
helicase	cleaves and unwinds short sections of DNA ahead of the replication fork
primase	synthesizes an RNA primer to begin the elongation process
DNA polymerase	adds new nucleotides to the 3' OH group of an existing nucleotide strand; dismantles the RNA primer; proofreads base pairing
DNA ligase	splices together Okazaki fragments in the lagging strand

Amino acid abbreviations

Amino acid	Three-letter abbreviation	Amino acid	Three-letter abbreviation
alanine	ala	leucine	leu
arginine	arg	lysine	lys
asparagine	asn	methionine	met
aspartate	asp	phenylalanine	phe
cysteine	cys	proline	pro
glutamate	glu	serine	ser
glutamine	gln	threonine	thr
glycine	gly	tryptophan	trp
histidine	his	tyrosine	tyr
isoleucine	ile	valine	val

Procedure

- The illustration shows an imaginary polypeptide produced by a bacterial cell. Using the tables above, draw one possible nucleotide sequence for the DNA molecule that contains the gene for this polypeptide.



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2. Draw a labelled diagram to show the mRNA molecule being transcribed from the DNA strand.

Analysis

1. Compare DNA molecules with your class. How many different sequences could code for the same polypeptide product? What advantage might this give a living cell?
2. The processes of transcription and translation consume a great deal of cellular energy. Why do you think the cell does not simply translate proteins directly from DNA? Brainstorm some ideas, and discuss your ideas with your classmates.