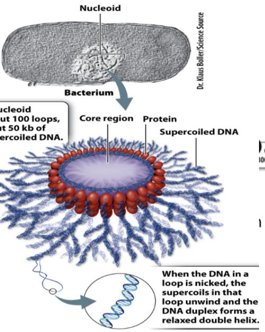
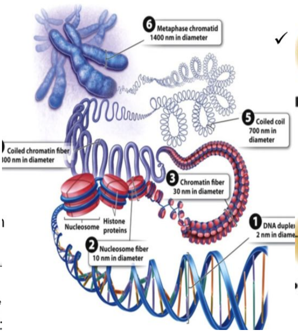
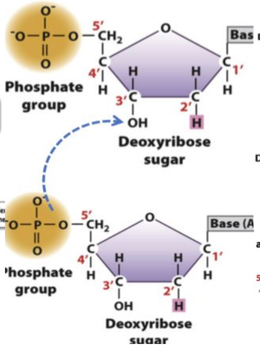
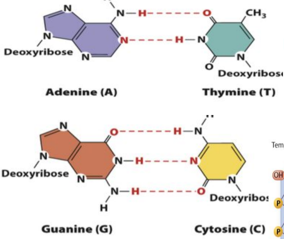
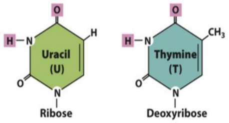


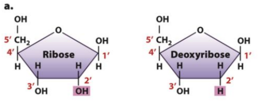


✓

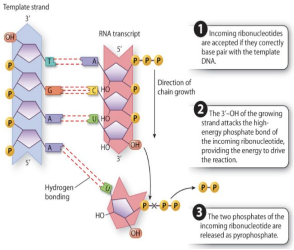




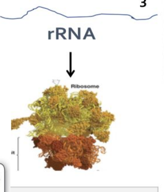




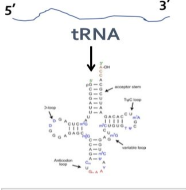
Ribose has a hydroxyl (–OH) group where deoxyribose has a hydrogen (–H).



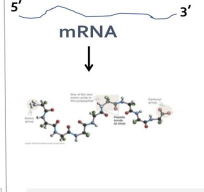
1. Incoming ribonucleotides are accepted if they correctly base pair with the template DNA.
2. The 3′–OH of the growing strand attacks the high-energy phosphate bond of the incoming ribonucleotide, providing the energy to drive the reaction.
3. The two phosphates of the incoming ribonucleotide are released as pyrophosphate.



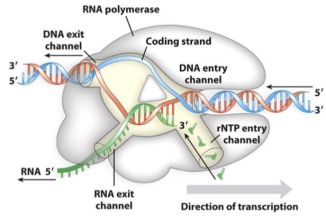
Not translated!
s-RNA assembled with
ibosomal proteins.

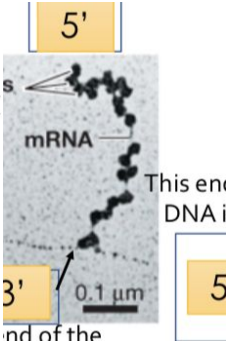


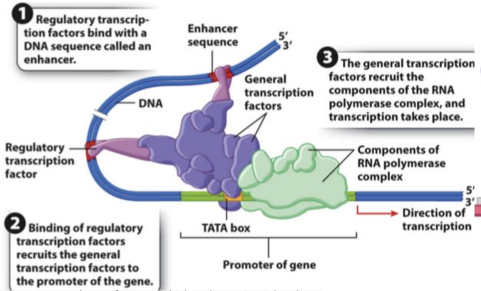
- ✓ Not translated!
- ✓ Exhibit ds feature within a single molecule.

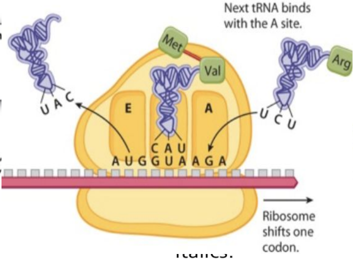


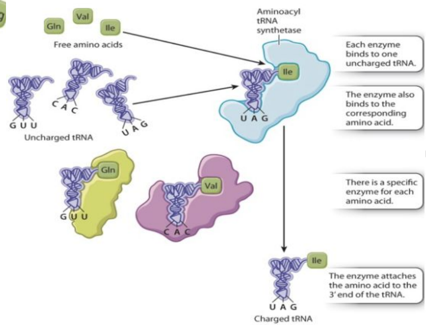
- ✓ Translated into a proteins during translation (protein synthesis)





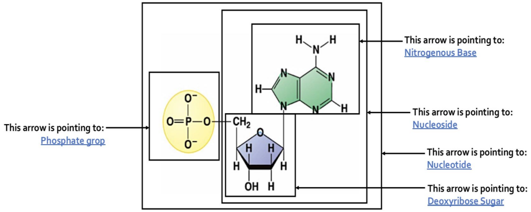




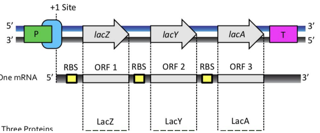


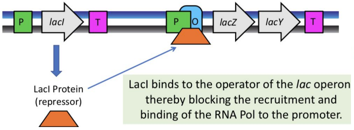
The wobble effect means that if the first two bases of a codon and anti-codon match, the third one can be "fudged".

DNA Monomer = Nucleotide

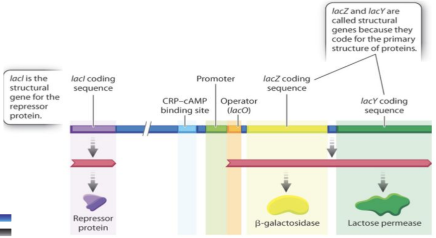


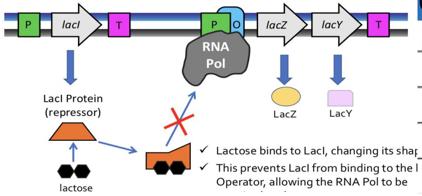
Operons are a cluster of genes (multiple coding regions) that share a common promoter and termination sequence. One mRNA is produced yet multiple proteins are translated.



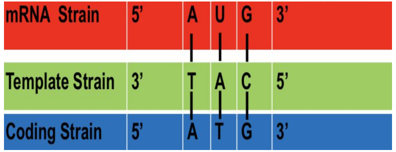


LacI binds to the operator of the *lac* operon thereby blocking the recruitment and binding of the RNA Pol to the promoter.

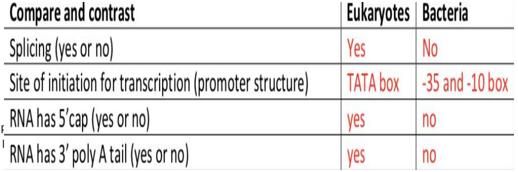




- ✓ Lactose binds to LacI, changing its shap
- ✓ This prevents LacI from binding to the
Operator, allowing the RNA Pol to be



mRNA Strain	5’	A	U	G	3’
Template Strain	3’	T	A	C	5’
Coding Strain	5’	A	T	G	3’



Compare and contrast	Eukaryotes	Bacteria
Splicing (yes or no)	Yes	No
Site of initiation for transcription (promoter structure)	TATA box	-35 and -10 box
RNA has 5’cap (yes or no)	yes	no
RNA has 3’ poly A tail (yes or no)	yes	no

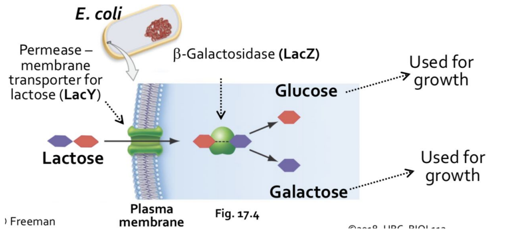


Fig. 17.4

) Freeman

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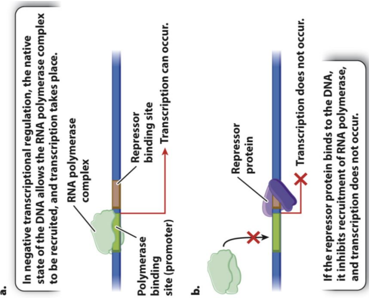
Compare/contrast...	Eukaryotes	Bacteria
Chromosome structure	Contains histones (nucleosomes)	Does not contain histones
Site of transcription	Nucleus	Cytoplasm
What is the promoter structure?	TATA box, 30 bp upstream	-35 box and -10 box
What are the proteins involved contacting the promoter?	General/basal transcription factors	Sigma
Is splicing (removal of introns) required?	Yes	No
Capping and tailing of mRNA?	Yes	No
Site of translation	Cytoplasm	Cytoplasm
Can translation occur while transcription is still occurring?	No	Yes

T or F?	Statement
T	a. The direction of transcription for both gene 1 and gene 2 is 3' –> 5' on the template strand.
T	b. The template strand for gene 2 is represented by the bottom strand.
F	c. The +1 site (start of transcription) for gene 2 is downstream of its "T" (terminator).
T	d. For gene 2, the top strand sequence is identical to its mRNA except T's will be U's.
F	e. If the two genes above (gene 1, gene 2) were being transcribed simultaneously, the RNA polymerases would be moving towards each other (convergent).
F	f. The coding strand for gene 1 is the top strand (5' –> 3')
T	g. When considering the direction of transcription for gene 1, the promoter for gene 2 (P2) is upstream from the promoter (P1) for gene 1.
F	h. The top strand will always be the coding strand for all genes in this bacterium.
T	*i.* The -10 box of the promoter sequence for gene 1 will be located closer to the 3' end of the bottom strand than its 5' end.
T	j. The +1 site for gene 2 can be found upstream of T2 considering direction of transcription for gene 2.
F	k. Both genes would share a ribosomal binding site.
T	l. The template strand for gene 1 is represented by the top strand.
T	m. For both genes 1 and 2, movement of RNA polymerase depends on the orientation of two different consensus sequences (-35 box and -10 box) on the promoter.

T or F	Statement
T	The template strand for this operon is the bottom strand.
F	Each protein coding region within the operon will have its own +1 site.
T	Each protein coding region within the operon will have its own start codon.
F	The terminator sequence will stop translation for all 4 proteins.
F	One ribosomal binding site is shared by all 4 protein coding regions.
F	Four different RNA polymerases are required to transcribe the operon.
F	Translation of the proteins further downstream (e.g. proteins 3 and 4) depends on the successful translation of the upstream proteins 1 and 2.
T	All four proteins can be translated simultaneously as each have their own ribosomal binding site.



Gene structure	Bacterial Gene? √	Eukaryotic Gene? √	Description and Function
Promoter	√	√	Binds the RNA Polymerase
Introns		√	Sequence that are cut out in RNA processing/splicing
Stop codon			Does not function in transcription, only TRANSLATION! Codes for the end of protein synthesis.
5' CAP		√	Added to mRNA once the 5' end is synthesized .
TATA box		√	sequence on Euk promoter, TBP/general transcription factors bind here
-10 and -35 box	√		sequence on Bac promoter, sigma binds here
Template strand	√	√	DNA strand that Codes for the mRNA
Transcription start site	√ (+1 site)	√	First base that is transcribed into mRNA Bac = ~10 bases from -10 box Euk = ~25 bases from TATA box
Terminator	√ (hairpin)	√	Terminates transcription – Bac = hairpin loop, Euk – multiple repeat sequences
+1 site	√	√	First base that is transcribed into mRNA
Start codon			Does not function in transcription, only TRANSLATION!
Exons		√	Coding regions that may be spliced out or kept in a mRNA transcript.
Ribosomal binding site			Does not function in transcription, only TRANSLATION!
Non-template /coding	√	√	Opposite strand of the template but often used to read the code! (Same sequence as the mRNA except with T's instead of U's.
Poly A tail		√	Added after mRNA made in Euk.