

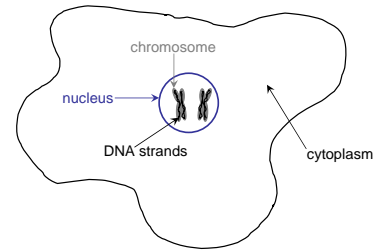
Some Basic Biology Related to Microarray Technology

1/9/2007

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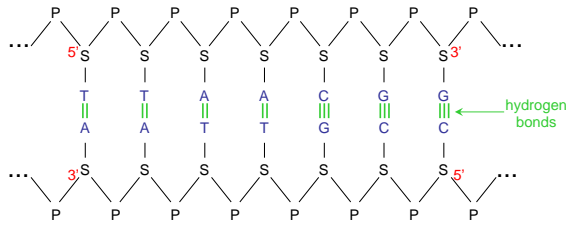
A VERY Simplified Eukaryotic Cell



DNA contains thousands of genes.

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Deoxyribonucleic Acid (DNA)



S=deoxyribose sugar
P=phosphate

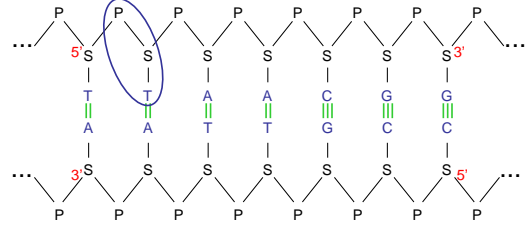
Bases

A=adenine
C=cytosine
G=guanine
T=thymine

The two DNA strands are twisted in the famous double helix shape (base pairs like rungs in a spiraling ladder).

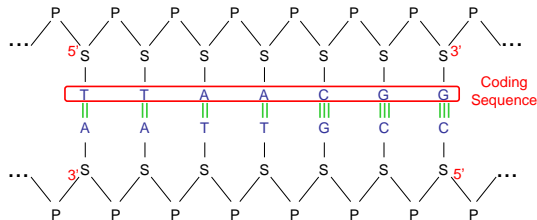
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Nucleotide=Phosphate-Sugar-Base



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Sequence of bases holds instructions for manufacturing proteins

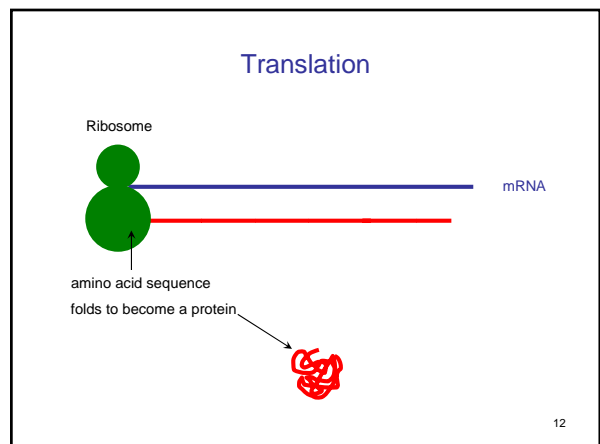
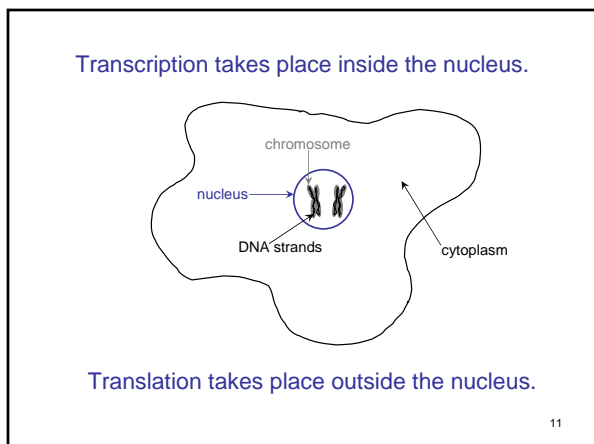
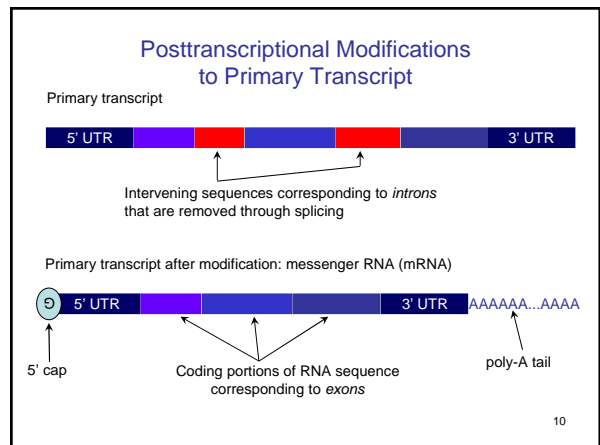
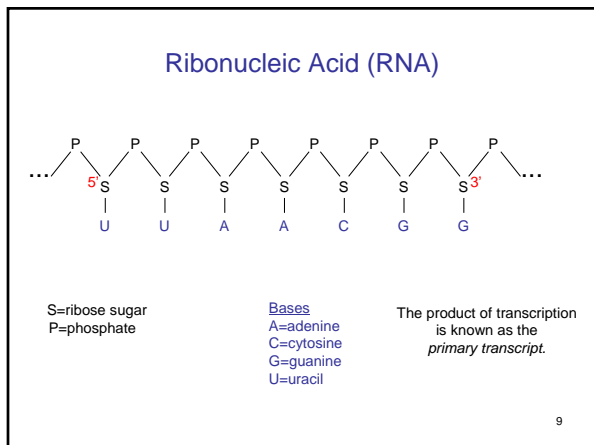
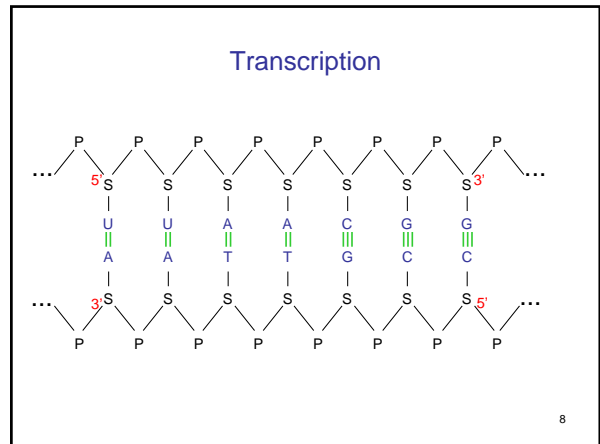
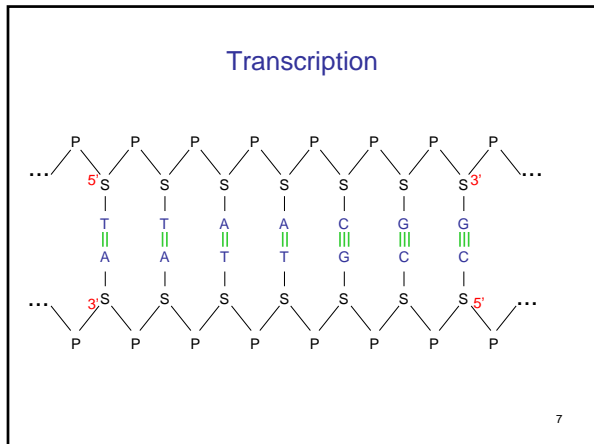


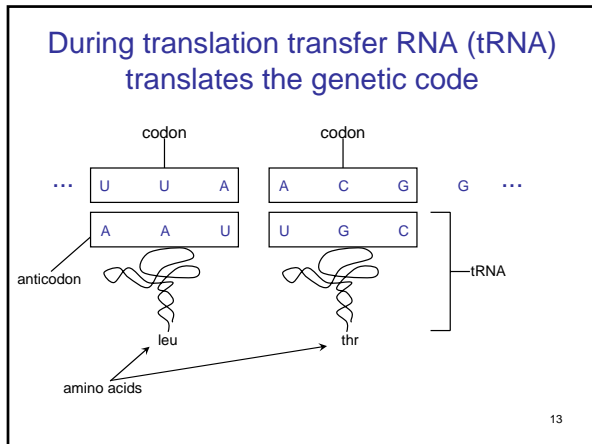
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RNA Polymerase

- An enzyme is a protein that catalyzes chemical reactions.
- RNA polymerase is the enzyme responsible for transcribing DNA to RNA.

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The Genetic Code

		Second Base			mRNA codon		amino acid	
		U	C	A	G			
U	UUU	phe	UCU	ser	UAU	tyr	UGU	cys
	UUC	phe	UCC	ser	UAC	tyr	UGC	cys
	UUA	leu	UCA	ser	UAA	STOP	UGA	STOP
	UUG	leu	UCG	ser	UAG	STOP	UGG	trp
C	CUU	leu	CCU	pro	CAU	his	CGU	arg
	CUC	leu	CCC	pro	CAC	his	CGC	arg
	CUA	leu	CCA	pro	CAA	gln	CGA	arg
	CUG	leu	CCG	pro	CAG	gln	CGG	arg
A	AUU	ile	ACU	thr	AAU	asn	AGU	ser
	AUC	ile	ACC	thr	AAC	asn	AGC	ser
	AUA	ile	ACA	thr	AAA	lys	AGA	arg
	AUG	met	ACG	thr	AAA	lys	AGG	arg
G	GUU	val	GCU	ala	GAU	asp	GGU	gly
	GUC	val	GCC	ala	GAC	asp	GGC	gly
	GUA	val	GCA	ala	GAA	glu	GGA	gly
	GUG	val	GCG	ala	GAG	glu	GGG	gly

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- ### Miscellaneous Comments
- The biology is more complicated than I described.
 - It is amazing!
 - Humans have somewhere around 30,000 genes. (The exact number is a subject for debate.)
 - Much of the variation is created by differences in how cells use the genes they have.
 - Microarrays are a tool that can help us understand how cells of various types use their genes in response to varying conditions. This helps us to understand gene function.
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