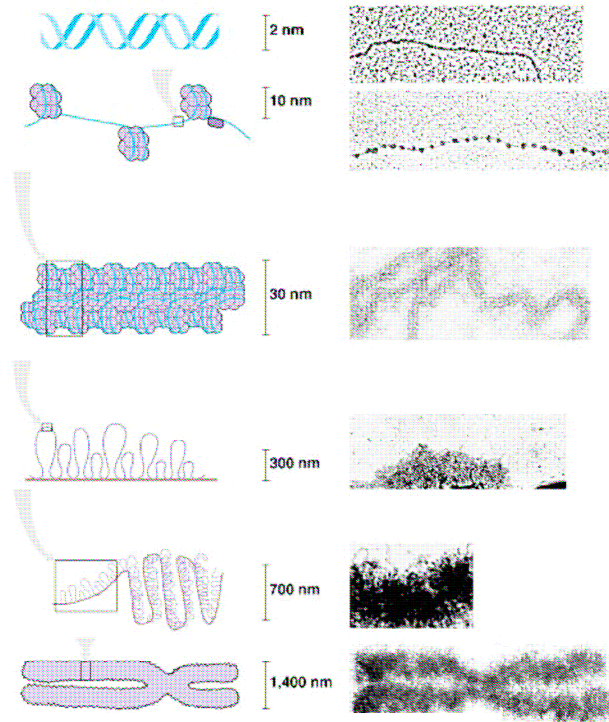


## CHAPTERS 14.1—14.6, 17: Eukaryotic Genetics

1. Review the levels of DNA packing within the eukaryote nucleus. Label each level. (A similar diagram is on pg 188 of your textbook.)



2. How do the coding regions and genome sizes of prokaryotes and eukaryotes compare?

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3. Much of mammalian non-coding DNA is in the form of \_\_\_\_\_

4. What is the cause of Fragile X?

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5. What is the cause of Huntington's disease?

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Name: \_\_\_\_\_

Note Set 31

6. Discuss an example of interspersed repetitive DNA?

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7. What is a multigene family?

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8. Multigene families are hypothesized to have evolved from...

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9. How is the globulin multigene family an adaptation to mammals?

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10. Explain how gene amplification can regulate gene expression.

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11. How can transposons alter gene expression?

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12. Describe the effect of each of the following control mechanisms.

a. DNA methylation \_\_\_\_\_

b. Histone acetylation \_\_\_\_\_

c. Transcription factors \_\_\_\_\_

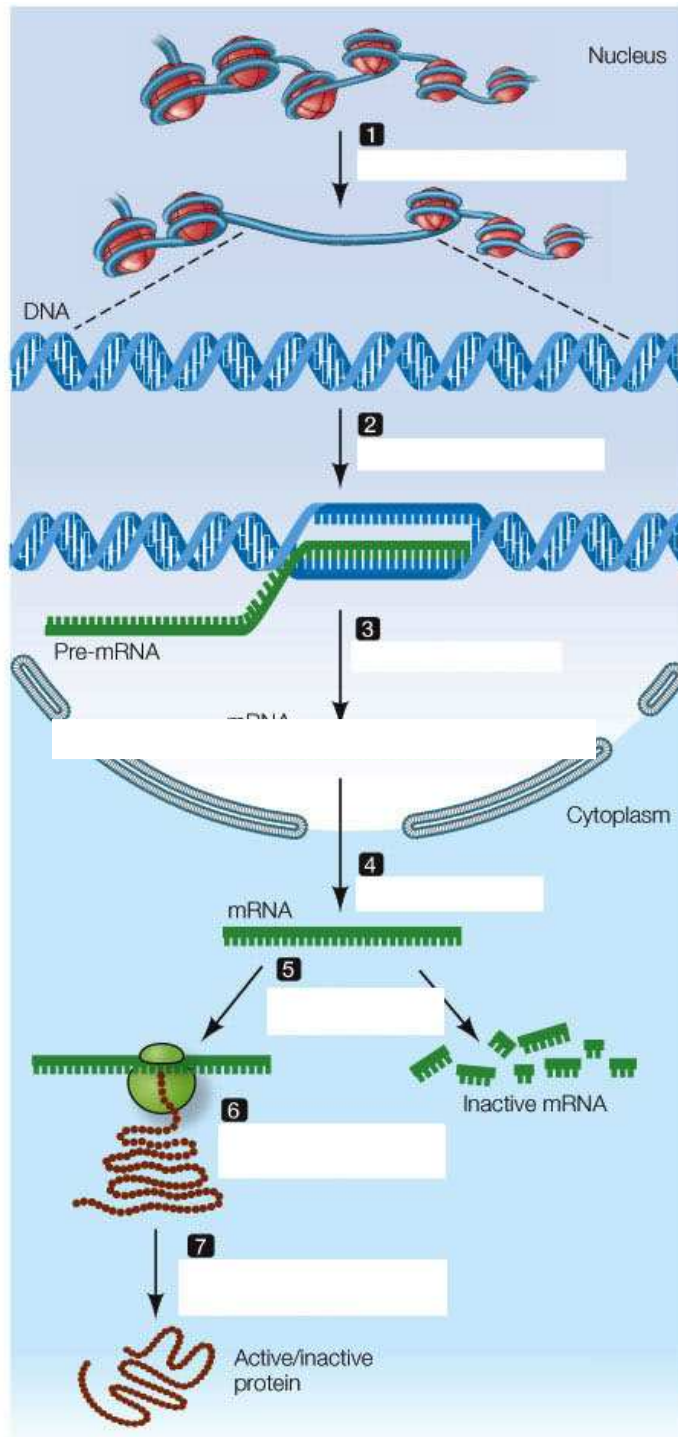
d. Control elements \_\_\_\_\_

e. Enhancers \_\_\_\_\_

f. Activators \_\_\_\_\_

g. DNA-binding domain \_\_\_\_\_

13. Review the opportunities for gene regulation in eukaryotes from **Figure 14.12** and the on-line tutorial. Label and describe each possible regulatory mechanism.



Name: \_\_\_\_\_

Note Set 31

14. What is the difference between heterochromatin and euchromatin? Which is transcribed?

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15. Which regions of the chromosome will typically be in the form of heterochromatin?

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16. How does alternative RNA splicing affect gene expression?

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17. How does RNA degradation affect gene expression?

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18. How does protein processing and degradation affect gene expression?

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**END OF CHAPTER 14 MULTIPLE CHOICE**

1. Eukaryotic protein-coding genes differ from their prokaryotic counterparts in that eukaryotic genes
  - A) are double-stranded.
  - B) are present in only a single copy.
  - C) contain introns.
  - D) have a promoter.
  - E) transcribe mRNA.
  
2. Comparison of the genomes of yeast and bacteria shows that only yeast has many genes for
  - A) energy metabolism.
  - B) cell wall synthesis.
  - C) intracellular protein targeting.
  - D) DNA-binding proteins.
  - E) RNA polymerase.
  
3. The genomes of the fruit fly and the nematode are similar to that of yeast, except that the former organisms have many genes for
  - A) intercellular signaling.
  - B) synthesis of polysaccharides.
  - C) cell cycle regulation.
  - D) intracellular protein targeting.
  - E) transposable elements.
  
4. Which of the following does not occur after mRNA is transcribed?
  - A) Binding of RNA polymerase II to the promoter
  - B) Capping of the 5' end
  - C) Addition of a poly A tail to the 3' end
  - D) Splicing out of the introns
  - E) Transport to the cytosol
  
5. Which statement about RNA splicing is not true?
  - A) It removes introns.
  - B) It is performed by small nuclear ribonucleoprotein particles (snRNPs).
  - C) It always removes the same introns.
  - D) It is usually directed by consensus sequences.
  - E) It shortens the RNA molecule.

6. Eukaryotic transposons
- A) always use RNA for replication.
  - B) are approximately 50 bp long.
  - C) are made up of either DNA or RNA.
  - D) do not contain genes coding for transposition.
  - E) make up about 40 percent of the human genome.
7. Which statement about selective gene transcription in eukaryotes is not true?
- A) Different classes of RNA polymerase transcribe different parts of the genome.
  - B) Transcription requires transcription factors.
  - C) Genes are transcribed in groups called operons.
  - D) Both positive and negative regulation occur.
  - E) Many proteins bind at the promoter.
8. Heterochromatin
- A) contains more DNA than does euchromatin.
  - B) is transcriptionally inactive.
  - C) is responsible for all negative transcriptional control.
  - D) clumps the X chromosome in human males.
  - E) occurs only during mitosis.
9. Translational control
- A) is not observed in eukaryotes.
  - B) is a slower form of regulation than transcriptional control.
  - C) can be achieved by only one mechanism.
  - D) requires that mRNA be uncapped.
  - E) ensures that heme synthesis equals globin synthesis.
10. Control of gene expression in eukaryotes includes all of the following except
- A) alternative splicing of RNA transcripts.
  - B) binding of proteins to DNA.
  - C) transcription factors.
  - D) feedback inhibition of enzyme activity by allosteric control.
  - E) DNA methylation.