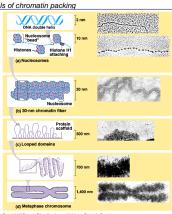
CHAPTER 19 GENE EXPRESSION



SIGNALS CONTROLLING GENE EXPRESSION

- **CHROMOSOME PUFFS**
- ▶ FOUND IN INSECT LARVAE CHROMOSOMES
- THEIR SHAPE MAKES DNA MORE ACCESSIBLE FOR TRANSCRIPTION AND TRANSLATION
- ▶ ECDYSONE: HORMONES MADE FOR MOLTING IN INSECTS

Figure 19.1 Levels of chromatin packing



MORE SIGNALS

- D CONTROL OF STEROID HORMONES IN SOME VERTEBRATES
- ATTACHES TO RECEPTOR

 ACTIVATES

HORMONE

- NELEASING INHIBITOR FACTOR
- ACTIVATES
 EXPRESSION OF
 GENES ON TRGET
 CELLS
- ACTIVATES STEROID RECEPT.
- INHIBITOR
 PROTEIN TIED TO
 DN CODON

100-10,000 base pairs 10-1 million

Table 19.1 Types of Repetitive DNA

Table 19.1 Types of Repetitive DNA **Tandemly Repetitive DNA (Satellite DNA)** Repeated units at a site are usually identical Proportion of mammalian DNA: 10-15% 1-10 base pairs Length of each repeated unit: Total length of repetitive DNA per site, in base pairs: Regular satellite DNA 100,000-10 million Minisatellite DNA 100-100,000 Microsatellite DNA 10-100 Interspersed Repetitive DNA "Copies" are very similar but not identical Proportion of mammalian DNA: 25-40%

Number of repetitions per genome:

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Length of each repeated unit:

Figure 19.2 Part of a family of identical genes for ribosomal RNA

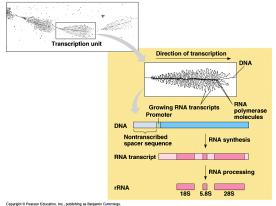
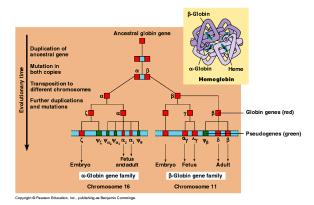


Figure 19.3 The evolution of human α -globin and β -globin gene families



ALTERING GENE EXPRESSION

- **DESIGNATION**
- INCREASE r-RNA SYNTHESIS ON THE RIBOSOMES
- INCREASE PROTEIN SYNTHEIS
- **USED IN CHEMOTHERAPY**



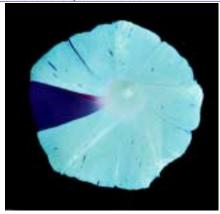
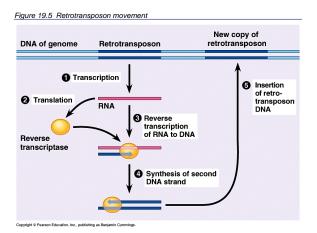


Figure 19.x2 Transposons in corn



REARRANGEMENTS IN THE GENOME

- **▶ TRANSPOSONS-"JUMPING GENES"**
- **▶ IMMUNOGLOBULINS (Ig)-5 types**
- **B LYMPHOCYTES (WBC)**
- INDIVIDUALS WITH DISTINCTIVE GENOMES
- DNA METHYLATION/ADDING CH3 GROUPS TO DNA
- **HUNTINGTONS DISEASE**



1

Figure 19.6 DNA rearrangement in the maturation of an immunoglobulin (antibody)

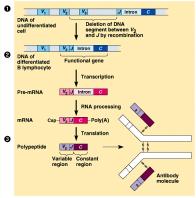
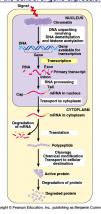
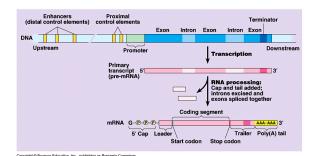


Figure 19.7 Opportunities for the control of gene expression in eukaryotic cells



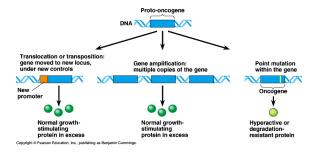
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CANCER/ABNORMAL GENE EXPRESSION?

- **ONCOGENE**
- **▶ PROTOONCOGENE/NORMAL GENE**
- ► MUTAGENS/MUTONS/MUTAGENIC AGENTS/POINT MUTATIONS
- ▶ RETROVIRUSES: CAUSING UNRESTRAINED GROWTH OF CELL
- **INHERITANCE OF MUTATIONS**

Figure 19.13 Genetic changes that can turn proto-ocogenes into oncogenes





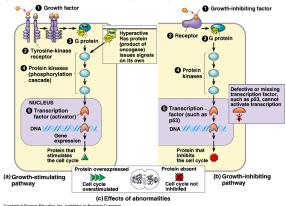
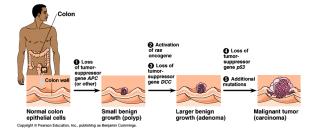


Figure 19.15 A multi-step model for the development of colorectal cancer



INHERITANCE OF MUTATION

- TUMOR REPRESSOR GENES ON CHR 12
- **DESCRIPTION COLON CANCER -APC GENE CHR 5**
- **BREAST CANCER : CHR 17- BRCA1**
- CHR.15-BRCA2
- CAN INTERFERONS HELP SUPRESS THIS PROCESS?