

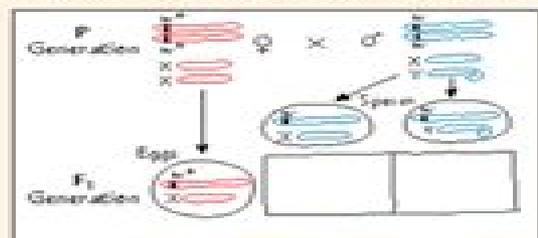
15 The Chromosomal Basis of Inheritance

KEY CONCEPTS

- 15.1** Mendelian inheritance has its physical basis in the behavior of chromosomes. p. 295
- 15.2** Sex-linked genes exhibit unique patterns of inheritance. p. 298
- 15.3** Linked genes tend to be inherited together because they are located near each other on the same chromosome. p. 301
- 15.4** Alterations of chromosome number or structure cause some genetic disorders. p. 306
- 15.5** Some inheritance patterns are exceptions to standard Mendelian inheritance. p. 310

Study Tip

Draw chromosomes: As you work on the figure legend questions in this chapter, draw the chromosomes for the crosses described in the questions. Below is a starting sketch for the What If? question that follows Figure 15.3. (Here you are including sex chromosomes to keep track of the offspring.)



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- For Students** (in eText and Study Area)
- Get Ready for Chapter 15
 - Animation: The Chromosomal Basis of Independent Assortment
 - Animation: Linked Genes and Crossing Over
- For Instructors to Assign** (in Item Library)
- Tutorial: Pedigrees and Sex-Linkage
 - Tutorial: Recombination and Linkage Mapping



Figure 15.1 The four yellow dots mark the locations of a specific gene, tagged with a fluorescent yellow dye, on a pair of homologous chromosomes. The chromosomes have duplicated, so each chromosome has two sister chromatids, each with a copy of the gene. This provides a visual demonstration that genes—Mendel's "factors"—are segments of DNA located along chromosomes.

What is the relationship between genes and chromosomes?

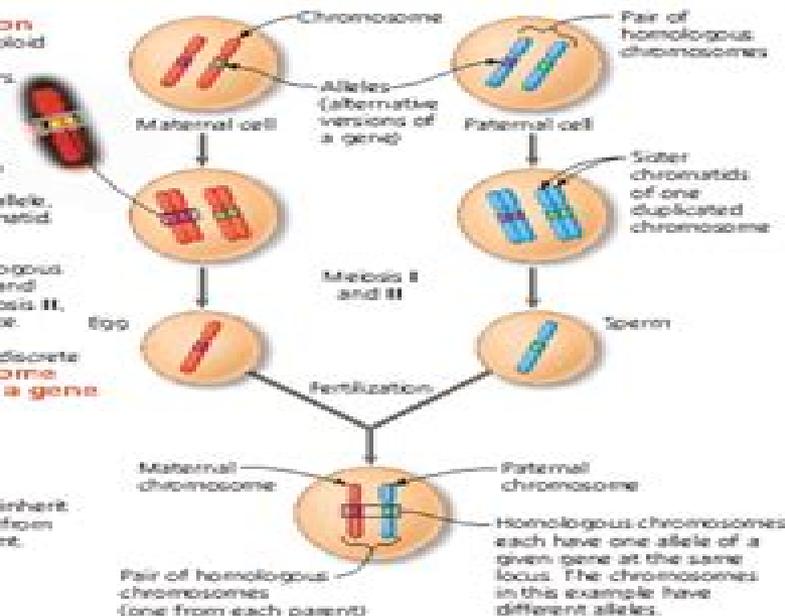
Genes are located on chromosomes. In diploid cells, chromosomes and genes are present in pairs.

Chromosomes duplicate before cell division. Each duplicated chromosome has two copies of each allele, one on each sister chromatid.

During meiosis I, homologous chromosomes separate and alleles segregate. In meiosis II, sister chromatids separate.

Genes are passed on as discrete units. **Each chromosome has one version of a gene (one allele).**

Offspring inherit one allele from each parent.



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Kathleen Armour



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Practical Biology William Martin Smallwood, Ida Louise Reveley, Guy Andrew Bailey, 1916

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