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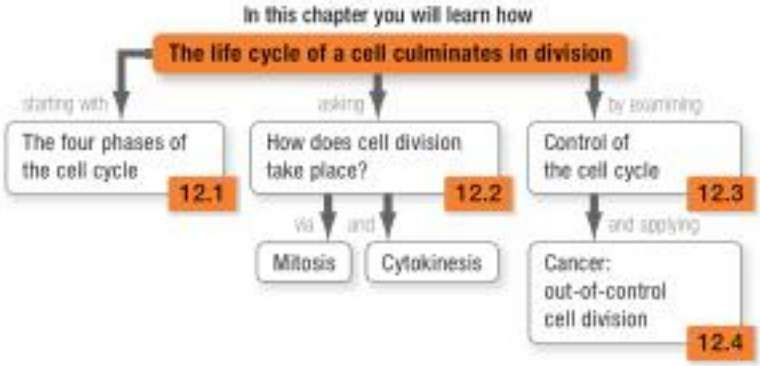
12 The Cell Cycle

This cell, from a hyacinth plant, is undergoing a type of nuclear division called mitosis. Understanding how mitosis occurs is a major focus of this chapter.



The cell theory maintains that all organisms are made of cells and that all cells arise from preexisting cells (Chapter 1). Although the cell theory was widely accepted among biologists by the 1860s, most thought that new cells arose within preexisting cells by a process that resembled the growth of mineral crystals. But Rudolf Virchow proposed that new cells are formed by the splitting of preexisting

Virchow's hypothesis. Plants and animals start life as single-celled embryos and grow through a series of cell divisions.

Early studies revealed two fundamentally different ways that nuclei divide before cell division: meiosis and mitosis. In animals, **meiosis** leads to the production of sperm and eggs, which are the male and female reproductive cells termed **gametes.** Meiosis is equally important in other eukaryotes, but the cells produced are not gametes. In plants, for example, the products of meiosis are **spores. Mitosis** leads to the production of the other cell types, referred to as **somatic** (literally, "body-belonging") **cells.** (You can see how meiosis and mitosis are related to each other and to the transmission of genetic information in the Big Picture on pages 408–409.)

BIG PICTURE

This chapter is part of the Big Picture. See how on pages 408–409.