8

How Cellular Information Is Altered

8.1. INTRODUCTION

We have already discussed some aspects of how cells inherit information and how a chemostat (Chapter 6) can be used as a tool to select for individual cells with different or augmented metabolism. The mechanism for DNA replication in procaryotes has been summarized in Chapter 4. This process is a good example of the exchange of genetic information from one generation to another. However, some individuals can receive additional genetic information through natural or artificial means. The initial genetic information within a cell may also undergo rearrangements or alterations. In this chapter we will discuss some mechanisms causing alterations in a cell's content of genetic information and ways that we can manipulate those mechanisms to improve bioprocesses.

8.2. EVOLVING DESIRABLE BIOCHEMICAL ACTIVITIES THROUGH MUTATION AND SELECTION

Although the cell has a well-developed system to prevent errors in DNA replication and an active repair system to correct damage to a DNA molecule, mistakes occur. These mistakes are called *mutations*. Before we discuss mutations, we need to establish the working vocabulary of microbial genetics.