



**Figure 2.6.** Cell-division cycle of a typical yeast, *Saccharomyces cerevisiae*. (With permission, from T. D. Brock, D. W. Smith, and M. T. Madigan, *Biology of Microorganisms*, 4th ed., Pearson Education, Upper Saddle River, NJ, 1984, p. 80.)

drying, and some chemical agents. Both sexual and asexual spores of molds can germinate and form new hyphae. Figure 2.7 describes the structure and asexual reproduction of molds.

Molds usually form long, highly branched cells and easily grow on moist, solid nutrient surfaces. The typical size of a filamentous form of mold is 5 to 20  $\mu\text{m}$ . When grown in submerged culture, molds often form cell aggregates and pellets. The typical size of a mold pellet varies between 50  $\mu\text{m}$  and 1 mm, depending on the type of mold and growth conditions. Pellet formation can cause some nutrient-transfer (mainly oxygen) problems inside the pellet. However, pellet formation reduces broth viscosity, which can improve bulk oxygen transfer.

On the basis of their mode of sexual reproduction, fungi are grouped in four classes.

1. The phycomycetes are algalike fungi; however, they do not possess chlorophyll and cannot photosynthesize. Aquatic and terrestrial molds belong to this category.
2. The ascomycetes form sexual spores called ascospores, which are contained within a sac (a capsule structure). Some molds of the genera *Neurospora* and *Aspergillus* and yeasts belong to this category.
3. The basidiomycetes reproduce by basidiospores, which are extended from the stalks of specialized cells called the basidia. Mushrooms are basidiomycetes.