

Bioprocess Considerations in Using Animal Cell Cultures

Animal cells have become important catalysts for many bioprocesses. They are capable of making a vast array of important therapeutic proteins. With recombinant DNA techniques, it is possible to achieve significant levels of production of compounds made only in minute amounts in native cells. Animal cells possess the machinery to do complex post-translational modifications to proteins. This capacity is essential in some cases to the formation of a clinically useful product. Let us consider some of the important constraints in using these cells.

12.1. STRUCTURE AND BIOCHEMISTRY OF ANIMAL CELLS

Animal cells vary in size (10 to 30 μm) and shape (spherical, ellipsoidal). In terms of intracellular structures, animal cells are typical eucaryotes, and we discussed their cellular structure in Chapter 2. Figure 12.1 summarizes the structure of a typical animal cell.

Animal cells do not have a cell wall, but are surrounded by a thin and fragile plasma membrane that is composed of protein, lipid, and carbohydrate. This structure results in significant shear sensitivity. In some cells, a portion of the plasma membrane is modified to form a number of projections called *microvilli*. The microvilli increase the surface area of the cell and provide more effective passage of materials across the plasma membrane. The composition of plasma membrane is not uniform and varies in different regions of the