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Medical Applications of Bioprocess Engineering

15.1. INTRODUCTION

With increasing knowledge of cellular and molecular biology, the boundary between traditional bioprocess engineering and biomedical engineering has become increasingly fuzzy. In this chapter we will consider areas in which bioprocess principles are critical to solution of medical problems. Two important areas are tissue engineering and gene therapy using viral vectors. These are examples; other medical applications exist, and their number will undoubtedly increase. Indeed, we have already mentioned the use of transgenic plants as a source for edible vaccines and the techniques of microfabrication applied to make miniature process facilities for rapid DNA analysis to allow genome analysis in a physician's office.

15.2. TISSUE ENGINEERING

15.2.1. What Is Tissue Engineering?

Tissue engineering has a primary focus on developing *in vitro* bioartificial tissues, typically based on cells derived from donor tissue. These tissues can be used as transplants to improve biological function in the recipient. Commercial examples include living skin