

Preface

The branch of biology which makes use of living organisms to create new products is termed as biotechnology. The application of biotechnology for studying animal cells and cell culture is termed as animal cell biotechnology. Some of the key areas of study under this field are sequencing of animal genomes, recombinant DNA technology, identification of genes, regulation of genes, molecular markers and diagnostics. The animals which are genetically altered to have specific characteristics are known as transgenic animals. They are produced using a variety of techniques such as nuclear transfer, DNA microinjection, sperm mediated gene transfer and artificial chromosomes. Animal cell biotechnology finds application across various fields such as food production, organ transplant, pharmaceuticals, animal forensics and animal breeding. Animal cell biotechnology is an upcoming field of science that has undergone rapid development over the past few decades. Most of the topics introduced herein cover new techniques and the applications of animal cell biotechnology. Those in search of information to further their knowledge will be greatly assisted by this book.

To facilitate a deeper understanding of the contents of this book a short introduction of every chapter is written below:

Chapter 1- The area of biotechnology which makes use of animal cells that are propagated in vitro, for the manufacture of biological molecules, and for the discovery and testing of medicine, is known as animal cell biotechnology. Some of the topics which fall under this field of study are animal cell, animal biotechnology, transcriptomics and proteomics, etc. This is an introductory chapter which will briefly introduce all these significant aspects of animal cell biotechnology.

Chapter 2- The process of growing animal cells in vitro on a favorable artificial medium and in a favorable environment is known as animal cell culture. There are various types of animal cell culture such as primary and secondary cell culture, and subculture of cell. This chapter explains all these types of animal cell cultures and various other aspects related to it such as organ culture, cell cryopreservation, etc.

Chapter 3- The methods used to incorporate foreign genes into the genome of an animal so that these genes are inherited and expressed in the offspring fall under transgenic animal technology. Transgenic animals are those animals whose genome has been modified to have desired traits. This chapter elaborates methods of creation of transgenic animals, and applications and ethical concerns of transgenic technology.

Chapter 4- Stem cells are the cells which have the potential to differentiate into several specific cell types. Stem cell technology involves the use of these stem cells for the treatment of a wide variety of diseases. Stem cells are broadly divided into totipotent stem cells, pluripotent stem cells and mesenchymal stem cells. The topics elaborated in this chapter will help in gaining a better perspective about stem cell technology and stem cell therapy.

Chapter 5- Genetic engineering is a set of technologies used to modify the genome of organisms. It includes the transfer of genes from one organism to another within or across species. This

chapter discusses in detail the major concepts of genetic engineering such as gene expression, gene cloning, recombinant proteins, and cell and tissue engineering.

I would like to share the credit of this book with my editorial team who worked tirelessly on this book. I owe the completion of this book to the never-ending support of my family, who supported me throughout the project.

Harry Johnson