

PREFACE

We get our clothes stitched according to our requirements. We also cook and order food according to our requirements. If a food item is not up to our taste we add or remove flavors or in other words edit it. Similarly, can genes be edited?

The answer is YES! We can edit or change existing nucleotides of genomes that are in the field of gene editing. There are several tools (natural and artificial) that have been developed to change genomes. This field of gene editing has been applied to bacteria, fungi, plants, and animals. There are reports of permission from ethics to edit human embryos for a particular lab. One interesting application has been to edit mosquito genomes that serve as vectors for malarial parasites! Isn't this a novel approach to disease rather than the use of chemicals that have effects on the environment. There are reports of using the technology to knockout a receptor involved in binding of the HIV. Such applications show great potential in the prevention or treatment of genetic or other diseases including cancer.

The purpose of this book is to cover the principle and rationale behind gene editing. The various tools used are discussed here along with schematic figures for easy understanding. One of the most popular tools CRISPR-Cas that is an adaptive immunity mechanism in bacteria that has been applied as a tool has a whole chapter. Each of these tools has been discussed along with the latest research. There is a chapter on case studies to enable the reader to understand each mechanism in the current research scenario.

Then the book covers the potential and the various challenges especially in terms of ethics and solutions to such challenges. In short, a reader can grasp the salient features of this exciting field with great potential for gene therapy or creation of plants/livestock without the risks of transgenesis by reading this book.