

Gene Editing: An Update

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.



Dr Perna Pandey, a biotechnologist with several years of wet lab research experience, has worked as a senior research fellow at International Center for Genetic Engineering and Biotechnology, New Delhi. Her field of research in PhD included isolation and molecular characterization of Geminiviruses, genome sequencing, gene annotation, as well as gene silencing using the RNA interference technology. She has published papers in peer-reviewed journals in the field and has submitted a number of annotated Geminiviral genome sequences in the GenBank, including two novel ones. Perna has also completed her editing and proof-reading courses from SIER, UK and now works as a freelance scientific editor, writer and a subject matter expert. She has edited and co-authored several books on a range of topics in Life-Sciences. When Perna is not busy with her assignments, she loves visiting historical places.



Shiv Sanjeevi Sripathi secured second rank in Mumbai University and first rank in his college at his undergrad level and in his college during his Masters and has worked on a stem cell project at the Specialized Centre for Cell Based Therapy (SCCT), KEM Hospital at Mumbai, following which he was a Junior Research Fellow at Microbiology & Cell Biology Department, Indian Institute of Science, Bangalore from August 2009 to November 2011. The field of work involved cloning of cell wall genes and transcription factors in *E. coli* & *M. smegmatis*. This was followed by a stint as a Research and Development Executive at Transasia Biomedicals, Mumbai where he worked on patent writing and Immunoassays from 2011 till 2013. In 2013, he entered the teaching field where he has been tutoring biology and chemistry to the students of 11th and 12th grades along with English grammar and communication skills to people of all age groups. Shiv also loves helping people write scientific manuscripts and has co-edited several books on life sciences and aspects of biotechnology with Apple Academic Press.