

Introduction to gene expression. Bacterial gene control: Operons; The mal regulon, ara operon, trp operon. Control of transcription during bacterial sporulation. Genes with multiple promoters. Heterologous and homologous expression of genes in *E. coli* and yeast. Effect of promoters on gene expression. Protein-DNA interactions for the control of transcription. Transcription factors in eukaryotes: types, structures and functions for RNA polymerase I, II and III. Signal-mediated transport of mRNA through nuclear pore complexes. Transcription activators in eukaryotic transcription. Role of transcription termination in pol.II gene regulation. Protein modifications for gene expression: Histone acetylation, Sumoylation etc. Gene regulation and splicing. Gene silencing. qPCR and microarray for the study of gene expression. Catabolite repression of genes in fungi. Gene regulation and expression in archaeobacteria. Bioinformatics tools for the study of gene expression and regulation.

SUGGESTED READINGS

1. Lesk, A. M. 2002. Introduction to bioinformatics. Oxford Univ. Press, U.K.
2. Lodish, H., A. Berk, C. A.Kaiser, M. Krieger, M. P. Scott, A. Bretscher, H. Ploegh and P. Matsudaira, P. 2008. Molecular Cell Biology. 6th Ed. Freeman W. H. USA.
3. Nelson, D.L and M.M. Cox. 2008. Lehninger Principles of Biochemistry. 5th edition, Worth Publishers, New York
4. Sambrook, J. and D. W. Russell. 2000. Molecular cloning, a laboratory manual. Cold Spring Harbor Laboratory Press, N. Y.
5. Talbot, N. 2001. Molecular and Cellular Biology of Filamentous Fungi. Oxford university press
6. Wagner, R. 2000. Transcription Regulation in Prokaryotes. Oxford university press
7. Watson, J. D., Baker, T. A., Bell, S. P., Gann, A., Levine, M. and Losick, R. 2007. Molecular Biology of the Gene. 5th Ed. Pearson/Benjamin Cummings, CA.
8. Weaver, R. F. 2008. Molecular Biology. 4th edition. McGraw Hill, USA.