McCarthy, J.E.G., Tuite, M.F.: **Post-Transcriptional Control of Gene Expression.** (NATO ASI Series, Series H: Cell Biology, Vol. 49.) - Springer-Verlag, Berlin - Heidelberg - New York - London - Paris - Tokyo - Hong Kong 1990. 652 pp.

The book presents contributions of participants to the International Workshop, held in Goslar, FRG, April 6-12, 1990. All lectures are review-oriented and ofter the reader an overview covering most of the key problems of post-transcriptional control. 59 chapters on 650 pages present examples of post-transcriptional regulation revealed by investigators working with bacteria, phages, yeasts, animal and plant cells. The comparison of results obtained in various organisms confirms post-transcriptional control as an important principle of the regulation of gene expression.

More than one third of the contributions concerns bacteria and phages. For decades, *Escherichia coli* and coliphages have served as a model for research in molecular biology. Detailed knowledge of DNA sequences makes possible new surprising discoveries. The post-transcriptional control of gene expression in bacteria has not been studied as well as transcriptional control, the average bacterial nRNA half-life seemed to make transcriptional regulation of gene expression an efficient mechanism. Now, more and more experimental data are appearing, showing the dependence of the efficiency of translation and mRNA stability upon the bacterial growth stage. The translational control is either non-specific, determined by the accessibility of ribosomes and translational factors, or specific, mediated by differential mRNA stability. Post-transcriptional control determines individual levels of proteins in the bacterial cell to a greater extent than has so far been supposed.

The regulation of mom operon of bacteriophage Mu presents an example of a combination of transcriptional and translational control of gene expression (Wulczyn *et al.*, chapter 23). The mom gene encodes a DNA modification function which is responsible for the sensitivity of Mu to the host restriction systems. Constitutive mom expression is lethal to the host cell, therefore its fine regulation is necessary. The mom expression has to be limited to a brief window in time after phage DNA replication and before phage DNA packaging. Transcription from the mom promoter is dependent on the phage C protein and at the same time on the methylation of certain promoter sequences. However, transcription is not sufficient for the effective production of mom protein. Another control mechanism is operating. At first, Com protein must be translated on mom mRNA. Com gene is the first gene in the mom operon, upstream the mom gene. Com protein is a positive regulator of mom gene expression on the translational level.

Post-transcriptional control minimizing the risk of undesirable gene expression was described in mammalian proto-oncogenes (Belasco *et al.*, chapter 7). Fos protein (the product of c-fos) associates with the product of another proto-ontogene to form a heterodimer activating transcription from a number of mammalian promoters. Transient expression of the c-fos gene is one of the first cellular responses to stimulation by a growth factor. Constitutive c-fos expression causes malignant transformation of the cell. To survive the cell has to stop the synthesis of Fos protein immediately after the need has disappeared. Fos mRNA contains two sequences responsible for the extremely short lifetime of mRNA. The synthesis of Fos protein is therefore tuned down soon after the end of transcription.

In the plant kingdom, the post-transcriptional control of gene expression has been studied in a limited number of examples. There are only four contributions in this book concerning plants. Three of them pay attention to plant viruses, the last one is concerned with the chloroplast. RNA of plant viruses is very efficient in all systems of translation *in vitro*. The reason of this enhancing effect is the stretch of mRNA on the 5 untranslated region. In the TMV this sequence is called omega, and it raises the efficiency of translation also in connection with heterologous mRNA.

For researchers working in the field of plant molecular biology it is very interesting to learn more about various examples of translational control in animals and bacteria. These investigations indicate a useful direction in plant research.

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