

99

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The Regulation of DNA Replication and Transcription

The Role of Trigger Molecules in Normal and Malignant Gene Expression

Mechanisms involved in gene activation and inactivation remain a key concern for researchers seeking to understand processes of cell division and tissue development in both normal and malignant states. Although work in this field has been considerable, studies have not yet succeeded in establishing an adequate explanatory model for gene repression and derepression at the molecular level.

This monograph explores basic processes of DNA replication and transcription in an effort to identify the mechanisms responsible for the release of genetic information and its role in the regulation of cellular events. Concerned with discovering the fundamental concept that might integrate and explain the wide range of existing lines of evidence, the author reports and interprets the results of experiments conducted in an impressive range of biological systems. Focused on complex mechanisms at the biochemical level, these studies allow analysis of the pathways involved when cells, organs and animal systems react to various trigger molecules derived from both living cells and exogenous sources. These include hormones, RNA, RNA fragments, alkaloids, actinomycin D, and phorbol esters as well as chemical carcinogens and drugs. Combining the results of these studies with his own extensive work in this field, the author is able to formulate a uniquely integrative

biochemical model for gene expression, demonstrating that both biological and chemically synthesized molecules can trigger the differential release of information from DNA and thus influence cell transformation.

Apart from its academic significance for research scientists, this new biochemical model offers high potential assistance in the search for ways to induce or control the expression of certain genes and, moreover, to promote differentiation of given cells in vitro as well as in situ. As such, the book should provide stimulating reading for all oncologists, biochemists, embryologists, and biologists interested in finding a model which helps answer key questions concerning the molecular mechanisms of gene expression in both normal and cancerous cells.

Contents

- Initiation and Control of DNA Replication
- RNA Polymerases and Release of Information from DNA
- Hormones in the Release of Specific Information from DNA
- Exogenous RNAs in Gene Expression and Transformation of Cells
- Carcinogens in DNA Replication and Release of Specific Information
- Basic Mechanism of Gene Activation
- Final Discussion and Recapitulation

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