

Srivastava R, editor. Apoptosis, cell signaling and human diseases, molecular mechanisms. Totowa (NJ): Humana Press; 2007. Volume 1, 369 pages; ISBN: 1-58829-822-5; price: €109.95; Volume 2, 402 pages; ISBN: 1-58829-677-6; price: €109.95.

Field of medicine: Cell and molecular biology, pathology, virology, immunology, neurology, genetics.

Format: Hardcover book.

Audience: Basic researchers dealing with regulation of apoptosis, cell survival and proliferation, as well as clinical researchers investigating the role of apoptotic and survival pathways in the pathogenesis of human diseases.

Purpose: To provide an extensive review of different aspects of apoptotic and cell survival mechanism, and their involvement in the development and prognosis of various diseases such as cancer, neurodegenerative disorders, and viral infections.

Content: The book *Apoptosis, Cell Signaling and Human Diseases: Molecular Mechanisms* has two volumes. Volume I is divided into two sections – Malignant Transformation and Metastasis and Molecular Basis of Disease Therapy, and has 15 chapters. Volume II is also divided into two sections – Kinases and Phosphatases and Molecular Basis of Cell Death, and has 18 chapters.

Each chapter is accompanied by schematic diagrams, figures, and tables, with an extensive list of important references. There is a short summary at the beginning of each chapter, providing the necessary information on the content of the chapter and a list of important key words.

In volume I, the first chapter reviews the role of BCR-ABL oncogene in the development of

human leukemias, mouse models of chronic myelogenous leukemia, and therapeutic strategies for chronic myelogenous leukemia, with special emphasis on the imatinib mesylate (Gleevec). The second chapter describes the process of angiogenesis and the role of angiogenesis in the development of cancer. It extensively reviews the factors involved in the regulation of angiogenesis including vascular endothelial growth factor, angiopoietins, proteases, ephrins, integrins, cadherins, as well as various inhibitors of angiogenesis, especially tumstatin. The third chapter describes in detail the molecular mechanisms of resistance of metastatic cells to apoptosis as a basis of molecular diagnosis-based anti-tumor therapy, whereas the next chapter discusses the role of a balance between pro-apoptotic and pro-survival factors in the tumor development, and reviews major apoptotic pathways and their regulation. Chapter 5 discusses the role of DNA damage checkpoints aberrations in cancer development and therapeutic approaches interfering with DNA damage response pathways, whereas the next chapter reviews the oncogene *c-Myc*, regarding regulation of *c-Myc* activity, and involvement of *c-Myc* in cell growth, proliferation, evasion of apoptosis and development of cancer. It also discusses the role of *c-Myc* in β -cell failure and development of diabetes. The seventh chapter deals with the role of lysophospholipids, the metabolites in phospholipid synthesis, in the regulation of cell growth and

survival. It describes lysophospholipid metabolism and the role of sphingosine-1 phosphate in the signal transduction, mediation of growth and survival, and their involvement in the development of malignant diseases. The eighth chapter reviews the role of β GBP cytokine in the control of cell growth and discusses its pro-apoptotic role in cancer cells. The last chapter in the first part of volume I discusses transcription factors E2F, Myc, p53, and NF- κ B as “control nodes,” which may, depending on the micro environmental signals, initiate either apoptosis or cell cycle progression.

The next six chapters belong to the second part of volume I, “Molecular Basis of Disease Therapy.” The tenth chapter concentrates on the role of NF- κ B transcription factor in tumor development and progression and defines potential molecular targets for cancer therapy. The eleventh chapter describes colorectal cancer drug 5-fluorouracil, its molecular mechanisms of action and basis of the resistance to 5-fluorouracil therapy, as well as combined therapeutic approaches to avoid the resistance development. The twelfth chapter reviews the endothelial and neural progenitor cells as vehicles for cancer therapy and the following chapter deals with a proper assessment of the treatment-induced tumor cell apoptosis during *in vivo* treatment with anticancer drugs. The fourteenth chapter discusses the role of survivin, a molecule from the IAP family, in cell division and apoptosis inhibition and discusses the possible survivin-based therapeutic strategies. The last chapter describes the role of histone deacetylases (HDAC) in malignant diseases and the pro-apoptotic actions of various HDAC inhibitors, as well as their therapeutic applications.

The first part of the volume II consists of eight chapters dealing with the role of kinases and phosphatases in various pathologic conditions. The first chapter describes two different isoforms of protein kinase A (PKA) and their different roles in cell growth regulation and reviews the role of PKA in tumor development

and as a potential target of antitumor drugs and cancer diagnostic tool. The second chapter reviews the role of protein kinases from the protein kinase C (PKC) family in the regulation of apoptotic processes and cancer development and pro-survival and pro-apoptotic PKC isoforms. Phosphoinositide 3-kinase-Akt pathway, which is involved in anti-apoptotic action during viral infections, is reviewed in the third chapter. Chapter 4 reviews cyclin-dependent kinase 5 (CDK5), which is restricted to neural tissue and whose inhibitors may protect from the development of chronic neurodegenerative diseases. Raf/MEK/ERK, a system that couples signals from cell-surface receptors to transcription factors is extensively reviewed in Chapter 5, with respect to different transcription factors and its involvement in the development of human cancer and cancer resistance to chemotherapy. The sixth chapter describes the role of mitogen-activated protein kinases (MAPKs) in the development of human diseases, such as autoimmune and neurodegenerative diseases, whereas the next chapter describes the role of serine/threonine phosphatases in the regulation of apoptotic processes. Chapter 8 describes the phenomenon of disordered fibrinolytic processes in neoplastic diseases and deals with the role of urokinase and urokinase receptor signaling in tumor progression.

The second part of the volume II is dedicated to the molecular basis of cell death. The first chapter in this part describes the mechanism of ischemia and reperfusion injury with respect to the involvement of different pathways regulating apoptosis and survival (death receptors, mitochondrial pathway, Bcl-2 family, caspases, phosphatidylinositol-3-kinase, PKC, ERK). The next chapter describes the role of cyclooxygenase-2 (COX-2) gene overexpression in the development of colorectal cancer. Chapter 11 reviews death receptors, their signaling pathways and chemotherapeutic drugs targeting death receptor signaling pathways. Chapter 12 discusses the mechanisms of induction and execution of DNA

damage-dependent apoptosis, major DNA damage repair pathways, and DNA damage induced cell-cycle checkpoints, whereas Chapter 13 reviews the role of ubiquitin-proteasome system in the induction of apoptosis and the therapeutic potential of substrate specific E3 ubiquitin ligases. Chapter 14 describes mechanisms of human immunodeficiency virus (HIV)-induced apoptosis of infected and uninfected CD4 T lymphocytes, and Chapter 15 provides an extensive overview of inhibitor of apoptosis proteins (IAP) and their interactions with caspases. Chapter 16 deals with the role DNA damage and repair pathways in neuronal apoptosis and neurodegeneration, whereas Chapter 17 overviews the biology of caspases, mediators of apoptosis, and additionally emphasizes their non-apoptotic functions during development. The last chapter discusses the mechanisms of oxidative stress and its role in the pathogenesis of diabetic neuropathy.

Highlights: The book equally focuses on molecular as well as clinical aspects of apoptosis and cell

cycle regulation and provides important information for clinicians as well as researchers in different fields of biomedicine including oncology, neurology, endocrinology, molecular diagnostics, clinical immunology, molecular biology, genetics etc. Integrative approach used in this book is crucial for translational research and future success in treatment and diagnosis of various diseases.

Related reading: Many other books would be informative and valuable for further reading. Among them, some of the recently published titles include Cellular Signaling and Apoptosis Research (Demasi AR, 2007), Application of Apoptosis to Cancer Treatment (Sluysen M, 2007), Role of Apoptosis in Infection (Griffin D, 2005), Apoptosis Methods and Protocols (Brady HJM, 2004), Apoptosis: The Life and Death of Cells (Potten C and Wilson J, 2004).

Nataša Kovačić

natasa@mef.hr