

2007), and an Earth Commission and a Department of Earth Sciences (set up in January 2007), of which IMD is an important constituent.

A final example comes from the differences the author highlights between the views of the Planning Commission and NCST, the former emphasizing economic and the latter technological self-reliance. Once again I cannot help feeling that things have not changed a great deal in all these years. Haksar opposed the idea of NCST and virtually closed it down when he was made its Chairman. A National Commission on S&T (not Committee) was proposed, but did not win acceptance. It resurfaced during Rajiv Gandhi's tenure as Prime Minister, but again did not materialize. It has been revived recently, with the support of the Planning Commission – with what results we should see shortly. It is as if there are certain fundamental organizational dilemmas that the country has been unable to resolve.

There are numerous other questions that come to mind after reading Parthasarathi: his book is indeed thought-provoking. But I should stop here, saying only that the book is strongly recommended to anybody who is interested in Indian S&T, and wishes to understand how we have got to where we are today.

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Annual Review of Pathology: Mechanisms of Disease, 2007. Abbas, Galli and Howley (eds). Annual Reviews Inc, 4139 El Camino Way, P. O. Box 10139, Palo Alto, California 94303, USA. Vol. 2. 429 pp.

This book provides recent advances in the understanding of the disease mechanisms as well as novel experimental approaches useful to both basic scientists and physicians. While an attempt has been made by the editors to cover different types of diseases, there are five chapters dealing with different types of cancers, perhaps due to the fact that cancer is one of the most prevalent diseases.

Besides giving updates on a variety of diseases, there are two chapters devoted

to upcoming areas of research. The chapter by Christopher H. Contag deals with whole-body animal imaging. With the use of *in vivo* molecular imaging of the whole animal, it is possible to study the dynamic cellular and molecular changes. Besides the description about the principle of optical imaging, specific sections on imaging using radioactive traces and optical imaging using bioluminescence and fluorescence are well described. The utility of imaging in the field of regenerative medicine and stem-cell biology is also adequately explained. The chapter by Ward and Dirks deals with cancer stem cells, one of the important and upcoming areas of biology. Cancer stem cells are a sub-population of cells in a cancer that can self-renew, differentiate and regenerate a phenocopy of the cancer when injected *in vivo*. Evidence for the presence of stem cells as early as half a century ago and the stem-cell hypothesis have been explained adequately. Successful isolation of stem cells from hematopoietic cancers and various solid tumours are well described. More importantly, the experimental and therapeutic implications of cancer stem cells are discussed. Anticancer therapies that target the bulk population of tumour cells but miss the cancer stem cells may lead to cancer recurrence and chemoresistance.

In the first chapter, Henry C. Pitot describes a model for rat hepatocarcinogenesis, the pathogenesis of neoplasia of liver. The rat model exhibits three distinct, quantifiable stages: initiation, promotion and progression. He starts with a famous quote saying that each person's life is the pattern of a mosaic and each incident happening is equal to one tiny stone in the mosaic. He narrates how his scientific life began in his grandfather's pharmacy and also about his interest to do science. Cristofano and Ellenson describe the current understanding of endometrial carcinoma, concentrating more on molecular pathways involved in the development and progression of major types of endometrial carcinoma. This is a common malignancy of the female genital tract characterized by a number of tumour types. A detailed description of genetic alterations associated with two types of endometrial carcinoma (types I and II) is given. Further, the existence of endometrial stem cells and their role in carcinoma development is also discussed.

William G. Kaelin Jr illustrates the role of the *VHL* gene in the development of

von Hippel–Lindau disease, which is characterized by an increased risk of hemangioblastoma, clear cell renal carcinoma and pheochromocytoma. The chapter is a good description of the structure and function of the VHL protein. Possible therapeutic strategies based on VHL biology are also discussed. Andrea I. McClatchey discusses different aspects of neurofibromatosis, which are a group of genetic disorders featuring the development of tumours of the nervous system, particularly of the nerve sheath. Differences in the genetic basis of three recognized forms of neurofibromatosis are described clearly. A good account of clinical features, pathogenesis, treatment, genetics of *NF1* and *NF2* tumour suppressor genes and mouse model of neurofibromatosis is given.

McNally and Pytel review the basic structural properties of muscle and genetic mechanisms that lead to myopathy and muscular dystrophies. The muscle structure, degeneration and regeneration, genes associated with the development of muscular dystrophy and different types of muscular dystrophies are well reviewed. Waki and Tontonoz narrate the recent advances in obesity, in particular about the adipose tissue being considered as an active endocrine organ secreting multiple bioactive factors called adipokines. Dysregulation of adipokines is emerging as an important mechanism by which the adipose tissue contributes to systemic insulin resistance and metabolic disease. In particular, detailed information is given about leptin, adiponectin, resistin, plasminogen activator inhibitor, retinol-binding protein 4, Visfatin and the role of inflammation in the adipose tissue in the development of obesity-linked insulin resistance. Wilson and Goilav focus on the mechanisms that underlie the development of human renal cystic diseases. A detailed description of inherited renal cystic diseases consisting of pattern of inheritance, gene involved, clinical features and pathology is given. Although less common, sporadic renal cystic diseases are also covered. Renal cystic diseases are characterized by the expansion of the nephron tubular epithelial components to form fluid-filled cysts lined by a single layer of epithelium. Further, a complete account of how deregulation in cellular proliferation, apoptosis, secretion, polarity and changes in cell–matrix interaction, cell–cell interactions and renal differentiation contribute to cyst expansion is provided.

Nagy *et al.* elucidate the role of vascular endothelial growth factor-A (VEGF-A) during induction of pathological angiogenesis, which generates a new vascular supply in tumours, wounds and chronic inflammatory disorders. A detailed description is given about the VEGF family of proteins and their receptors, their regulation, signalling pathways involved and the mechanisms by which VEGF-A induces pathological angiogenesis. Further, efforts taken to develop VEGF-A as a therapeutic target are also described. Rabinovitch discusses current experimental and clinical studies that investigate the pathobiology of pulmonary hypertension (PHA). A detailed account of different conditions that lead to the development of pulmonary arterial hypertension, and current treatment methods available is given. Moreover, this chapter also discusses the possibility of lung regeneration through stem cells and the role of bone morphogenetic receptor II in the development of both familial and sporadic PHA.

Chin and Parkos provide an overview of the consequences of neutrophil or polymorphonuclear leukocyte (PMN) infiltrations into epithelial tissues in particular, related to epithelial injury and highlight the molecular details of PMN epithelial interactions during transmigration. Besides providing both *in vitro* and *in vivo* models to study PMN epithelial migrations, this chapter also provides the role of various molecules like CD11b/CD18, intercellular adhesion molecule-1, desmosomal junctional adhesion molecule, CD47 and signal regulatory protein in PMN transmigration. Braun and Wei provide an update on the understanding about Inflammatory Bowel Disease (IBD). There exists a mutual beneficial relationship between the host and the resident commensal microbes. IBD is a set of chronic, relapsing inflammatory intestinal diseases in which rules of the normal host-microbe interactions have been violated. This chapter provides a good description about the role of pathological microbial traits, host immune and epithelial functions, recent advances in the genetics of IBD and immunology of host-microbial interactions and recent treatment strategies. Laflamme *et al.* review the potential mechanism behind the benefits of cell-based therapy for myocardial ischaemia and infarction. Table 1 in this chapter gives a comprehensive list of all cell-based randomized therapies in

patients with ischaemic heart disease. The heterogeneous nature of the heart disease requires an individual-based cell therapy. Although several methods of cell-based therapy are under trial, benefits are yet to be established, thereby suggesting a need for better mechanistic understanding in order to develop newer improved therapeutic approaches.

Malaria is the only infectious disease covered in this book. Halder *et al.* provide recent understanding of the molecular basis of infection. While the life cycle of the malarial parasite includes both its growth in mosquito and human, all the clinical symptoms of malaria are a consequence of infection of human erythrocytes. To develop new diagnostic and therapeutic methods, it is necessary to understand the basic mechanisms that govern parasite invasion, remodelling, growth and reinvasion of erythrocytes.

Overall, this book is an excellent collection of well-written chapters on different types of diseases, in particular cancer, including some contemporary areas like cancer stem cells and live animal imaging.

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Adoption of Health Technologies in India: Implications for the AIDS Vaccine. Indrani Gupta, Mayur Trivedi and Subodh Kandamuthan. Sage Publications India Pvt Ltd, B1/I-1, Mohan Cooperative Industrial Area, Mathura Road, New Delhi 110 044. 2007. 235 pp. Price: Rs 295.

The book is based on secondary data and discussions with key players like health sector experts, planners and administrators

involved in the introduction of health technologies in India. The idea is to look back at the success and failure of key health technologies with an aim to plan forward for the introduction of AIDS vaccine, which is still a distant dream because 120 candidate vaccines have so far failed in clinical trials.

India has the second largest population of HIV/AIDS cases in the world (about 5.1 million) with epicentre in southern and northeastern India. The Government of India recognized the need to contain AIDS by setting up NACP in 1987 and NACO in 1992. The efforts have been fortified with IAVI and ICMR joining in 2001 and the Global Fund for AIDS control, recently.

The authors have made a bold attempt to identify key factors that affect successful adoption of health technologies, which has been done by tracing the history of adoption and an in-depth analysis of ongoing selected health technologies in India, with an aim to import these lessons while introducing the AIDS vaccine. The key factors analysed are: timing of adoption, appropriateness and adaptability of the technology, policy framework of adoption, supply, demand and distribution issues. However, political commitment, nationwide mobilization of mass organizations, involvement of influential local leaders, strong advocacy and information, evaluation and communication have not been given prime importance in the analysis. Nevertheless, it has been highlighted that India adopts health technology early, but lacks commitment and resources for successful implementation.

The first part (chapters I-V) deals with the need for an AIDS vaccine in India in the backdrop of lessons learnt from the introduction of selected health technologies, namely Universal Immunization Programme (UIP), hepatitis B vaccine, no-scalpel vasectomy (NSV), voluntary counselling and testing (VCT) and anti-retroviral therapy (ART) in India. Part II (chapters VI-X) presents critical analysis of case studies of adoption of these health technologies. It is evident that India has a good record of timely adoption/introduction, but without epidemiological survey of disease burden as is the case with hepatitis B and HIV testing without counselling. The process of approvals and regulations has been smooth. However, there is less than smooth implementation due to imperfect coordination between the Centre and States on various issues.