



## Introduction

Ruggero Montesano\*

*International Agency for Research on Cancer, Lyon, France*

This issue entitled “Cancer on the threshold of a New Millennium” includes a series of articles that attempt to examine the achievements and the shortcomings of cancer research and discusses how, based on a better understanding of this disease, more effective strategies for cancer prevention and control can be obtained. As former Presidents of the European Association for Cancer Research (EACR), Jan Ponten and I started this initiative in 1998. Since the death of Jan Ponten in November 1999, Sir Walter Bodmer has contributed to this undertaking and his help in finalising this undertaking is acknowledged. The present publication includes nine contributions by distinguished representatives of various cancer disciplines.

Cancer is the second most common cause of mortality after cardiovascular diseases among the 60 million deaths occurring every year worldwide. This disease is a major public health problem in developed countries and is becoming an important cause of mortality in the adult population in developing countries. The content of this publication should provide valuable information to help in deciding the priorities in cancer research and cancer control in various regions of the world. Various topics are addressed and the contribution of epidemiology in the identification of the causes of human cancers and in the assessment of various forms of cancer control is discussed. Cancer epidemiological studies have enabled the development of rigorous quantitative methodologies and quickly identified some major ‘exposures’ that are causally associated with the risk of cancer. Smoking and lung cancer, hepatitis B infection and liver cancer and occupational cancers are prominent examples. These findings had a profound impact on public health. However, the aetiology of some major human cancers, e.g. breast, colon and prostate, still remains elusive. Further rapid progress probably requires the integration of classical epidemiology with other cancer disciplines. Classical indicators (incidence, mortality and survival)

could be used as markers of emerging risks and of the effectiveness of prevention and treatment. The decline of certain cancers in recent years in some countries indicates that the most effective tools against cancer remain primary prevention and early detection.

Considerable progress has been made in describing the pathogenesis of human cancers at the cellular and molecular level. Knowledge is gradually accumulating about genes that confer sensitivity or resistance to the carcinogenic effect of environmental exposures. This field should provide a crucial link between the statistical risk factors for a group and determination of which members of a population at risk will actually be affected. At present, the gene–environment interaction in the aetio-pathogenesis of cancer is still rather poorly understood; its elucidation will be a major future challenge.

Advances in genetics have enabled inherited risk to be assessed on a molecular basis with the identification of the precise genomic changes. Although the demonstration of single inherited genetic defects causing a high cancer risk has been a ‘tour de force’, the associated cancer burden is small and so far the impact on public health very limited.

Molecular cancer biology has amassed a vast amount of data. The key malfunctions occurring in neoplastic cells are evidently very complex. However, no coherent picture is at hand to explain the individual profile of a single cancer or how necessary causative genetic, and epigenetic, changes explain the phenotype of the cancer cell.

The understanding of the natural history of a given cancer is essential in the implementation of screening. Chemo- and radiotherapy have been effective treatments for a few types of cancers. However, their overall curative impact has been minimal. Progress in molecular biology and in understanding the role of genes in cell cycle control may provide some promising future avenues to explore for cancer therapy.

This publication is dedicated to Jan Pontén. His contribution in the selection of the topics and the contributors was essential. Jan had an unusually broadminded approach in addressing the issue of cancer, not only in

---

\* Tel.: +33-472-73-84-62; fax: +33-472-73-83-22.

E-mail address: montesano@iarc.fr (R. Montesano).

his scientific approach, but also in discussing issues related to the relationship between the cancer patient and the doctor, and in the necessity to improve palliative cancer care in societies with different cultural backgrounds.

We would like to thank the various contributors who have enabled this special issue to be produced. Our

special thanks to Cold Spring Harbor Laboratory Press for permission to reproduce the article by Jan Pontén and to Federik Pontén for his help. This publication was made possible by the interaction between the EACR and the Federation of European Cancer Societies (FECS) and a particular thank you goes to Professor Dieter Hossfeld, President of FECS.