



We present to you this very special issue related to cancer biology, guest edited by Professor P. Kondaiah. This is coming at a time when the awareness of the occurrence of Cancer in India is growing and concerted efforts are underway to detect and control the proliferation of this killer disease at an early stage of its manifestation. There are several groups in India who are following different pathways to curb the spread of this disease and this compilation gives a bird's eye view of the work carried out in these laboratories. The issue highlights the importance of cancer stem cells, the significance of targeted therapies in research with particular emphasis on gene therapy and its impact on breast cancer. Our colleague, Professor P. Kondaiah, an authority in the area of cancer biology in India, has collated the articles and has done an excellent job in guest editing and on behalf of the editorial board I thank him for this effort.

Special thanks to our editorial staff for putting an enormous dedication to get the issue in this current form. We have lined up the next couple of issues on subjects of topical interest as always and the guest editors are already at work to bring these issues with the best of articles in the respective areas.

T.N. Guru Row

Editor

ssctng@sscu.iisc.ernet.in



Cancer Enigma: Concepts, Challenges and Prospects

Cancer as a disease is a huge burden on health in any society. It is believed that life style changes over the centuries are primarily responsible for the high incidence of cancers in the population. Compared to several decades ago, the incidence of cancer is several folds and is rapidly rising. However, the reasons for this increase are not clearly understood. Although the incidence of various types of cancers is relatively higher in developed nations, recent lifestyle changes in developing countries are resulting in the increase of cancer incidence in these countries. In India, breast, head and neck, and cervix cancers are relatively more prevalent than other types of cancers. Of these, breast cancers are on the rise in urban populations and it is expected to be on the top of cancers of women in urban India. Besides, there is a significant rise in the incidence of breast cancers in the young women in India. The other important cancer that needs immediate attention is the oral cancer. In India, it accounts for almost 40% of all cancers, due to the widespread habits of tobacco chewing and smoking in conjunction with alcohol consumption. Its over-all five-year survival period is among the lowest for all major cancers and has not changed in the past two decades, despite advances in the management of cancers. The other highly fatal forms of solid tumors are the cancer of pancreas, brain, lung and liver. If diagnosed early, most patients respond to therapy that results in better prognosis. In advanced stages the cancer cells are highly resistance to all forms of therapy and some cells acquire the ability (or they are always present but dormant) to spread to other organ sites and form secondary tumors. This phenomenon of developing secondary tumors is called "metastasis". Currently several novel targeted therapies are being tried to contain the spread and development of metastasis of some forms of cancers. Cancer Research has entered a critical phase in the global scenario following the recent excitements in genomics arena. We now have better understanding of the basic mechanisms of cancer initiation and progression with innumerable genes, pathways identified in the recent years. The major task in front of the scientists is on the challenges in translating these findings to the bedside for the benefit of patients. Recent advances in cancer include genomics and proteomics approaches to identify gene expression signatures associated with progression of various cancers. For example, by micro array analysis, several groups proposed gene expression signatures that predict biological behavior of malignancies. Following the identification of target genes, novel targeted therapeutic strategies could be devised. For example, antibody therapy for Her2/neu expressing breast cancers was possible due to the discovery of Her2 amplification in some breast cancers. Also, kinase inhibitors for some forms of leukemia have been developed following basic research that identified an aberrant kinase (BCR-ABL) in these cancers. Also, inhibitors of several oncogenic proteins such as EGFR, Raf etc are available for the treatment of some forms of tumors. Besides, several other targeted therapies are in various stages of clinical evaluation notable among them are VEGF and VEGF receptor inhibitors that are targeted at tumor angiogenesis. These therapies are either small molecules or antibodies. However, these therapies have limited success and combination therapies are being advocated. This indicates that there is no universal cure for any type of cancer and a multi-pronged approach is the urgent need.

In view of the exciting developments in cancer biology, we planned this issue containing reviews on the latest developments in cancer biology written by experts in their respective fields. In this issue, we covered the basics of initiation of cancer and the exiting area of cancer stem cells; the important aspects of therapeutics including targeted therapies covering both basic and clinical research. Moreover, the recent exciting areas of gene therapy and preventive approaches applicable to cervical cancers are also included. Finally at a very basic level of structural differences in oncogenic molecules and their use in



developing targeted drugs with an example of BRCA genes that cause hereditary forms of breast cancer is also included. These areas have a great potential for translational research. We earnestly hope that these articles will be of interesting addition to already available information on cancer biology.

I personally thank the editorial board of the Journal of Indian Institute of Science with a special thanks to the Chief Editor, Dr. T.N. Guru Row for giving me this opportunity to put together this issue. We are grateful to all the authors for spending considerable time from their busy schedule in writing the articles. Finally I place on record our appreciation for the help rendered by the reviewers, copy editors and proof readers in bringing out this issue.



Prof. Paturu Kondaiah

Professor
Molecular Reproduction Development & Genetics,
Indian Institute of Science,
Bangalore 560012, India.
Tel# +91 080 2293 2688
paturu@mrdg.iisc.ernet.in

