

# Chapter 15

## Preparing Professionals in Cancer Therapy: A Case Study of Programmed Cell Death

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### ABSTRACT

*Cancer is currently the second biggest cause of death in the Western world. Cancer cells escape the normal process of programmed cell death i.e., fail to die on schedule. The ability of cancer cells to avoid programmed cell death and continue to proliferate is one of the fundamental hallmarks of cancer and is a major target of cancer therapy development. Universities and research institutes are playing a major role in progress of cancer research. The aim of this study is to attract graduates of different disciplines towards cancer research and bring together researchers from different disciplines with an interest in the role of programmed cell death in cancer therapy and exploitation of programmed cell death research for therapeutic targeting of cancer. In spite of this, it is of broad interest to make a bridge or to start collaborations in between basic researchers and medical oncologists as well as for pharmaceutical companies i.e., aim of this study is to bridging the gap between knowledge and its action or application.*

### INTRODUCTION

Cancer is currently the second biggest cause of death in the western world. Deaths from cancer worldwide are projected to continue to rise to over 11 million in 2030. It is a group of diseases

with similar characteristics. Cancer can occur in all living cells from head to toe, and different cancers have different natural history. Epidemiological study shows that 70 – 90% of all cancers are environmental (WHO, India). At present there are about 10 million new cancer patients identi-

DOI: 10.4018/978-1-4666-2845-8.ch015

## ***Preparing Professionals in Cancer Therapy***

fied each year, worldwide. Out of which nearly 5.5 million are in the developing countries like India. Currently 12% of all deaths in the world are due to cancer. In forthcoming 20 years, death toll due to cancer will increase from 6 to 10 million (WHO, India). Earlier communicable diseases like cholera or malaria were considered as major health problems of India but with progression of time, non-communicable diseases like heart disease, cancer and diabetes, are emerging as the major health issues in developing countries including India. It is said that coming days will be days of cancer and heart disease. These diseases are lifestyle related, have a long latent period and needs special treatment, including proper infrastructure. It is not so easily treatable disease like malaria or cholera. The risk factors for the major non-communicable diseases are tobacco, dietary habits, inadequate physical activity and alcohol consumption (WHO, India).

Data from population based cancer registries under National Cancer Registry Program indicate that the leading sites of cancer are oral cavity, lungs, oesophagus and stomach in male and cervix and breast in females, accounting for more than 50% of all cancer death in India. WHO has estimated that 91% of oral cancers in South–East Asia are directly related to the use of tobacco. If we see globally, the number one cancer is cancer of the lung, and smoking is the main cause of it. Though cancer of the lung is the leading cancer of the developed world, because of the changing life style and increasing number of smokers, it is also becoming a major cause of death, in a developing country like India. It is to be noted that between 1985 and 1990, lung cancer burden of the developing world went up by 25% (from 261,000 to 327,100), while that of the developed world went up by only 7% (from 415,000 to 444,700) (Agarwal, Yeole and Ram 2009). From this data we can assume that with rapid change of our life style, we are also inviting some unwanted cause of health problem. Another problem in India is that over 70% of patients, presented in advanced stage

of the disease, resulting in poor survival and high mortality rates. Government of India formulated the National Cancer Control Programme in 1984 with four major goals:

1. Primary Prevention
2. Early Detection of Cancer
3. Treatment
4. Palliative Care

Primary prevention can be defined as ‘action taken prior to the onset of disease, which removes the possibility that a disease will even occur’, like health education regarding hazards of tobacco consumption and necessity of genital hygiene for prevention of cervical cancer. Educating the people regarding the disease will help to drive the fears and stigma associated with the disease. It is important to involve all levels of the population in the education process. The concept of cancer education should focus on tobacco control, physical activity and avoidance of obesity, healthy dietary practices, avoidance of sedentary life style, safe sexual practice to avoid human papilloma virus infection. Apart from the Government machinery, there is an important role of Non Governmental Organizations (NGOs), in this type of health program.

There are many socio-cultural hurdles that complicate the cancer control process in most of the developing countries. Illiteracy, lack of any health communication strategy, fatalistic attitude of people, social stigma and ignorance about a disease like cancer prevent people to seek early medical consultation. Thus, the voluntary or Non-Government Organizations have great responsibility in creating awareness and educating people about cancer prevention, in organizing a systematic campaign against tobacco usage and in providing dedicated cancer screening and early detection services.

During the last decade the concept of apoptotic cell death as a natural barrier against cancer has evolved to the widened concept of programmed

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