

Cancer update – 2006*

Cancer is one of the biggest threats to society, claiming several lakhs of lives every year. However, recent scientific findings reveal that if diagnosed and treated early, many cancers can be cured. Though the developed nations are deploying recent techniques to treat cancer and reducing the occurrence of cancer incidences by growing public awareness, India is lagging behind in offering such treatments and in cancer management. Even if such facilities are available in the country, they are limited to big cities only, which hardly reaches the rural public. In view of this, Uttaranchal Forest Hospital Trust Medical College, Haldwani and Institute of Allied Health Services, Education and Training, Haldwani had recently organized a national symposium. The aim was to have a candid look on recent developments in the field of cancer diagnostics, therapeutics and management by key voices in the academic community and to explore the possibilities to establish a medical centre with such facilities. The symposium attracted renowned doctors and distinguished scientists from all over the country. The two-day deliberations were centred on five themes, namely, Role of nuclear medicine in cancer, Biomolecules of cancer, Cancer: A surgeon's perspective, New approach towards cancer therapy and Cancer management.

In the inaugural speech of scientific session, R. C. Sobti (Panjab University) discussed molecular epidemiology of cancer in the post-genomic era. He explained that completion of the Human Genome Project revealed genetic variations that presumably support the fact that family history is a risk factor for cancer. These variations may also interact with the environment and lifestyle factors that would finally determine an individual's risk for cancer susceptibility. The common variations are single nucleotide polymorphisms (SNPs) that can be used as molecular markers to predict an individual's risk to

develop cancer. SNP studies of phase-I and phase-II metabolic genes, cell-cycle regulatory genes, DNA repair genes, genes of the immune system, oncogenes and anti-oncogenes, etc. could contribute a lot to this aspect. He also stressed on the need of constructing SNP and genotyping map of the human genome that will help in applying individualized medicine leading to more accuracy in treating cancer.

Several speakers enumerated the importance of nuclear medicine in oncology. A. K. Singh (Institute of Nuclear Medicine and Allied Health Sciences, DRDO, Delhi) highlighted the need for introducing nuclear medicine to the Indian pharmaceutical industry, especially when pharmacoscintigraphy (application of nuclear medicine to pharmaceutical industry) is getting worldwide recognition as a frontline diagnostic imaging modality. With the advent of receptor and molecular single photon emission computed tomography imaging, and development of positron emission tomography (PET) hardware and pharmaceuticals, nuclear medicine has entered a decisive phase in drug development in the West. Singh described nuclear medicine imaging technique that involves injection of a chemical (or a drug) with a suitable radioactive element into the body and imaging thereafter with the help of a gamma-camera or a PET system. This approach has an advantage of quantitation that makes it possible to obtain dynamic parametric information not possible by any other non-invasive system with exquisite ease. Baljinder Singh (Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh) enumerated new radiopharmaceuticals, such as indium-111-labelled octreotide (pentetreotide) that has enabled more specific imaging for the diagnosis of gastroentero-pancreatic endocrine tumours, radio-labelled peptides like ^{68}Ga , and mechanism of tumour uptake involving $^{99\text{m}}\text{Tc}$ -methoxyisobutyl isonitrile. He also mentioned new techniques such as sentinel lymph-node localization and biopsy that allow less invasive tumour staging. P. S. Choudhury (Rajiv Gandhi Cancer Institute and Research Center (RGCIRC), Delhi) discussed the higher accuracy rate in tumour imaging when PET and computerized tomography are integrated in the same machine in

comparison to using these technologies in isolation. T. Kataria (RGCIRC) stated that intensity modulated radiotherapy or intelligently modified radiotherapy, which involves introduction of required dose of radiation within or around the tumour without compromising the tolerance of normal tissues within which the tumour is placed, can be used as the treatment of choice for head and neck cancers, especially nasopharynx, oropharynx, larynx and hypopharynx, as tumours at these sites have a propensity to involve lymphatics either ipsilaterally or bilaterally, making it difficult to offer surgery.

S. S. Chauhan (All India Institute of Medical Sciences, New Delhi) discussed findings on the expression of cathepsin L, a cysteine protease that has been implicated in tumour invasion and metastasis. His group found cathepsin L to be up-regulated by vascular endothelial growth factor, a major regulator of physiological and pathological neovascularization in tumours. Z. Ali (Institute of Medical Science, Banaras Hindu University, Varanasi) discussed findings of his group on nucleosomal structures in the transcriptionally active chromatin and discussed how this would help in the understanding of cancer gene expression.

Several speakers discussed oncology from the surgical point of view. A. K. Dewan (RGCIRC) introduced current advancement in cancer treatment involving robotic surgery. He also mentioned about the revolution that could be brought in this field by genomics and proteomics, and by protein and DNA-based nanorobot in the near future. A. K. Gupta (PGIMER) stated his experience in dealing with cases of metastatic neck diseases with surgical intervention. He concluded that for accurate prediction of five-year survival radiology, nuclear imaging and if possible histopathological evaluation should also be included.

R. K. Pandey (Roswell Park Cancer Institute, Buffalo, New York) introduced the audience to the utility of chlorophyll *a*-based compounds for tumour imaging and photodynamic therapy (PDT). According to him, compared with standard approaches, e.g. surgery, radiotherapy, chemotherapy, hormone therapy, etc. PDT can achieve equivalent or higher efficacy

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in the treatment of many cancers with greatly reduced morbidity and disfigurement. PDT can be applied before and after surgery, chemotherapy and or ionizing radiation therapy, and can be repeated many times. Also, the adjunctive use of PDT at the time of surgical removal of a primary tumour may aid in the elimination of residual microscopic metastases. Neeta Singh (AIIMS) depicted the attempt of her group to produce a human papillomavirus (HPV)-16 chimeric prophylactic cum-therapeutic vaccine. The high-risk HPV-16 and -18 types account for approximately 70% of cervical cancer in women. Hence, discovering appropriate vaccines would be a major contribution for prevention and treatment of cervical cancer. M. C. Pant (King George's Medical University, Lucknow) expressed his views on

the future prospects of cancer treatment involving molecular targeted therapy that could be achieved by targeting the cancer cells with signal transduction inhibitors, proteasome inhibitors that prevent proteolysis of proteins affecting multiple signaling cascades, Cox-2 inhibitors that prevent malignant transformation, and vaccines, immunotherapy and gene therapy. D. C. Doval (RGCIRC) stated that besides conventional chemotherapy by taxanes, the current concept of using molecular markers has opened a new field of early prediction for breast cancer, which would certainly contribute to reduction of morbidity rate.

R. Kapoor (PGIMER) discussed various strategies of early detection and prevention of breast cancer involving self as well as clinical examination and mammo-

graphy. V. Singh (PGIMER) discussed the management of gall-bladder carcinoma by employing CT, biopsy/fine-needle aspiration cytology, cholecystectomy, endoscopic plastic/metal stenting. Kapil Kumar (RGCIRC) in his discussion on management of gall bladder cancer, mentioned the latest trends to explore the combination of gemcitabine/cisplatin in locally advanced gall-bladder cancer treatment.

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MEETING REPORT

Recognition and reward to the tribal and farming communities for conservation of agro-biodiversity*

India, in compliance with the requirement under the Trade Related aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO), enacted the Protection of Plant Varieties and Farmers' Rights Act (PPVFR Act) in 2001. TRIPS require Member countries of WTO to provide legal protection to plant varieties either by patents or by an effective *sui generis* system or a combination of both¹. Having India chosen not to grant patent to plants and animals and the parts thereof, including seeds, varieties and species under its Patent (Second Amendment)² of 2002, the *sui generis* system was the only national option for protection of plant varieties. The Intellectual Property Rights (IPR) available to plant varieties under the PPVFR Act is similar to the Plant Breeder's Right (PBR). This IPR confers exclusive right on the breeder or his/her successor, agent or licensee of a plant variety to produce,

sell, market, distribute, import or export the propagating material of the protected variety³. A plant variety, unlike a patentable non-biological innovation, is always generated from pre-existing varieties. All such pre-existing varieties in all cases are traceable to the land races and varieties evolved by farmers and the wild relatives conserved by them over hundreds of years. Thus, farmers are the immediate or distant contributors to the prior art associated with any new variety and this entitles them to the Farmers' Rights (FR). The FR were introduced by the Food and Agricultural Organization (FAO) of the United Nations to recognize the past, present and future contributions of farmers in all regions of the world, particularly in centres of origin and diversity, for conserving, improving and making available plant genetic resources for continued improvement of all crop plants⁴. The recent FAO Treaty on Plant Genetic Resources on Food and Agriculture defined FR as the rights to save, use, exchange and sell farm-saved seeds and other propagating materials, and to participate in decision-making regarding, and in the fair and equitable sharing of the benefits arising from, the use of plant genetic resources⁵.

In November 2005, the Government of India implemented certain sections of the PPVFR Act for the purpose of establishing the PPVFR Authority, which is competent to implement the PPVFR Act. This Authority, based in Delhi, is currently engaged in developing framework and regulations for implementation of the rest of the sections of the Act with progressive opening of different crop species for the purpose of registration. As part of this process, the PPVFR Authority along with M.S. Swaminathan Research Foundation (MSSRF), Chennai organized a multi-stakeholder national consultation on FR to develop guidelines for implementing the three important aspects of the FR provided in the Act. This consultation was held on 4 November 2006 and attended by about 85 participants from different regions of the country representing tribal communities, farmers, farmers' associations, panchayat representatives, non-governmental organizations, legal experts, scientists, officials from the Department of Agriculture associated with variety release, etc. M. S. Swaminathan (MSSRF) and S. Nagarajan (Chairman, PPVFR Authority) chaired the two sessions. Jeypore, Koraput district, Orissa was chosen as the venue of

*A report on the National Consultation on Farmers' Rights held in Jeypore, Koraput on 4 November 2006 under the auspices of Protection of Plant Varieties and Farmers' Rights Authority, Government of India and M.S. Swaminathan Research Foundation, Chennai.