RADIATION SCIENCE TODAY

A Quarterly eNewsletter

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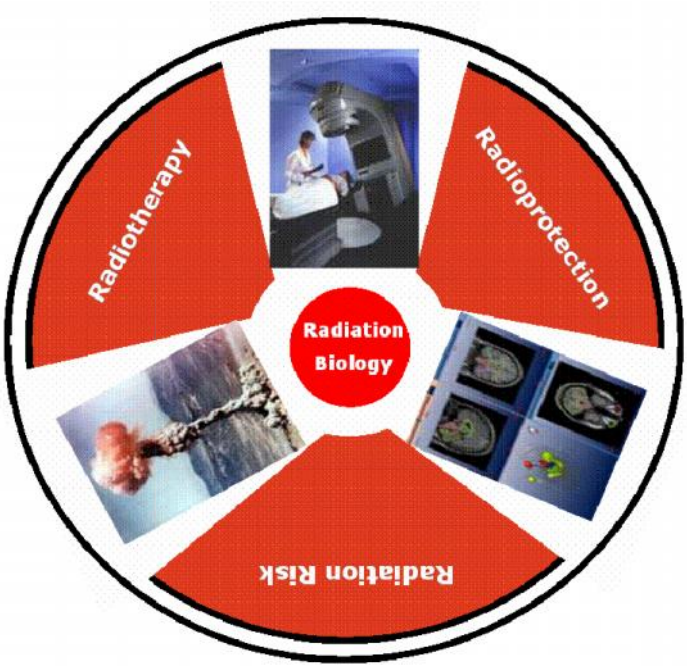

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Radiation Science Today

April-June **Issue:** 18 **Year:** 2012

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1. An Interview with Prof. Jean Cadet, France

An Interview
on
Radiation-induced damage to DNA: formation, measurement and biochemical processing
with
Prof. Jean Cadet (JC)
Scientific Adviser, CEA/Grenoble
Adjunct Professor, Medical University of Sherbrooke, France
by
Radiation Science Today (RST)

RST: Since discovery of radiation and radioactivity in late 1890's, DNA has been central theme of radiation effects. Later on role of other targets of radiation action also took the space. In your opinion, what could be the reason(s) of domination of DNA-centric dogma in radiation research, which still persists very strongly?

JC: Other biomolecules including proteins and lipids are also biological targets of both indirect and direct effects of ionizing radiation. However radiation-induced DNA lesions exert a major biological impact in terms of lethality, mutagenesis and carcinogenicity. This is particularly true for the deleterious clustered lesions that include double strand breaks (DSBs) and non-DSB oxidatively generated clustered DNA damage consisting of several modified bases, abasic sites and/or single strand breaks within one or two DNA helix turns.

RST: In your opinion, in last 10 years, what are the major breakthrough research findings in the area of radiation and DNA damage?

JC: Major progress has been made during the last decade on the accurate measurement of several single oxidized nucleosides in cellular DNA that arise from either the molecular effects of hydroxyl radical ($^{\bullet}OH$), the main reactive oxygen species produced by radiolysis of water molecules, and direct interaction (ionization) of highly energetic photons with DNA. As two main findings it was found that the indirect effects mediated by $^{\bullet}OH$ generated in close vicinity of DNA are more important (about 70%) than ionization (about 30%) in terms of damage induction to DNA. It was also clearly established that the frequency of single base damage formation is much lower than was reported in the beginning of the 90's by a factor of about two magnitudes in close agreement with theoretical calculations. This provides further support to the major role played by clustered DNA damage whose severity increased with the linear energy transfer values of photons and heavy ions, in the overall biological effects of ionizing radiation. Important discoveries have been made on the repair and mutagenic properties of several of the complex clustered DNA damage that may be generated by multiple hit processes triggered by high energetic photons and particles.

RST: In your opinion, in last few years what are the major technical advancement without which we could not have gained key information in the area of radiation and DNA damage?

JC: The availability of powerful analytical tools such as accurate and sensitive high performance liquid chromatography associated with the quantitative electrospray ionization tandem mass spectrometry technique has allowed the measurement of single oxidized base damage and several tandem and interstrand cross-links in cellular DNA. This has been complemented by measurements of damage generated at relatively low dose of exposure (down to 0.1 Gy) by the implementation of enzymatic based methods involving the comet assay. It may be added that the assessment of biological effects of complex DNA damage has benefited of major achievements in the domain of the synthesis of clustered lesions containing DNA duplexes and the development of relevant assays aimed at assessing mutagenic effects. It may be added that the immunological detection of γH2AX foci as a sensitive assay, although lacking of some specificity, represents a powerful tool for monitoring the formation and repair of radiation-induced DSBs in cells.

RST: How do you think the interaction of physicists and chemists helped biologists in better understanding of DNA damage and cellular radiation response?

JC: One may noted an increasing overlapping between physicists, chemists and biologists that has led to fruitful cooperative projects and major achievements. In that respect, I may quote a few relevant examples of synergetic efforts. This have been the case for gaining insights into chemical effects on DNA of low energy electrons that are generated as secondary reactive species after the initial interaction of high energetic photons with DNA. The relevant role played by several physicists and physico-chemists in proposing highly relevant theoretical models of radiation-induced DNA degradation product distribution mostly based on Monte-Carlo calculations that include the effects of linear energy transfer has to be acknowledged. Detailed mechanistic information on the formation of several DNA oxidation products including formamidopyrimidine arising from $^{\bullet}$OH and one-electron oxidation of purine bases has been inferred from density functional theory calculations. Another relevant of strong and efficient cooperation between, chemists and biologists deals with the assessment of biological role of several clustered DNA damage.

RST: There are several key molecules discovered in DNA damage and repair? Out of which few of them you think are most critical?

JC: Several radiation-induced complex DNA lesions that are induced by one single radical event ($^{\bullet}$OH, one-electron oxidation) have been characterized in model studies and further investigated in cellular DNA. This was the case for purine 5',8-cyclonucleosides that are produced by $^{\bullet}$OH-mediated hydrogen abstraction from the C5 of the 2-deoxyribose moiety of DNA and are removed by nucleotide excision repair. Hydrogen atom abstraction from the sugar moiety at C4 has been shown to give rise to DNA interstrand cross-links. Another example of DNA interstrand cross-link formation involves nucleophilic reactions of the guanine radical cation generated by ionization. Relevant mechanistic information on the generation of DNA-protein cross-links has been gained from detailed investigations that have shown occurrence of efficient nucleophilic addition of amino acids such as lysine, serine and proline to the guanine radical cation. These few examples illustrate the complexity of the degradation pathways that are involved in the molecular effects of ionizing radiation on cellular DNA.

RST: Based on your expertise in the area of photochemistry and photobiology, do you like to comment, how they complement the radiation biology of ionizing radiation?
JC: Obviously the effects of solar light and ionizing radiation on DNA are for the bulk very different in terms of DNA damage induction and degradation pathways due to huge differences in the energy of the photons of the two radiation domains of the electromagnetic range. It is now well documented that excitation processes induced by the interaction of ionizing radiation with DNA do not generate detectable amounts of bipyrimidine addition products such as cyclobutane pyrimidine dimers and pyrimidine (6-4) pyrimidone adducts that are efficiently formed by absorption of UVB photons by thymine and cytosine and their subsequent excitation. However the possibility of specifically one-electron oxidizing nucleobases and preferentially guanine in DNA by either UVA photosensitization or bi-photonic ionization by high intensity UVC laser pulses has been used to mimic the effects of direct effect of ionizing radiation. This has allowed the determination of the distribution of one-electron oxidation base products in cellular DNA and the delineation of the mechanisms of formation of DNA-protein and interstrand cross-links.

RST: What would be future line of research in radiation and DNA damage?
JC: Still considerable efforts remain to be done in the elucidation of the molecular effects of ionizing radiation in terms of induction of the several classes of damage to cellular damage with emphasis on the measurement of non-DSB oxidatively generated damage that arise from several simultaneous radical and excitation events. The detection of the latter damage that is still a challenging analytical issue may be used as a true signature of radiation effects and a marker of exposure of low radiation doses. This should also permit the delineation of the biological role (repair, mutagenicity) of these complexes types of relevant radiation-induced DNA damage.

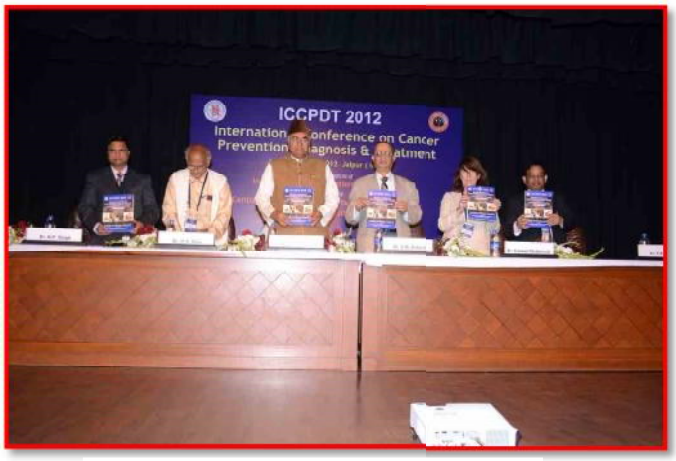
Brief biographical note of Prof. Jean Cadet:

Prof. Jean Cadet is Scientific Adviser at the French Atomic Energy Commission, CEA/Grenoble and Adjunct Professor, University of Sherbrooke, Sherbrooke, Canada after being the head of the Laboratory of "*Lésions des Acides Nucléiques*" and Research Director at CEA. He his involved in research activities that deal with various aspects of the chemistry and biochemistry of oxidatively generated and photo-induced damage to DNA. He is author or co-author of 550 publications consisting of more than 500 original contributions to peer-reviewed journals and about 50 book chapters. His "h" factor as provided by Web of Science Citation Report is 61. He has been and is member of the editorial board of several journals: *Chemical Research in Toxicology* (until 2009), *Free Radical Research* (until 2009) *Free Radical in Biology and Medicine*, *Mutation Research*, *Indian Journal of Radiation Research, International Journal of Radiation Biology, International Journal of Low Radiation*. He has been recently appointed as Associate Editor of *Radiation Research* and *Journal of Biochemical Technology* and since 2009 he is the Editor-in-Chief of *Photochemistry and Photobiology*. He has received several awards including "*Armes Lecturer*" from the University of Manitoba at Winnipeg, "*Weiss Medal*" from the Association for Radiation Research, UK, "*Grand Prix Scientifique*" from CEA, "*Research Award*" from the American Society for Photobiology, the "*Medal for Excellence*" from the European Society for Photobiology. He has also received the "*Prix Charles Dhéré*" in chemical biology and the "*Médaille Berthelot*" in chemistry from the French Academy of Sciences. He has been promoted "Chevalier de l'Ordre National du Mérite" by the French Minister of Universities and Research.

2. Report of ISRB Events

INTERNATIONAL CONFERENCE ON CANCER PREVENTION, DIAGNOSIS & TREATMENT (ICCPDT 2012) JAIPUR (INDIA), JANUARY 21-22, 2012

The International Conference on Cancer Prevention, Diagnosis & Treatment was organized by Centre for Advanced Studies, Department of Zoology, University of Rajasthan under the auspices of Indian Society for Radiation Biology (ISRB) at Indralok Auditorium, Jaipur (India) on January 21-22 2012. The main aim of the conference was to bring the alarming world cancer crisis to the forefront by urging the public, government leaders and health policy makers to take proactive steps in the global fight against cancer and work together to decrease the global burden of cancer. One of the objectives of this conference was to improve and rectify the horrifying scenario related to the poor diagnosis and inadequate treatment facilities available for the patients suffering from various types of cancers especially in developing countries like India.



Inauguration session

The scientific program of the conference encompassed the advances in the field of oncology for the awareness, prevention, early diagnosis and treatment of this dreaded disease. This Conference was attended by more than 400 International as well as national faculties and delegates to share their knowledge and experience with others and to encourage young investigators and researchers to promote further education and research in oncology.

The conference was inaugurated Shri A. A. Khan, Minister of Medical & Health, Family Welfare, Ayurved & Medical Education, Govt. of Rajasthan and presided by Dr. M. R. Raju, Managing Trustee of International Cancer Center Mahatama Gandhi Memorial Medical Trust, Dr. V. M. Katoch, Director General, ICMR & Secretary to Government of India, Ministry of Health & Family Welfare was the guest of honour. During the inaugural ceremony, MOU was

signed and exchanged between University of Rajasthan, Jaipur and McMaster University, Hamilton, Canada for the mutual interest in the advancement of Radiation & Cancer Research. ISRB Fellowship Awards were also presented to some renowned scientists for their outstanding contribution in the field of Radiation Biology. The program was wrapped up by beautiful and colorful Rajasthani cultural program.

Exhibition on Cancer

On the first day of the conference, 4 scientific sessions were conducted with 28 invited talks from eminent scientists/clinicians of various countries in different areas of oncology and 45 posters were presented by young investigators of various institutes of the country.

The first session was focused on tumor-micro environment and signaling in which Dr. Carmel Mothersill of McMaster University, Canada highlighted that alternative medicine and other techniques involving electromagnetic perturbations can modify the response of cells to ionizing radiation and induce bystander effects. She stressed that this can provide the novel target to exploit in radiation protection. This was followed by Dr. Tetsuya Konishi of Niigata University of Pharmacy, Japan who presented a talk on Squalene enhances tumor growth inhibition by doxorubicin by in balb/c mice through modulation of checkpoint signaling. He suggested the complimentary use of squalene in cancer treatment. After this, Dr. Mansoor M. Ahmed of University of Miami, USA discussed in details about the signaling pathways that lead to either apoptosis or survival of cells during his talk on signal transduction in tumor micro-environment. The other speakers in this session were Dr. R.C. Chaubey, BARC, Mumbai who highlighted the use of comet assay in quantifying DNA damage and predicting the cellular radiosensitivity of tumor cells and Dr. Manish Biyani from University of Tokyo, Japan who proposed the use of peptide aptamers as capturing agents in early cancer diagnosis.

The next session was targeted on the strategies for prevention, detection & surgical management of cancer. Dr. R. A. Towner of Oklahoma Medical Research Foundation, USA discussed on Molecular MRI differentiation of vegfr2 levels in rat c6 and rg2 gliomas.

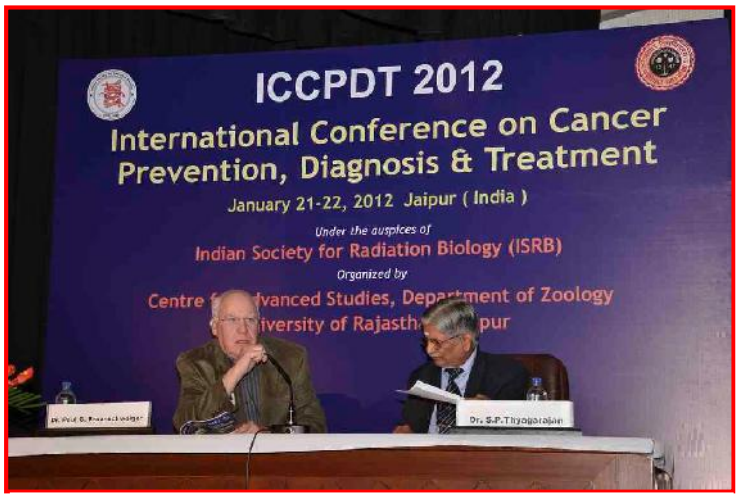
Dr. P. K. Mishra from Tata Memorial Centre, Mumbai proposed that dendritic cell based therapeutic vaccination is an attractive anti-cancer strategy with minimal toxic side effects during his talk on Development of a dendritic cell engineered therapeutic vaccine for gastrointestinal malignancies. The other important talks of this session on various types of cancers were delivered by *Dr.* A. K. Dewan from Rajiv Gandhi Cancer Institute, Delhi delivered an overview on Past present and future of Head and neck oncology. Dr. Mridul Gehlot and Dr. Raj Govind Sharma from Jaipur delivered the talks on Advances in surgical management of breast cancer and cervical interepithelial neoplasia, respectively. Dr. Karan Peepre from Gandhi Medical College, Bhopal discussed the role of FDG PET/CT fusion imaging in the management of breast cancer.

Session III was focused on Emerging radiotherapy approaches & treatment modalities. In this Dr. R. P. Tripathi, Director, INMAS, New Delhi highlighted the role of non invasive imaging modalities in early diagnosis of cancers. Dr. Niloy Ranjan Datta from IAEA Austria discussed the limited availability of radiation therapy in multi-modality cancer treatment in developing countries during his talk on 'Is radiation therapy a cost-effective and economically viable option for developing countries?' Dr. Hirohiko Yajima of National Institute of Radiological Sciences, Japan described the basic biological research for heavy ion radiotherapy with HIMAC, heavy ion medical accelerator in Chiba, Japan. P.S. Choudhary from RGCI & RC, Delhi presented a talk on PET-CT imaging for staging and tumor response monitoring. At the end of session, Dr. Arun Chougule, S.M.S. Medical College & Hospital, Jaipur explained the recent advances in radiotherapy.

Scientific Session

Scientific Session

The last session of first day of conference was based on Xtreme molecular imaging & targeted therapy chaired by. At the beginning, Dr. Rao Papineni from Carestream Health Inc., USA unfolded his work on non invasive functional molecular imaging-illuminate the myeloperoxidase enzyme action during ovarian cancer mouse model tumorigenesis. He suggested that a real time determination of *in vivo* MPO activity in the tumor and during the progression of ovarian cancer will be valuable to assess the role of innate immune process in ovarian cancer progression, cancer treatment and the proper management of current therapies. Subsequently, Dr. Puneet Gupta, Apollo Hospital Delhi, spotlighted on the latest molecular targeted anti-cancer drugs in routine cancer practice especially in India.



Scientific Session

Dr. Gopal Pande, CCMB Hyderabad, showed the methods developed in his laboratory to visualize cells in intact tissues during the talk on Non-invasive in vivo imaging of transplanted hepatocytes and bone marrow cells in the liver tissues of mice and rats. Dr. Lekha Dinesh Kumar, from the same institute, delivered lecture on Tyrosine kinase EPHB4: a novel biological drug in controlling colon and breast cancer through the modulation of wnt pathway and target gene c-myc. She suggested that Ephb4 could be used as a biological drug in controlling colon and breast cancers.

The second day of the conference consists of four sessions including 20 invited talks and 45 posters presentations. The first session of second day was on Nanotherapeutics in cancer treatment. In the beginning, Dr. S. H. Pawar, Dr. D. Y. Patil University Kolhapur, highlighted the recent advances in nanotechnology for cancer treatment. Dr. C. K. K. Nair from Pushpagiri Institute of Medical Sciences Thiruvella, delivered lecture on the therapeutic applications of magnetic Fe3O4 nanoparticles in cancer therapy: preclinical investigations, and suggested the need of elegant applications of nanotechnology in cancer treatment. Dr. R. Ravichandran of Royal Hospital from Oman presented a review on Radiosensitization by gold nanoparticles- Monte Carlo study. He emphasized on targeting of tumors using Au-

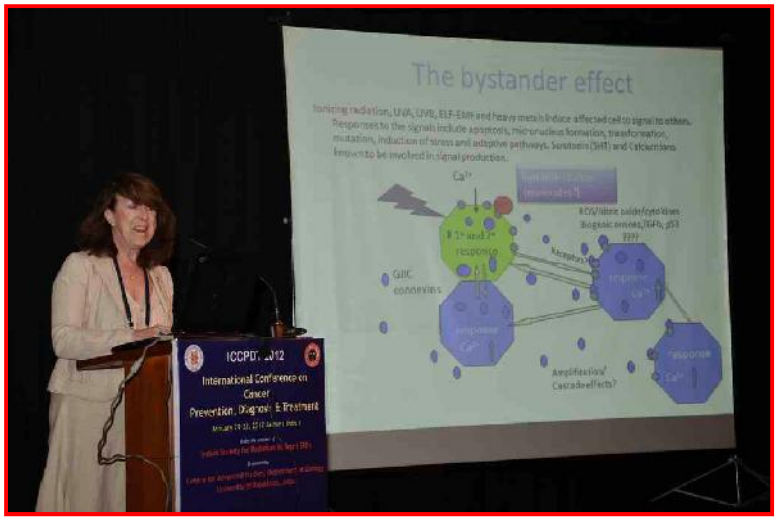
nanoparticles and the theoretical calculations to depict energy depositions for different photon energies. After this, Dr. B. S. Satish Rao, from Manipal Life Sciences Centre delivered a talk on Anticancer, radio-sensitizing effect of Plumbagin and Juglone as free and microsphere, liposome based targeted drug delivery platforms.

Scientific Session

The next session was focused on Anti-cancer drug development, chaired by where different speakers highlighted their views in the advancement in chemotherapy. Dr. A. K. Kohli, from BARC, addressed the Role of BRIT in combating cancer in India. Dr. Vijayalaxmi, from University of Texas, USA proposed the potential role of Melatonin in treatment of many diseases including cancer. Dr. Hemant Malhotra, S.M.S. Medical College & Hospital, Jaipur, presented a well thought-out magnitude of the problem of cancer in his talk on Chemotherapy today and tomorrow. Dr. Vijay K. Singh from AFRRI USA, delivered a talk on Myeloid progenitors: A radiation countermeasure that is effective when initiated days after irradiation. Dr. Vijay K Kalia from NIMHANS, Bangalore presented his studies on the malignant gliomas, one of the major challenges for the oncologists, during his talk on Optimizing temozolomide-radiotherapy of malignant gliomas by lonidamine. At the end of the session, Dr. Sarvesh Paliwal from Banasthali University, Tonk, delivered a lecture on Prodrug approach: A stylish way for delivery of anti-neoplastic agents and highlighted the enzyme prodrug strategies for selective delivery of anti-neoplastic agents.

The next session was aimed on Cancer risk & its management by phytochemicals. Dr. M. R. Raju from Los Alamos National Laboratory, USA shared his experiences on the complex problem of cancer during his talk on Cancer awareness, prevention, early detection and treatment-In rural Andhra Pradesh. Dr. Sung Kee Jo, KAERI from Korea made his presentation on Complementary effects of an herbal composition (hemohim) for cancer radiotherapy and chemotherapy. It was followed by Dr. S. C. Jain, DRDO who highlighted on Cancer risk associated with the use of mobile phones – WHO latest view. At the end of the

session Dr. Pradeep Kumar, from Meerut delivered a talk on Anticancer activity of Achyranthes aspera (apamarg)



Scientific Session

The last Session of the conference was focused on Ethical issues in biomedical research. Dr. S. P. Thyagarajan from Sri Ramachandra University, Chennai presented an Overview of ethics and research ethics education with the concern of the abuses of human subjects in biomedical experiments especially during world war II. Later, Dr. Paul G. Braunschweiger, University of Miami from USA highlighted the need to maintain the public's trust in the biomedical research enterprise for which personal integrity and professionalism is essential. His talk was targeted on Responsible authorship: The key to professionalism. Subsequently, Dr. Sergio G. Litewka, University of Miami from USA delivered a lecture on International perspectives on research misconduct. It was followed by the presentation of Dr. Ram P Agarwal, University of Miami, USA on Religio-cultural sensitivity and the ethical conduct of research in which he pointed out that it is important for a researcher to develop protocols, methodology, informed consent forms etc. conforming with religio cultural diversity, local customs and the beliefs of the participants. Later, Dr. Colin Seymour, Mc Master University from Canada presented his thoughts on the ego, the ID, and radiotherapy. At the end, Dr. Suresh Varadarajan from Sri Ramachandra University, Chennai, delivered a talk on preserving the public trust in research enterprise.

The closing ceremony of the conference was marked by the valedictory function. Prof. N. P Singh, Head, Department of Zoology, University of Rajasthan welcomed all the delegates. Prof. P. K. Goyal, President-ISRB, presented a brief conference report. Prof. S. P. Thyagrajan, Pro Vice Chancellor, Sri Ramachandra University, Chennai was the Chief Guest and he delivered the valedictory address. Dr. R. P. Tripathi, Director, Institute of Medical & Allied Sciences , Delhi addressed the house as the Guest of Honour. Prof. B. L. Sharma, Vice Chancellor, University of Rajasthan, Jaipur delivered the presidential address. The guests on

the dais honored Ms. Dhanya K. C. (Amla Cancer Research Centre, Thrissur), Mr. Ashok Bhagwath (Manipal University, Manipal), Dr. Sreedevi Balakrishna (BARC, Mumbai), Ms. Anupama Mittal (Banasthali University, Banasthali) with Best Poster Presentation Award. Prof. P. K. Goyal, made a vivacious atmosphere in the auditorium by encouraging his team members for their contributions to make this event memorable, academically and socially. All these members received memento as a token of appreciation from the guests. The program was concluded with the vote of thanks presented by Prof. P. K. Goyal, Convener ICCPDT.

Report prepared and submitted by

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Convener- ICCPDT 2012, Radiation & Cancer Biology Laboratory
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3. FROM ARCHIVES OF RADIATION SCIENCES

Paper: Comparison of heavy particle with X-irradiation on the hamster lung
Source: *American Journal of Pathology 1979, Vol: 95(3):765-74.*

(http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2042313/?tool=pubmed)

Authors: K. H. Woodruff, J. T. Leith, P. Powers-Risius, V. Havens, J. T. Lyman, J. Howard, and C. A. Tobias

Laboratory: Bio-Medical Division, Lawrence Berkeley Laboratory and Donner Laboraton- of Medical Physics. Berkeley, California, Department of Pathology, University of California. San Francisco, USA

Highlights of the paper

In the present paper, radiobiological effect of 375-MeV/nucleon neon irradiation in the plateau region of ionization was compared with 230 kVp X-rays after irradiation of whole thorax of hamsters. One year after irradiation, analysis of morphological changes in lungs of irradiated animals was performed. No change in pulmonary parenchvma and nonparenchvma was observed. The volume density of pulmonary septums, septal cells, connective tissue and alveolar cells was increased while the volume densities of alveoli, empty alveolar space and capillary lumens were diminished. The relative biological effect of neon compared to X-rays was found to be 1.6-1.8.

Significance of the paper

The paper provided one of important finding about in vivo radiobiological effects of charged particle in comparison with X-radiation.

by
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Note: *Interested readers may submit similar articles. This column is aimed to highlight the salient points and significance of seminal research articles/events in radiation biology and allied sciences, which further substantially changed the understanding in that particular research field.*

4. ARTICLE OF THE ISSUE

Evidence for formation of DNA repair centers and dose-response nonlinearity in human cells

The papers deals with radiation induced foci formation in human cells after low and high dose of radiation. The paper provides a strong support about co-existence of DNA repair centers and foci formation. Using live cell imaging and mathematical fitting of foci kinetics, the papers showed that foci formation/Gy of radiation dose was significantly higher at low dose than at high dose suggesting non-linear DNA damage response/repair. Present paper published recently in *Proceedings of National Academy of Sciences, USA Vol. 109, 2012, page: 443–448.*

Read the abstract / full article on following link:

http://www.pnas.org/content/109/2/443.full.pdf+html *(Open Access Article)*

5. LITERATURE UPDATE

Radiation Biology

- **Double-strand break motions shift radiation risk notions?**
  http://www.pnas.org/content/109/2/351.extract?etoc

- **Evidence for formation of DNA repair centers and dose-response nonlinearity in human cells**
  http://www.pnas.org/content/109/2/443.abstract?etoc (Open Access)

- **Damage clusters after gamma irradiation of a nanoparticulate plasmid DNA peptide condensate**
  http://www.springerlink.com/content/v208jk73p1458453/

- **Radiation dose in the high background radiation area in Kerala, India**
  http://rpd.oxfordjournals.org/content/148/4/482.abstract?etoc

Low dose Radiation Biology

- **Modulation of inflammatory immune reactions by low-dose ionizing radiation: molecular mechanisms and clinical application.**
  http://www.ncbi.nlm.nih.gov/pubmed/22414082.1

- **Low dose IR-induced IGF-1-sCLU expression: a p53-repressed expression cascade that interferes with TGFβ1 signaling to confer a pro-survival bystander effect.**
  http://www.ncbi.nlm.nih.gov/pubmed/22391565.1

Radiation carcinogenesis

- **Radiation-induced carcinogenesis: mechanistically based differences between gamma-rays and neutrons, and interactions with DMBA.**
  http://www.ncbi.nlm.nih.gov/pubmed/22194850 (Open Access)

Radiation induced Bystander effect

- **Ionizing radiation-induced metabolic oxidative stress and prolonged cell injury.**
  http://www.ncbi.nlm.nih.gov/pubmed/22182453

- **Bystander effect of conditioned medium from low and high doses of γ-irradiated human leukemic cells on normal lymphocytes and cancer cells.**
  http://www.ncbi.nlm.nih.gov/pubmed/22181982

- **Bystander-type effects mediated by long-lived inflammatory signaling in irradiated bone marrow.**
  www.ncbi.nlm.nih.gov/pubmed/22181982

- **The importance of bystander effects in radiation therapy in melanoma skin-cancer cells and umbilical-cord stromal stem cells.**
  http://www.ncbi.nlm.nih.gov/pubmed/22169765

- **Cytochrome-c mediated a bystander response dependent on inducible nitric oxide synthase in irradiated hepatoma cells.**
  http://www.ncbi.nlm.nih.gov/pubmed/22274409

- **Laser-induced radiation microbeam technology and simultaneous real-time fluorescence imaging in live cells.**
  http://www.ncbi.nlm.nih.gov/pubmed/22264527

- **Bystander apoptosis in human cells mediated by irradiated blood plasma.**
  http://www.ncbi.nlm.nih.gov/pubmed/22230196

- **Bystander normal human fibroblasts reduce damage response in radiation targeted cancer cells through intercellular ROS level modulation.**
  http://www.ncbi.nlm.nih.gov/pubmed/22210495

- **3D-modelling of radon-induced cellular radiobiological effects in bronchial airway bifurcations: direct versus bystander effects.**
  http://www.ncbi.nlm.nih.gov/pubmed/22420832.1

- **Possible Role of Exosomes Containing RNA in Mediating Nontargeted Effect of Ionizing Radiation.**
  http://www.ncbi.nlm.nih.gov/pubmed/22404739.1

Radiation Protection

- **Skin toxicity from external beam radiation therapy in breast cancer patients: protective effects of Resveratrol, Lycopene, Vitamin C and anthocianin (Ixor®)**
  http://www.ro-journal.com/content/7/1/12

Cancer Biology and Therapy

- **Tumourigenicity and radiation resistance of mesenchymal stem cells**
  http://informahealthcare.com/stoken/default+domain/ONC1%20Dec%202011/abs/10.3109/0284186X.2011.636752
- **Radiosensitization by the novel DNA intercalating agent vosaroxin**
  http://www.ro-journal.com/content/7/1/26/abstract (Open access)
- **Post-radiation increase in VEGF enhances glioma cell motility in vitro**
  http://www.ro-journal.com/content/7/1/25 (Open access)
- **Studies on efficacy of a novel 177Lu-labeled porphyrin derivative in regression of tumors in mouse model.**
  http://www.ncbi.nlm.nih.gov/pubmed/22191655
- **mTOR inhibitors: A novel class of anti-cancer agents**
  http://www.infectagentscancer.com/content/7/1/1 (Open Access)
- **RNAi-mediated targeting of non-coding and coding sequences in DNA repair gene messages efficiently radiosensitizes human tumor cells**
  http://cancerres.aacrjournals.org/content/early/2012/01/10/0008-5472.CAN-11-2785.abstract?papetoc
- **NF-κB mediates radio-sensitization by the PARP-1 inhibitor, AG-014699**
  http://www.nature.com/onc/journal/v31/n2/abs/onc2011229a.html?WT.ec_id=ONC-201201
- **Resveratrol protects mouse embryonic stem cells from ionizing radiation by accelerating recovery from DNA strand breakage**
  http://carcin.oxfordjournals.org/content/33/1/149.abstract?etoc
- **Supernatants derived from chemotherapy-treated cancer cell lines can modify angiogenesis**
  http://www.nature.com/bjc/journal/v106/n5/abs/bjc201213a.html?WT.ec_id=BJC-201202

Cancer Radiotherapy

- **Risk factors associated with fatal pulmonary hemorrhage in locally advanced non-small cell lung cancer treated with chemoradiotherapy**
  http://www.biomedcentral.com/1471-2407/12/27/abstract
- **Skin toxicity from external beam radiation therapy in breast cancer patients: protective effects of Resveratrol, Lycopene, Vitamin C and anthocianin (Ixor®)**
  http://www.ro-journal.com/content/7/1/12
- **The role of microRNA-binding site polymorphisms in DNA repair genes as risk factors for bladder cancer and breast cancer and their impact on radiotherapy outcomes**
  http://carcin.oxfordjournals.org/content/33/3/581.abstract?etoc
- **Current progress in adaptive radiation therapy for head and neck cancer.**
  http://www.ncbi.nlm.nih.gov/pubmed/22328127
- **A new method of lower extremity immobilization in radiotherapy**
  http://www.ro-journal.com/content/7/1/27 (Open access)

Cancer: Prognosis and Diagnosis

- **Predictive and prognostic value of circulating nucleosomes and serum biomarkers in patients with metastasized colorectal cancer undergoing Selective Internal Radiation Therapy**
  http://www.biomedcentral.com/1471-2407/12/5/abstract

Technological advancement/note

- **Immunolabeling artifacts and the need for live-cell imaging**
  http://www.nature.com/nmeth/journal/v9/n2/abs/nmeth.1855.html?lang=en?WT.ec_id=NMETH-201202
- **A new device to expose cells to changing dose rates of ionising radiation**
  http://rpd.oxfordjournals.org/content/148/3/366.abstract?etoc
- **Laser-induced radiation microbeam technology and simultaneous real-time fluorescence imaging in live cells.**
  http://www.ncbi.nlm.nih.gov/pubmed/22264527

- **In vivo flow cytometry visualizes the effects of tumor resection on metastasis by real-time monitoring of rare circulating cancer cells http://cancerres.aacrjournals.org/content/early/2012/03/23/0008-5472.CAN-11-3733.abstract?papetoc**
- **A thermometer for cells http://www.nature.com/nmeth/journal/v9/n4/full/nmeth.1966.html?WT.ec_id=NMETH-201204**
- **A new method of lower extremity immobilization in radiotherapy http://www.ro-journal.com/content/7/1/27 (Open access)**
- **Acellular comet assay: a tool for assessing variables influencing the alkaline comet assay http://rpd.oxfordjournals.org/content/148/2/155.abstract?etoc**

6. NEWS

Nuclear Technology & Safety

Fukushima Accident and Radiation Safety

- **Japan's nuclear crisis: Fukushima's legacy of fear**

  http://www.nature.com/news/japan-s-nuclear-crisis-fukushima-s-legacy-of-fear-1.10183

Radiation Safety

- **Preliminary radiological safety assessment for decommissioning of thoria dissolver of the 233U pilot plant, Trombay**

  http://rpd.oxfordjournals.org/content/148/2/149.abstract?etoc

- **Study of the distribution of 226Ra in ground water near the uranium industry of Jharkhand, India**

  http://rpd.oxfordjournals.org/content/148/2/211.abstract?etoc

Science and Society

Indian Science and Technology

- **India mulling stricter laws to curb unethical trials**
  http://www.nature.com/nm/journal/v18/n2/full/nm0212-182.html?WT.ec_id=NM-201202
- **Population-based cancer incidence in Sikkim, India: report on ethnic variation**
  http://www.nature.com/bjc/journal/v106/n5/abs/bjc2011598a.html?WT.ec_id=BJC-201202

Science in General

- **Indian budget disappoints**
  http://www.nature.com/news/indian-budget-disappoints-1.10263
- **Indian science in need of overhaul**
  http://www.nature.com/news/indian-science-in-need-of-overhaul-1.9750
- **Indian TB cases highlight need for drug-resistance tests**
  http://www.nature.com/nm/journal/v18/n3/full/nm0312-333.html?WT.ec_id=NM-201203

7. VIEWS

- **Cancer stem cells: an evolving concept**
  http://www.nature.com/nrc/journal/v12/n2/abs/nrc3184.html?lang=en?WT.ec_id=NRC-201202
- **"The only thing I know is that I know nothing": 5-fluorouracil in human milk**
  http://annonc.oxfordjournals.org/content/23/2/543.extract?etoc
- **The low-level nuclear threat**
  http://www.nature.com/nature/journal/v482/n7383/full/482005a.html?WT.ec_id=NATURE-20120202

- **Oncogenesis—our little sister**
  http://www.nature.com/onc/journal/v31/n11/full/onc201235a.html?WT.ec_id=ONC-201203
- **Energy policy: The nuclear landscape**
  http://www.nature.com/nature/journal/v483/n7388/full/483151a.html?WT.ec_id=NATURE-20120308
- **Energy: Plumbing the depths**
  http://www.nature.com/nature/journal/v483/n7388/full/483154a.html?WT.ec_id=NATURE-20120308

8. ARTICLE SERIES/REVIEWS

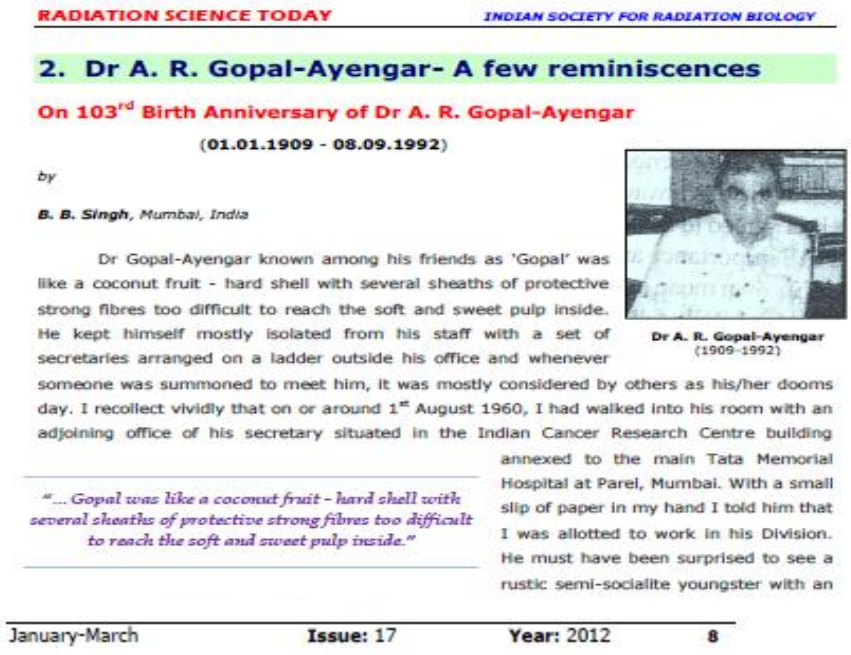
- **Radiotherapy and "new" drugs - new side effects?**
  http://www.ro-journal.com/content/6/1/177
- **Apoptosis induction and tumor cell repopulation: The yin and yang of radiotherapy**
  http://www.ro-journal.com/content/6/1/176 (Open Access)
- **Balancing repair and tolerance of DNA damage caused by alkylating agents**
  http://www.nature.com/nrc/journal/v12/n2/abs/nrc3185.html?lang=en?WT.ec_id=NRC-201202
- **Radiation damage and radioprotectants: new concepts in the era of molecular medicine.**
  http://www.ncbi.nlm.nih.gov/pubmed/22294702
- **The radiation bystander effect and its potential implications for human health.**
  http://www.ncbi.nlm.nih.gov/pubmed/22452594.1
- **The potential of exploiting DNA-repair defects for optimizing lung cancer treatment**
  http://www.nature.com/nrclinonc/journal/v9/n3/abs/nrclinonc.2012.3.html?lang=en?WT.ec_id=NRCLINONC-201203

9. RECENT BOOKS

- **Model averaging in the analysis of leukemia mortality among Japanese A-bomb survivors**
  http://www.springerlink.com/content/645hkl7g8u10vt70/
- **Thermally and optically stimulated luminescence: a simulation approach**
  http://rpd.oxfordjournals.org/content/148/4/514.extract?etoc

10. LETTER(S) FROM THE READERS

- The enewsletter is comprehensive and informative. Especially the article "Dr A. R. Gopal-Ayengar- A few reminiscences" on 103rd Birth Anniversary of Dr A. R. Gopal-Ayengar (01.01.1909-08.09.1992) by Dr B. B. Singh is a true message to all youngsters.
  -***Dr Madhu Bala***, *Vice-President-ISRB, INMAS, Delhi*



RADIATION SCIENCE TODAY INDIAN SOCIETY FOR RADIATION BIOLOGY

2. Dr A. R. Gopal-Ayengar- A few reminiscences

On 103rd Birth Anniversary of Dr A. R. Gopal-Ayengar

(01.01.1909 - 08.09.1992)

by

***B. B. Singh**, Mumbai, India*

Dr A. R. Gopal-Ayengar
(1909-1992)

Dr Gopal-Ayengar known among his friends as 'Gopal' was like a coconut fruit - hard shell with several sheaths of protective strong fibres too difficult to reach the soft and sweet pulp inside. He kept himself mostly isolated from his staff with a set of secretaries arranged on a ladder outside his office and whenever someone was summoned to meet him, it was mostly considered by others as his/her dooms day. I recollect vividly that on or around 1st August 1960, I had walked into his room with an adjoining office of his secretary situated in the Indian Cancer Research Centre building annexed to the main Tata Memorial Hospital at Parel, Mumbai. With a small slip of paper in my hand I told him that I was allotted to work in his Division. He must have been surprised to see a rustic semi-socialite youngster with an

"... Gopal was like a coconut fruit - hard shell with several sheaths of protective strong fibres too difficult to reach the soft and sweet pulp inside."

January-March **Issue:** 17 **Year:** 2012 8

11. UPCOMING CONFERENCE & WORKSHOP OF ISRB

Pre-Conference Workshop on Radiation Biology in Translational Research, ACTREC, Navi Mumbai, India

November 21, 2012

International Conference on Radiation Biology: (ICRB- 2012) and 11th Biennial Meeting of Indian Society for Radiation Biology
Theme: Cosmic Radiation to Cancer Therapeutics
Advanced Centre for Training, Research and Education on Cancer (ACTREC), Navi Mumbai, Mumbai, India

November 22-24, 2012

Conference Secretariat:

Advanced Centre for Treatment, Research and Education in Cancer, Tata Memorial Centre, Kharghar Sector 22, Navi Mumbai, 410210, India

Phone: +91-22-27405075

Fax: +91-22-27405080

Email: ICRB2012@gmail.com

For updated information visit web page:

www.icrb2012.org or

http://www.isrbindia.com/upcoming-events-of-the-society/

Post Conference Satellite International Conference on Radiation and Cancer, Nehru Gram Bharati University (NGBU), Allahabad, India

November 26-27, 2012

Contact Person:

Dr K. P. Mishra (Conference Chairman)

Vice Chancellor

Nehru Gram Bharati University

Allahabad 211 002 India

Mobile: +91-9320466999/9838737787

Tel. +91-532-6453999 Fax 91-532-2468700

Email: vc.ngbu@gmail.com,

mishra_kaushala@rediffmail.com

12. UPCOMING MEETINGS / WORKSHOPS

- **14th Milan Breast Cancer Conference, June 20-22, 2012**

  http://www.breastmilan.com/index.html

- **7th International Conference of the International Society of Intraoperative Radiation Therapy,** June 22-24, 2012, Grand Hotel Dino, Baveno – Italy

  www.isiortmeeting2012.org
- **2012 AACR/ASCO Workshop: Methods in Clinical Cancer Research, July 28-Aug. 3, 2012, Colarado, USA**

  http://www.vailworkshop.org/
- **Cell Symposia Human Immunity,** August 19 - 21, 2012, Sheraton Lisboa, Lisbon, Portugal
  http://www.cell-symposia-human-immunity.com/index.html
- **37th ESMO Congress, Vienna, Austria, September 28 - October 2, 2012**
  http://www.esmo.org/events/vienna-2012-congress/abstract-submission.html

- **Pre-Conference Workshop on Radiation Biology in Translational Research, ACTREC, Navi Mumbai, India, November 21, 2012**

  Conference Secretariat:

  Advanced Centre for Treatment, Research and Education in Cancer, Tata Memorial Centre, Kharghar Sector 22, Navi Mumbai, 410210, India

Phone: +91-22-27405075

Fax: +91-22-27405080

Email: ICRB2012@gmail.com

Web page: www.icrb2012.org

- **International Conference on Radiation Biology: (ICRB- 2012) and 11th Biennial Meeting of Indian Society for Radiation Biology, Theme:** Cosmic Radiation to Cancer Therapeutics, Advanced Centre for Training, Research and Education in Cancer (ACTREC), Navi Mumbai, Mumbai, India, November 22-24, 2012

  Conference Secretariat:

  Advanced Centre for Treatment, Research and Education in Cancer, Tata Memorial Centre, Kharghar Sector 22, Navi Mumbai, 410210, India

  Phone: +91-22-27405075

  Fax: +91-22-27405080

  Email: ICRB2012@gmail.com

  Web page: www.icrb2012.org

- **Post Conference Satellite International Conference on Radiation and Cancer, Nehru Gram Bharati University (NGBU), Allahabad, India November 26-27, 2012**

  Contact Person:
  Dr K. P. Mishra (Conference Chairman)
  Vice Chancellor Nehru Gram Bharati University
  Allahabad 211 002 India
  Mobile: +91-9320466999/9838737787
  Tel. +91-532-6453999 Fax 91-532-2468700
  Email: vc.ngbu@gmail.com, mishra_kaushala@rediffmail.com

Important Notice: Are you organizing any Workshop/Meeting related to Radiation Research or in related research areas? You can add the announcement of event to this eNewsletter **free of cost**!! The announcement would reach to ISRB Community as well many more in India and abroad. The details of announcement may be communicated to: **isrb_enewsletter@yahoo.co.in.** Moreover, the information would be included to web page as and when it would be available.

13. AWARDS/HONORS TO ISRB MEMBERS

Name of the ISRB Member	Affiliation	Award/Honors	Year/ Period
Prof. A. T. Natarajan	Professor (emeritus) Leiden University Medical Center. Leinden, Netherlands Visiting Professor, University of Tuscia, Viterbo, Italy	The Life Time Achievement Award" by Kalinga Institute of Technology University 2012 during 37th Annual Conference of Environmental Mutagen Society of India (EMSI), Bhubaneshwar, 24th February, 2012	Feb. 2012
Prof. P. K. Goyal	Radiation & Cancer Biology Laboratory Department of Zoology University of Rajasthan Jaipur	• **Life Time Achievement Award**, for outstanding contribution and meritorious services to teaching and research in discipline of Radiation & Cancer Biology, received during International Conference on Emerging Frontiers & Challenges in Radiation Biology, January 24-25, 2012 at Bikaner. • **Convener** of INDO US CITI Workshop on Promoting Ethics and Professionalism in Biomedical Research, Jaipur, 23 January 2012. • **Member** of International Advisory Board of 6th International Niigata Symposium on Diet & Health being held at Niigata, Japan, October 15 to 17, 2012	Jan-March 2012

Congratulations *to the Life Members of Indian Society for Radiation Biology for prestigious Awards and Honors!!*

We wish many more in future!!

14. RECENT PUBLICATIONS/PATENTS OF ISRB MEMBERS

Author/Affiliation	Title	Citation	Key words
Sarma HD*, Das T, Banerjee S, Venkatesh M, Vidyasagar PB, Mishra KP. Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai *Email: hdsarma@barc.gov.in	Studies on efficacy of a novel ^{177}Lu-labeled porphyrin derivative in regression of tumors in mouse model.	Curr Radiopharm. 2011, 1;4(2):150-60.	Lu-177, porphyrin
Kumar B[1], Kumar A, Ghosh S[1], Pandey BN, Mishra KP, Hazra B[1*]. Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai [1]Department of Pharmaceutical Technology, Jadavpur University Kolkata, India. *Email: banasrihazra@yahoo.co.in	Diospyrin derivative, an anticancer quinonoid, regulates apoptosis at endoplasmic reticulum as well as mitochondria by modulating cytosolic calcium in human breast carcinoma cells.	Biochem Biophys Res Commun. 2012 Jan 13;417(2):903-909 **http://www.ncbi.nlm.nih.gov/pubmed/22209849**	Diospyrin, calcium signaling, apoptosis
Hazra B*[1], Ghosh S[1], Kumar A, Pandey BN. Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai [1]Department of Pharmaceutical Technology, Jadavpur University Kolkata, India. *Email: banasrihazra@yahoo.co.in	The prospective role of plant products in radiotherapy of cancer: a current overview	Front Pharmacol. 2011;2:94. **http://www.ncbi.nlm.nih.gov/pubmed/22291649 (Open Access)**	Plant products, cancer radiotherapy
Annapurna Agrawal, Preeti Verma, Swafiya Jahan and P.K.Goyal. Radiation & Cancer Biology Laboratory Department of Zoology University of Rajasthan Jaipur Email: pkgoyal2002@gmail.com	Prevention of chemical induced skin tumors in mice by Aegle marmelos, an Indian medicinal plant, fruit extract.	Journal of Environmental Pathology, Toxicology & Oncology, 30 (3) 251-259, 2011.	
Priyanka Sharma, Jyoti Parmar, Preeti Verma, Priyanka Sharma and	Protective Effect of Phyllanthus niruri on	Journal of Natural Sciences Research.1 (4)	

P.K.Goyal Radiation & Cancer Biology Laboratory Department of Zoology University of Rajasthan Jaipur Email: pkgoyal2002@gmail.com	DMBA/Croton Oil Mediated Carcinogenic Response and Oxidative Damage in Accordance to Histopathological Studies in Skin of Mice.	2011	
Annapurna Agrawal and P.K.Goyal Radiation & Cancer Biology Laboratory Department of Zoology University of Rajasthan Jaipur Email: pkgoyal2002@gmail.com	Radiation induced hematological alterations and their inhibition by Aegle marmelos fruit extract.	Nuclear Journal of Radiation Protection 2011 Vol. XXVI (3) 181-274.	
Annapurna Agrawal and P.K.Goyal Radiation & Cancer Biology Laboratory Department of Zoology University of Rajasthan Jaipur Email: pkgoyal2002@gmail.com	Debilitation of radiation induced intestinal injury by Aegle marmelos fruit extract in mice.	Int J Cur Biomed Phar Res 2012; 2(2): 234-240.	

15. CAREER FORUM

Grants and Awards

- Looking for **Grants, Funds, Fellowships** related to **Radiation Research,** visit the Radiation Research Web page or following link **http://www.radres.org/ECOMradres/timssnet/common/tnt_JobsFundingandFellowships.cfm**
- **Pre- and Post Doctoral Fellowships from NIH**
  http://grants.nih.gov/training/extramural.htm
- **AACR-Gertrude B. Elion Cancer Research Award**
  http://www.aacr.org/default.aspx?p=3859

- **AACR Career Development Awards**

  http://www.aacr.org/default.aspx?p=3858
- **AACR seeks nominations of outstanding scientists for prestigious Landon-AACR Prizes for Basic & Translational Cancer Research.**

  Call for nominations now open through August 25, 2008

  For information, visit **http://www.aacr.org/page13893.aspx**
- **Science Foundation Ireland, (SFI)**

  The national foundation for excellence in scientific research is investing in academic researchers and research teams who are most likely to generate new knowledge, leading edge technologies, and competitive enterprises.

  www.sfi.ie
- **Pancreatic cancer research centre funding over 2 million dollars**

  Please view individual grant mechanisms for eligibility and deadlines.

  Grants provide funding for outstanding pancreatic cancer research .

  http://www.aacr.org/home/scientists/research-funding--fellowships.aspx
- **AACR, Research Funding & Fellowships**

  http://www.aacr.org/home/scientists/research-funding--fellowships.aspx

New

- **Biomedical Research Fellowship Programme for India (Wellcome Trust/DBT India)**

  http://www.wellcomedbt.org/

Article related to career issues

- **Education: The PhD factory**

  http://www.nature.com/news/2011/110420/full/472276a.html?WT.ec_id=NATURE-20110421
- **Education: Rethinking PhDs**

  http://www.nature.com/news/2011/110420/full/472280a.html?WT.ec_id=NATURE-20110421
- **Seven ages of the PhD**

  http://www.nature.com/nature/journal/v472/n7343/full/472283a.html?WT.ec_id=NATURE-20110421

- **Developing world: Educating India**
  http://www.nature.com/news/2011/110405/full/472024a.html?WT.ec_id=NATURE-20110407
- **Postdoctoral training: Time for change**
  http://www.nature.com/ncb/journal/v13/n7/full/ncb0711-735a.html?WT.ec_id=NCB-201107

Important Web Sites

- **AACR Research Fellowships**
  http://www.aacr.org/default.aspx?p=3860
- ***GrantsNet*** is resource to find funds for training in the sciences and undergraduate science education. Through the support of HHMI and AAAS, this service is completely free.
  http://www.grantsnet.org/start.cfm?session_id=844615
- **Naturejobs** the career magazine from Nature with the hottest science jobs and details of career related issues.
  http://www.nature.com/naturejobs/index.html
- **Post Doc Jobs,** a site providing opportunities about Post Doc Jobs. It is a platform to bring students, Professionals and Research Institutes together.
  http://www.postdocjobs.com/
- ***Science's Next Wave*** is a weekly online publication that covers scientific training, career development, and the science job market. *Next Wave* is published by *SCIENCE* magazine and the American Association for the Advancement of Science.
  http://nextwave.sciencemag.org/?CFID=789744&CFTOKEN=78870222
- The National Academy of Sciences offers Research Associateship Awards to doctoral level scientists and engineers (US and foreign nationals). For more information go to
  http://sites.nationalacademies.org/pga/RAP/index.htm
- **Science careers**
  http://sciencecareers.sciencemag.org/tools_tips/outreach/relationships_booklet

Important Notice: If you have any vacancy in your laboratory/Institute, you can advertise the post through this eNewsletter. In addition, any award in these fields may be also announced. **It is absolutely free!!** The advertisement would reach to Members of ISRB and many more, who may be interested about the vacancy. The details of vacancy may be communicated to: **isrb_enewsletter@yahoo.co.in**.

16. USEFUL LINKS

http://www.isrbindia.com/eNewsletter/useful-links/

17. IMPORTANT JOURNALS

http://www.isrbindia.com/eNewsletter/journals-links/

18. NEW LIFE MEMBERS OF ISRB

Warm welcome to New Life Members of ISRB

S. N.	Name	Affiliation	Research Interest/Expertise
1.	Ms. Amritha M. Joshi *(ISRB/J-15/206)*	Dept. of Biophysics, Mumbai University, Kalina, MUMBAI 400098, **INDIA**	Radiation Biophysics, Radiation protection
2.	Prof. P. M. Dongre *(ISRB/D-10/013)*	Prof. and Head, Dept. of Biophysics, Mumbai University, Kalina, MUMBAI 400 098, **INDIA**	Radiation Biophysics, Radiation protection
3.	Shri Damodar K. M Gowda *(ISRB/G-20/039)*	Department of Physiology, K.G. Hegde Medical Academy, Deralakatte, MANGALORE-18, **INDIA**	Radiation Biology
4.	Shri Shrikant L. Patil *(ISRB/P-10/208)*	Department of Physiology, K.G. Hegde Medical Academy, Deralakatte, MANGALORE-18, **INDIA**	Radiation Biology
5.	Ms. K. B. Kalpana *(ISRB/K-13/280)*	Department of Biochemistry and Biotechnology, Annamalai University, ANNAMALAI NAGAR, 608 002, Tamil Nadu, **INDIA**	Radiation Biology
6.	Prof. Shyam Kishore Srivastava *(ISRB/S-59/233)*	Prof. and Head, Department of Radiation Oncology, TMH, Parel, MUMBAI 400 012, **INDIA**	Radiation oncology
7.	Dr Umesh Mahantshetty *(ISRB/M-13/207)*	Department of Radiation Oncology, Tata Memorial Hospital, Dr Ernest Borges Street, Parel, MUMBAI – 400012, **INDIA**	Radiation oncology

19. NOTICE BOARD

- ## Update your email and contact address

Dear Members of ISRB,

The eNewsletter would be send to ISRB Members by email only. If your email address is getting changed or you have any other preferred email, please communicate to us as soon as possible on **isrb_enewsletter@yahoo.co.in**. In case, any other ISRB Member, who is not receiving eNewsletter, please intimate us his/her email address.

In addition, if any other friend or colleague is interested to receive the eNewsletter, please let us know his/her email address to be included in our mailing list. The eNewsletter is free to ISRB Members as well as non-Members too. **The subscription of eNewsletter is absolutely free!!!**

In addition, it is frequent problem to communicate with ISRB members due to change in address. If your contact address has been changed please intimate to Secretary, ISRB. This would help us to reach you and communicate, when ever needed.

- ## Join ISRB

Are you/your colleague/friend working in Radiation Research or related field and still not a Member of Indian Society for Radiation Biology? Join ISRB.

As Member of ISRB, (a) you would join with scientific community working in Radiation Research and related research areas. (b) You are entitled to participate in Meeting/Workshops of ISRB at reduced Registration Fee (c) Your interaction with Scientists and experts from India and abroad would help in your career.

To be a Member of ISRB, fill the attached application form (in last of eNewsletter) along with along with Membership fee to Secretary, ISRB. For details, contact Secretary or any of the Office Bearers of ISRB as given below.

The application form can be downloaded from the web page: **www.isrbindia.com** or click on following link:

http://www.isrbindia.com/assets/Uplaods/ISRB-Membership-Application-Form.doc (MS Word Version)

http://www.isrbindia.com/assets/Uplaods/ISRB-Membership-Application-Form.pdf (PDF Version)

• Awards / Honors to ISRB Members

Editorial Board `**Radiation Science Today'** is pleased to launch a column "**AWARDS/HONORS to ISRB Members**" in the eNewsletter. We hope the column would make us more aware with each other about our awards/ scientific achievements.

This column is only for Members of Indian Society for Radiation Biology. If you are Member of ISRB and received any award or scientific honour, you are requested to send details of same in following format on email address: **isrb_enewsletter@yahoo.co.in**, with **subject line**: Awards/Honors.

To avoid the verification of Membership and any ambiguity from non-ISRB Members, a line of statement is requested that 'I am a Member / Life Member of Indian Society for Radiation Biology'.

Details of award or scientific recognition can be submitted in prescribed format provided below as when received, which would be included in next upcoming issue of the eNewsletter.

Please circulate the announcement to your colleagues and friends, who are Members of ISRB. Please provide complete information to avoid unnecessary delay in publication in eNewsletter.

Name and Present Address of ISRB Member	Affiliation (if any)	Name of Award/Honor	Year/Period

Statement: I am Member/Life Member of Indian Society for Radiation Biology.

Name of the ISRB Member:

• Recent publications/patents of ISRB Members

Dear Members of ISRB,

It is our pleasure to mention that in last two years, '**Radiation Science Today**' the eNewsletter published by Indian Society for Radiation Biology, has made a significant contribution to link the Members of Society working in various research fields of radiation biology and allied sciences. To further strengthen the interaction amongst Members of ISRB, we have initiated a new Column **'Recent Publications of ISRB Members' beginning** from issue of eNewsletter i.e. **Jan-March , 2010 Issue 9.**

The publication/patents meeting following criteria would be included in the eNewsletter:

1. At least one author of citation should be Life Member of ISRB.

2. Citations only with final page number should be provided i.e. 'In Press' citations would not be considered.

3. It should be published in National/International Journals or Book/Book Chapters. No abstract or Conference Proceedings would be considered.

4. Names of ISRB Members names should be bold and underlined. The authors may provide maximum five key words. The email address of corresponding authors should be provided so that interested may contact to seek some clarification or to receive reprints.

5. Members should provide full citation(s) as and when it would be made available in the required format.

All ISRB Members are requested and encouraged to submit their recent publication(s) in format provided with **Subject Head line: Publication.** A copy of the format is provided below for your reference.

You may communicate the message to other ISRB members, if they could not receive this communication.

Authors/Affiliation/Email	Title	Citation	Key Words
Kumar A, Ali M, Mishra P, **Pandey BN**, Sharma P, **Mishra KP**. Email: mishra_kaushala@rediffmail.com Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai - 400085, India	Thorium-induced neurobehavioural and neurochemical alterations in Swiss mice.	International Journal of Radiation Biology, 2009, 85(4):338-347.	Thorium Toxicity; Neurobehavioral, neurochmeical alterations; oxidative injury
Hazra B[1], **Pandey BN**, Kumar A, Ghosh S[1], Kumar B[1], **Mishra KP** Email: banasrihazra@yahoo.co.in Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai - 400085, India [1]Department of Pharmaceutical Technology, Jadavpur University , Kolkata , India	Plant Products in modification of cellular damage by radiation: Implications in cancer radiotherapy.	In "Herbal Drugs: A Cancer Chemopreventive and Therapeutic Perspective" (Ed.: R. Arora, INMAS, New Delhi), Publisher: Jaypee Brothers Medical Publishers, New Delhi , 2009	Cancer radiotherapy; Natural Plant Products; Apoptosis

- ## You can contribute in this eNewsletter

You can send your contribution, which may be included in this eNewsletter under **'Reader's Column'**

Brief scientific article (maximum 1000 words, if reference needed, in 'International Journal of Radiation Biology' style) may be submitted for publication in eNewsletter. Your article may fall under following subject category: (i) radiation sciences or related research areas; (ii) your opinion on any scientific issue, technique or some general topics; (iii) any major finding or research concept from the archives of radiation sciences. The article should be original. It would be published in eNewsletter after general screening/reviewing of the article by the Editorial Board.

For any further clarification or submission of any article write to Editor on email address: isrb_enewsletter@yahoo.co

In addition, if you come across any recent journal / books published in radiation and related research areas, please send us the details of the book/journal on our email: isrb_enewsletter@yahoo.co. The details of books/journal would be included in the eNewsletter **free of cost**!!!

INDIAN SOCIETY FOR RADIATION BIOLOGY
Executive Council (2011-13)

Prof. P. K. Goyal (President)	Radiation & Cancer biology Laboratory, Department of Zoology, University of Rajasthan, Jaipur, India
Dr. M. Bala (Vice President)	Department of Radiation Biology, Institute of Nuclear Medicine & Allied Sciences Brig. S. K. Mazumdar Marg, Delhi, India
Dr. S.C. Jain (Vice President)	Centre for Fire, Explosive & Environment Safety, Brig. S.K. Mazumdar Marg, Delhi – 110054, India
Dr. B. N. Pandey (Secretary)	Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai 400 085, India
Dr. R. K. Purohit (Treasurer)	Radiation Biology Laboratory, P.G. Department of Zoology, Govt. Dungar College, Bikaner, Rajasthan, India
Dr Amit Kumar (Member)	Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai 400 085, India
Dr Arindam Basu (Member)	Radiation Biology Laboratory, Department of Zoology, Seth R. L. Ruia Govt. College, Ramgarh Shekhavati. Sikar, Rajasthan, India
Prof. Arun Chougule (Member)	Medical Physics Unit, S.M.S. Medical College & Hospitals, Jaipur- 302015, India
Prof. C. K. K. Nair (Member)	Department of Radiation Biology, Amala Cancer Research Centre, Trichur 680555, Kerala, India
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We hope you will find this Newsletter as a useful resource of information. However, we look forward for your active contribution and valuable comments/ suggestions for improvement of the eNewsletter on **isrb_enewsletter@yahoo.co.in** or any of the Member of Editorial Board.

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Every effort has been taken to provide up-to-date and correct information in the Newsletter. However, readers are advised to check the related source of information.

Editorial Board

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Web page: **www.isrbindia.com**

Application for Membership

Affix your passport size photo here

To:

Secretary
Indian Society for Radiation Biology (ISRB)

Dear Sir,

I wish to apply for **Life Membership** for the Indian Society for Radiation Biology. My particulars are given below:

1. Full Name (Block Letters)
   .....
2. Present Position/Title
   .....
3. Date of Birth ...
   .....
4. Academic qualifications: Degree University Year

   ....
   .....

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   .....

   ....
   .....
5. Field of Specialization
   .....
6. Research Interest
   .....

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7. Address: Official:
..……………..…………………………………………………………………..…...….......

……..…………………………………………………………………………………..
………..

Tel… ……………..Fax: ……………… E-mail
..................……………………….…..………......

Permanent
…………………………………………………………………………………..….…....

8. Life Membership fee : Rs 2000.00 Foreign members: US$ 200
Bank transfer/Draft/Cheque No. …………Date: …………Drawn on Bank. …………………………
……………………………………in favour of 'Indian Society for Radiation Biology' is enclosed.

(Note: Outstation cheques would not be accepted. DD should be payable at Mumbai or Delhi.)

Place: ………………...……….. Date:……….. Signature: …………………………………….………....

Proposed by …………………………Membership No. and Signature …..….……...…..…………..……...

Seconded by ……………….…. Membership No. and Signature …………...……………………..…

For Use of ISRB Secretariat Only

Membership No. ....Type of Membership ....…...........……...……...…................
Membership approved/not approved by Executive Council in its meeting held
on………………………………
Payment received vide …………………………… on
………………………………………………………………...

Secretary/Treasurer: …………………………..

President, Indian Society for Radiation Biology

Please mail the Application for Membership along with recent passport size photographs to:
Dr B. N. Pandey, Secretary, ISRB, Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Mumbai 400 085, India. E-mail: isrbindia@yahoo.in; badrinarain@yahoo.co.in