

SOCIETY FOR RADIATION RESEARCH (SRR)



Registration No.: Maharashtra State, Mumbai 2280, 2014 GBBSD)

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A Report on

IUAC-SRR Workshop

on

**RECENT ADVANCES IN BIOLOGICAL EFFECTS OF IONIZING RADIATION AND ITS
IMPLICATIONS IN HEALTH AND MEDICINE**

April 27-29, 2023

Inter-University Accelerator Centre

New Delhi-110067

(Venue: Seminar Hall, IUAC, Delhi)

MODE: Offline and online (E-CONFERENCE)

SRR has taken initiative to organize International workshop with specific themes on radiation research. These schools/seminars/workshop aimed (i) to educate/train the young researchers/students about theme area and (ii) encourage/facilitate the young researchers (in India and abroad) to build their career in radiation research. **SRR-IUAC have organized** a workshop on “Recent advances in biological effects of ionizing radiation and its implications in health and medicine” During the workshop 58 registered participants was there from India and abroad. A range of topics were covered through talks/special lectures by eminent faculties from India and abroad (Japan, USA, Norway).



Prof. A. C. Pandey welcoming Dr. A. K. Mishra



Dignitaries



Dr. A. K. Mishra delivering the inaugural talk



Dr. B. N. Pandey giving vote of thanks

During inauguration session of the workshop on 27th April 2023, **Dr Anil K Mishra, (Director, Institute of Nuclear Medicine and Allied Sciences, DRDO, Min of defence, Lucknow Road, Timarpur, Delhi)** delivered an Inaugural talk. Dr Ambuj Tripathi delivered welcome note to all delegates and participants of the workshop. **Dr Avinash Pandey, Director IUAC,** delivered opening remarks and **Dr R. Billimagga, President SRR** shared his view about vision and mission of SRR. Dr Bilimagga shared his views about bridging the gaps between researchers and clinicians and role of SRR in providing and improving health of mankind.

The brief introduction about the SRR and emerging radiobiological concepts was highlighted by **Dr K. P. Mishra** (Ex-Head, RB&HSD, BARC, Mumbai, Ex-VC, NGBU, Allahabad, Founder President, SRR). He has provided a brief information about goals, recent activities of the Society. He discussed about, how this Society has grown with a huge success in the field of radiation research, with the contribution of all radiation biologists, radiation oncologists in conducting different activities, seminars, conferences and workshops to explore the radiation biological research.

During the Inaugural Session of the workshop **Dr Anil K Mishra, (Director, Institute of Nuclear Medicine and Allied Sciences, DRDO, Min of defence, Lucknow Road, Timarpur, Delhi)** delivered an Inaugural address. Dr Mishra highlighted the

importance of nuclear energy in oncology and neurology, with special reference to diagnosis and treatments. He also clearly explained the current needs of radiation, radio-pharmaceuticals in non-invasive imaging and their roles in diagnosis of various ailments and treatments.

Dr B. N. Pandey (Head, RSCBS, RB&HSD, BARC, Mumbai) has given vote of thanks to all the dignitaries for the inaugural session and for informative views. Dr Pandey thanked all the participants, Director, IUAC Delhi, organizers from IUAC, Members and other colleagues of IUAC for their whole hearted support to organize the IUAC-SRR workshop.



Prof. K. P. Mishra delivering the talk



Prof. A. Ranjan delivering the talk

The first scientific session was chaired by Ashish Ranjan (Oklahoma State University, USA). In this session, KP Mishra (Ex-BARC, Mumbai, Ex-VC, NGBU, Allahabad) delivered a lecture on ‘New Developments in Radiobiology and Their Implications to Health’. In this lecture, he mentioned about new strategies and development of radiation biology areas. Current cell and organisms based models in understanding radiation effects and their applications in development of new therapy. At the same time how, such strategies are useful in assessment of changes at molecular and cellular levels following exposure with different types of radiation (viz. High LET and Low LET). How intracellular dynamics changes with reference to normal and transformed cells including tumor micro-environment.



Prof. K. P. Mishra delivering the talk in the session chaired by Prof. A. Ranjan



Participants listening to the talk by Prof. K. P. Mishra

Dr Ramesh S Bilimagga, HCG Cancer Hospital, Bangalore, India delivered a lecture on ‘Cancer and radio-resistance’. In this lecture, he about various mutations and changes in cell signaling pathways which are responsible of radiation resistance and alterations in tumor micro-environment. He also discussed about available therapies and mode of action of a few molecular drugs in improving cancer therapy.



Prof. R. S. Bilimagga delivering his talk

Dr Eirik Malinen, University Hospital, Oslo, Norway has delivered a lecture on ‘Proton and photon

radiotherapy of the head and neck in a mouse model: Normal tissue effects and cytokine expression’. During his lecture he described about different types of radiation and different patterns of deposition and distribution of radiation energy in the tumor and normal tissues. He shared details of Braggs peak on in its therapeutic significance. He explained crucial role of cytokines in regulation of immune responses and radiation induced damages in normal vs transformed cells.

Dr Nuzhat Husain, RML Hospital, Lucknow delivered her lecture on ‘DNA Damage and Radiation Exposure- a dose effect relationship’ In her lecture she shared clinical observations about changes in DNA damage using gamma H2AX foci formation and chromosomal abnormalities following CT scans. In case of patients gone through CT scan the damage to DNA found to be significantly be significantly high with respect to radiation dose exposures.

Dr Ashish Ranjan from Oklahoma State University, USA shared his work on ‘Translating focused ultrasound and nanomedicines for chemo-immunotherapy of solid tumors’. His presentation was related to changes in temperature following focused ultrasound improves the delivery of drug to the target site and thereby one can get better efficacy with lesser toxicity. During his presentation he shared clinical data on pets viz. Dogs, Cats etc. In summary he shared that how this approach can be translated to human’s also as drug delivery systems specifically deliver drug at target site.



Prof. A. Ranjan during his talk



Prof. B. N. Pandey delivering his talk

Dr BN Pandey from BARC, Mumbai presented his lecture on ‘Emerging Concepts in High LET Radiobiology with Novel Insights and New Twists in Cancer Radiotherapy’

Dr Roger W. Howell from New Jersey Medical School, Newark, USA shared his talk on Bioeffect Modeling for Radiopharmaceutical Therapy. His talk was related to modeling of radiopharmaceuticals with reference to dose to be delivered to get best possible efficacy. He shared software developed for calculation of radiopharmaceutical dose using MIRD equation. This software is very popular among clinicians across the globe. The same can also be used for assessment of absorbed doses both at in vivo and in vitro levels.

Dr Teruaki Konishi from National Institute of Quantum Science, Chiba, Japan delivered his talk on

‘Physico-chemical and biological aspect of ultra-high dose rate particle (FLASH) therapy (*ONLINE*).’ During his talk he shared clinical relevance of ultra high doses and dose rate with clinical results. He suggested that such ultrahigh doses provide equally good clinical outcomes in case of solid tumors.

Dr Sutapa Mukherjee, CNCI Kolkata delivered by talk on ‘Therapeutic Exploitation of Mitotic Checkpoint Defects in Cervical Cancer Cells by Aspirin for Restoring Radiosensitivity’. During her talk she discussed about role of checkpoints in progression of cell cycles. By targeting checkpoint defects using Aspirin one can sensitized cell for the radiation. In summary she shared molecular mechanism of radiation sensitization effects of Aspirin along with role of free radicals and mitochondria.

Dr Rajesh Sharan from IUAC, Delhi presented his talk online on ‘An epigenetic biomarker with high potential of prognostic & diagnostic applications in cancer management, including radiotherapy’. During his talk he shared journey of success related to identification of epigenetic biomarker and its potential in cancer management.



Dr. A. Tripathi describing Charged Particle Research at IUAC

Dr Ambuj Tripathi from IUAC, Delhi shared his work on ‘Charged Particle Research at IUAC’. During his talk he discussed about effects of charged particles on different materials. He also shared glimps of available infrastructure in IUAC and application of radiation facilities ralted to different branch of science.

Dr Utpal Ghosh, Kalyani University, Kolkata delivered his lecture on ‘Carbon ion radiotherapy: A new strategy for combating radio-resistant, chemo-resistant unresectable aggressive human cancer’. During his lecture talked on radiation induced DNA damage and its significance in cancer cell death. He described the detailed mechanism of ionizing radiation induced DNA damages by both direct and indirect mechanism. In summary he shared his work on carbon ion beam and role of PARP-1 inhibitor (olaparib) in sensitization of cancerous cells.



Dr. U. Ghosh during his talk



Dr. D. Gupta receiving a memento from the session chair Dr. S. Mukherjee

Dr Damodar Gupta, from INMAS, Delhi discussed his work on ‘Mitochondrial dynamics in regulation of biological radiation response’. During his presentation he shared crucial role of mitochondria in radiation responses. The changes in mitochondrial dynamics varies from types of radiation and absorbed doses. In summary he explained about approaches related to sensitization of transformed cells and protection of normal cells by altering mitochondrial physiology and dynamics using molecular agents.

Awards

Best Presentation Award:

Sunil Kumar, Saha Institute of Nuclear Physics, Kolkata

Martina Saran, Inter-University Accelerator Centre, New Delhi

Rudra Prasad Khanal, Central Department of Physics, Tribhuvan University, Nepal

Best Participant Award:

Devanshi Sharma, Sri Venkateswara College, New Delhi

Ram Sharan Karki, Central department of Physics, Tribhuvan University, Kirtipur, Kathmandu



Dr. S. Kumar receiving a memento from Prof. K. P. Mishra



Dr. M. Saran receiving a memento from Prof. K. P. Mishra



Mr. R. P. Khanal receiving a memento from Prof. K. P. Mishra



Ms. D. Sharma receiving a memento from Prof. K. P. Mishra



Mr. R. P. Karki receiving a memento from Prof. K. P. Mishra



Dr. N. K. Chowdhary (INMAS, Delhi) describing his views on the workshop



Group Photograph