AROI Newsletter

June 2025 Vol.21, Issue 2

From the office of AROI

Dear All,
Greetings from AROI !!!

We encourage you to actively participate in all AROI conference activities and take advantage of this opportunity to learn from experts and peers. Your engagement will be instrumental in making AROI a successful organization.
On behalf of the organizing committee, we extend a warm welcome to our upcoming annual conference! We are thrilled to invite you all for AROICON 2025 at Kolkata. This year's theme, Evidence, Empathy, Enterprise, Excellence promises a dynamic platform for learning, collaboration, and innovation in the field of oncology. Renowned speakers, interactive workshops, and engaging sessions are being designed to expand your knowledge and foster valuable connections. We believe this conference will be an excellent opportunity to network with colleagues, share your research, and contribute to the advancement of our field.

We look forward to welcoming you at Kolkata and making this conference a memorable and enriching experience for all.

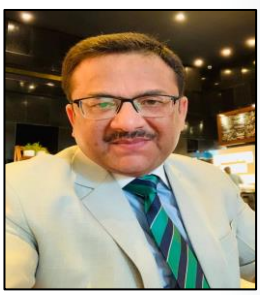
Dr. Manoj Gupta
Chair AROI

Dr. S N Senapati
President AROI

Dr. C S Madhu
President Elect AROI

Dr. V Srinivasan
Secretary General AROI

Chairman – ICRO
Dr. Sarbani Ghosh Laskar



Vice Chairman – ICRO
Dr. Gautam Sharan

Secretary – ICRO
Dr. Pooja Nandwani Patel

AROI Newsletter

Inside this issue

Dr. Vikas Jagtap

AROI - Vice President (Jr.)
Deputy Medical Superintendent
Additional Professor & HOD
Department of Radiation Oncology
NEIGRIHMS, Shillong

Newsletter Editor

The views expressed are that of authors/ contributors

From the office of AROI

BIDS INVITED FOR AROI - ICRO SUN PG COURSES & AROI – ESTRO COURSES

Bids are invited to hold

1. **AROI ICRO Teaching Program -**
   a) AROI-ICRO Sun PG Teaching Courses 2027 (3 courses)

3. **AROI-ESTRO Teaching Courses for 2027**

   a) Gynae Teaching Course
   b) Head & Neck Teaching course
   c) Advanced Technologies Teaching course

3. **Best of ASTRO – 2026 & 2027**

4. **YROC 2027**

How to Apply

- Forwarded by Head of the Department / Head of the institute
- Should be through Zonal / State Chapter of AROI
- Application should reach to Dr. V. Srinivasan, Secretary General AROI, by 31st August 2025 by email.
  E-mail: secretaryaroi@gmail.com

Dr. S. N. Senapati
President AROI

Dr. V. Srinivasan
Secretary General AROI

From the office of AROI

Applications Invited for: Fellowships/ Grants/ Best Papers

S.No.	Name of Fellowship	No's	For	Age Group	Fellowship Grant (in INR)	Basis	Member of AROI For #/yrs.	Min Papers	Regularly Attending AROI conferences	Already availed fellowship in the past
1. Overseas										
1.1	AROI Fellowship	1	Radiation Oncologist	>50	1.5 Lakhs	MD/DNB	20	5	Yes	Then weightage to be given To those who have not Availed any Fellowship (or Any other Candidate is not available)
1.2	AROI Fellowship	2	Radiation Oncologist	41-50	1.5 Lakhs	MD/DNB	10	5	Yes	
1.3	AROI Fellowship	3	Radiation Oncologist	35-40	1 Lakh	MD/DNB	5	3	Yes	
1.4	AROI Fellowship	4	Radiation Oncologist	30-35	1 Lakh	MD/DNB	3	3	Yes	
2. Within India at higher centres										
2.1	AROI Fellowship	1	Radiation Oncologist	30-35	30,000	MD/DNB	3	1 BASED ON THE RESUME AND INTERVIEW ATTHE CONFERENCE & PREFERENCE GIVEN TO PAPER PRESENTERS	Yes	
2.2	AROI Fellowship	1	Medical Physicist	< 40	30,000	DRP/MSc (MP)	2		Yes	
2.3	AROI Fellowship	1	RT Technologist	<45	10,000	AERB Certified	Yes		No	
2.4	Neil Joseph Fellowship	6	3rd year PG student		20,000	Student MD/DNB	Yes	RESUME AND INTERVIEW		

3.1	Best Proffered Paper for Senior Members	1	Radiation Oncologist	>40 - ≤50	Only certificate	Post MD/DNB >10 Yrs of experience	10-15 yrs of LM	
3.2	Best Proffered Paper for Senior Members	1	Radiation Oncologist	-≤40	Only certificate	Post MD/DNB Min 5yrs of experience	5-10 yrs of LM	
3.3	Dr. K. T. Bhowmik Young Doctor Award	1	Radiation Oncologist Post MD/DNB	<40	Plaque + 30,000 For fellowship	Post MD/DNB	Min 3 yrs of LM	
3.4	Dr. M. S. Gujral Gold Medal	1	MD/DNB Students	<30	15,000+Medal		Yes	
3.5	Dr. M. C. Pant Gold Medal	1	MD /DNB Students	<30	10,000+Medal		Yes	
3.6	Gold Medal Medical Physics	1	Physicist/Radiation oncologist with physicist	<40	10,000 + Medal	DRP/MSc in Med. Physics	Yes	

From the office of AROI

Applications Invited for: Fellowships/ Grants/ Best Papers

Procedure for Application:

1. Applicants have to email a copy of date of birth certificate, the publications mentioned under each Fellowship and Self-certified proclamation that they are working full time in radiotherapy.

2. Fellowship amount will be given to candidates after 15% deduction.

3. All the applications for fellowship/ best paper awards to be emailed along with the abstract & full paper in word copy and the letter from head of department/ institute to the office of Secretary General AROI by **5 PM, 31st August 2025.**

4. No Objection certificate (NOC) from their Head of Department if selected to go for 4weeks fellowship.

5. Fellowship must be completed before **31st October 2026**.

6. PG Students shall send recommendation for presenting Best paper through Head of the Department.

7. For best papers, NOC for publication in JCRT (if selected) is required. PG students should approach for best paper through their HOD/guide.

8. For fellowships more than 35 years of age category, ICRO membership is mandatory.

9. Email address and details -
    a) Dr. V Srinivasan, Secretary General AROI: secretaryaroi@gmail.com
    b) Dr. S. N. Senapati, President AROI: snsenapati2007@gmail.com

From the office of AROI

FICRO applications

Secretary – ICRO
Dr Pooja Nandwani Patel

Vice Chairman – ICRO
Dr. Gautam Sharan

Chairman - ICRO
Dr. Sarbani Ghosh Laskar

Guidelines and Instructions for nomination of candidates

An individual elected as a Fellow of the Indian College of Radiation Oncology is expected to:

Stand out among peers in the profession as a person of distinction at the national/ international level.

Have distinguished himself/herself in the profession:

as a physician in his / her specialty; and/or

in service to Medicine in patient care, teaching, public health work and/or health administration.

The Eligibility Criteria for the Fellowship of Indian College of Radiation Oncology:

Founder Members of the ICRO

OR

Membership of the ICRO for at least 5 years and possessing more than 15 years of experience after post-graduation.

Founder members are automatically eligible for award of the Fellowship, subject to submission of Application and the payment of the Admission Fees for the Fellowship. (Fellowship Fees- Rs 10000/- Includes the GST)

For other than Founder Members, Application needs to be submitted and after Election as a Fellow, a communication will be sent to the Elected Fellows for depositing the Admission Fees for the Fellowship, by the due date as per the communication.

Fellowships will be awarded after the receipt of the Admission Fees.

Format of the Application Form and the Instructions can be downloaded from the AROI Website. A soft copy of the application is to reach Dr. Pooja Nandwani Patel, Secretary ICRO through email (secretaryicro@gmail.com) so as to reach her not later than 12 midnight of **31st Jul 2025**. A hard copy of the application along with all supporting documents is to reach the Secretary, ICRO (Address given in the application form) at the earliest but not later than **10th August 2025.** The applications will be valid for a period of 2 years (The current year, if received by deadline, and for the subsequent year).

Late applications will be considered only for the Election of Fellows for the subsequent year.

Admission Fees for ICRO Fellows:

INR 10000/-(Rupees Ten Thousand only. This includes GST), through DD / Online Bank Transfer to "AROI-ICRO",

Name of A/C:AROI-ICRO
Bank: State Bank of India
Bank Address: Millerganj, Ludhiana, Punjab-141001
Account No: 39535445525
IFSC: SBIN0000731
Type of Account: Current

FICRO applications

The Nominees are to be Proposed and Seconded by Members of AROI of GOOD STANDING of FIFTEEN YEARS duration. The PROPOSERS AND SECONDERS MUST BE_ICRO MEMBERS. Soft copy of the Application must reach the Secretary, ICRO by midnight of **31st Jul** of the year of Election, with a copy to the Chairman, ICRO. Documentary evidence of all Statements/Experience/Awards must be attached to the HARD COPY of the Application and is to be sent to the Secretary, ICRO so as reach him/her on or before **10th August** of the year of Election. The attention of the Proposer and Seconder making the nomination is invited to the Guidelines and Instructions laid down for the purpose.

1. The Proposer and Seconder nominating the candidate should certify from personal knowledge the professional and scientific standing/achievements of the candidate
2. Every candidate shall be proposed and seconded by a statement in writing signed by at least two Life Members of AROI of GOOD STANDING of FIFTEEN YEARS duration. The PROPOSERS AND SECONDERS MUST BE_ICRO MEMBERS.

INSTRUCTIONS

1. One hard copy each of the following documents must accompany the application for nomination.
    i. A precise statement limited to 120 words on nominee's professional and scientific standing/ achievements which form the basis for nomination signed by proposer/seconder.
    ii. Information as per format prescribed, duly completed. Follow the same section numbers in their submission as in the nomination form avoiding reference to enclosed appendices.
    iii. List of publications:
        a) Two separate lists of publications i.e. one in Journals included in Medical Databases, Medical Literature analysis and retrieval system (Medlar) etc. and other one in Journals, not included in medical database but published in Journals of National Societies/Professional Associations.
        b) Be written in chronological order and should include (1) Names and initials of all authors, (2) Title of article, (3) Title of publication abbreviated, (4) Volume number, (5) First and last page number, (6) Years of publication.
        c) Reference to books should include: (1) City of publication (2) Name of Publisher (3) Year of Publications.
        d) Abstracts and Proceedings of Conferences etc. should not be included in the list of publications.
2. One copy of six published papers considered to be best by the proposer. The Citation Index of six best published papers of the nominee and Average Impact Factor of the Journals in which the six best papers have been published may also be provided along with nomination for Fellowship. (Impact factor of the Journal in the year of publication of the concerned article).

FICRO applications

The under-mentioned guidelines may also please be noted in this connection:

1. Only Life Members of AROI of GOOD STANDING of FIFTEEN YEARS duration and who are ICRO Members can Propose or Second the Nominee.
2. A Member may not propose more than three names for Fellowship in a year. He/ She may, however, second any number of proposals.
3. The candidate shall be Indian citizen. Exceptionally a foreign national who may have done outstanding work in India or for India in his/her own country may be considered.

Note: Nominations which are either incomplete or not according to the prescribed format will not be processed.

Chairman, ICRO	Secretary, ICRO
Prof. Sarbani Ghosh Laskar Fellow of Indian College of Radiation Oncology (FICRO) Professor & Radiation Oncologist Department of Radiation Oncology Tata Memorial Hospital Mumbai – 400 012, Maharashtra Email: sarbanilaskar@gmail.com	**Dr. Pooja Nandwani Patel** Fellow of Indian College of Radiation Oncology (FICRO) Director, Radiation Oncology, Sterling Hospitals Sindhubhavan, Behind Sindhubhavan Marg, Off S G Highway Bodakdev, Ahmedabad – 380 054, Gujarat Email: secretaryicro@gmail.com

FOR SELECTION OF ICRO FELLOW, AN OVERALL ASSESSMENT IN ALL SPHERES WILL BE DONE AND VARIOUS CRITERIA WILL BE CONSIDERED AND NOT ONLY EXCELLENCE IN ONE PARTICULAR SPHERE ALONE

From the office of AROI

Dr. B. D. Gupta Memorial Oration

- Born in Uttar Pradesh on 8th March 1934.
- Graduated from Medical College Agra and post-graduation in Radiology (combined Radio-diagnosis and Radiotherapy) under the eminent Dr. P.K. Haldar in 1963.
- He went to Manchester in United Kingdom and worked at Christie hospital, obtained the FRCR degree from London and came back to the country to practice exclusively Radiotherapy and Oncology.
- Following a brief stint at the AIIMS, New Delhi, he joined PGIMER, Chandigarh in November,1971
- Founded the Department of Radiotherapy and served as the Head of this department PGIMER till 31st March 1994.
- Founder of Modern Radiation Oncology in India
- Established number of Radiotherapy centres in northern India including one at AIIMS, New Delhi; MD Oswal Centre, Ludhiana & few centres in foreign (1 in Sri Lanka).
- He was instrumental in developing first indigenous Linear Accelerator in collaboration with SAMEER, Mumbai & CSIO Chandigarh & first prototype machine was installed at PGIMER which worked for 10 years.

Orator – Prof. Manoj Gupta

- Completed his graduation & PG from King George Medical College, Lucknow in 1985 & 1990 respectively.
- Later he completed his DNB & MNAMS.
- He was Ex Dean Academic at AIIMS, Rishikesh (UK) from 26th August 2019 to 25th August 2022.
- Currently he is a Director, Sri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun, UK, India since 17th March 2025
- Chair AROI for 2024-2026
- Total 150 publications (International 111 & National 39)

From the office of AROI

Padma Shri Prof. K. A. Dinshaw Memorial Oration

Dr Dinshaw was born on 16 Nov 1943 at Kolkata. She moved to Vellore to study medicine. She always wanted to be the Surgeon. During her MBBS training her teacher introduced to Dr Soloman Padam Singh, who was well known Radiation Oncologist at Vellore. He convinced her to be Radiation Oncologist. He made all arrangement for her to Cambridge at Addenbrook's Hospital. At Cambridge she worked with Prof Mitchell who was working on radiosensitizer Synkavit and also running trial on hyperthermia. This was to sensitize her for conducting clinical trials, which will be useful in the future. She completed her FRCR on 16 December 1973. She planned to work at Vellore. Before joining at Vellore, she came to Mumbai just to have holidays when one of her relative asked her to meet Dr Jussawala and explore if she can work at the TMH. Reluctantly she took appointment with Dr Jussawala & reached TMH. There she met Dr Jussawala, Dr Paymaster, Dr PB Desai and Dr JM Pinto & joined TMH.

She has been instrumental in initiating several programs at TMH. Initiated joint clinic (MDT) culture even before 1979. Gynae joint clinic with Dr MR Kamat and Lymphoma Clinic with Dr SH Advani. She was famous for green ink-pen. She was instrumental in building several institutions few to mention, ACTREC, Navi Mumbai, TMC Kolkata. She was art lover and gave dimensions to hospital with input of art. She was bestowed with "Padma Shri" award from Government of India for her exemplary services for oncology. She left heavenly abode on Friday, 26th August 2011.

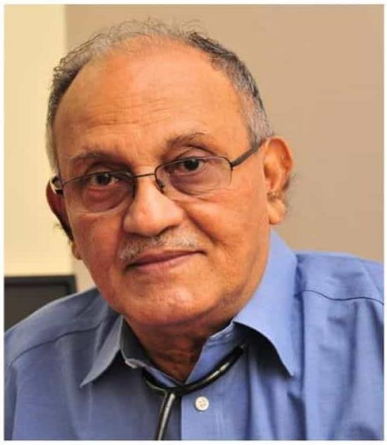
An era ended but Legacy continued.

Orator – Dr. Vivek Kavadi

- Vivek S. Kavadi, MD, MBA, FASTRO, is CEO of the American Society for Radiation Oncology (ASTRO)
- Received medical degree from Harvard Medical School & completed his residency training at MD Anderson Cancer Center where he was chief resident.
- His practice has been with Texas Oncology, where he served on the Executive Committee of the largest private oncology group practice in the United States and was a Medical Director for the Houston region.
- He was the National Medical Director and was Principal Investigator for their RTOG/NRG Research Program.
- He subsequently served as Chief Radiation Oncology Officer for US Oncology/McKesson.
- Dr. Kavadi received his MBA from The Wharton School in 2021.
- CEO of ASTRO since November 1, 2024.

From the office of AROI

Padma Shri Prof. M Krishnan Nair Memorial Oration



- Padmasree Prof M Krishnan Nair MD, FRCR (1939-2021)
- Finished MBBS in 1963(University of Kerala) & MD Radiotherapy in 1968(University of Punjab). Trained in Christie Manchester 1969-70. Got FRCR in 1972. Continued as Faculty in Medical College, Trivandrum.
- Founder Director, RCC , Thiruvananthapuram (1981-2003)
- One of the Founder Members of AROI
- National President AROI (1984-1986)
- Awarded Padmasree in 2001
- Had contributed significantly to Radiation Oncology, Brachytherapy, Epidemiology, Palliative medicine , Community Oncology , National Cancer Control Plan etc.

Orator – Prof. J. P. Agarwal

- Prof. J P Agarwal is a multifaceted person, devoted radiation oncologist for his patients, known academician among his students & peers alike, a keen researcher in oncology particularly H & N and thoracic cancers for issues particularly facing our subcontinent.
- Finished PG from renowned TMH, Mumbai, since then he joined his Alma mater as faculty in 1996 & became professor in 2006 & subsequently as HOD in Nov 2016.
- currently Member of Board of studies for Homi Bhabha National institute (HBNI) and for several universities including NBE.
- PG examiner for various universities, NBE.
- Apart from being assessor for NMC & NABH, on several committees for Govt Of India, AIIMS, Govt of Maharashtra & several departments as expert.
- Recipient of several fellowships, AROI Fellowship, ECCO fellowship, Acta Oncologica IGRT fellow.
- Awarded honorary membership of ESTRO.
- A very keen publisher of his research work & has authored & co-authored more than 426 peer reviewed articles & over 6000 citations with the h index of 37 since 2020.

Clinical Radiobiology in Practice: Five Case-Based Lessons for the Radiation Oncologist

Gautam Kumar Sharan[1]
Anmol Verma[2]
Adrija Ghosh[3]
Satyajit Pradhan[4]

1. Medical Officer 'G' & Radiation Oncologist, Homi Bhabha cancer Hospital & Research Centre, Tata Memorial Centre, Muzaffarpur- 842 004
2. Senior Resident, Department of Radiation Oncology, Homi Bhabha cancer Hospital & Research Centre, Tata Memorial Centre, Muzaffarpur- 842 004
3. Senior Resident, Department of Radiation Oncology, Mahamana Madan Mohan Malviya Cancer Centre and Homi Bhabha Cancer Hospital, Tata Memorial Centre, Varanasi- 221 005
4. Professor, Radiotherapy & Director, Mahamana Madan Mohan Malviya Cancer Centre and Homi Bhabha Cancer Hospital, Tata Memorial Centre, Varanasi- 221 005

Case 1: Radiobiology Principles in Glioblastoma Management – A Clinical Insight

Clinical Scenario

A 62-year-old male presented with progressive headaches, left hemiparesis, and cognitive decline. MRI revealed a heterogeneously enhancing lesion in the right frontal lobe with midline shift. He underwent maximal safe resection. Histopathology confirmed glioblastoma (WHO Grade IV), IDH-wildtype and MGMT promoter unmethylated. Residual disease was evident post-operatively. He was planned for adjuvant radiotherapy (RT) to 60 Gy in 30 fractions over 6 weeks with concurrent temozolomide (TMZ) at 75 mg/m²/day.

Key Radiobiological Concepts and Applications

1. TUMOR HYPOXIA AND REOXYGENATION

Radiobiological Concept:

Hypoxic tumor cells are inherently more resistant to radiation. Oxygen acts as a radiosensitizer by stabilizing DNA damage, particularly double-strand breaks. The Oxygen Enhancement Ratio (OER) indicates that hypoxic cells require 2.5–3 times more dose for equivalent damage compared to normoxic cells (1).

Clinical Relevance in GBM:

Glioblastomas are poorly vascularized and contain necrotic cores, leading to heterogeneous oxygenation. With fractionated RT, better-oxygenated cells are preferentially eliminated, allowing hypoxic cells to reoxygenate between sessions, thereby enhancing radiosensitivity (2).

Evidence:

Joiner and van der Kogel highlight reoxygenation as one of the critical components of fractionated RT (3). Zagzag et al. demonstrated that HIF-1α expression, a marker of hypoxia, is correlated with glioma grade and poor prognosis (4).

2. FRACTIONATION, REPAIR, REDISTRIBUTION, AND REPOPULATION

Concept Overview:

Fractionated RT utilizes the "4 R's" of radiobiology:

- Repair of sublethal DNA damage in normal tissues
- Reoxygenation of tumor subvolumes
- Redistribution of tumor cells into radiosensitive cell cycle phases
- Repopulation of tumor cells, which can accelerate after ~4 weeks (5)

GBM-Specific Considerations:

While GBM cells exhibit poor repair mechanisms, glioma stem-like cells (GSCs) show enhanced DNA damage response (DDR), contributing to recurrence (6). A 6-week RT course balances tumor control and sparing of normal brain using mechanisms like non-homologous end joining (NHEJ) and homologous recombination (HR).

Clinical Radiobiology in Practice

Supporting Evidence:
Piroth et al. showed that hypofractionated regimens (e.g., 40 Gy in 15 fractions) may benefit elderly GBM patients by minimizing overall treatment time (7). RTOG 9006 found that hyperfractionation failed to improve survival, suggesting biological limitations in GBM (8).

3. RADIOSENSITIZATION BY TEMOZOLOMIDE (TMZ)

Mechanism:
TMZ methylates DNA at the O6 position of guanine, leading to mismatched base pairs and DNA strand breaks. MGMT (O6-methylguanine-DNA methyltransferase) repairs this lesion, and its promoter methylation is associated with improved TMZ response (9).

Radiosensitizing Effect:
Even in MGMT-unmethylated tumors, TMZ adds to DNA damage and inhibits base excision repair, synergizing with RT-induced cytotoxicity (10).

Clinical Evidence:
The landmark EORTC-NCIC trial by Stupp et al. showed a median survival improvement from 12.1 to 14.6 months with concurrent and adjuvant TMZ versus RT alone (11). Five-year survival increased from 2% to 9.8% (12). Ceccarelli et al. provided molecular classification showing MGMT and IDH status as major determinants of response (13).

4. GLIOMA STEM CELLS (GSCS) AND RADIORESISTANCE

Biological Insight:
GSCs reside in hypoxic and perivascular niches and have elevated DDR pathways, including ATM, ATR, and CHK1/2, contributing to radioresistance and recurrence (14).

Experimental Data:
Bao et al. showed GSCs activate DNA damage checkpoints more efficiently than non-GSCs, conferring radioresistance (15). Venere et al. demonstrated that targeting DDR pathways may sensitize GSCs to radiation (16).

Treatment Plan Justification Based on Radiobiology

Treatment Parameter	Radiobiological Justification
60 Gy in 30 fractions	Allows reoxygenation, redistribution, and normal tissue repair; effective for both bulk and infiltrative tumor.
Concurrent TMZ	Enhances DNA damage; provides radiosensitization even in MGMT-unmethylated tumors.
RT initiation ~3 weeks post-op	Prevents accelerated repopulation and limits early GSC expansion.
Image-Guided RT (IGRT)	Ensures precise targeting, sparing adjacent healthy brain, reducing late cognitive sequelae.

Take-Home Point

1. GBM's hypoxic microenvironment necessitates fractionated RT to allow progressive reoxygenation.
2. The 4 R's—repair, reoxygenation, redistribution, and repopulation—form the basis for the standard 2 Gy × 30 fraction schedule.
3. TMZ remains a key radiosensitizer, even when MGMT is unmethylated, though benefit is attenuated.
4. GSCs are highly radioresistant due to robust DDR mechanisms; DDR inhibitors may enhance response.
5. Evidence from the Stupp protocol has firmly established the standard of care: concurrent chemoradiation in GBM.

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Clinical Radiobiology in Practice

2. Hall EJ, Giaccia AJ. Radiobiology for the Radiologist. 8th ed. Philadelphia: Wolters Kluwer; 2019.
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12. Stupp R, Hegi ME, Mason WP, et al. Effects of radiotherapy with concomitant and adjuvant temozolomide versus radiotherapy alone on survival in glioblastoma in a randomised phase III study: 5-year analysis. Lancet Oncol. 2009;10(5):459-466.
13. Ceccarelli M, Barthel FP, Malta TM, et al. Molecular profiling reveals biologically discrete subsets and pathways of progression in diffuse glioma. Cell. 2016;164(3):550-563.
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15. Bao S, Wu Q, McLendon RE, et al. Glioma stem cells promote radioresistance by preferential activation of the DNA damage response. Nature. 2006;444(7120):756-760.
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Case 2: Radiobiological Foundations of Adjuvant Therapy in Buccal Mucosa SCC

Clinical Scenario

A 45-year-old non-smoking female presented with a 4 cm ulceroproliferative lesion in the right buccal mucosa. Biopsy confirmed moderately differentiated squamous cell carcinoma (SCC). Imaging showed infiltration into the gingivobuccal sulcus and submucosa. She underwent wide local excision and right modified neck dissection. Histopathology revealed:

- Close surgical margin (<1 mm)
- Perineural invasion (PNI+)
- Lymphovascular invasion (LVI+)
- Two positive lymph nodes (Level I and II), no extranodal extension
- Pathologic stage: pT3N2b

She was planned for adjuvant radiotherapy (RT) to 66 Gy in 33 fractions, with weekly cisplatin.

Core Radiobiological Concepts

1. THE 4 R'S OF RADIOBIOLOGY IN THE POSTOPERATIVE SETTING

Fractionated RT relies on four foundational biological processes: Repair, Redistribution, Reoxygenation, and Repopulation.

- Repair: Normal tissues can efficiently repair sublethal DNA damage between fractions, reducing late toxicity. The inter-fraction interval (~24 hours) is optimal for repair in head and neck tissues (1).

Clinical Radiobiology in Practice

- Redistribution: Tumor cells move through the cell cycle between fractions. G2 and M phases are radiosensitive, while S phase is radioresistant. Fractionation increases the probability of hitting cells in sensitive phases (2).
- Reoxygenation: The postoperative bed may harbor hypoxic microscopic residual disease. Fractionated RT allows reoxygenation between fractions, increasing radiosensitivity via the oxygen enhancement ratio (OER ≈ 2.5–3) (3).
- Repopulation: Residual tumor cells begin accelerated proliferation around 3–4 weeks post-surgery. Starting RT within 4–6 weeks is critical. Weekly cisplatin helps suppress repopulation and enhances radiation response (4).

Key Evidence:

- Ang et al. (RTOG 9501) demonstrated the benefit of adjuvant chemoradiation in high-risk postoperative patients (5).
- Peters et al. showed that concurrent chemoradiotherapy (CRT) significantly improves locoregional control (6).
- Bese et al. found that RT delay beyond 6 weeks significantly worsened disease-free and overall survival (7).

2.CELL CYCLE, RADIOSENSITIVITY, AND MICROSCOPIC DISEASE

Cell cycle phase-specific radiosensitivity influences tumor control in postoperative settings.

Phase	Radiosensitivity	Key Characteristics
G1	Moderate	Checkpoint regulation
S	Resistant	Active DNA synthesis; efficient repair
G2	Sensitive	DNA damage checkpoints
M	Highly Sensitive	Condensed chromatin; low repair capacity

Fractionation exploits this by increasing the chance of irradiating cells in G2/M phases over time.

Supporting Data:

- Pawlik & Keyomarsi showed phase-dependent radiosensitivity in SCC, with peaks in G2/M (8).
- Raben et al. demonstrated that cisplatin enhances G2/M arrest, making RT more effective (9).

3. LINEAR-QUADRATIC (LQ) MODEL AND ALTERED FRACTIONATION

The LQ model describes cell survival post-irradiation as:

$S = e^{-(\alpha D + \beta D^2)}$

- α = lethal damage
- β = sublethal, repairable damage
- The α/β ratio indicates tissue sensitivity to dose per fraction.

Oral cavity SCC has a high α/β (~10 Gy), favoring conventional or hyperfractionated RT. For high-risk features (PNI, LVI, close margins), a higher biological effective dose (BED) is required.

66 Gy in 33 fractions yields a BED of approximately 79.2 Gy (assuming α/β = 10), suitable for local control in adverse biology.

Evidence:

- RTOG 9003 (Ang et al.) showed that hyperfractionated RT improves disease control in head and neck SCC (10).
- DAHANCA trials demonstrated that 6 fractions/week accelerated RT improves outcomes by minimizing repopulation (11).

4. RADIOSENSITIZATION BY CISPLATIN

Cisplatin enhances RT effectiveness via multiple mechanisms:

- Inhibits DNA repair pathways, including nucleotide excision repair (NER) and non-homologous end-joining (NHEJ)
- Forms DNA crosslinks, augmenting radiation-induced double-strand breaks
- Induces G2/M arrest, increasing radiosensitivity

Key Trials:

- RTOG 9501 and EORTC 22931 validated that CRT provides superior locoregional control and OS over RT alone in high-risk postoperative SCC (5,12).

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- Meta-analysis by Pignon et al. reported a 6.5% absolute OS benefit at 5 years with cisplatin-based CRT (13).

5. RADIOBIOLOGICAL IMPERATIVES FOR EARLY RT

Postoperative RT should start within 4–6 weeks. Delayed initiation allows residual tumor clonogens to repopulate, increasing recurrence risk.

Each week of delay beyond 6 weeks may reduce local control probability by 10–12% (7).

Supporting Evidence:

- Rosenthal et al. reported increased locoregional failure with RT delays >6 weeks post-op (14).
- Bese et al. found significant decreases in DFS and OS when RT was delayed (7).

Summary Table: Radiobiology-Based Clinical Decisions

Clinical Element	Radiobiologic Justification
66 Gy in 33 fractions	Adequate BED (~79 Gy) for controlling microscopic residual disease in high-risk scenarios
Weekly cisplatin	Radiosensitizes via DNA crosslinks, inhibits repair, and induces G2/M arrest
RT start within 4–6 weeks post-op	Prevents accelerated repopulation of residual cancer cells
Fractionation	Promotes normal tissue repair, tumor cell reoxygenation, and redistribution into G2/M phases
High-risk pathology (PNI, LVI, margin)	Necessitates dose intensification and chemoradiation

Take-Home Points

1. The 4 R's of radiobiology underpin the rationale for fractionated RT in postoperative head and neck SCC.
2. Radiosensitivity varies across the cell cycle; fractionation helps overcome this heterogeneity.
3. The LQ model supports using 66 Gy in 33 fractions for high-risk postoperative settings.
4. Concurrent cisplatin synergistically increases radiation efficacy and curbs repopulation.
5. Timely initiation of RT post-surgery is vital to avoid biologically driven failures.

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Case 3: Radiobiological Basis of Chemoradiation in FIGO Stage IIB Cervical Cancer

Clinical Scenario

A 50-year-old premenopausal woman presents with abnormal bleeding and pelvic discomfort. Examination reveals a bulky exophytic cervical tumor invading the left parametrium. Biopsy confirms moderately differentiated squamous cell carcinoma. MRI pelvis confirms parametrial involvement without pelvic sidewall or nodal disease. She is diagnosed with FIGO Stage IIB cervical cancer.

Treatment Plan:

- External beam radiotherapy (EBRT): 50 Gy in 25 fractions (5 weeks) to the whole pelvis
- Concurrent weekly cisplatin (40 mg/m²)
- Followed by high-dose-rate (HDR) intracavitary brachytherapy: 7 Gy × 4 fractions

Core Radiobiological Concepts

1. RADIOSENSITIZATION BY CONCURRENT CHEMOTHERAPY

Mechanism:

Cisplatin enhances radiation cytotoxicity via:

- Inhibiting nucleotide excision repair (NER) and DNA repair pathways
- Causing DNA crosslinks (intra- and inter-strand), impeding replication
- Inducing G2/M arrest—the most radiosensitive cell cycle phase

These actions result in augmented DNA double-strand breaks and suppressed tumor repopulation (1,2).

Clinical Evidence:

- GOG 120 Trial (Rose et al.): Concurrent cisplatin improved overall survival (OS) by 30–50% over RT alone in locally advanced cervical cancer (3).
- GOG 85 (Whitney et al.): Weekly cisplatin offered better 3-year OS (65% vs 54%) than hydroxyurea-based regimens (4).
- Meta-analysis by CCRT Meta-analysis Collaboration: Cisplatin-based CRT provided a 6% absolute OS benefit at 5 years (5).

2. TUMOR REPOPULATION AND OVERALL TREATMENT TIME (OTT)

Radiobiologic Principle:

Accelerated repopulation begins approximately 3–4 weeks after RT initiation. Cervical squamous cell carcinomas have high proliferative rates (doubling time ~4 days), leading to a loss of tumor control if OTT exceeds 7 weeks (6).

Why OTT Matters:

- Each day beyond 56 days results in a 0.5–1% decline in pelvic control (7).
- Delays between EBRT and brachytherapy compromise biologically effective dose (BED) and tumor sterilization.

Biological Modeling:

BED for tumor control must account for repopulation:

$BED = nd\,[1 + d / (\alpha/\beta)] - (\log_2(POT - Tk)/Td)$

Where:

- Tk ≈ 21 days (onset of accelerated repopulation)
- Td ≈ 4 days (tumor doubling time)

Evidence:

- Petereit et al.: OTT > 55 days reduced pelvic control by >10% (6).
- EMBRACE and GOG 92 trials emphasized completion within 7 weeks for optimal outcomes (8,9).
- Viswanathan et al.: Delays between EBRT and ICBT negatively impact tumor control (10).

3. VOLUME EFFECT AND NORMAL TISSUE TOLERANCE

Radiobiologic Concepts:

- TD 5/5: Dose resulting in a 5% risk of complication within 5 years
- NTCP (Normal Tissue Complication Probability): Depends on total dose, fraction size, irradiated volume, and organ-specific α/β

Clinical Radiobiology in Practice

Critical Organs in Cervical RT:

Organ	TD 5/5 (Whole Organ)	Endpoint	EQD2 Constraint
Bladder	65 Gy	Contracture, frequency	D2cc < 90 Gy (α/β = 3)
Rectum	60 Gy	Proctitis, ulceration	D2cc < 75 Gy
Sigmoid		Perforation, stricture	D2cc < 70 Gy

Use of Modern Techniques:

- 3D-CRT, IMRT, and IGABT minimize high-dose volumes to organs-at-risk (OARs).
- During brachytherapy, image guidance allows accurate dose sculpting around the high-risk clinical target volume (HR-CTV).

EQD2 Dose Summation:

- HDR brachytherapy (7 Gy × 4) = 28 Gy physical
- EQD2tumor = nd × (1 + d / α/β) = 28 × (1 + 7/10) = 47.6 Gy
- Total tumor EQD2 (EBRT + ICBT) ≈ 97–105 Gy—sufficient for ablation (11)

Supporting Data:

- EMBRACE-I: IGABT improved local control to 90% with lower toxicity (12)
- Haie-Meder et al.: HR-CTV D90 ≥ 85 Gy EQD2 associated with better local control (13)

Integrated Radiobiologic Approach to Treatment

Treatment Component	Radiobiologic Justification
Weekly cisplatin	Radiosensitizes tumor by DNA crosslinking, G2/M arrest, and repair inhibition
EBRT 50 Gy in 25 fractions	Fractionation supports normal tissue repair, tumor reoxygenation, and redistributes cells
HDR Brachytherapy (7 Gy × 4)	Delivers high BED to central tumor, sparing OARs
OTT < 56 days	Avoids accelerated repopulation; preserves tumor control
IMRT/IGABT Planning	Optimizes dose conformity; reduces NTCP for bladder, rectum, and sigmoid

Take-Home Messages

1. Concurrent cisplatin augments RT by inducing lethal DNA damage, impairing repair, and enhancing cell kill in radiosensitive phases.
2. OTT ≤ 56 days is critical to prevent repopulation and maintain local control; integrate brachytherapy promptly.
3. HDR brachytherapy adds significant BED to the tumor core while protecting adjacent organs through image-guided techniques.
4. Modern RT planning (e.g., MRI-based IGABT, IMRT) is essential for balancing tumor dose escalation and OAR safety.
5. Adherence to radiobiological principles, particularly BED summation and NTCP limits, directly correlates with treatment success in cervical cancer.

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Case 4: Hypofractionated Radiotherapy in Intermediate-Risk Prostate Cancer – Radiobiological Justification

Clinical Scenario

A 70-year-old male with no significant comorbidities presents with a PSA of 12.3 ng/mL. Digital rectal examination reveals a firm nodule in the right prostate lobe. Biopsy confirms Gleason 7 (3+4) adenocarcinoma in 4 of 12 cores. MRI pelvis demonstrates cT2b disease with no extracapsular extension or seminal vesicle invasion. Bone scan is negative. He is classified as intermediate-risk prostate cancer (Gleason 7, PSA 10–20, cT2b). Two radiotherapy regimens are discussed:

1. Conventional fractionation: 78 Gy in 39 fractions over 7.5 weeks
2. Moderate hypofractionation: 60 Gy in 20 fractions over 4 weeks

The patient chooses hypofractionated external beam radiotherapy (EBRT).

Core Radiobiological Concepts

1. PROSTATE CANCER AND THE LOW A/B RATIO

The α/β ratio reflects tissue sensitivity to fraction size. Tumors with a low α/β ratio respond more effectively to larger radiation doses per fraction. Most tumors and early-reacting tissues have high α/β values (~10 Gy), but prostate cancer is an exception, with an α/β ratio estimated at ~1.5 Gy, similar to late-responding normal tissues like the rectum or spinal cord (1,2).

Clinical Implication:

This unique biology supports hypofractionation, as larger fraction sizes enhance tumor control without significantly increasing toxicity—provided normal tissues are spared.

Evidence:

- Brenner and Hall (1999) proposed the low α/β hypothesis based on clinical outcome models (1).
- Further modeling by Fowler and clinical trials support this concept (2).

2.FRACTION SIZE SENSITIVITY AND BED CALCULATIONS

To evaluate and compare regimens, the Linear-Quadratic (LQ) model is used to calculate Biologically Effective Dose (BED):

$BED = nd \times (1 + d / \alpha/\beta)$

Where:

- n = number of fractions
- d = dose per fraction
- α/β = tissue-specific value

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BED Comparison Table

Regimen	Total Dose	BED (α/β = 1.5)	BED (α/β = 3)	BED (α/β = 10)
78 Gy in 39 fractions	78	182.0	130.0	93.6
60 Gy in 20 fractions	60	180.0	120.0	96.0

The hypofractionated regimen offers comparable BED to conventional schedules for tumor control (α/β = 1.5) with minimal compromise in safety (α/β = 3 for normal tissues).

Key Trials:

- CHHiP Trial (UK): 60 Gy in 20 fractions was non-inferior to 74 Gy in 37 fractions, with similar 5-year biochemical relapse-free survival (~90%) (3).
- PROFIT Trial (Canada): Confirmed equivalence between 60 Gy in 20 fractions and 78 Gy in 39, with acceptable toxicity profiles (4).

3. HYPOFRACTIONATION AND LATE-RESPONDING TISSUES

While hypofractionation benefits tumor control in low α/β tumors like prostate cancer, it also increases the BED to nearby normal tissues (e.g., rectum, bladder) which share a similarly low α/β ratio (~3 Gy).

Toxicity Risk:

- Hypofractionated treatments must adhere to strict organ-at-risk (OAR) dose constraints to prevent late toxicities.

Typical Constraints:

Organ	EQD2 Constraint (α/β = 3)	Toxicity Risk
Rectum	V70 < 15%, V60 < 35%	Proctitis, bleeding
Bladder	V70 < 25%, V65 < 50%	Frequency, cystitis
Urethra	Dmax < 75 Gy	Dysuria, stricture

Planning Essentials:

- IMRT and IGRT are necessary to deliver precise doses and reduce NTCP.
- Daily image guidance accounts for prostate motion, minimizing dose to adjacent organs.

Evidence:

- HYPRO Trial: Used 64.6 Gy in 19 fractions (3.4 Gy/fraction); while tumor control was similar, higher late GU toxicity was observed—highlighting the need for caution with extreme hypofractionation (5).
- Thus, moderate hypofractionation (2.5–3 Gy/fraction) is preferred and safe in standard clinical use.

Summary: Radiobiologic Rationale for Moderate Hypofractionation

Component	Justification
60 Gy in 20 fractions	Delivers BED equivalent to 78 Gy in 39 fractions for prostate cancer (α/β = 1.5)
IMRT + IGRT	Enables accurate targeting and reduces OAR toxicity
No ADT used	Appropriate in selected intermediate-risk patients with favorable features

Advantages of Hypofractionation

Factor	Benefit
Tumor α/β = 1.5	Larger fractions increase tumor cell kill
Equivalent tumor BED	Comparable efficacy to conventional fractionation
Shorter treatment duration	Greater patient convenience and cost-effectiveness
Supported by RCTs	CHHiP, PROFIT, and RTOG trials demonstrate non-inferiority

Clinical Radiobiology in Practice

Key Clinical Trials Supporting Hypofractionation

1. CHHiP Trial (Dearnaley et al.):
- N=3216
- 60 Gy/20# vs 74 Gy/37#
- bNED ~90%, similar toxicity (3)2.

2. PROFIT Trial (Catton et al.):
- N=1206
- 60 Gy/20# vs 78 Gy/39#
- Similar outcomes; conventional arm had more acute GI toxicity (4)

3. RTOG 0415 (Low-risk patients):
- N=1115
- 73.8 Gy/41# vs 70 Gy/28#
- Equivalent bPFS; manageable late toxicity (6)

Take-Home Messages

1. Prostate cancer's low α/β (~1.5 Gy) supports larger fraction sizes for effective tumor control.
2. Moderate hypofractionation (≤3 Gy/fraction) provides equivalent or superior BED with no significant increase in late toxicity.
3. IMRT and IGRT are critical in delivering hypofractionated schedules safely by respecting normal tissue constraints.
4. BED modeling using the LQ formula is essential to personalize fractionation schedules and optimize therapeutic ratio.
5. Large randomized trials consistently support hypofractionation as a standard option in intermediate-risk prostate cancer.

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Case 5: Pediatric Medulloblastoma – Radiobiology of Craniospinal Irradiation

Clinical Scenario

A 7-year-old boy presents with headache, vomiting, and ataxia. MRI reveals a midline posterior fossa mass with hydrocephalus. He undergoes VP shunt placement and gross total resection. Histopathology confirms classic medulloblastoma (WHO Grade IV). CSF cytology is negative; spinal MRI shows no metastases. He is stratified as standard-risk medulloblastoma (M0, non-anaplastic, no residual tumor).

Planned treatment:

- Craniospinal irradiation (CSI): 23.4 Gy in 13 fractions
- Posterior fossa boost: 30.6 Gy in 17 fractions
- Concurrent weekly vincristine, followed by adjuvant chemotherapy

Core Radiobiological Concepts

1. RADIOSENSITIVITY OF THE DEVELOPING CNS

Children's brains are more radiosensitive due to high cellular proliferation, immature repair capacity, and active developmental processes such as myelination and synaptogenesis.

Key vulnerable areas:

- Hippocampus: Neurogenesis → cognitive function
- Cerebellum: Coordination and balance
- Pituitary–hypothalamic axis: Endocrine function

Critical age window: Children <7 years show highest risk of neurocognitive damage, with linear IQ loss per Gy (~0.3–0.6 points/Gy) to temporal lobes and hippocampus (1,2).

Evidence:

- Mulhern et al. (2005): CSI leads to sustained declines in IQ and memory, particularly in younger children (1)

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- Merchant et al. (2009): Temporal lobe radiation dose correlates with reduced processing speed and working memory (2).

2. INTEGRAL DOSE, VOLUME EFFECT, AND SECOND MALIGNANCY RISK

Integral dose = Dose × Volume irradiated. CSI exposes large anatomical volumes—brain, spine, and systemic organs—to radiation.

Consequences:

- Endocrine toxicity (thyroid, pituitary)
- Growth abnormalities (vertebral irradiation)
- Increased lifetime SMN risk due to:
    - Larger volumes irradiated
    - Higher radiation dose
    - Long life expectancy

Common secondary malignancies:

- Meningiomas, gliomas, sarcomas, thyroid carcinoma, and leukemia
- Latency typically 10–30 years

Proton therapy advantage:

- Bragg peak delivers dose to the target without exit dose → ~30–60% reduction in integral dose
- Reduced risk of SMNs and endocrine/cognitive late effects

Evidence:

- Chung et al. (2013): Lower SMN rates with proton therapy compared to photons (3).
- Yock et al. (2016): Proton CSI in standard-risk medulloblastoma preserved IQ and growth hormone function (4).

3. RADIOPROTECTION AND NTCP IN PEDIATRIC RT

The Normal Tissue Complication Probability (NTCP) model accounts for:

- Dose (total and per fraction)
- Volume irradiated
- Tissue-specific α/β ratio

Pediatric tissues have steep NTCP curves → small dose increases cause significant complications.

Tissue	Late Effect	TD 5/5 (Gy)	Pediatric Tolerance
Whole Brain	IQ loss, necrosis	~50	<30 Gy preferred
Spinal Cord	Myelopathy, paralysis	~50	<36 Gy
Cochlea	SNHL	~35	<30 Gy
Pituitary	GH deficiency	~30	<20 Gy

Strategies to reduce NTCP:

- IMRT/conformal RT: Better sculpting of dose, avoids cochlea/pituitary overexposure
- Proton CSI: Significantly reduces dose to anterior organs (thyroid, breast, GI tract)
- MRI fusion: Improves delineation of hippocampus and brainstem

Evidence:

- Merchant et al. (2008): Conformal RT with cochlear-sparing preserved hearing in children receiving vincristine (5).
- SJMB03 trial (Yock et al., 2016): Reduced late effects with tailored dose-painting and proton CSI (4).

Radiobiology of Dose and Fractionation

CSI: 23.4 Gy in 13 fractions (1.8 Gy/fraction)

Historically, CSI doses were 36 Gy, but studies in standard-risk medulloblastoma showed 23.4 Gy provided equivalent disease control with significantly lower late toxicity.

- Tumor control: Supported by medulloblastoma's radiosensitivity (α/β ~10 Gy)
- Normal tissue sparing: Lower BED for surrounding CNS structures
- Vincristine during RT: Enhances radiosensitization, suppresses tumor repopulation
- **Posterior Fossa Boost: 30.6 Gy in 17 fractions**
- Targeted dose escalation to tumor bed → total 54Gy
- Reduces risk of under-treatment in critical foci

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Summary Table: Radiobiologic Considerations

Component	Radiobiologic Justification
CSI 23.4 Gy	Sufficient for M0, standard-risk disease with less neurotoxicity
Proton therapy	Minimizes integral dose and risk of SMNs/endocrinopathy
IMRT/conformal RT	Spares cochlea, pituitary, hippocampus
Weekly vincristine	Radiosensitizer, inhibits mitosis and DNA repair
Posterior fossa boost	Ensures adequate BED to tumor bed while sparing surrounding structures
TCP-guided planning	Minimizes risk of late sequelae in highly vulnerable pediatric CNS tissues

Take-Home Messages

1. The pediatric CNS is highly radiosensitive, necessitating careful dose and volume selection.
2. CSI at 23.4 Gy is effective for standard-risk medulloblastoma while minimizing neurotoxicity.
3. Integral dose and second cancer risk must be considered in long-term survivors—proton therapy offers clear advantages.
4. Radioprotective strategies using NTCP models and advanced planning are essential to limit long-term complications.
5. Dose fractionation must balance tumor control (via BED) and normal tissue safety in the context of a developing brain.

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47th ICRO–SUN Post-Graduate Teaching Programme

12 – 13 April 2025
NRS Medical College & Hospitals, Kolkata

Update from
Prof. (Dr.) Anis Bandyopadhyay

The 47th ICRO–SUN Post-Graduate Teaching Programme was successfully held on 12th and 13th April 2025 at Nil Ratan Sircar Medical College & Hospital, Kolkata. This academic event, focusing on the theme "Recent Advances in Clinical Oncology", was organized by the Department of Radiation Oncology in collaboration with ICRO–AROI, and aimed at postgraduate trainees and junior residents in Radiation Oncology. The programme was formally inaugurated by AROI President Prof. Surendranath Senapati, AROI General Secretary Dr. Srinivasan and ICRO Secretary Dr Pooja Nandwani Patel, in the august presence of the Chief Guest, Prof. Indira Basu, Principal of NRSMC&H. The dignitaries highlighted the need for academic consistency, technological adaptability, and multidisciplinary collaboration in modern oncology. Over two days, participants attended sessions covering a wide spectrum of contemporary oncology topics, including, Advances in radiation techniques like adaptive radiotherapy, technological transformation, surface-guided RT, particle therapy, and motion management in treatment planning along with recent developments in molecular imaging, pathology, and systemic therapies, integration of immunotherapy with radiotherapy and finally the emerging role of artificial intelligence in radiation and threats and opportunities it provided. The lectures were delivered by experienced faculty from reputed institutions across India and were well received for their clarity, clinical relevance, and exam-focused approach. Around 84 post graduate students registered and attended the program and actively participated in the discussions. The course was smoothly conducted by the course Coordinators Prof Dr Anis Bandyopadhyay and Dr Priyanka Das and their team and was convened by Prof Dr Rajat Bandyopadhyay. The discussions were enriched by the presence of the ICRO chairman Prof (Dr) Sarbani Ghosh Laskar who took special care in clarifying the students doubts along with other renowned faculties present. One of the major topic of discussion and concern among the students is the role of AI in future and the threat it possess for the fraternity, the trepidations of which was felt long after the lecture was over, in the Dining room.

The programme concluded with a valedictory session and distribution of certificates. Overall, the 47th ICRO–SUN PG Teaching Programme was a highly successful academic event, reaffirming ICRO's continued commitment to postgraduate education and academic excellence in the field of clinical oncology.

National Workshop on Research Methodology

10 - 11 May 2025
BHU, Varanasi

Update from
Dr. Sunil Choudhary

The National Workshop on Research Methodology was organized by the Department of Radiotherapy and Radiation Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi under the aegis of Association of Radiation Oncologists of India, Uttar Pradesh Chapter on May 10-11, 2025. The event started with the inaugural ceremony wherein The Rector, BHU was the Chief Guest while Prof SN Sankhwar, Director, IMS, BHU and Prof Satyajit Pradhan, Director, TMC, Varanasi were the Guests of Honor. The keynote address was delivered by the Rector who is also the Director, Institute of Science, BHU.

The Workshop was attended by 46 delegates, primarily Young Radiation Oncologists, from across the country. A total of 14 Faculty members from across the country had delivered their talk during this event. Special emphasis was given on Hands-on training with several PhD scholars of Biostatistics serving as volunteers during the Workshop. The scientific program was for a total of 14 hours wherein pertinent topics were deliberated by highly experienced and learned Faculty from BHU and across the nation. Padmashri Urmila Srivastava, the distinguished Kajri singer and Vidhushi Sucharita Gupta, the seasoned Folk singer, mesmerized the audience during the cultural night held in KN Udupa Auditorium, BHU on May 10th.

Prof Lalit Mohan Aggarwal, Radiological Physicist, BHU was the Organizing Chairman. Dr Sunil Choudhary, Prof and Head, Department of Radiotherapy & Radiation Medicine, IMS, BHU was the Organizing Secretary while Dr Ashish Kumar Yadav, Assistant Professor, Unit of Biostatistics was the Joint Organizing Secretary. Prof TB Singh was the Scientific Chairman of the Workshop. The Workshop ended with Valedictory function. The vote of thanks was delivered by Prof Naveen Kumar PG, Dental Sciences, BHU. The program was supported by Sponsored Research & Industrial Consultancy Cell, Banaras Hindu University.

1st Annual Conference Karnataka Chapter

17 – 18 May 2025
Bangalore Baptist Hospital, Bengaluru

Update from
Dr. Ravindra Ganganna

The recent scientific conference AROKSCON-2025 proved to be a remarkable success, bringing together the members of state chapter with active participation of most of the centres representing most of the district head quarters. More than 120 members attended the conference and witnessed the event with active participation. With a diverse array of Oration, keynote speeches, panel discussions, quiz and poster presentations for residents, the event facilitated the exchange of innovative ideas and cutting-edge research in the field of radiation oncology under the theme "Emerging Technologies-Future of cancer care."

The highlights of the event were

1. Oration in the memory of our great teacher - Dr. Gurunath Kilara by Dr. Kumarswamy
2. Keynote Lecture under the theme by prof. Dr. Nirmala Srikantaiah.
3. Special Guest lecture by National chapter representative Dr. Umesh Mahantshetty on "Updates of results of recent clinical trials in cervical malignancy. “
4. Around ½ century of research papers presented out of which 6 papers were chosen for oral - best paper award category.
5. Highlight of the event was Prof Dr. Ashwath Narayana's online interactive session with the postgraduate students under "Meet the professor" Session.
6. Release of the book on radiation protection translated in Kannada language by Dr. Keshava - Senior most physicist and teacher of all time for radiation oncologists of Karnataka and beyond happened during inauguration ceremony of the conference.
7. Additionally the conference composed of 12 talks, 4 Debates, 4 Panel discussion, PG quiz and scientific paper presentations.

All senior members appreciated the organizers for promoting active participation of younger members in debates, panel discussions and scientific events.

High levels of participation, engaging sessions, and fruitful networking opportunities underscored the conference's impact. Attendees praised the well-organized structure, the relevance of topics discussed, and the collaborative atmosphere, making this conference a milestone in advancing scientific knowledge and fostering interdisciplinary collaboration.

8th Teaching Course in Radiobiology and Medical Physics

21 – 22 Jun 2025
Sri Aurobindo Medical College and PG Institute, Indore

Update from
Dr. Virendra Bhandari

A Teaching Course in Radiobiology and medical physics was organized by Department of Radiation Oncology at Sri Aurobindo Medical College and P G Institute on 21st and 22nd June 2025. All the basic subjects in both the topics were covered in these days. About 85 students from all over India attended the course. There was one to one interaction and basics of the subject along with clinical application were explained in very simple words. All the students attending appreciated the course..

49th ICRO–SUN Post-Graduate Teaching Programme

28 - 29 Jun 2025
SGPGI - Lucknow

Update from
Dr. Pooja Nandwani Patel

Palliative Medicine in Oncology Teaching Course for Postgraduate Trainees in Radiation Oncology

Why should a Radiation / Clinical oncologist have a working knowledge of palliative medicine?

A substantial portion of the work of radiation / clinical oncologists involve the use of radiation to palliate the symptoms arising as a consequence of local tumor growth and infiltration, resulting principally from spread of tumor to bone, viscera and soft tissues, and neuropathic pain arising from tumors in the pelvis, spine and axillary regions, but also other sites. Sometimes these are emergencies.

Further, primary or secondary tumors involving the brain, skull base or meninges cause pain and/or hydrocephephalus; obstruction of tubes (esophagus / bronchus causing dysphagia / bronchial obstruction) or drainage channels (veins or lymphatics, resulting in limb oedema / lymphoedema); or haemorrhage in the oesophagus, bronchus or genitourinary tract. These symptoms are effectively managed by radiotherapy in conjunction with systemic chemotherapy, other drugs or interventional manoeuvres.

Other advanced cancers at diagnosis, arising from esophagus, stomach, pancreas, prostate and malignant gliomas will invariably persist following variable periods of initial symptomatic relief following radiotherapy +/- chemotherapy +/- targeted / immuno / hormonal therapies and require increasingly more care and symptom relief with the passage of time.

Depending upon the patient care pathway / administrative structure of a hospital, the radiation oncologist may or may not be the first point of care, or is referred a patient following a tissue diagnosis or after having received surgery and / or chemotherapy. While additional investigations or assessments or planning for radiotherapy are being undertaken, the patient may be in need of symptom relief, and it is the mandate of the radiation oncologist to seek and recognize this need and offer the same, or refer appropriately for a palliative medicine consultation.

When patients are referred for palliative treatment, the symptom burden is likely to be more pronounced and in need of urgent relief. The radiation oncologist must be alert to this possibility. Also, during radiotherapy, side effects ensue, and timely recognition and mitigation is the responsibility of the radiation oncologist.

Not infrequently patients are referred at the end of life for palliative treatments, where the burden of treatments far outweighs any reasonable chance of relief following radiotherapy and/or systemic therapies. The radiation oncologist must be able to recognize the futility and possess the required skills to assess and prognosticate, and convey the same with sensitivity.

It is also relevant to consider that suffering is not just physical but Holistic. Recognizing that you are dealing with the PERSON and Family facing advanced disease needs Psycho-Social and Spiritual Care; to enhance Coping Mechanisms.

If any one of the above experiences resonates with you, do consider attending this educational endeavour, which aims to bring together oncologists and palliative medicine clinicians from diverse streams and have made it a mission and passion to share their learning.

49th ICRO–SUN Post-Graduate Teaching Programme

28 - 29 Jun 2025
SGPGI - Lucknow

Update from
Dr. Pooja Nandwani Patel

Palliative Medicine in Oncology Teaching Course for Postgraduate Trainees in Radiation Oncology

How will the attendee gain?

- It is expected that the attendees will be able to appreciate the various accompanying symptoms and concerns of a cancer patient & family / significant others.
- Some symptoms may be addressed, while others identified and an appropriate referral made.
- Depending upon whether the radiation / clinical oncologist is the primary lead or a member of the multi-disciplinary team, the patient / family will increasingly lean on that specialist who brings comfort and solace to both the soma and psyche.
- Increasingly, with the advent of newer drugs and technologies that promise better outcomes, for the patient and family it is both control of cancer and control of symptoms and anxiety that matter the most, and in striving towards this goal, the radiation / clinical oncologist must consider comprehensive care to provide both satisfaction and justify a leadership role.
- Organized by: Department of Radiotherapy, SGPGI
- Supported by: Indian College of Radiation Oncology (ICRO), AROI, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow & Sun Oncology
- Dates: 28 -29 June, 2025
- Venue: Telemedicine Auditorium, SGPGIMS, Lucknow

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28 - 29 Jun 2025
SGPGI - Lucknow

Update from
Dr. Pooja Nandwani Patel

Palliative Medicine in Oncology Teaching Course for Postgraduate Trainees in Radiation Oncology

S.N	Time	Topic	Presenter
		Day 1, 28 Jun2024, SESSION- 1	
1	09.00-09.25 AM	Introduction to the course– Role of Palliative Care for an oncologist	Shaleen Kumar
2	09:30-09.55 AM	Introduction to pain, its assessment and management. Concept of total pain.	Anjum Joad
3	10:00-10:25 AM	Morphine - its availability and role in cancer management. Rotation / conversion of opioids.	Sanjay Dhiraj
4	10:30-10.45 AM	Nerve blocks, when?	Sujeet Gautam
	10:45-11.25 AM	Inauguration & Tea	
5	11:30-11:55AM	CNS tumor patients – Management of raised intracranial tension; Cord compression; Management of neurological and mental deficits; Physiotherapy and rehabilitation	Reena George
6	12.00-12.25 PM	Essentials in Communication – breaking bad news	Santosh Chaturvedi
	12:30-01:00 PM	Reflections, summary, Q & A for Session 1	Session 1 faculty
	01.00-01:55PM	Lunch	
		Day 1, 28Jun2024, SESSION 2	
7	02.00-02.25 PM	Head and neck cancers – Challenges in nutrition and feeding; Swallowing issues; Aspiration; Stridor; Dental prophylaxis. Supportive care required during treatment (Palliative Surgery / Radiotherapy/ Chemotherapy optimum schedules)	Sushmita Ghoshal
8	02.30-02:55 PM	Lung Cancers - Distressing respiratory symptoms, SVCO and pleural effusions; approach in para-neoplastic scenarios. How to manage respiratory distress?	Mohan Gurjar
9	03:00-03:25 PM	Pelvic cancers – Pelvic pains; bleeding; foul smelling discharge; fistula; fissures.	Swarupa Mitra
10	03.30-03.45 PM	Care of the bed ridden - oral care, perineal care, back care, bed sores, tracheostomy care.	Hanife MacGamwell
11	03:45-04:00 PM	Stoma care, wound care	Metty Morris
	04.00-04.30 PM	Tea	
12	04.30-04:55 PM	GI cancers: Management of Nausea and vomiting; Management of Jaundice and Ascites; Intractable abdominal pain; Cancer cachexia; constipation; diarrhoea, Intestinal Obstruction – SAIO and Complete, Route of drug administration	Anu Behari
13	05:00-05:25 PM	Psychological issues in persons needing palliation, terminally ill / Care for care givers / treating physician (physician burnout)	Santosh Chaturvedi
	05.30-06.00 PM	Reflections, summary, Q & A for Session 2	Session 2 faculty

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Update from
Dr. Pooja Nandwani Patel

Palliative Medicine in Oncology Teaching Course for Postgraduate Trainees in Radiation Oncology

		Day 2, 29 Jun2024, SESSION- 3	
14	08:30-08:55 AM	Palliation in children – Children are not small adults	Punita Lal
15	09:00-09:15 AM	Breast cancers – Body image issues; Lymph edema care	Rohini Khurana
16	09:15-09:40 AM	Domiciliary care/home visit / Hospice program Care of dying – in the hospital, home, hospice; bereavement support for the family	Hanife MacGamwell
	09:45-11:00	Communication with cancer patients / families – Role play by PGs and Nurses	Panel & Audience interaction
	11:00-11:30 AM	Tea	
17	11:30-11:55 PM	Holistic assessment tools...to plan personalised care	Anjum Joad
18	12:00-12:55 PM	Advanced Directives –Why, When and how can we avoid transferring a terminally ill cancer patient to ICU for ventilator support? Legal and ethical dimensions; withholding life sustaining measures; Principles of Medical Ethics - Relevance in Palliative & End of Life Care	Afzal Azim & Panel
	01:00-01:30 PM	Reflections, summary, Q & A for Session 3 (Quiz)	Session 3 faculty
	01:30- 02.00 PM	Vote of thanks followed by Lunch and adjorn	

49th ICRO–SUN Post-Graduate Teaching Programme

28 - 29 Jun 2025
SGPGI - Lucknow

Update from
Dr. Pooja Nandwani Patel

49th ICRO Teaching Program at Lucknow conducted at SGPGI under able leadership of Dr Shaleen Sir and Dr Punita Mam with rock back support by Suriji, Sarit and Sun Oncology team.

This was the first time we had the topic *Palliative Medicine in Oncology* discussed so meticulously in the one and half day teaching program attended by 70 postgraduate students. Very interesting role plays were done by students and staff of SGPGI with interactive panel discussions - a very different way of teaching and learning with fun.

We had an ICRO quiz for the first time with an online Mentimeter and the winners were -

1st- Dr Pamela Sen - BHU, Varanasi

2nd- Dr Ajay CS - Army Hospital, New Delhi

Thoughtful topic, innovative way of learning and new quiz pattern - 49th ICRO program done with tireless support by Suriji and team and Dr Shaleen Sir and SGPGI team.

Accolades

Congratulations

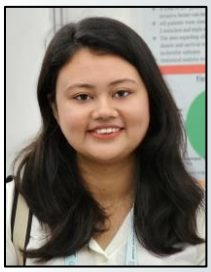
ICRO Quiz winners

47th ICRO Quiz Winner

1st
Dr. Ananya Ghosh
NH, Kolkata

2nd
Dr. Ankita Prusty
IGMC, Shimla

49th ICRO Quiz Winner

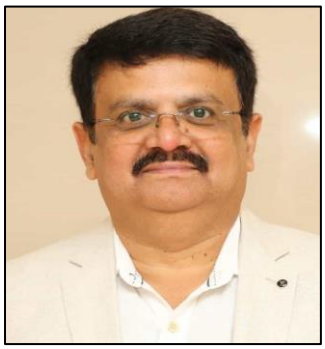


1st
Dr. Pamela Sen
BHU, Varanasi

2nd
Dr. Ajay CS
Army Hospital New Delhi

Election Results

Karnataka Chapter



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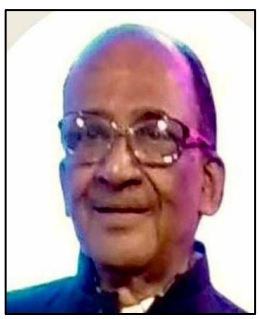
Obituary

Dr. Deepak Kumar Patra - LM 650

- Associate professor from Odisha State Chapter left for heavenly abode on 7 April 25 following a brief illness.
- He was an alumni of AHPGIC.

Dr. B. Krishnamurthy Reddy - LM 42

- Passed away peacefully on 2 April 2025 in Bangalore
- He was honored by KUVEMPU VEDIKE, KMIO for the services rendered at KMIO (1981 - 2007) on 25th November 2006
- Has held senior positions at prestigious institutions like KMIO since 1981-2007
- Was Prof & Senior Consultant at Apollo Hospitals in Bangalore since Jan 2007
- Became a member of the Board of Studies in Paramedical Subjects of RGUHS in January 2007
- Framed and recommended the M.D. Radiotherapy Syllabus to RGUHS in 1999
- Contributed as a member of the ICMR Subcommittee for forming guidelines for stomach cancer in 2007
- Held the position of President at AROI Karnataka Chapter from 2003 to 2006
- Became a member of the Board of Studies in Paramedical Subjects of RGUHS in January 2007



Dr. Ashok Chaudhary - LM 3

- Maharashtra State Chapter- passed away on 15 Jun 25
- He retired from TMH in 2006

Events to attend

AROI calendar 2025

ICRO- SUN PG				
SGRR Institute of Medical and Health Sciences, Dehradun (UK)	30-31 Aug 25	Dr Manoj Gupta	9418470607	Landmark Trials & Practice Changing Evidence in Breast, H& N, GI & Gynaec cancers.
Vydehi Institute of Medical Sciences, Bangalore, Karnataka	11-12 Oct 25	Dr Geeta Narayanan	9980082823	Paediatric and Haematological Malignancies.
ICRO - INTAS RADIOBIOLOGY COURSE (Prof. Manoj Gupta)				
AIIMS, Rishikesh, Uttarakhand	Nov 25	Dr Manoj Gupta	9418470607	RADIOBIOLOGY
AROI-ESTRO Teaching Courses				
12th AROI-ESTRO Advanced Technologies	29 Jan -1 Feb 2026	Dr Rakesh Kapoor	9872648344	PGIMER, Chandigarh
45thAROICON 2025				
BISWA BANGLA CONVENTION CENTRE, Kolkata	27 – 30 Nov 2025	Dr Suman Malik / Dr.Jyotirup Goswami	9830545324 9903388063	Narayana Super Speciality Hospital, Kolkata

AROI calendar 2026

1. **YROC 2026**
   a) Dr Thejaswini B. at KMIO, Bangalore KA – 24 - 25 Jan 2026
2. **ICRO SUN PG 2026 (tentative schedule)**
   a) JN Medical College, AMU, Aligarh, UP- Dr Shadab- Apr 2026
   b) Cancer Institute (WIA) Adyar TN &PY – Dr Priya Iyer- Jul 2026
   c) Cancer hospital, IGMC, Shimla NZ- Dr Manish Gupta- Sep 2026
3. **AROI-ESTRO TEACHING COURSES 2026**
   a) 9th AROI- ESTRO Gynae Teaching course - Dr. Tapas Kumar Dora at Homi Bhabha Cancer Hospital & Research Centre, Mullanpur/Sangrur, New Chandigarh, Punjab NZ- 26-29 Mar 2026
   b) 4th AROI- ESTRO Head & Neck Teaching course - Dr Shalini Singh at Department of Radiotherapy, SGPGIMS, Lucknow UP- 11 -13 Jun 2026
   c) 13th AROI- ESTRO Advanced Technologies Teaching course-2026 - Dr Pardeep Garg at GGSMCH, Faridkot NZ – Jan 2027
4. **AROICON 2026**
   a) Dr Vijay Karan Reddy at Apollo Cancer Institute, Hyderabad Telangana - 3 -6 Dec 2026

Events to attend

Events to attend

Events to attend

Events to attend

29th Annual Conference of Association of Radiation Oncologists of India (AROI) – North Zone

1st & 2nd November 2025

Christian Medical College and Hospital
Ludhiana, Punjab

Dr William Bhatti Chief Patron	**Dr Jeyaraj D. Pandian** Chief Patron	**Dr M. K. Mahajan** Patron	**Dr Rajesh Vashistha** Patron

Dr Pamela Jeyaraj
Organizing Chairperson & Secretary

Dr Jaineet Sachdeva
Co-organizing Chairperson

Invitation

North Zone AROI
President
Dr Deepak Abrol

Secretary
Dr Pardeep Garg

Past President
Dr Neeraj Jain

National Executive AROI
Chair AROI
Dr Manoj Gupta

President AROI
Dr Senapati

President Elect AROI
Dr C. S. Madhu

Secretary AROI
Dr V. Srinivasan

Organizing Committee
Joint Secretary
Dr Mary Joan
Dr Joel Abraham Thomas

Treasurer
Dr Abraham P. Abraham

Scientific Committee
Chairperson
Dr. Bhavana Rai

Dear Colleagues,

Greetings from the Organizing Committee of NZAROICON 2025!

It gives us immense pleasure to extend a warm invitation to you for the 29th North Zone Association of Radiation Oncologists of India Conference (NZAROICON), scheduled to be held during 1st & 2nd November 2025, at Christian Medical College, Ludhiana. As a pioneering institution with a distinguished legacy of 131 years in healing, education, and research since its establishment in 1894, CMC Ludhiana continues to be a beacon of excellence in the state of Punjab.

The North Zone Association of Radiation Oncologists of India (NZ-AROI), a prominent regional chapter of AROI, unites radiation oncology professionals across northern India. As the foremost body dedicated to the advancement of Radiation Oncology in the region, it champions policy reform, drives technological innovation, and upholds excellence in cancer care. NZ-AROI serves as a dynamic platform for academic exchange, collaborative research, and professional growth through scientific conferences, workshops, and continuing medical education initiatives.

The theme for this year's conference, "**Thriving Beyond Cancer Towards Wellness**" highlights our commitment to enhancing the quality of life of cancer survivors. The scientific program has been meticulously curated to foster insightful discussions, featuring thought-provoking presentations by renowned national and international experts. Delegates can look forward to engaging interactive sessions that will enrich their knowledge and clinical practice.

We eagerly anticipate welcoming you to Ludhiana, the 'Hosiery Capital' and 'Manchester of India' for this prestigious event. We assure you of an intellectually stimulating and enriching experience as we collectively strive toward improving survivorship and holistic cancer care.

Warm regards,

Organizing Committee

Contact Us:

NZAROI2025@cmcludhiana.in

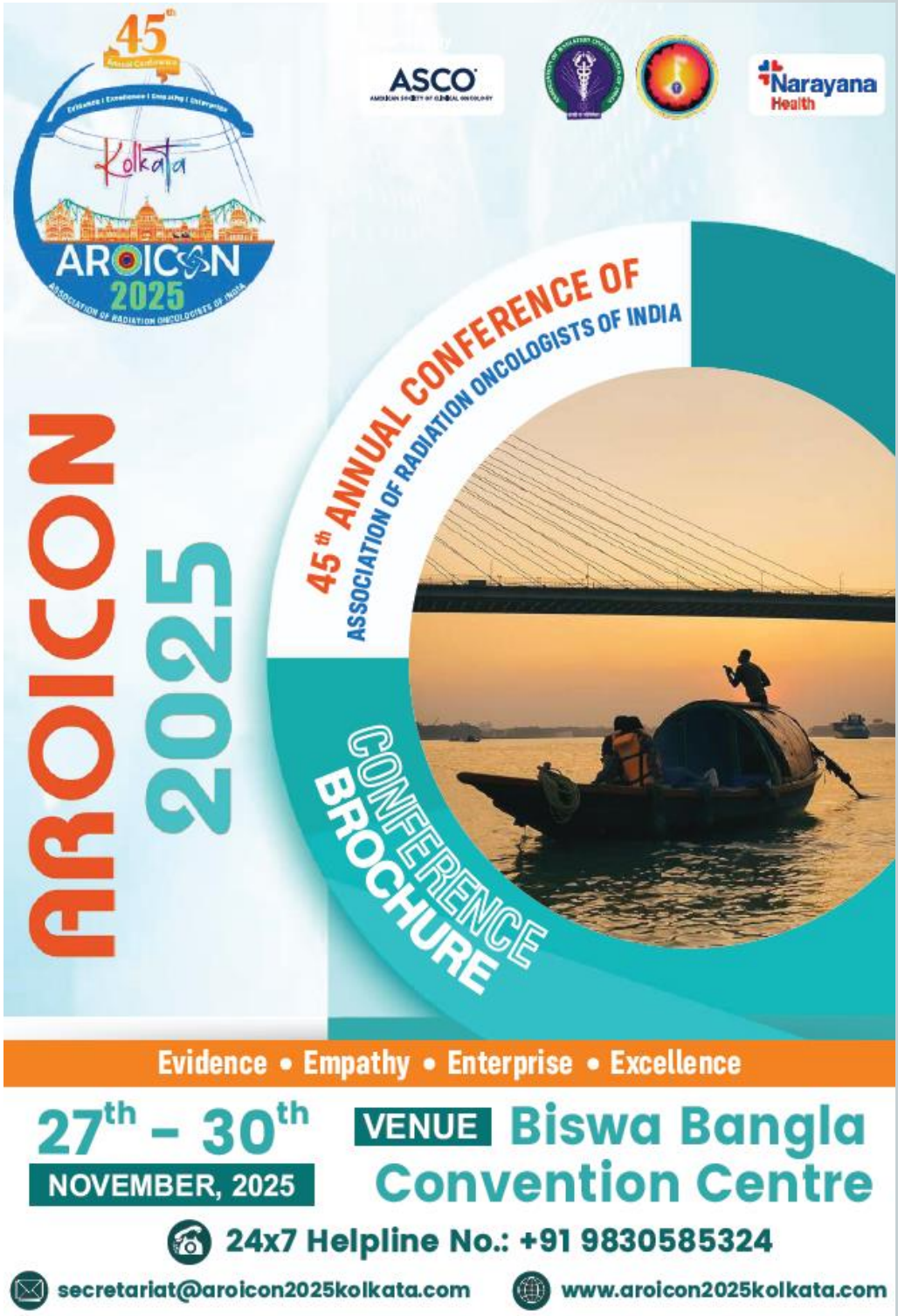
Phone: +91-9115112720

Scan Here to ***REGISTER***

Events to attend

Events to attend

Events to attend



Events to attend

AROI greetings

1st July 2025