

**3rd Russian conference with
international participation
RADIOBIOLOGICAL BASIS OF
RADIATION THERAPY**

Program



**17–18 October 2019
JINR, Dubna**

17 October

- 8:30 – 9:00 Registration of the conference participants
- 9:00 – 9:20 Conference opening: Acad. RAS A.D. Kaprin, Acad. RAS
V.A. Matveev, RAS Corresp. Member E.A. Krasavin, RAS Corresp.
Member G.D. Shirkov, Prof. Dr. Biol. A.I. Gaziev

Section 1 Molecular and cellular mechanisms of the radiosensitivity of normal and tumor cells and tissues. Modern approaches to radiosensitivity control based on new fundamental knowledge.

Co-chairs: Prof. Dr. Biol. I.A. Zamulaeva, Dr. Med. L.P. Zhavoronkov

- 9:30–10:00 Regularities in tumor stem cells' response to a single and fractionated ionizing radiation exposure
I.A. Zamulaeva, O.N. Matchuk, E.I. Selivanova
- 10:00–10:20 A new method of increasing the efficiency of ionizing radiation action on tumor tissue cells
E.A. Krasavin, A.V. Boreyko, I.A. Zamulaeva
- 10:20–10:35 The regulatory role of non-coding RNAs in gene expression as part of radioresponse formation in human normal and tumor cells
L.V. Shulenina, V.F. Mikhailov, D.V. Saleeva, N.F. Raeva, A.F. Tkacheva, G.D. Zasukhina
- 10:35–10:50 A study of radioresistance mechanisms in human tumor cells
A.A. Tsishnatti, S.M. Rodneva, N.M. Smetanina, Yu.A. Fedotov, D.V. Guryev
- 10:50–11:05 Thermo-radiosensitization of chemotherapy-resistant tumor cells
A.O. Yakimova, A.V. Khokhlova, V.A. Mosina, A.E. Kabakov
- 11:05–11:30 Poster session
Coffee break
- 11:30–12:00 Mitochondrial dysfunction and protection of normal tissues by melatonin during the radiation therapy of tumors
A.I. Gaziev
- 12:00–12:15 An experimental evaluation of the effect of a regulated dose of ionizing radiation on the brain
I.B. Ushakov, V.P. Fedorov, A.N. Astashova

- 12:15-12:30 Evaluation of microglia in the mouse brain after local head exposure at different doses
A.V. Rodina, Yu.P. Semochkina, G.A. Posypanova, M.G. Ratushnyak, E.Yu. Moskaleva
- 12:30-12:45 Impairment of cognitive functions in mice in a long-term period after a local gamma-ray exposure of the brain
A.S. Zhirnik, O.D. Smirnova, E.Yu. Moskaleva
- 12:45-13:00 Radiation-induced pulmonary fibrosis: correlation between immunity suppression and regulatory T-cells
E.G. Kuzmina, T.Yu. Mushkarina, T.V. Konyantina
- 13:00-13:15 Evaluation of regulatory T-cells' (TREG) radiosensitivity
T.Yu. Mushkarina, T.V. Konyantina, E.G. Kuzmina, L.Yu. Gritsova

13:15-14:30

Lunch

Section 2 Biological basis and clinical effects of different radiation therapy methods. Prediction and evaluation of radiation therapy efficiency.

Co-chairs: Prof. Dr. Med. E.V. Khmelevsky, Dr. Phys.-Math. Prof. A.P. Chernyaev, Prof. Dr. Phys.-Math. A.A. Ivanov

- 14:30-15:00 Radiobiological specifics and antitumor efficiency of ultra-high dose rate photon beams
V.K. Bozhenko, A.M. Shishkin, A.V. Ivanov, V.N. Vasilyev, E.V. Khmelevsky, O.A. Bezborodova, R.N. Plavnik, E.V. Grabovsky, G.M. Oleynik, Yu.A. Bykov, E.G. Krastelev, V.P. Smirnov
- 15:00–15:15 Damage repair in V79 cells after exposure to accelerated protons and carbon ions and secondary heavy charged particles
E.V. Koryakina, M.V. Troshina, V.I. Potetnya, R.M. Baykuzina, S.N. Koryakin, A.A. Lychagin
- 15:15–15:30 High-dose thin scanning proton beam exposure of solid Ehrlich ascites carcinoma in mice
T.A. Belyakova, V.E. Balakin, S.I. Zaichkina, O.M. Rozanova, E.N. Smirnova, N.S. Strelnikova, A.E. Shemyakov, S.S. Sorokina
- 15:30-15:45 Proton boron capture therapy: a novel approach to proton therapy
Pavel Bláha, Lorenzo Manti, Chiara Feoli
- 15:45-16:00 Mathematical evaluation of the robustness of IMPT plans
V. Vondracek, J. Kubes, M. Andrlík, M. Navratil, J. Rosina, A. Grebenyuk

- 16:00-16:30 Poster session
Coffee break
- 16:30-16:45 Evaluation of radionuclide therapy efficiency based on a cytogenetic study of oncological patients with bone metastases
I.K. Khvostunov, V.V. Krylov, T.Yu. Kochetova, A.A. Rodichev, N.N. Shepel, O.N. Korovchuk, V.S. Pyatenko, T.I. Khvostunova
- 16:45-17:00 Irradiation modeling as part of the development of salvage high-dose-rate intraluminal brachytherapy of esophageal cancer recurrence after a course of radiation therapy to determine the acceptable invasion depth
A.V. Demyanovich, D.B. Sanin, S.V. Gamayunov, V.V. Martynova, N.B. Borysheva, L.N. Titova, I.N. Ivanova, A.N. Magomedova
- 17:00-17:15 Conformal proton therapy of intracranial tumors: technological support and clinical experience at the JINR medical proton beam
A.V. Agapov, V.N. Gaevsky, E.V. Kizhaev, E.I. Luchin, G.V. Mitsyn, A.G. Molokanov, M.A. Tseytlina, S.V. Shvidky, K.N. Shipulin
- 17:15-17:30 *In vivo* dosimetry for the adjuvant brachytherapy of endometrial cancer
G.Z. Kulieva, V.F. Stepanenko, V.V. Bogacheva, N.B. Borysheva, V.V. Don, L.I. Krikunova
- 17:30-17:45 Measurement of the neutron spectrum during medical electron accelerator operation
P.P. Gantsovsky, M.V. Zheltonozhskaya, Yu.A. Komarov, E.N. Lykova, A.G. Tsovyanov, A.P. Chernyaev
- 17:45-18:00 Development of Moscow University's medical physicist training and retraining curricula
A.P. Chernyaev, P.Yu. Borshchegovskaya, S.M. Varzar, M.V. Zheltonozhskaya, E.N. Lykova, S.U. Nisimov, V.V. Rozanov
- 18:00-18:45 A round table on psychological disorders during the radiation therapy on cancer
Co-chairs: Acad. RAS A.V. Lisitsa, Prof. A.S. Stenberg
- 19:30-21:30 Welcome party

18 October

Section 3 Development and application of radiomodifiers in the radiation therapy of tumors. Radiopharmaceuticals in diagnosing and therapy

Co-chairs: Acad. RAS Prof. Dr. Med. I.B. Ushakov, Prof. Dr. Med. A.N. Grebeniuk, Dr. Biol. L.M. Rozhdestvensky, Dr. Biol. M.V. Filimonova

- 9:30-10:00 Russian-made pharmaceuticals' capability as radiomodifiers and maintenance drugs in the radiation therapy of tumors
A.N. Grebeniuk, V.D. Gladkikh
- 10:00-10:15 Radioprotectors as a means of protecting healthy tissues during radiochemotherapy
M.V. Vasin, I.B. Ushakov
- 10:15-10:30 Specifics of the radiomodifying activity of nitrogen oxide synthase inhibitors and perspectives for their use in nuclear medicine
A.S. Filimonov, M.V. Filimonova, M.V. Makarchuk, L.I. Shevchenko, A.S. Saburova, V.I. Surinova, M.Yu. Ksendzук, A.A. Shitova, O.V. Soldatova
- 10:30-10:45 Experimental evaluation of the radioprotective efficiency of biotechnological drugs
E.V. Murzina, G.A. Sofronov, A.S. Simbirtsev, N.V. Aksenova, O.M. Veselova
- 10:45-11:00 The radiomodifier β -leukin does not protect the transplanted Lewis carcinoma in mice from radiation exposure
L.M. Rozhdestvenskaya, A.A. Lippenholz, V.V. Zorin
- 11:00-11:15 Using the stromal vascular fraction of the fatty tissue and paracrine factors of a conditioned medium obtained by cultivating mesenchymal stem cells to stimulate radiation-induced skin ulcers in an experiment
V.G. Lebedev, Yu.B. Deshevoy, A.A. Temnov, T.A. Nasonova, A.V. Lyrshchikova, O.A. Dobrynina, T.A. Astrelina, B.B. Moroz
- 11:15-11:30 Poster session
Coffee break
- 11:30-11:45 Mesenchymal stem cells of the placental tissue in the treatment of local radiation-induced skin damage
V.A. Brunchukov, T.A. Astrelina, V.A. Nikitina, I.V. Kobzeva, Yu.B. Suchkova, D.Yu. Usupzhanova, A.A. Rastorgueva, O.A. Maksimova, V.E. Kryuchikhin, S.V. Lishchuk, E.A. Dubova, K.A. Pavlov, V.A. Brumberg, A.Yu. Bushmanov, A.V. Samoylov
- 11:45-12:00 An infrared thermographic study of halazolinum's protective effect against local radiation damage to healthy tissues

N.M. Stavrakova, V.N. Maltsev, M.D. Vorontsova, A.V. Datsenko, A.A. Ivanov

- 12:00-12:15 Development of cerium fluoride-based radioprotective and radiosensitizing drugs for increasing the efficiency of radiation therapy
K.A. Kamenskikh, A.L. Popov, A.M. Ermakov, V.K. Ivanov
- 12:15-12:30 Modification of tumor cells' radiosensitivity by the glycolysis inhibitor glucosamine D
N.Ya. Guiliano, F.M. Ibatullin, M.M. Dubotolova, L.A. Noskin, S.I. Stepanov
- 12:30-12:45 An endocolony test evaluation of the modifying effect of recombinant human alpha protein and recombinant human granulocyte colony-stimulating factor on hematopoietic stem cells' radiosensitivity
E.A. Pryakhin, G.A. Tryapitsyna, I.A. Shaposhnikova, N.A. Obvintseva, Yu.I. Ostroumov, P.S. Shmelin, A.V. Akleev
- 12:45-13:00 An experimental study of the biodistribution of new bone-seeking compounds based on ⁶⁸Ga-labeled phosphonic acids
V.K. Tishchenko, V.M. Petriev, A.A. Mikhailovskaya, K.A. Kuzenkova, I.N. Zavestovskaya
- 13:00-13:15 Optimization of chemoradiation therapy modes taking into account the distribution of platinum in the tumor tissue
D.A. Ginevsky, P.V. Izhevsky, I.N. Sheyno
- 13:15-14:00 Lunch
- 14:00-14:30 A session of the RAS Scientific Council on Radiobiology
- 14:30-14:45 Summarizing the Young Scientists Contest results

Section 4 Evaluation of the long-term consequences of radiation exposure

Co-chairs: Prof. Dr. Biol. A.I. Gaziev, Dr. Phys.-Math. A.N. Bugay

- 14:45-15:00 Radiobiological effects of proton exposure-related secondary radiation and induced radioactivity in the medical booth of JINR's Phasotron
A.A. Ivanov, T.M. Blokhina, T.M. Bychkova, N.Yu. Vorobyova, G.V. Mitsyn, A.G. Molokanov, O.V. Nikitenko, Ya.V. Sidakova, S.V. Shvidky, E.I. Yashkina, V.A. Shurshakov, A.N. Osipov
- 15:00-15:15 Capabilities and advantages of the mFISH technique regarding the analysis of chromosome aberrations induced by radiation of different quality
E.A. Nasonova
- 15:15-15:30 Evaluation of genome instability in patients with oral mucosa cancer by the frequency of cells with polysomy of chromosomes 7 and 11 after gamma-ray therapy
E.V. Golub, G.F. Mikhailova, T.G. Shkavrova, V.V. Tsepenco, V.V. Polkin, Yu.A. Panaseykin, P.A. Isaev
- 15:30-15:45 Analysis of the increased risk of carcinogenesis in residents of radionuclide-contaminated regions after the Chernobyl nuclear power plant disaster
L.S. Baleva, A.E. Sipyagina, V.S. Sukhorukov, N.M. Karakhan
- 15:45-16:00 Coffee break
- 16:00-16:45 General discussion. Adoption of the Conference Resolution.

Poster reports

Different ways of taking into account personal radiosensitivity

O.G. Cherednichenko, A.L. Pilyugina

Mathematical models of radiation-induced cell death in planning radiation therapy

I.N. Sheyno, O.A. Ugarova, Yu.A. Fedotov

Analysis of spontaneous and G2 gamma-induced chromosome aberrations in blood lymphocytes of patients with female reproductive system cancer

T.I. Ivanova, V.A. Khorokhorina, N.I. Sychenkova, L.I. Krikunova, I.A. Zamulaeva

Changes in brain cortex neurons after a single and fractionated radiation exposure

V.P. Fedorov, O.P. Gundarova, N.V. Sgibneva

Cellular and molecular changes in the brain after head exposure to γ , n radiation

A.V. Rodina, Yu.P. Semochkina, V.G. Shuvatova, E.Yu. Moskaleva

Comparison of γ H2AX foci formation after exposure of human lymphocyte in culture and *in vivo* exposure after NOD SCID transplantation to mice

N.I. Atamanyuk, D.I. Osipov, S.S. Andreev, A.E. Aldibekova, E.A. Pryakhin

Proton exposure effect on behavioral reactions in mice

K.N. Lyakhova, D.M. Utina, I.A. Kolesnikova, Yu.S. Severyukhin, M. Lalkovičova

Integration of human paillomavirus 16 DNA and the prognosis for the efficiency of second-stage cervical cancer therapy

V.I. Kiseleva, L.S. Mkrtychyan, L.I. Krikunova, L.V. Lyubina, G.P. Bezyaeva, L.V. Panarina, N.M. Lipunov, I.A. Zamulaeva

The action of gamma radiation and accelerated protons on the M-1 sarcoma in rats

A.E. Koretskaya, V.V. Yuzhakov, K.S. Korchagina, N.K. Fomina, S.N. Koryakin, A.N. Solovyov, M.G. Tsyganova, I.E. Ingel, L.E. Sevankaeva, N.D. Yakovleva, Yu.S. Romanko

Evaluation of the quality and radioprotective efficiency of a synthetic genistein-based pharmaceutical as a promising drug for radiation therapy maintenance

O.Yu. Strelova, L.S. Teslov, K.V. Volkova, R.A. Tarumov, A.N. Grebenyuk

Experimental justification for administering the B-190 drug as a promising radiomodifier in the radiation therapy of tumors

T.N. Vlasenko, N.V. Aksenova

Development of a rapid technique of evaluating the activity of the endogenous synthesis of nitrogen oxide as a possible pharmacological marker of the NOS inhibitors' radioprotective effect

M.Yu. Ksendzjuk, V.I. Surinova, A.A. Shitova, O.V. Soldatova, L.I. Shevchenko,
A.S. Filimonov, M.V. Filimonova, A.S. Saburova

Radiosensitizing properties of citrate-stabilized hafnium oxide (HfO₂) nanoparticles

N.R. Popova, G.S. Taran, D.D. Kolmanovich, A.L. Popov, T.O. Shekunova, V.K. Ivanov

New combinations of chemical agents and different physical factors in radiation therapy

A.N. Filimonova, E.S. Evstratova, V.G. Petin

Geum rivale L. as a promising basis for radiation therapy maintenance drugs

A.A. Orlova, M.N. Povydysh, A.N. Grebenyuk

Radioprotective action of the inosine and CO (II) complex on C57BL mouse blood cells for a single acute exposure

N.N. Veyalkina, E.M. Kadukova, E.V. Tsukanova, K.N. Shaforost, A.S. Abdullaev,
E.N. Shamilev

Phenotypic manifestation of cells' genetic instability after ionizing and non-ionizing radiation exposure

E.S. Evstratova, V.G. Petin

Estimation of the action of low doses of X-ray radiation on human mesenchymal stem cells

D.Yu. Usupzhanova, T.A. Astrelina, V.A. Nikitina, Yu.B. Suchkova, I.V. Kobzeva,
V.A. Brunchukov, A.A. Rastorgueva, V.A. Brumberg, A.Yu. Bushmanov, A.S. Samoylov

On the possibility of using synergic effects of physical agents and chemical substances in tumor therapy

M.S. Tolkaeva, E.S. Evstratova

The biological material bank of Seversk Biophysical Research Center

D.S. Isubakova, E.V. Bronikovskaya, O.S. Tsymbal, M.V. Khalyuzova, N.V. Litvyakov, I.V. Milto, L.R. Takhauova, R.M. Takhauov

The biodistribution of ^{188}Re -labeled porous silicon nanoparticles in the organism of laboratory animals

V.K. Tishchenko, V.M. Petriev, A.A. Mikhailovskaya, A.V. Kabashin, E.D. Stepchenkova, I.N. Zavestovskaya

Automation of visualized flow cytometry-based calculation of γH2AX loci and micronuclei

G. Marchenko