

QUESTIONNAIRE

(*) – mandatory fields

	Details about organisation
* Organization name	Center of Radiobiology and Radiation Ecology
Organisation acronym	CRRE
* Organization Activity Type (RES - Research, HE - University, SME - Small and Medium Enterprise, IND - Industry, OTH - Other)	RES
* Keywords of main research areas	general radiobiology, environmental risk-factors, population health, radiation neurobiology, ecology, pollution by radionuclides, cancer, radiosensitivity
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* Description of organization and its research achievements for the last five years (~ 5000 signs)
<p>L.E.P.L. Center of Radiobiology and Radiation Ecology http://www.radiobiology.org.ge</p>
<p>The Institute's mission is to conduct basic and applied researches for study the impact of radiation and different environmental risk-factors on population health.</p>
<p>The Major research trends and problems:</p> <p>General Radiobiology – Study of mechanisms of adaptation reactions elicited in mammals in response to environmental conditions, physiological correlates of individual stability during ionizing radiation exposure and different risk-factors based on the functional states of the autonomic nervous system (ANS) and the red blood system (RBS).</p> <p>In framework of systems biology approach precision technologies for study of functional status of ANS and RBS are developed, that permits to make out the degree of exertion and potential resources of mentioned systems. This technology is on stage of approbation.</p> <p>It will be carried out comparative analysis of obtained data with data of molecular-cellular researches that will be obtained in single cell gel electrophoresis assay (Comet assay) technology that is on application stage.</p>
<p>Radiation Neurobiology - Study of the physiological and neurochemical mechanisms of radiation induced changes of motor, emotional-motivational and aggressive behavior of laboratory animals.</p>
<p>Radiation Ecology - Investigation of Pollution by Radionuclides, Toxic Elements and Creation of the Radiation and Hydro chemical Monitoring System of the R. Kura Basin in Georgia. Developing GIS and</p>

spreading model of above named pollutants.

Information Technology – Developing of GIS-based prediction models of radiation impact’s medical-biological consequences in heterogeneous by radiosensitivity, spatially distributed populations. Multivariate and multiple-factor mathematical analysis of medical-biological data.

Publications:

1. **G.Ormotsadze, K.Nadareishvili, Identification, Assessment and Prevention of Different Environmental Risk-Factors Impact, Including Radiation, on the Population Health.** IN BOOK “Prevention, Detection and Response to Nuclear and Radiological Threats”. (Editor) D. Diamond. S. Apikyan, **Springer Netherlands, 2008.**
2. **K.Nadareishvili, at all, Aggressive behavior and radiosensitivity in rats.** Radiats. Biol Radioecol. 2007 Jul-Aug; 47(4):481-92. in Russian
3. **G.Ormotsadze, at all, Combined treatment immediate and distant results analyses in maxillary cancer.** Experimental and Clinical Medicine, #4(29), p.14-17, Tbilisi
4. **G.Ormotsadze, Some aspects of quantitative estimation and physiological interpretation for results of spectral analysis of the heart rate variability in rabbits.** Proceedings of the Georgian Academy of Sciences. Tbilisi, Biological series T. 31, N3, p.p 397-403, 2005.
5. **G.Ormotsadze, A new method for studying the red blood system,** Radiation studies, Volume X, p.5 -35. Tbilisi 2002 <http://www.Radiobiology.org.ge>

Participation in international scientific forums:

- 1) G.Ormotsadze, K.Nadareishvili, H, Grebenchuk, Functional state of red blood system as a possible predictor of individual radiosensitivity and Oncogenesis. NATO Advanced Research Workshop “Threat Detection, response and consequence management Associated with nuclear and radiological terrorism” Brussels, Belgium.2008
- 2) G.Ormotsadze, K.Nadareishvili, Identification, Assessment and Prevention of Different Environmental Risk-Factors Impact, Including Radiation, on the Population Health. NATO Advanced Research Workshop, 3-7 may, Yerevan 2008.
- 3) ISTC Workshop "Distant Transfer of Radionuclides in Mountainous Regions", Tbilisi, 2006.

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International co-operation / Participation in EU RTD programs or other bilateral / multilateral actions

INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programs (please specify program/s, project title/s and year/s

- NASA Project “Earth Sciences Data Support System and Services for the

Northern Eurasia Earth Science Partnership Initiative”, 2006 - 2007.

- ISTC (International Science and Technology Centre) Project #G-391, “Brain Functions Correction”, 2000 - 20002.
- ISTC (International Science and Technology Centre) Project #G-1294, “Investigation of Pollution by Radionuclides, Toxic Elements and Creation of the Radiation and Hydrochemical Monitoring System of the R. Kura Basin in Georgia”, 2006 – 2009.

	* Please, use “X” to indicate the scientific area/s of your potential project
CHEMISTRY	
SOCIAL AND HUMAN SCIENCES	
ECONOMIC SCIENCES	
ENGINEERING SCIENCE	
ENVIRONMENT	X
AGRICULTURE AND FOOD	
HEALTH	X
MATHEMATICS	
INFORMATION SCIENCE	X
PHYSICS	
NANOTECHNOLOGIES	
ENERGY	
TRANSPORT	
SPACE	

*** Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years**

1. Functional state of the autonomic nervous system (ANS) and the red blood system (RBS) as a possible predictor of individual radiosensitivity and oncogenesis

The main purpose of Project is:

1. developing of assessment criteria for individual radiosensitivity and vulnerability to environmental risk-factors on the base of characteristics of the functional state of ANS and RBS;
2. developing of assessment criteria for individual risk of pathology development, caused by failure of adaptation resources;
3. Developing of the anthropocentric criteria for the assessment of environmental loads and prediction of population morbidity.

Up to date the studies in the field of individual radiosensitivity were dictated by needs of clinical radiology – addressed toward the prediction and study of objectionable radiological complications elicited during radiotherapy. Progress in the field of “low dose radiation research” and increased flow of experimental data underscoring the possible correlation between radiosensitivity and increased risk of cancer development, sharply augmented interest to this research issues.

In the present time, the problem of individual radiosensitivity is mainly associated with research issues of cellular radiosensitivity, while studies are focused on identification of specific molecular-genetic markers of cell radiosensitivity, to identify the genetic predictors of individual radiosensitivity. However, the long-term effects of radiation exposure. Consequences of low and medium dose radiation, depend not only on cell radiosensitivity, but also individual peculiarities of adaptive responses originated from homeostatic systems of biological organisms have to be taken into consideration, study of which requires principally new systemic approaches.

In our research center we have developed new technologies for the characterization of homeostatic stability of mammal organisms on the base of analysis of the functional states of ANS and RBS. The former might be considered as one of integral characteristics of regulatory systems functioning in mammal organisms, while the latter reflects the state of renewing cell population.

It is established that:

1. functional states of ANS and RBS of laboratory animals in physiological conditions have a considerable dispersion;
2. functional states of ANS and RBS are closely correlated;
3. Individual animals distinguished by ANS and RBS indices, are strongly different by their radiosensitivity, stability to stress and postural loadings.

Objectives:

1. To study the correlations between system characteristics of homeostatic stability, molecular-cellular markers of individual radiosensitivity and mortality rate of animals, irradiated by different doses of ionising radiation.
2. To study of system characteristics of homeostatic stability, molecular-cellular markers of individual radiosensitivity in cancer patients and apparently healthy population with different age and gender.

As a result precision Systems Biology criteria for evaluation of the individual radiosensitivity and cancer development risk will be developed .

Key word: Systems Biology, homeostatic stability, individual radiosensitivity,

	Please, confirm your agreement on data publication and dissemination
I agree with the publication of the data on the web-site http://www.inco-ecca.net , and dissemination among Mobility National Contact Points of the EU MS and AC (YES / NO)	YES
Date	09/12/2008