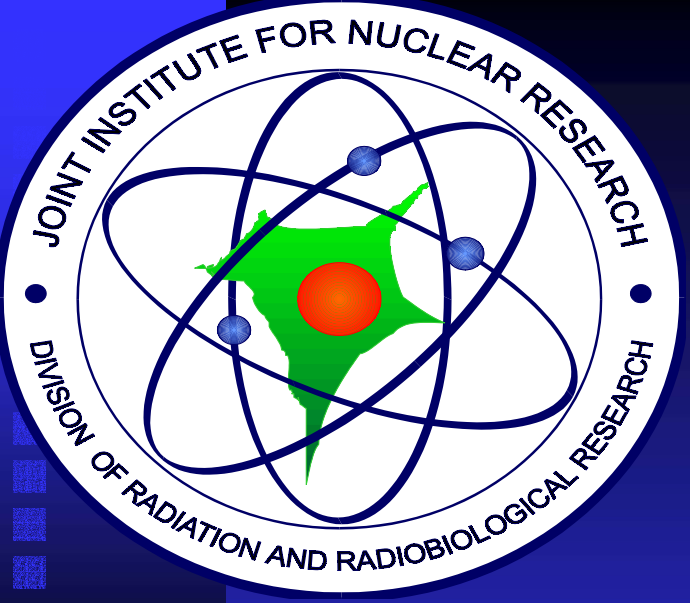


Scientific Council - 92 session

Department of Radiation and Radiobiological research

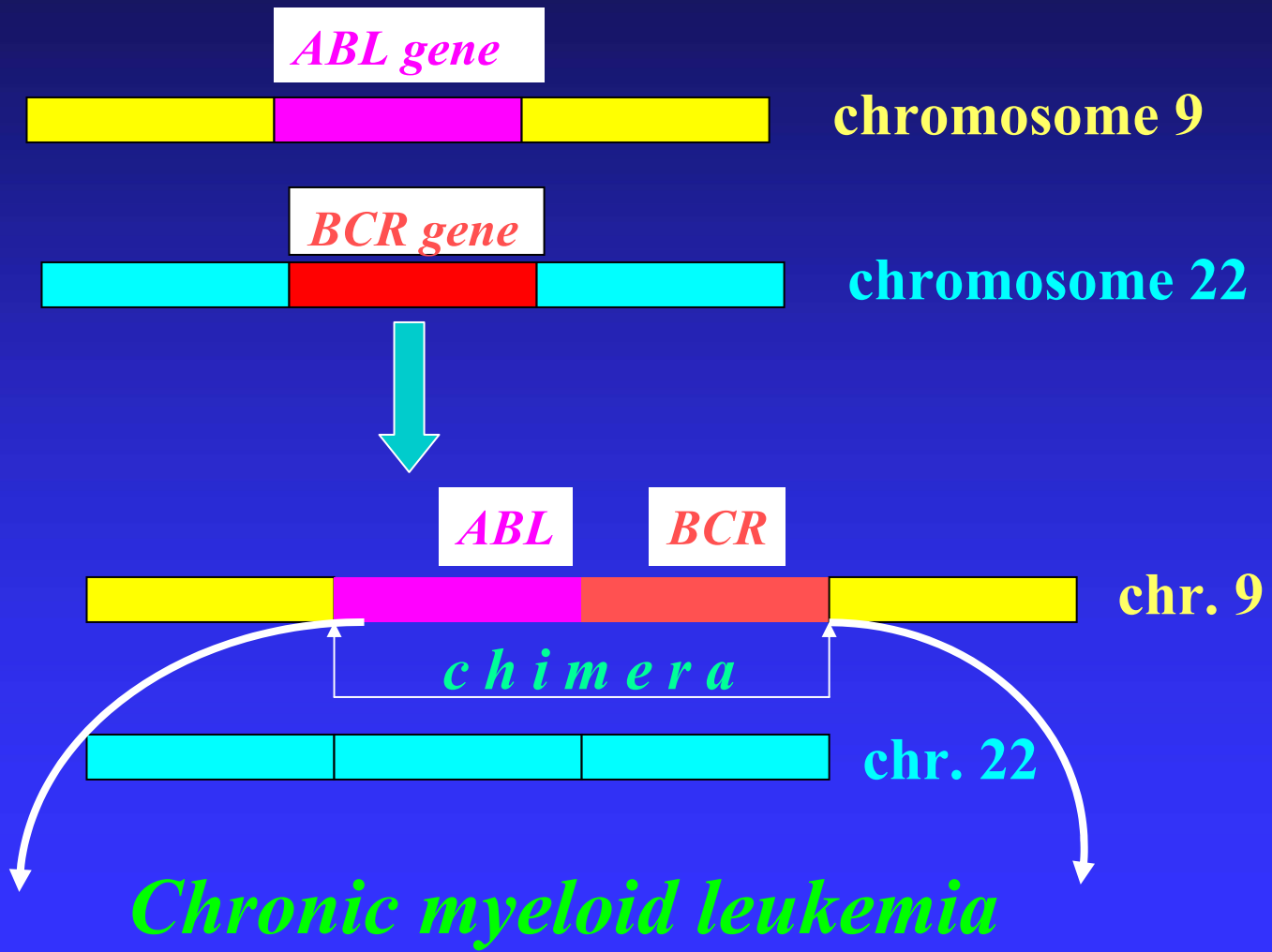
The main directions of research

- **Radiation genetics;**
- **Biophysics of photo-biological processes;**
- **Radiation research.**

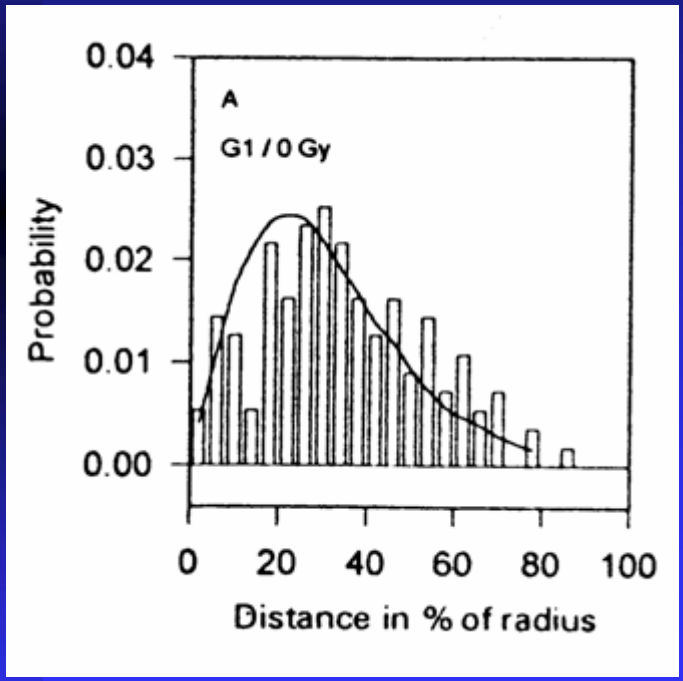
1. Radiation Genetics:

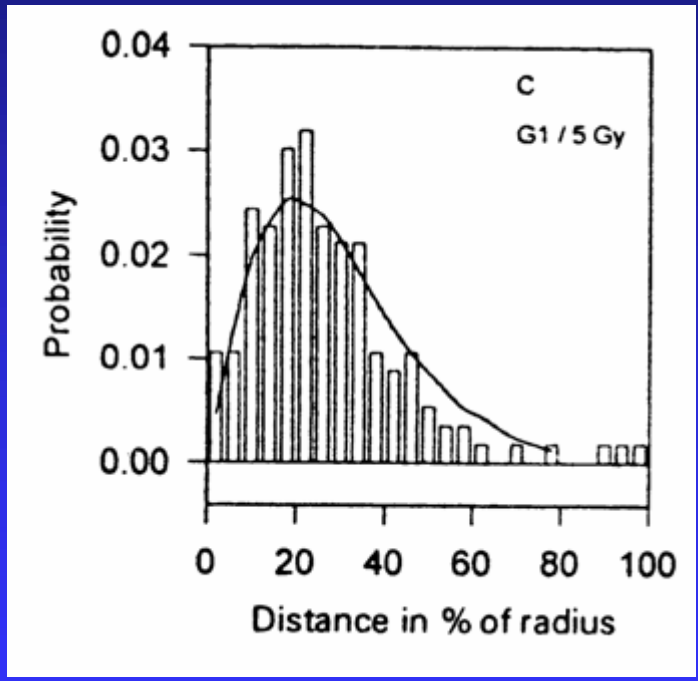
- *The problem of low doses of irradiation;*
- *Molecular mechanisms of induced mutagenesis;*
- *The problem of genetic instability.*

Chronic myeloid leukemia as a result of gene translocation



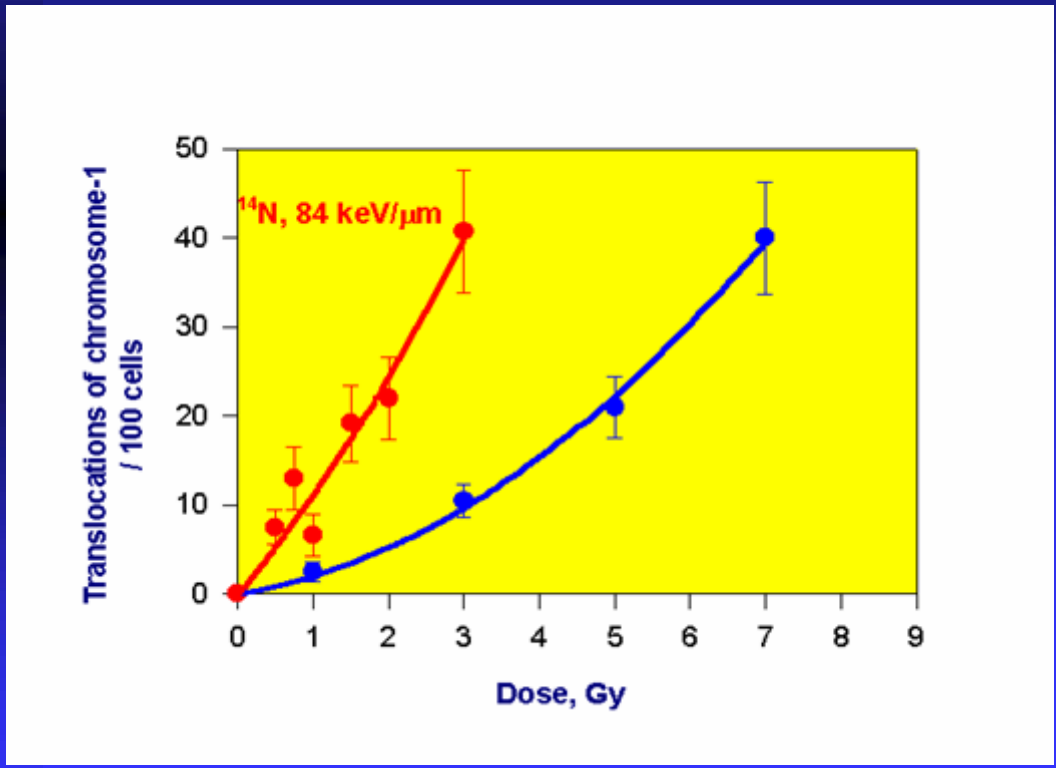
Estimation of the risk of chronic myeloid leukemia from low levels of radiation





Minimum distances between nonhomologous BCR and ABL genes in the control (A) and in the γ-irradiated (C) human lymphocytes.

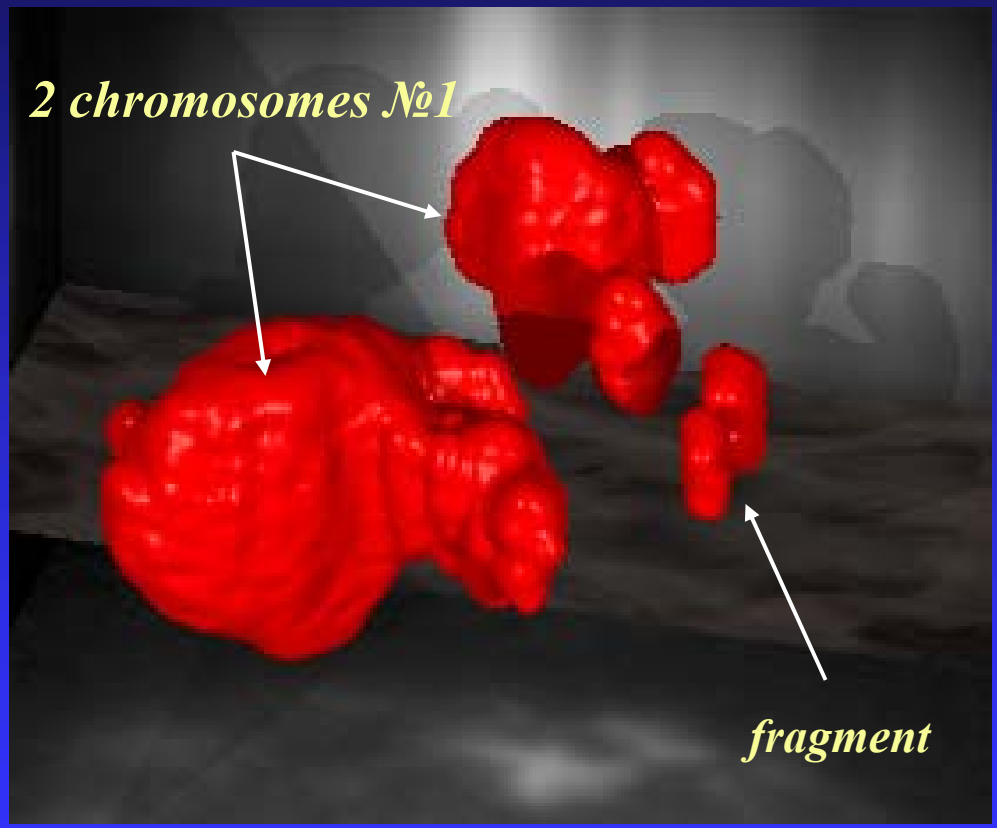
Induction of translocations by heavy ions



The goal:

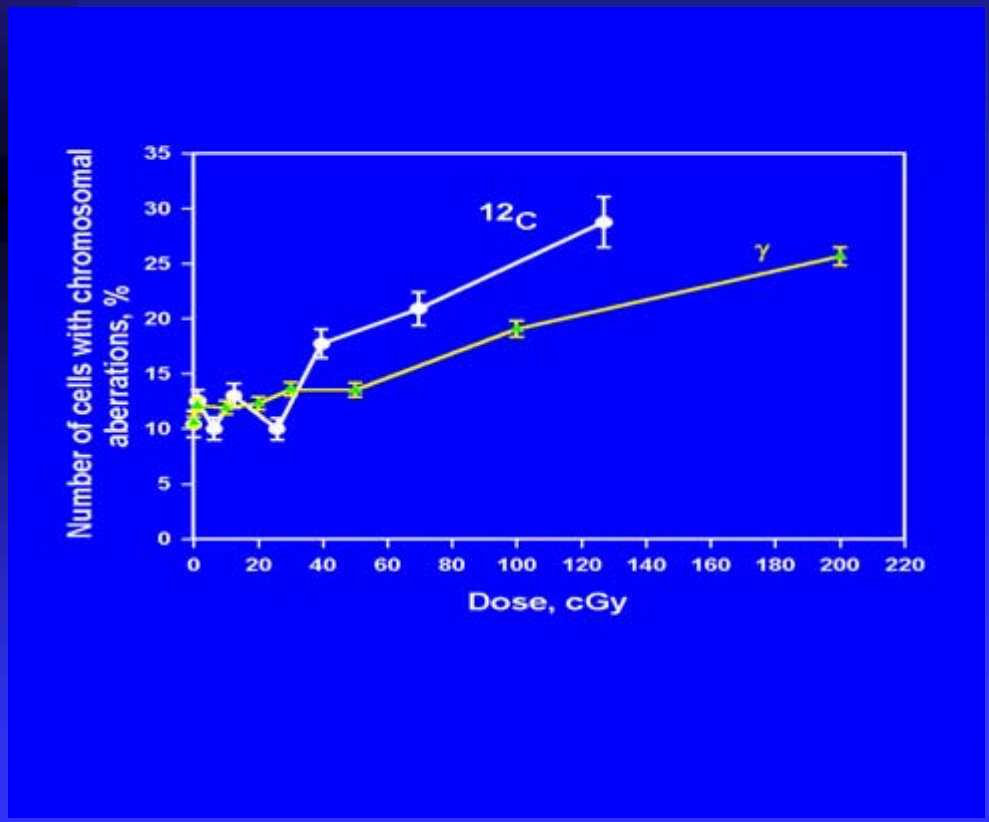
Study of regularities and mechanisms of stable and unstable chromosomal aberrations in human lymphocytes by heavy charged particles with high energy

Radiation cytogenetics



Chromosome 1 of human lymphocyte nucleus in interphase with fragment after irradiation 1 GeV protons at synchrophasotron. The 3 D dimension picture was obtained by using FISH technique and confocal microscopy.

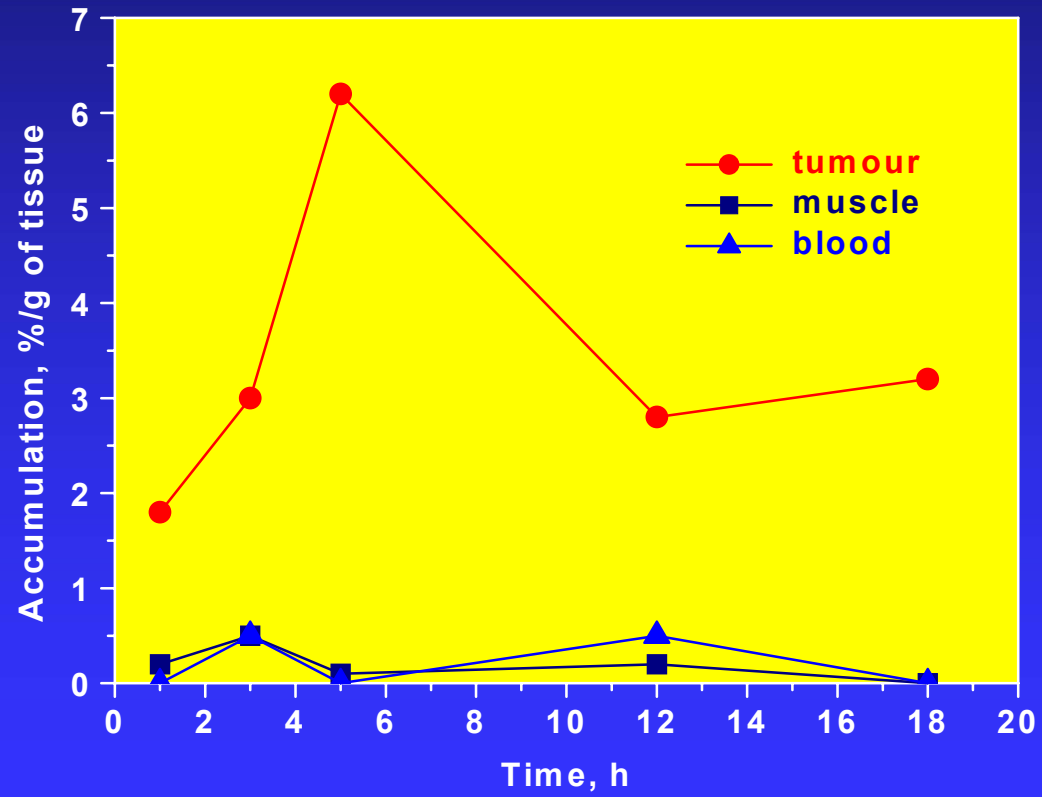
The first experiments at Nuclotron



The goal:

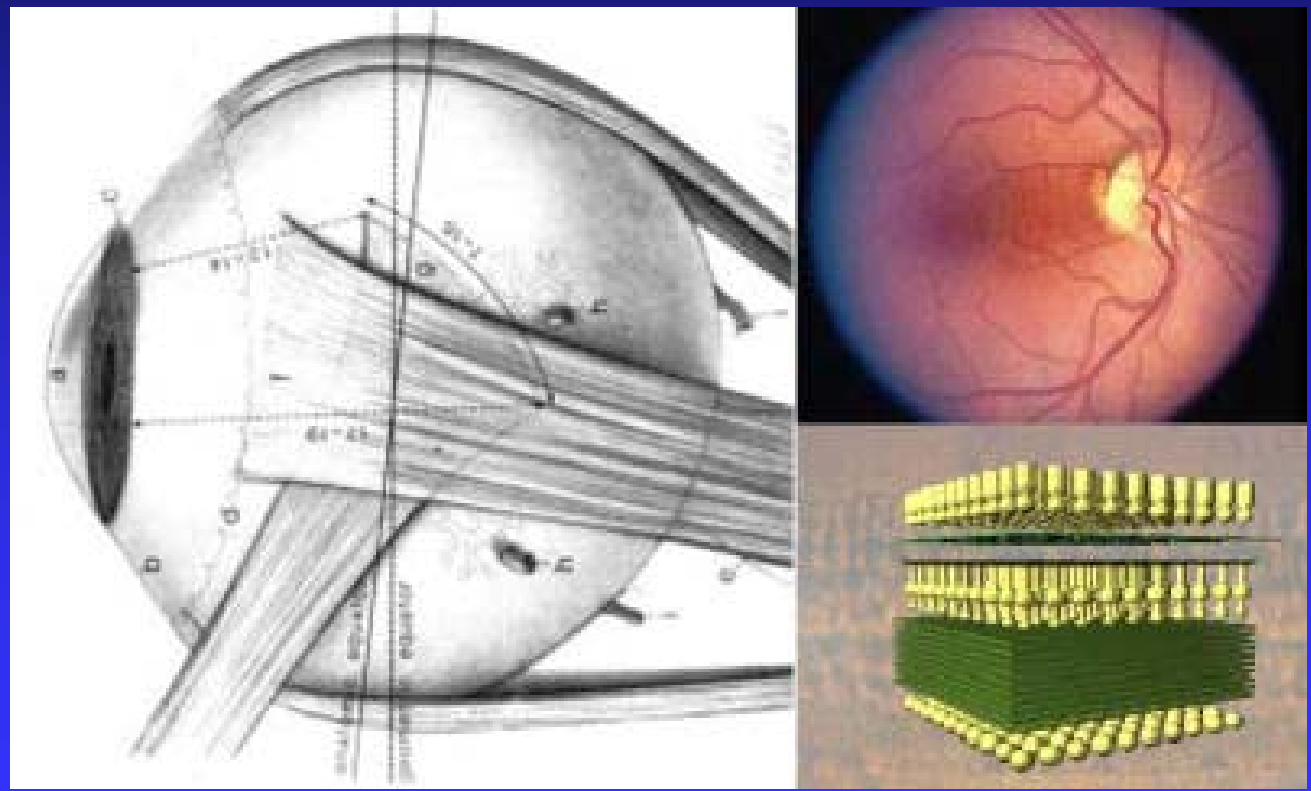
Cytogenetical study of irradiation of human and mammalian cells by heavy ions in low doses

Improvement of targeted therapy methods by using of α-emitters



Accumulation of ^{211}At-MTB in tissues of tumour-bearing animals

2. Biophysics of photo-biological processes

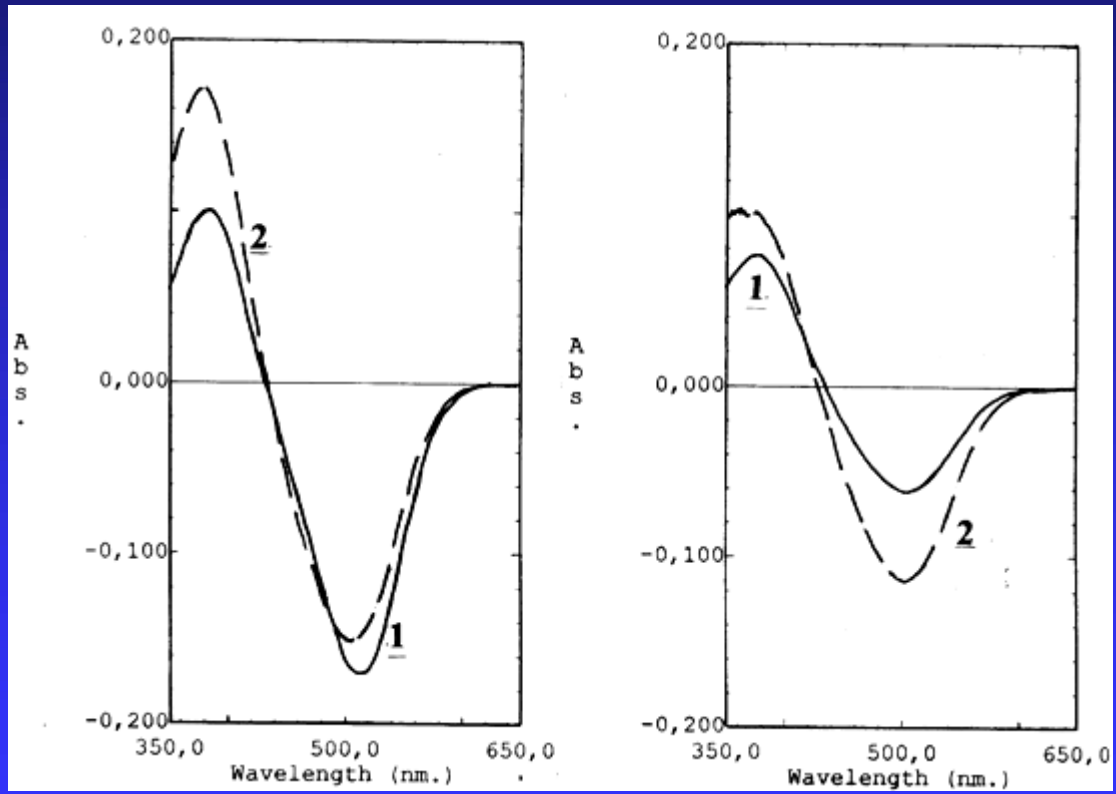


The main directions:

- *Investigations of molecular mechanisms of photo-reception;*
- *The study of heavy ion irradiation on retina and visual pigment;*
- *The research of light sensitive, photo-receptive membrane structure by small-angle scattering of neutrons method.*

The irradiation by charged particles leads to the visual pigment rhodopsin damage:

its ability for regeneration after 11-cis retinal adding decreases



Education activity

- *The chair of Biophysics in University "Dubna" is working at DRRR for four years. 25 students are educated on the speciality "The Radiation protection of people and environment". The specialization of the chair is "Radiation Biophysics".*
- *The new specialization "Biophysics of photo-biological processes" will be open at the next year.*

The chair of Biophysics