

**Probability model of adaptation and risk estimation of radiation-induced chromosomal instability**V. Korogodina<sup>a</sup>, B. Florko<sup>a</sup>, L. Osipova<sup>b</sup>, N. Sen'kova<sup>b</sup> and E. Antonova<sup>a</sup><sup>a</sup>*Joint Institute for Nuclear Research, Joliot-Curie 6, 141980 Dubna, Russian Federation;*<sup>b</sup>*Institute of genetics and cytology SD RAS, Lavrentieva 10, 630090 Novosibirsk, Russian Federation**korogod@jinr.ru*

One of the modern radiobiological problems is to estimate risks of chromosomal instability (RChI) for people and ecological populations located near the radiation sources. Our aim was to work out the probability model of adaptation to estimate risks of chromosomal instability. Methods and Objectives. We used data on numbers of cells with abnormalities (CAs) in meristem of seeds' seedling of plantain (*Plantago major*) growing in 30-km zone of NPP [Korogodina and Florko, NATO Proceedings, 2007] and frequency of CAs of blood lymphocytes of people living in radiation-polluted Tyumen and Irkutsk regions [Osipova et al, 2004]. Cytogenetic analyses were provided by standard methods. Model. Assumptions: a primary cells' damaging induces a secondary one; the latter is accompanied by natural selection of cells and organisms. In mathematical term: both the primary and secondary damaging can be described by Poisson (P) law and selection by geometrical (G) one [Florko, Korogodina, 2007]. The total process can be described by P+G model. Results. It was shown that the distribution of seeds on the number of CAs should be P+G distributions. G-contribution (it is RChI) and therefore seeds' survival are decreased dramatically near the NPP (up to 2 and 20% respectively). In addition to P- and G- distribution, a lognormal (LN) law can be revealed when we consider a distribution of persons on the CA frequencies because CA frequency depends on proliferate activity also. We considered samplings of persons who were irradiated directly through nuclear fall-out, their children and grand-children. It was shown that samplings of persons living in North Tyumen region are P+G-distributed, and G-contribution (RChI) decreases across the generations from 100 to 50%. Perhaps, G-law contributes constantly there due to food chain moss-deer-man. In Irkutsk region, interchange of G-, LN- and P- laws across the generation was observed. We can presume that the first generation was characterized by CAs originated from bystander effects (RChI~90%), the second one by inherited CAs proliferation, and the third one by CAs spontaneous level. Conclusion. G-parameters characterize the secondary processes of chromosomal instability and are very sensitive to irradiation intensity. They can be used to estimate the risks of chromosomal instability.