

**POPULATION GENETICAL INVESTIGATION OF THE LEVEL OF MUTAGENESIS
IN ECOLOGICALLY DIFFERENT REGIONS OF KAZAKHSTAN**

¹ Zh. A. Kashaganova, ¹ Zh.K. Kenzheyeva, ¹ Ye. U. Kuandykov, ¹ I.K. Nurpeissova,
¹К.А. Таракова, ² Р.К. Жексембиев

¹ *Kazakh National University named after S.D. Asfendiyarov, Almaty, Kazakhstan,*

² *The Kazakh State Women's Teacher Training University, Almaty, Kazakhstan.*

e-mail: abaikyzy_zh@mail.ru

This article presents the results Cytogenetic and Teratological researches of mammals, from ecologically disadvantaged areas as an informative indicator of biological pollution. Long exposure to low doses of radiation on the organism can cause various types of chromosomal aberrations and genomic mutations in the cells of animals, as well as congenital malformations in mammals.

Keywords: mammals, chromosomal aberrations, environment

**ПОПУЛЯЦИОННО- ГЕНЕТИЧЕСКИЕ ИССЛЕДОВАНИЯ УРОВНЯ
МУТАГЕНЕЗА ИЗ ЭКОЛОГИЧЕСКИ РАЗНЫХ РЕГИОНОВ КАЗАХСТАНА**

¹ Ж.А. Кашаганова, ¹Ж.К. Кенжеева, ¹Е.У. Куандыков, ¹И.К. Нурпеисова, ¹К.А. Таракова, ²Р.К. Жексембиев

¹*Казахский Национальный Медицинский Университет им. С.Д. Асфендиярова, Алматы, Казахстан,*

²*Казахский Государственный Женский Педагогический Университет, Алматы, Казахстан*

Цитогенетические и тератологические исследования млекопитающих, из экологически неблагоприятных районов служить информативным биологическим индикатором загрязнения окружающей среды. Длительное воздействие малых доз радиации на организм могут обуславливать различные типы aberrаций хромосом и геномные мутации в клетках животных, а также врожденные пороки развития у млекопитающих.

Ключевые слова: млекопитающие, хромосомные aberrаций, окружающая среда

Kazakhstan territory is unique including regions with radioactive pollution of Semipalatinsk nuclear test territory and storage of radioactive waste of uranium mines and metallurgy enterprises and regions of drying Aral sea. These technogenic factors may cause some types of chromosome aberrations and developmental anomalies in mammals [1].

The level of mutagenesis was estimated basing on chromosome aberrations and genomic mutation frequencies in bone marrow cells of natural rodents population (*Allactaga major* Kern., *Allactaga saltator* Eversman, *Cyttellus eritrogenus* Br) and domestic animals (sheep, cattle, horse), which inhabit these regions. Sheep populations which are bred in the regions with different climatic conditions were used for teratological investigations.

Different generations are met in the populations of mice family rodents caught in the nature. So studying the animals of different ages separately we can estimate the frequency of mutations in the animals of different age inhabiting the same radiation polluted regions. The frequency of chromosome aberrations in mice family rodents from such territories was twice as high as from the clear territories. In some animals chromosome aberration types characteristic for radiation mutagenesis (dicentrics, double acentric fragments) were found [2,4].

High level of cytogenetical instability in somatic cells of agricultural animals which were bred on the pastures within former nuclear test territories for several generations may be caused by chronic radiation in low doses. The analysis of the spectrum of recorded chromosome aberrations in somatic cells and their dynamics in different animal species inhabiting for several generations these territories being chronically irradiated, allows us to investigate the direction of genetical evolution of mammals genofond structure induced by ecological factors [3].

Comparative analysis of the frequencies of spontaneous abortuses, deadborn and newborn animals with innate developmental anomalies in the flocks bred in different environment conditions may obtain essential information about the influence of the negative antropogenic environmental factors on the animals genotype. Indeed, different developmental anomalies frequency was recorded for the sheep populations from different environments and different selection directions which were carried out for many years. It was found that some types of innate developmental anomalies caused by environmental factors. Endogenic factors also contribute to etiology of some developmental anomalies. In some lambs with innate anatomical defects about 47% bone marrow cells displayed chromosome aberrations and genomic mutation.

Reference

1. Aktual'nye voprosy radiojekologii Kazahstana. – № 1 // Radiojekologicheskoe sostojanie «severnoj» chasti territorii Semipalatinskogo ispytatel'nogo poligona / Kollektiv avtorov s rukovodstvom Lukashenko S.N. – Pavlodar, 2010. – 234 p.
2. Zhabasov R. Kojdyn citogenetikasy zhane teratologijasy – Almaty, 2006. – 287 p.
3. Isamov N.N., Koz'min G.V., Kruglikov B.P. i dr. Sostojanie zdorov'ja sel'skohozjajstvennyh zhivotnyh na territorijah, podvergnutih radioaktivnomu zagrizneniju v rezul'tate avarii na Chernobyl'skoj AJeS // Radiacija i risk. – 1997. – № 9. – P. 48-52.

4. Hiroo Nakajima Ph.D. «Radionuclides carved on the annual rings of a tree near Chernobyl» v. 1-7, N. Y. – L., 1994: 266-267 P