



## SEARCH FOR ANTI-RADIATION IMMUNOMODULATORS

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*Main trends of Activities:*

Determination of the level of radioactive contamination of the territory of the former Semipalatinsk nuclear testing site (STS) and the adjacent regions. Investigation of the long-term consequences of nuclear weapon tests and its elimination. Creation of effective radio-protectors and adaptogenes.

Karabalin Baltabay Kuanovich, a candidate of biological science, a head of the department of radio-biological studies, earlier was occupied in the studies devoted to biochemical and ecological adaptation of alive organisms; now he studies the effects of nuclear explosions on biosphere, radionuclide migration over a food chain, etc., supervises the work on search of effective radio-protectors and adaptogenes against radiation.

Kadyrova Nuriya Zhumakhmetovna, a candidate of biological science, a head of the laboratory of radio-protectors and adaptogenes, earlier dealt with the problems of biochemistry of oncogenesis. Now she studies the mechanism of the radio-modifying preparation effect on an alive organism after the action of the ionizing radiation.

The authors offer the following theme of possible collaboration with foreign partners: Search for Effective Anti-Radiation Preparations.

*The research objective:* Creation of the effective radio-protectors and Immunomodulators against radiation and its testing.

*Statement of Research:* After long-term action of small-dose radiation with a small --, some of radiation-induced effects per a dose unit (including cancer) grow stronger. As for alpha-particles and neutrons, the cancer-generated effect per one rad. for a small-dose long-term action is known to be effect per one rad. for a small-dose long-term action is known to be significantly higher than a high-dose short-term action. This conclusion is also supported by the data on an increase of the human bone cancer frequency under the action of long-term alpha-radiation (Arzer V.E., 1980). In the soil of the populated area crossed by the radioactive traces of the ground nuclear explosions the total alpha-activity is known to comprise  $1.5(10^5$  to  $1.8(10^5$  Bk/m<sup>2</sup>. So real danger of cancer and genetic disturbances in chromosome mechanism of a human being and an animal arises at this territory.

Due to this, the studies related to small-extent external and internal actions of radionuclides on alive organisms as well as the effects of biological-origin adaptogenes and Immunomodulators capable to normalize homeostasis of a system and to enhance the organism status are urgent.

The main role in suppression of a cancer tumor growth belongs to the immune system of an organism. Under the action of total irradiation in doses exceeding 1 GR, as is known, one can observe reduction of immune resistance of an organism and, hence, weakening the immune supervision for occurrence of primary seats of tumor growth.

This fact is considered as a candidate for a role of the real mechanism of radiation oncogenesis.

A long-term latent period between termination of the initiation processes (irradiation) and start of a tumor growth, clinically determined, is not a period of rest but a period of active struggle between the tendency for multiple potential seats of transformed cells to its reproduction and the force of immune control which confines this tendency. Mobile equilibrium is established. All measures directed to reinforce the immune forces of an organism will reduce the probability of tumor occurrence. As an example, suppression of occurrence of lymphoma of a thyroid gland via activation of the immune reactions of an organism by introduction of interferon, appropriate serums and  $\gamma$  can be considered. It is known also that suppression of immunity results in tumour occurrence.

In the central organs of immunity - in thymus and in marrow - the humor factors are created which are responsible for activity of T and B of lymphocytes and are prospecting in view of cure of immunodeficit states.

Many functions of thymus (thymidin, thimopoetin, thymus factors of blood, AFT-6) possess anti-tumor effect. Also the humor factor of marrow which causes triple increase of antibody production at a peak of immune reaction and unknown before has been also isolated and characterized (Petrov, 1975; Mikhailova, 1978).

Then it follows that necessity to produce, test and use immunomodulators made of animal organs when curing strong radiation affection and to prevent remote consequences of such affection, like occurrence of tumor, are out of doubt.

Due to this, preparation has been extracted from thymus of a new-born lamb, its biological activity has been determined, the spectrum has been taken off, nitrogen content has been measured. Comparison between this preparation and the analogue of the calf thymus has shown that our preparation is much more active and has different spectrum.

*To achieve the intended goals, the following tasks are to be done:*

- to study the radiomodifying and immunity-correcting properties of the preparation;
- to test it in combination with other preparations,
- to produce new radioprotectors and immunomodulators on a base of the organs and tissues of various animals, including the simplest vertebrates, at the contaminated territories, and its tests;
- to test existing preparations possessing the property to suppress tumours as the candidates for a role of radioprotector in a case of low-dose irradiation.
- Collection of raw materials (organs and tissues of animals), its transportation, fractionating, dialysis are carried out at low temperature in order to fractionating, dialysis are carried out at low temperature in order to preserve activity of the produced preparations.
- Determination of biological activity is performed by a specific technique with white linear mice;
- determination of the spectrum and other features are made by ordinary methods; irradiation of laboratory animals is executed at medicine X-ray devices.

*Expected Results:* Technology for production of the radioprotectors and preparations with specified immunomodulating property on a base of lymphoid and endocrine organs of various kinds of animals will be developed. After tests the most effective, prospecting preparations, possessing high biological activity and low toxic action will be selected; its iotimum doses will be determined. The prospecting and effective preparations will be transferred for clinic tests.

Possible foreign partnership will be useful for exchange by opinions, ideas, experience, matching the research techniques, performing joint investigations and for discussion of the obtained results.