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EXPERIMENTAL STUDY OF EKOM BIOTRONS, WHICH PROVIDE A REMOTE EFFECT OF SOME BIOLOGICAL OBJECTS ON OTHERS

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ABSRACT

Back in the middle of the last century, information began to appear about the existence of a certain electromagnetic field, called a biofield, which is emitted by biological objects - animals and plants. A scientist from China, Jiang Kanzhen Yu. V., suggested that if you concentrate this radiation from several plants or animals, this field will affect other biological objects. Further research proved this phenomenon. Jian Kanzhen designed the device that concentrated radiation from many biological objects using spherical copper mirrors. He called this device a BIOTRON. Another Russian scientist, E. V. Komrakov, developed and patented a modified Biotron device, more powerful, in 58 countries of the world, and called it BIOTRON-EKOM. Plant seedlings are placed in front of mirrors, and the radiation from them is focused on biological objects. It was found that when irradiated in a Biotron with seedlings of cereal plants, the average life span of C57Bl mice increased to 24.5%, and the nematodes Caenorhabditis elegans increased to 30.1% (the maximum life span was up to 23.2 and 25%, respectively) compared to the control groups. The acceleration of the growth of animal cells in the culture, an increase in the saturating density, an increase in the "total" and "stationary" life span of culture by 23 and 22%, respectively, and an increase in the germination energy of barley seeds by 7.5% were revealed.

Key Words: Biotron, lifespan, longevity, mice, nematodes, Caenorhabditis elegans, sprouts, plant seedlings, cereal plants.

CONTENT

INTRODUCTION

Currently, there is already some information about the effect of radiation from one organism on another using spherical copper mirrors that concentrate the biological field of an unknown nature of the donor on the recipient. This is described in the USSR patent of 1992 by the Russian scientist of Chinese origin from Khabarovsk, Jiang Kanzhen Yuri Vladimirovich (Jiang Kanzhen, 1992). He called such a field a bio-microwave field, and the installation he designed that concentrates this field called a Biotron.

Later, another Russian scientist, Evgeny Vyacheslavovich Komrakov, creatively reworked the ideas of Jiang Kanzhen and patented in 58 countries of the world (including in Russia) a modified BIOTRON installation, more efficient, in his opinion, and easier to manufacture, and called it BIOTRON-EKOM (Komrakov, 2012; 2014). Subsequently, E. V. Komrakov developed a smaller version of the BIOTRON, which became known as the COMPACT BIOTRON, and the first version, respectively, was called the LARGE BIOTRON.

Kotov B. S. and Gavinsky Yu. V. also showed the effect of some plants on others (Kotov, Gavinsky, 1984). They studied the effect of radiation from a growing seedling on the dry seeds of a receiving plant. The irradiated seeds germinated faster and acquired some useful properties. They also studied the characteristics of electromagnetic radiation emanating from growing plants. They measured the power of biological radiation of various plant sprouts in the wave range from 2 microns to 2 mm in W / cm^2 . At the same time, the maximum radiation power of plants during the growth period was from $0.5 \cdot 10^{-12}$ to $1 \cdot 10^{-11}$ W/cm^2. The authors also plotted the dependence of the radiation power density of plants on the time of their growth, starting from the moment of seed planting (Kotov, Gavinsky, 1998) (Fig. 1).

Scientists from the Lomonosov Moscow State University have also shown that there is an influence of growing fish or amphibian embryos on each other at a close distance. The effect of distant interaction of embryos is determined primarily by the combination of certain stages of embryonic development of interacting groups of individuals - donors and radiation acceptors (Burlakov et al., 2012).

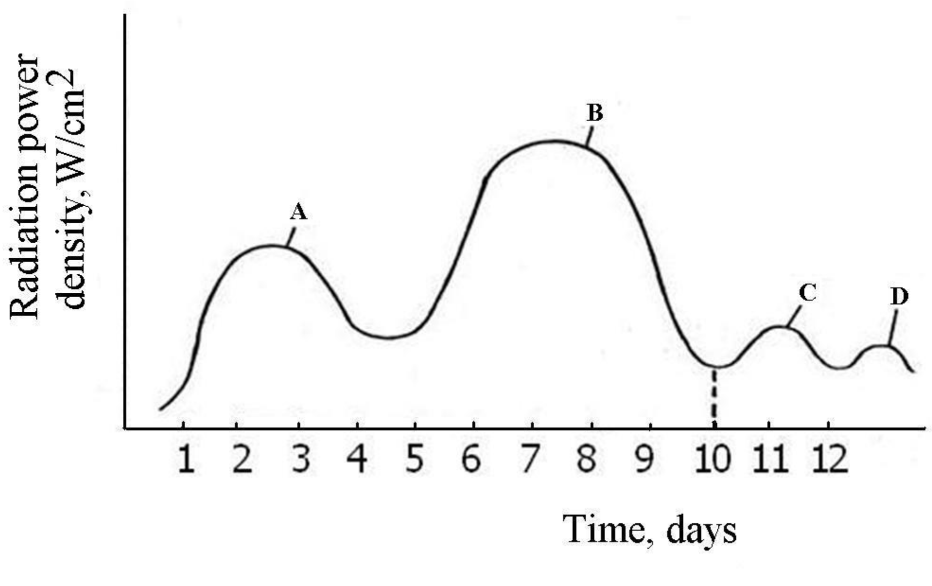

Fig. 1. The change in the power of biological radiation of various plants from the time of their growth from the moment of seed planting.

Another Russian scientist Zakharov Yu. A. developed a device for transmitting electromagnetic radiation from young plant seedlings to the skin of the face and head, and also gave some theoretical justifications for the action of biological radiation (Zakharov, 2009). In his opinion, with age or during illness, there is some mismatch of the wave interaction of the body's cells. Concentrated exposure of the electromagnetic field allows you to remove this mismatch and adjust the body, which in turn leads to rejuvenation and healing of diseases.

According to the general opinion, the most likely carriers of this type of effects are biological electromagnetic radiation of low intensity.

The authors of this article in 2017 studied the effect of concentrated radiation of wheat seedlings in a LARGE BIOTRON-EKOM on the life span of C57Bl mice and on their mobility, and in 2019 conducted an experiment in a COMPACT BIOTRON-EKOM (here in after Compact and Large Biotrons, respectively) on the effect of concentrated radiation of young mice on old ones. In 2016 and in the period from the end of 2018 to 2019 the influence of biological radiation of wheat, oat or barley seedlings on the life span of Caenorhabditis elegans nematodes strain No. 18 growing in plastic Petri dishes with a diameter of 35 mm in Compact and Large Biotrons was studied. The effect of radiation from young mice in a Compact Biotron on the life span of nematodes was also evaluated. At the end of 2019, the influence of concentrated radiation from barley seedlings on animal cell cultures was evaluated.

Nematodes, as a biological object, were chosen because they have a relatively short life span, approximately from 8 to 20 days at a temperature of 21^0C according to various sources, they are well studied, and there is also an established protocol for their content. For example, it has been shown that a decrease in temperature from 25.5 to 10^0C increases the duration of the growth stage of Caenorhabditis elegans nematodes by 5 times - from 2 to 10 days, and the life span − by 3.7 times from 8.9 to 34.7 days (Klass, Johnson, 1985). In addition, the life span of nematodes increases under the influence of certain concentrations of ethyl alcohol. It was found that the 1% content of ethyl alcohol in the growth medium increased the average life span of nematodes up to 33% compared to the control, and at an ethanol concentration of 2% - up to 85% (Ravin, 1984).

MATERIALS AND METHODS

The Large Biotron has 2 truncated spherical mirrors made of aluminum plates placed vertically opposite each other at a distance of their radius of 4 m. The size of each mirror is 4x2. 5 m with a radius of curvature of 4 m. Next to one of the mirrors there is a rack with 8 shelves, on which trays with plant seedlings are installed. In the middle between the mirrors is a couch for the patient. Radiation from plants is reflected from two mirror surfaces and focuses on the couch on which the person is located. The focal zone is symmetrical, because it consists of two combined parts in the form of intersecting spherical zones and has a size of 120x60x36cm, which allows you to effectively affect all the main human organs at once. Such a device can be very effective for improving and rejuvenating the body when using plant seedlings such as wheat, barley or oats or others aged 1-9 days as a source of biological electromagnetic radiation.

For experiments, either a plastic container with mice was placed on the couch, or a plastic tray for plants with a height of 8 cm turned upside down, on which plastic Petri dishes with nematodes were placed. The tray was necessary for the dishes to fall into the focal zone of the Large Biotron (Fig. 2).

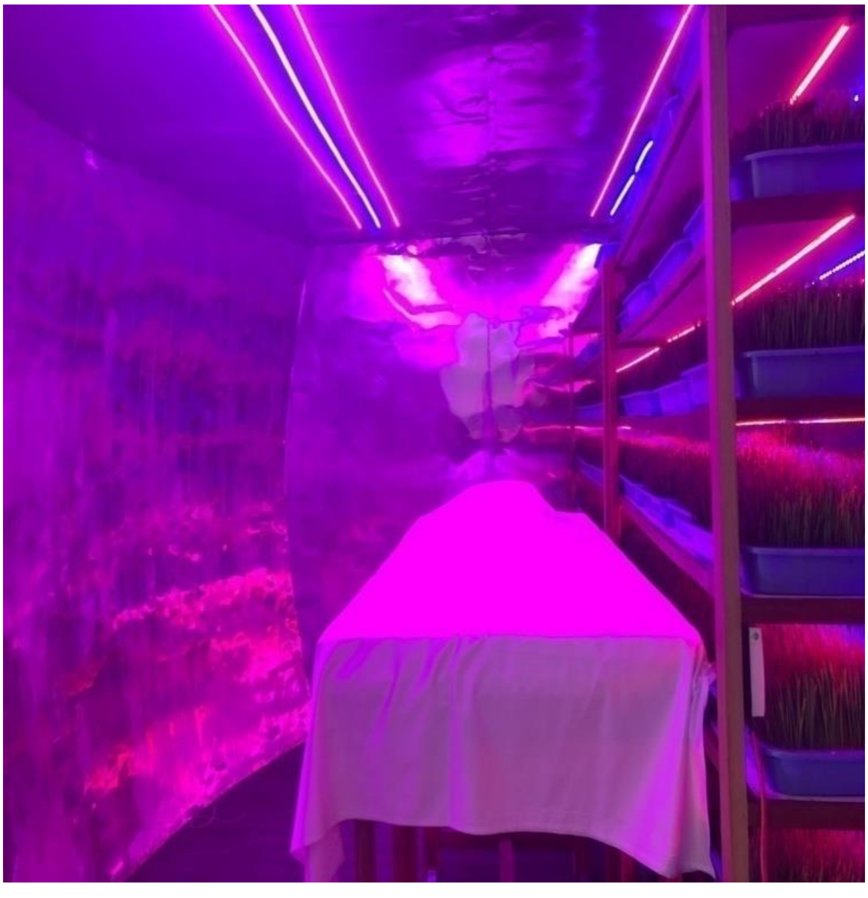

Fig. 2. Photos of two Large Biotrons (Photos provided by E. V. Kormrakov).

The Compact Biotron consists of two cylindrical mirrors made of aluminum sheets, which are also located opposite each other. One cylindrical mirror with a length of 1.3 m is located at the bottom, and the other is 2 m long, at the top on a movable frame (Fig. 3 and 4). For the patient's legs inside the Compact Biotron there is a shelf with a length of 0.7 m. The radius of the mirrors is 0.5 m. Between the mirrors there is a removable bed made of durable material in one layer, on which a person can be placed. Trays with sprouting plants are placed on the lower mirror.

Fig. 3. Photos of a Compact Biotron on a metal base (Photos provided by E. V. Komrakov).

Fig. 4. Photos of a Compact Biotron on a wooden frame (Photos by L. Yu. Prokhorov).

For the experiment, instead of a bed, two plastic slats were placed across the lower mirror, on which a half-box made of cardboard with two longitudinal slits 25 mm wide was placed. Plastic Petri dishes with a diameter of 35 mm with nematodes were placed on the half-box above the slots. After that, the upper mirror was lowered. Radiation from plants was reflected from the lower and upper mirrors and fell on standing Petri dishes with nematodes Caenorhabditis elegans (Fig. 4).

1. EXPERIMENTS ON MICE

1.1. **Experiment on the effect of biological radiation of barley sprouts in a Large Biotron on the life span and motor activity of mice**

The data of one of the first experiments on mice are indicative.

40 nine-month-old mice (males) of the C57Bl line were taken in March 2016. By the beginning of the experiment in November 2016, when they were 17 months old, 4 of them had already died. The remaining 36 mice were divided into 3 groups of 12 mice. One group ("Control") was not introduced into the Large Biotron and the mice of this group were in another room. The second group of mice ("In focus") they were installed in the Biotron in the focal zone and the third group ("At the wall") was also placed in the Biotron, but outside the focal zone at the surface (wall) of the mirror. Since November 1, 2016, at the age of 17 months, or approximately 65 years by human standards, 5 days a month, groups of mice "In focus" and "At the wall" were installed in the Biotron for 2-3 hours a day throughout the experiment. The coefficient

of conversion of the age of a person and the age of a mouse in this experiment was assumed to be equal to 3.8 (See the tables at the end of the article in the "Note" section)

In the experiment, all the mice were of the same age and were kept the same according to the standard method. The experiments were carried out in a Large Biotron located at the Institute of Human Biorestavration. Animals were irradiated with biological radiation of barley seedlings.

The average, maximum and average life expectancy of mice, as well as their overall mobility, were evaluated according to the "Open Field" test.

The test for the mobility of animals was proposed by C. S. Hall in 1936 to register their behavior in response to "new, potentially dangerous stimuli" and subsequently improved by other authors (Buresh et al., 1991). According to the methodology, two types of arenas were constructed for research: a round one with a diameter of 63 cm and a square in size 50x50 cm. Both arenas had a wall height of 40 cm. The animals were placed one by one inside the arena for 4 minutes to record the mobility indicators. Horizontal and vertical motor activity was recorded. The indicators of motor activity were taken as raising the head without lifting the front paws, a vertical stand with lifting the front paws, running with the intersection of the sector line, a 360-degree turn in one place. The indicators of each animal were summed up, and the obtained values were formed into a group and used in statistical calculations in the Excel program. According to the Student's T-criterion, the reliability of the difference between the average values of the studied groups with a significance level of 0.05 was calculated. A correlation analysis was also carried out.

Results

The average life span (ALS) of mice treated in the Biotron "In focus" increased by 24.5%, and the average upcoming life span increased by 146% since the start of exposure compared to control mice! A phenomenal achievement! The average upcoming life span (AULS) is the time that the mice lived on average from the age of the beginning of exposure at 17 months was taken up to death in the control or in the experiment (AULS = ALS – LS (life span) of the beginning of exposure). The increase in the average upcoming life span under exposure is the difference between the average upcoming life span in the experiment with irradiation of mice and the average upcoming life span of mice in the control group, without irradiation. The calculation formulas are as follows:

Increase in AULS = AULS in experiment – AULS in control;

or in percentage:

Increase in AULS (%) = ((AULS in experiment − AULS in control) / AULS in control) x 100%.

At the same time, the confidence levels of the difference between the average and average life span expectancy of irradiated mice from the control were p = 0.00002 and 0.000003, respectively, i.e. significantly less than the limit of the significance level p=0.05, which means a high significant difference.

The results of the experiment are shown in graphs and photos (Fig. 5-25). You can also watch videos of mice at different ages on the the corresponding URL.

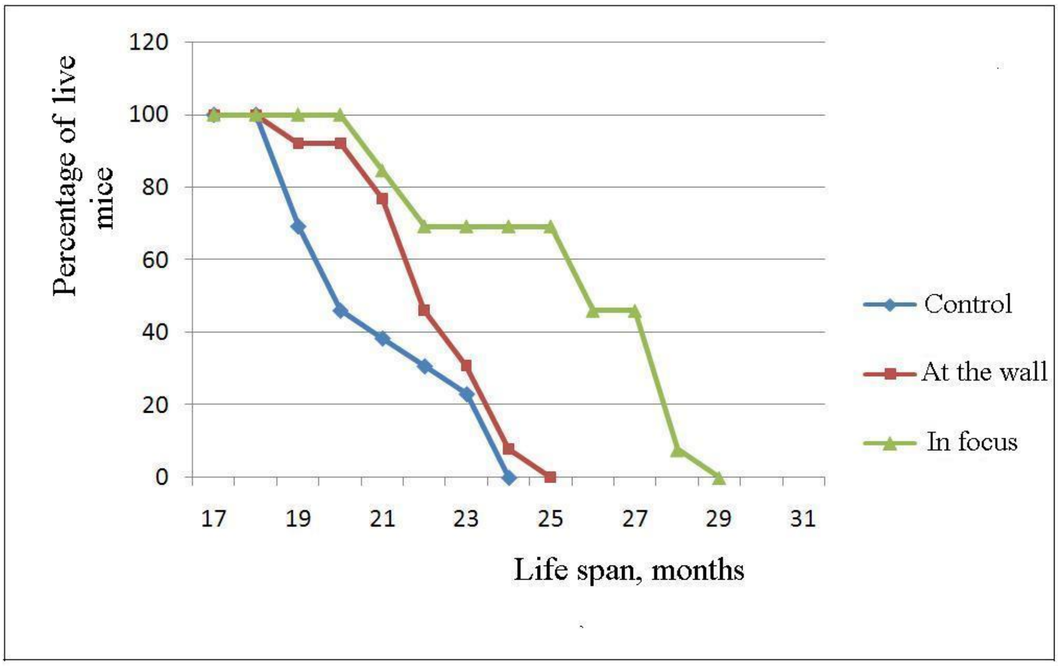

Fig. 5. Changes in the percentage of live mice that were periodically irradiated in a Large Biotron ("In focus" and "At the wall"), as well as non-irradiated mice that were outside the Biotron ("Control").

On 23.02.2017, almost 4 months after the start of the experiment from 1.11.2017 (the age of mice is 20.8 months), only 5 mice remained in the Control group (Fig. 6). There were 10 mice left in the "In focus" group (Fig. 7), and 9 mice were alive in the "At the wall" group (Fig. 8). The videos and photos show their appearance. The mice in the

"Control" group look like they should look at a respectable age – bald and sedentary (about 79 years old by human standards).

Fig. 6. Photo of 5 mice of the control group as of 23.02.2017 (the age of the mice is 20.8 months) or 79 years by human standards.

Fig. 7. Photo of 10 mice of the "In focus" group on 23.02.2017 (the age of the mice is 20.8 months) or 79 years by human standards.

Fig. 8. Photo of 9 mice of the "At the wall" group as of 23.02.2017 (the age of the mice is 20.8 months) or 79 years by human standards.

In the "In focus" and "At the wall" groups, the mice look significantly younger than in the control, and are much more active, especially in the "In focus" group.

Video of control mice that were outside the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7Q2xxRF83SUF5aHc/view?usp=sharing

Video of mice irradiated in the focal zone "In focus" of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7MTJ3M0dTUE5qenM/view?usp=sharing

Video of mice partially irradiated in a Biotron "At the wall" outside the focal zone:

https://drive.google.com/file/d/0B6fF2bMUEjr7RUNGN3BuTmJWc2M/view?usp=sharing

As of 28.04.2017 (the age of mice is 23 months), there were 3 mice left in the "Control" group, 8 mice in the "In focus" group, and 4 mice in the "At the wall" group. At this point, the age of mice in terms of humans is approximately 87 years. It is quite obvious that the quality of life of mice treated in the focal zone of the Biotron is significantly better than in the other groups, especially than in the control group. The unirradiated 3 surviving mice practically do not move, they are in one corner and only move slightly, they have the appearance of old mice with mangy fur (Fig.9). On the contrary, mice of the same age, but exposed to periodic irradiation in the focal zone of the Biotron, feel fine, cheerfully move along the entire surface of the tray and even try to climb on the wall, have the appearance of young mice (Fig. 10).

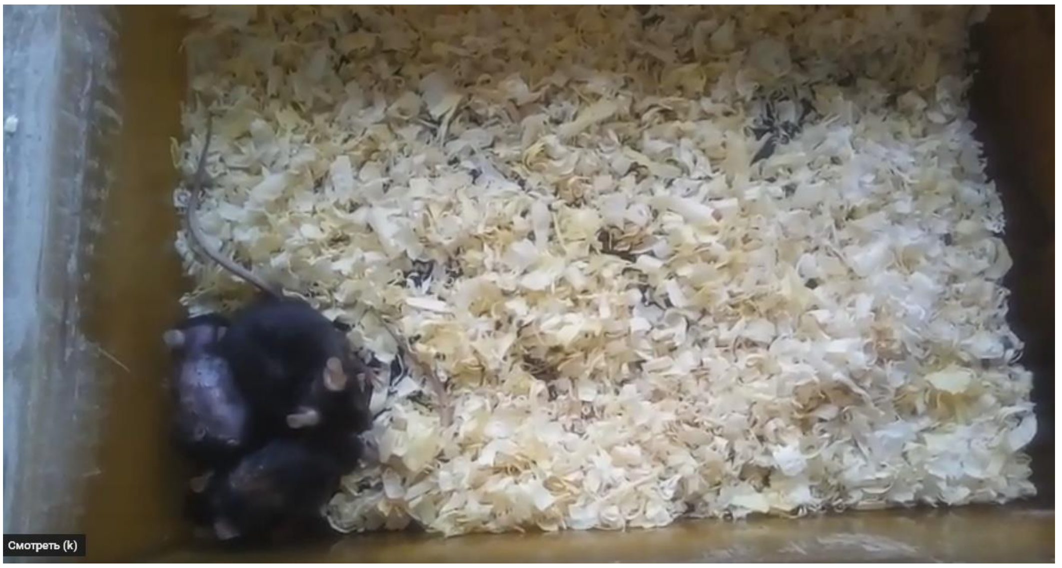

Fig. 9. Photo of the surviving 3 mice of the control group on 28.04.2017 at the age of 23 months or 87 years by human standards.

Fig. 10. Photo of 8 mice treated in the Biotron “In focus" on 28.04.2017 at the age of 23 months or 87 years by human standards.

Fig. 11. Photo of the surviving 4 mice that were in the Biotron "At the wall" on 28.04.2017 at the age of 23 months or 87 years by human standards.

The mice partially exposed to radiation "At the wall" (Fig. 11) look a little better than the control ones, but much worse than the mice that were in the focal zone at maximum exposure, and they are also less active.

Video of control mice that were outside the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7WkVHSzc4a3ZPYms/view?usp=sharing

Video of mice irradiated in the focal zone of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7Zk4yMjh5MEZubDA/view?usp=sharing

Video of mice partially irradiated in a Biotron "At the wall" outside the focal zone:

https://drive.google.com/file/d/0B6fF2bMUEjr7UlZGT3YxMkJiRHc/view?usp=sharing

As of 29.05.2017 (the age of mice is 24 months), all the mice in the "Control" group died. The last mouse died on 20.05.2017 at the age of 23.7 months, or about 90 years by human standards. The average age of the control mice was 20.4 months, or approximately 78 years by human standards. In the group "In focus" (Fig. 12), there are 8 mice left, as there were, and in the group "At the wall" (Fig. 13) there is only one mouse left, which is sedentary and looks very old. All 8 mice "In focus" are very active, look completely young and do not have any signs of aging. They are almost as mobile as before, trying to climb on the wall, and they are already 24 months old or in terms of a person about 91 years old. The last mouse from the group "At the wall" is extremely sluggish, barely moves, powerless, sits in a corner and is unable to take even one step because of old age.

Video of mice irradiated in the focal zone "In focus" of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7YmE2Rng1bUJCck0/view?usp=sharing

Video of mice partially irradiated in a Biotron "At the wall" outside the focal zone:

https://drive.google.com/file/d/0B6fF2bMUEjr7blhaUF9PTFhmRVk/view?usp=sharing

Fig. 12. Photo of 8 mice treated in the Biotron “In focus" on 29.05.2017 at the age of 24 months or 91 years old by human standards.

Fig. 13. Photo of one surviving mouse that was in the Biotron "At the wall" on 29.05.2017 at the age of 24 months or 91 years old by human standards.

The last mouse in the group "At the wall" died on 10.06.2017 at the age of 24.3 months, or about 92 years by human standards. The average age of the mice in the "At the wall" group was 21.5 months, or about 82 years by human standards.

Fig. 14. Photo of 8 mice constantly exposed to radiation in the Biotron “In focus" on 27.06.2017 at the age of 24.9 months or 95 years by human standards, after all the mice in the control and "At the wall" died.

As of 27.06.2017 (the age of mice is 24.9 months) in the "In focus" group (Fig. 14), all 8 mice are still alive. Their mobility has slightly decreased, however, their appearance is still normal. There are only the initial signs of aging (baldness) and this is about the age of 95 years by human standards!

Video of mice irradiated in the focal zone "In focus" of the Biotron on 27.06.2017 at the age of 24.9 months:

https://drive.google.com/file/d/0B6fF2bMUEjr7eTRabnZRelUzUVk/view?usp=sharin

As of 24.07.2017 (the age of mice is 25.8 months), 5 mice remained alive in the "In focus" group (Fig. 15). Three died "on the run", did not lie down, were not sedentary, two of them died of cancer (large tumors were observed).

Fig. 15. Photo of 5 remaining live mice treated in the Biotron "In focus" on 24.07.2017 at the age of 25.8 months or 98 years by human standards.

The appearance and mobility of the remaining mice are quite acceptable. They also move briskly, trying to stand on their hind legs and climb on the wall of the tray. There are practically no signs of aging. The age of mice in terms of human is already 98 years old.

Video of mice irradiated in the focal zone "In focus" of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7X1ppTThQeWNxcXM/view?usp=sharing

As of 28.08.2017 (the age of mice is almost 27 months), 5 mice are still alive in the group of irradiated in the focal zone "In focus" of the Biotron (Fig. 16). Their mobility and appearance have not changed much. Mice simply do not age, although by human standards they are already about 103 years old.

It is very interesting to compare the mice "In focus" in the photos from 28.08.2017 (age almost 27 months, fig. 16) and in the "Control" group from 23.02.2017 (age only 20.8 months or 79 years by human standards, fig. 17), as well as the corresponding videos. The difference in the age of mice is 6.2 months. This is about 30% of their life span as of 23.02.2017! The age difference by human standards is about 24 years, but the older mice irradiated in the Biotron look much younger than the younger non-irradiated mice. The number of mice in control group is the same, but their mobility and appearance differ dramatically. The control mice all died 2.5 months after 23.02.2017.

Fig. 16. Photo of the 5 remaining live mice treated in the Biotron "In focus" on 28.08.2017 at the age of 27 months or 103 years by human standards.

Fig. 17. Photo of the surviving 5 mice of the control group on 23.02.2017 at the age of 20.8 months or 79 years by human standards.

Video of mice irradiated in the focal zone of the Biotron on 28.08.2017 at the age of 27 months:

https://drive.google.com/file/d/0B6fF2bMUEjr7bjlCRFFPdnJrYVU/view?usp=sharing

Video of control mice that were outside the Biotron on 23.02.2017 at the age of 20.8 months:

https://drive.google.com/file/d/0B6fF2bMUEjr7Q2xxRF83SUF5aHc/view?usp=sharing

At the same time, it is noticeable that the control, younger mice aged 20.8 months less mobile, more bald than the older mice at 27 months, who were exposed to radiation in the Biotron.

We do not have videos of mice of the "Control" group up to the age of 21 months. However, we can safely assume that the same mobility and appearance as in the mice "In focus" at the age of 27 months, was in the mice in the "Control" group at the age of 20.8 months. Then it would be possible to say (by mobility and appearance) that the mice in the "In focus" group age slower (lag behind) by 6.2 months or about 24 years by human standards (30%) compared to the mice of the control group. It is obvious that there is a very significant extension of the active phase of the life of mice with high mobility and a very young appearance, despite the age of more than 100 years by human standards. This is especially surprising, since we started processing mice in a Large Biotron already at the advanced age of 17 months, or about 65 years by human standards, when they had already begun to die.

As of 18.09.2017 (the age of mice is 27.6 months), there were 2 mice left in the experimental group "In focus" (Fig. 18). The activity is good, they don't look old at all, they move around the tray, even stand at the wall of the tray. At the moment, they are already about 105 years old by human standards.

Fig. 18. Photo of 2 remaining live mice treated in the Biotron “In focus" on 18.09.2017 at the age of 27.6 months or 105 years by human standards.

Video of mice irradiated in the focal zone "In focus" of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7ekVLNE9JVWN2OEU/view?usp=sharing

On 28.09.2017 (age almost 28 months), there was one mouse left from the "In focus" group (Fig. 19). Her mobility has decreased, but she does not look old and sick. Quite a decent appearance, there are practically no bald spots and gray hair. The mouse is about 106 years old by human standards.

Fig. 19. Photo of one remaining live mouse from the treated in the Biotron "In focus" on 28.09.2017 at the age of 28 months or 106 years by human standards.

Video of a mouse on 28.09.2017 at the age of 28 months, irradiated in the focal zone "In focus" of the Biotron:

https://drive.google.com/file/d/0B6fF2bMUEjr7QUs1VWFOTjNPcEE/view?usp=sharing

The average life span of mice in the "Control" group is 20.4 months. In terms of a person, this is about 78 years old. The last mice from the Control group died between 23 and 24 months (at the age of about 90 years by human standards), and in the group" At the wall " the average life span was 21.5 months or about 82 years by human standards, the last mouse died at the beginning of the 25th month at the age of about 98 years. Mice in the "Control" and "At the wall" groups had almost the same life span. The difference in average life span is 5 years, and the maximum is 7 years by human standards.

The last mouse in the "In focus" group died on 07.11.2017 at the age of 2 years 5 months and 7 days (29.2 months), or approximately 111 years by human standards. The average age of the mice in the "In focus" group turned out to be 25.4 months or about 97 years by human standards. Thus, the average life span of experimental mice "In focus" increased by 5 months or by 24.5% ((25.4 – 20.4 months)/20.4)x100%) compared to control animals, and by human standards by 19 (!) years.

The maximum life span in the experiment exceeded this parameter in the control by 5.7 months or by 23.2% or 22 years by human standards.

After the death of all the mice in the "Control" group for 2 months, 67% of the mice in the "In focus" group were still alive.

The average life span of mice in the "At the wall" group increased only by 1.1 months. or by 5.6%. The maximum life span "At the wall" group exceeded this parameter in the control by 1.3 months or by 5.5% or 6 years by human standards.

In the "Control" group, the maximum life span of one mouse was 23.7 months (90 years), i.e. 5.5 months (21! years) less than the maximum life span of a mouse from the "In focus" group.

This suggests that it is the presence of mice in the focus of the installation that ensures a long and active life for mice.

The mobility of mice was also measured in special round and square arenas according to an internationally recognized method. The arenas are shown in the photo (Fig. 20). Each mouse was placed in the arena for 4 minutes. Then the average value of points was calculated for each group. Points are the sum of events (crossing the line, turning, lifting on the hind legs at the wall).

From the graph (Fig. 21) and the histogram of the average values of total mobility (Fig. 22), as well as Table No. 1, it is clearly visible that over time there is a decrease in the total mobility of mice in all groups. But in the groups "At the wall" of the mirror and "Control", the mobility indicators of animals throughout the experiment are much lower than the mobility indicators of mice in the group "In focus" of the installation.

The average mobility group "In focus" setup 65.3 ball. on 02.06.2017 (the age of the mice 24 months) almost two times higher in comparison with the average values in the group "At the wall" − 32 ball. that is clearly demonstrated in the chart of total motility (Fig. 21) and table 1.

Compared with the control 12.05.2017 (age mice 23.4 months) the mobility of mice "In focus" differs even more significantly - more than 4 times.

Table 2 presents the calculations of correlation analysis and significant differences in the average values of mobility in the groups. There were significant differences between the groups "Control" − "In focus" and the groups "Control" − "At the wall". There are no significant differences between the groups "In focus" and "At the wall" of the mirror.

The correlation coefficients between the groups "In focus" - "Control" and "In focus" − "At the wall" are $r = -0.71$ and $r = -0.67$, respectively, which indicates an average negative relationship between the groups and an average linear dependence.

There is a weak positive relationship between the groups "Control" and "At the wall" of the mirror with a correlation coefficient r=0.24, which shows a low linear dependence of mobility indicators between these groups.

Fig. 20. Photo of arenas for measuring the mobility of mice. On the left, the arena is rectangular, on the right – round (Photo provided by E. V. Komrakov).

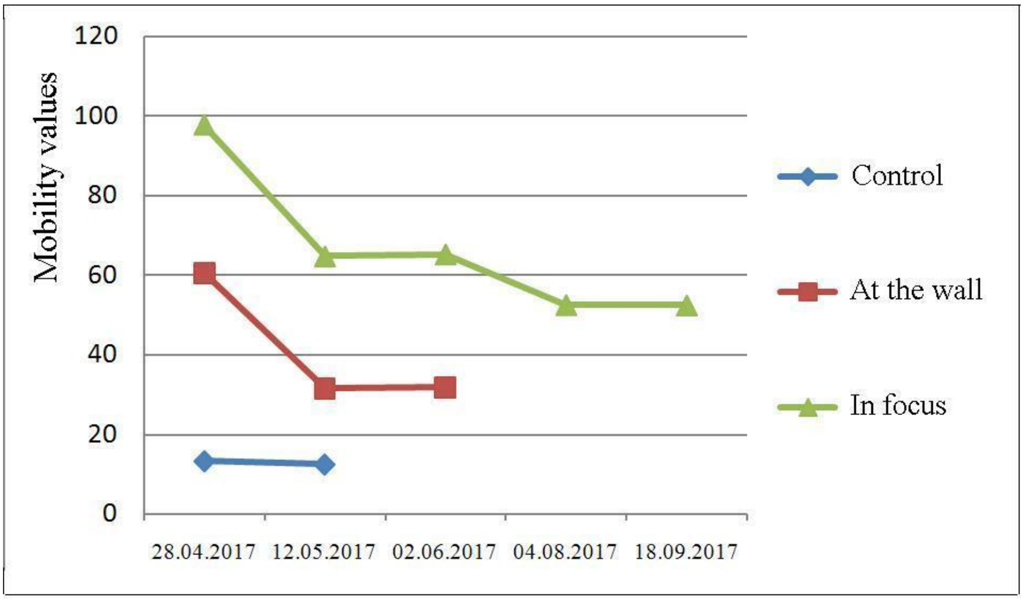

Fig. 21. The graph of indicators of the average values of total mobility (ball.) according to Table 1.

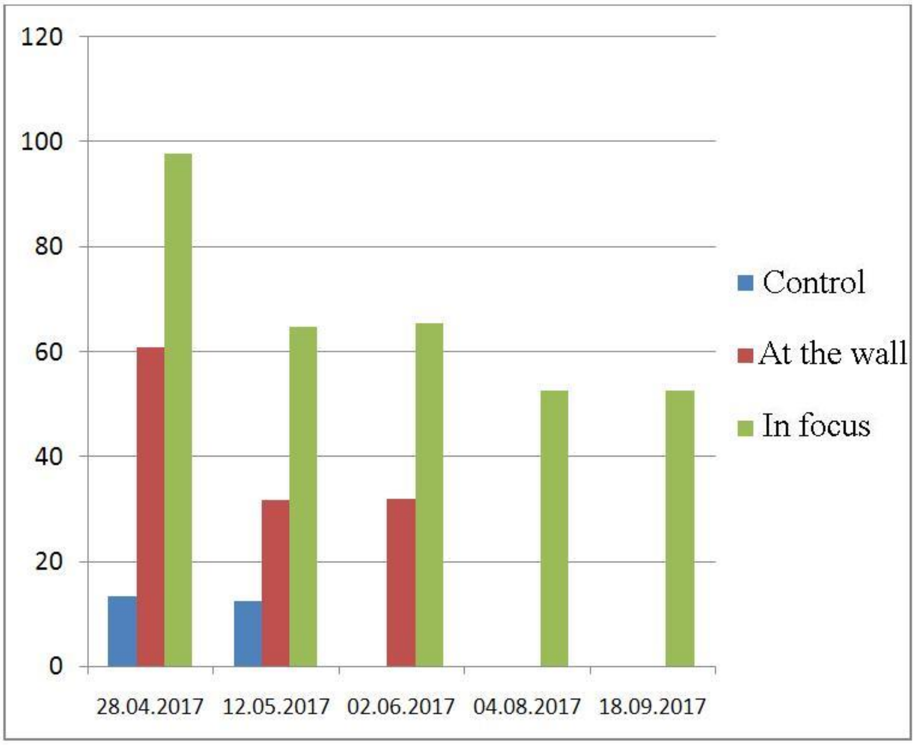

Fig. 22. Histogram of indicators of average values of total mobility (ball.).

Table 1. Average values of total mobility (ball.).

Data	Control	At the wall	In focus
28.04.2017	13,3	60,7	97,8
12.05.2017	12,5	31,6	64,8
02.06.2017		32	65,3
04.08.2017			52,6
18.09.2017			52,5

Table 2. Correlation analysis, significant differences.

Group	Correlation coefficient	Significant differences between groups
Control	− 0,71	There are significant differences
In focus		
Control	0,24	There are no differences
At the wall		
In focus	− 0,67	There are significant differences
At the wall		

1.2. **Experiment on the effect of concentrated biological electromagnetic radiation of young mice on the life span and motor activity of old ones mice in a Compact Biotron.**

From 1 April to December 2019, an experiment was performed on the effect of biological radiation of young mice on old mice in a Compact Biotron (Fig. 23-25). In the control and experimental groups of old mice, there were only 4 mice in the group. There was no larger number. It is clear that 4 mice are not enough for statistics and reliability, but the vector of influence can be quite detected. The mice were just over 2 years old. These are already very old mice, which are conditionally about 75 years old by human standards. The coefficient of conversion of the life span of mice and humans was adopted − 3.12, since other mice were taken than in the previous experiment, whose real life span was less (See the tables at the end of the article in the "Note" section).

The main purpose of the experiment is to detect the presence of the influence of concentrated biological electromagnetic radiation of young organisms on very old ones. 30 young mice aged one and a half months were taken as a source of biological radiation (Fig. 24).

Figure 25 shows the location of mice in a Compact Biotron. At the bottom, in a large container in the zone of the lower reflector, there are 30 young mice – radiation donors, and in the upper small container in the focal zone, the test subjects are old mice. At the beginning of June, young mice that were already 3.5 months old were replaced with new mice at the age of 1.5 months.

The mice in the control and experimental groups were selected at random, looked about the same and had about the same mobility. The exposure time was chosen for an average of 3 hours on weekdays. Weekends and holidays were not used. Since no one in the world, including Jiang Kanzhen, had done such experiments, it was not clear whether there would be a result at all. In addition, there are not very many young mice in the biomass, and they do not occupy the entire area of the bottom of the container, but only a small part of it, but due to the active movement of the mice, some uniformity is achieved. In this regard, a fairly long exposure time was chosen.

Fig. 23. A Photo of a Compact Biotron for studying the effect of radiation from young mice on old ones (Photo presented by V. E. Komrakov).

Fig. 24. Photo of 30 young mice-donors of biological radiation on 03.04.2019 at the age of 1.5 months.

Fig. 25. The location of a large plastic container with young mice standing on the mirror of a Compact Biotron and a small container standing on a large container with old mice (Photo provided by V. E. Komrakov).

Fig. 26. Photo of 4 mice of the control group on 03.04.2019 at the age of 24 months or 75 years by human standards.

Figures 26 and 27 show photos of control and experimental mice at the beginning of the experiment, respectively, at the age of 24 months. It can be seen that the mice have the same appearance in both groups.

Here is also a video taken at the beginning of the experiment on 03.04.2019.

Control group 03.04.2019:

https://drive.google.com/file/d/1aQh0kEqELJBNWhNwtzvommG0xJ5l6lxm/view?usp=sharing

Test group 03.04.2019:

https://drive.google.com/file/d/1VH_dNWfKStfYWdX1lhX0Oa6rqXjj7x64/view?usp=sharing

Young mice-radiation donors 03.04.2019:

https://drive.google.com/file/d/1A6yiUBr6NXImB1CwvD1v-CxfXZ6lq4RX/view?usp=sharing.

07.05.2019 in a month at the age of mice 25.2 months or 79 years old by human standards, there were 3 mice left in the control group (Fig. 28). One mouse died in mid-April. The apparent mobility in the control group is lower than in the experimental group. The photo of irradiated 4 mice is shown in figure 29.

Fig. 27. Photo of 4 mice of the experimental group on 03.04.2019 at the age of 24.1 months or 75 years by human standards.

Fig. 28. Photo of 3 mice of the control group on 07.05.2019 at the age of 25.2 months or 79 years by human standards.

Fig. 29. Photo of 4 mice of the experimental group on 07.05.2019 at the age of 25.2 months or 79 years by human standards.

Here are links to a video made on 07.05.2019 at the age of mice 25.2 months or 79 years by human standards.

Control group 07.05.2019:

https://drive.google.com/file/d/10acaS-YuivIp2QAh12XSsZH0Qvynm_zN/view?usp=sharing

The experimental group 07.05.2019:

https://drive.google.com/file/d/11UKG3dEaICxQuZYkJkKHd83nG-qNnBXK/view?usp=sharing

In the control group, one mouse died on 13.06.19, in the experimental group, one died on 18.06.19.

After 2.7 months, on 21.06.2019, mice aged 26.7 months or 83 years by human standards, 2 mice remained in the control group (Fig. 30), and 3 mice remained in the irradiated group (Fig. 31).

Also, the apparent mobility in the control group is lower than in the experimental group.

Fig. 30. Photo of the surviving 2 mice of the control group on 21.06.2019 at the age of 26.7 months or 83 years by human standards.

Fig. 31. Photo of the surviving 3 mice of the experimental group on 21.06.2019 at the age of 26.7 months or 83 years by human standards.

Video made on 21.06.2019 at the age of mice 26.7 months or 83 years by human standards.

Control group 21.06.2019:

https://drive.google.com/file/d/1JFb3ggCHBGalDASBdraTNXOCupDbuxPE/view?usp=sharing

Experimental group 21.06.2019:

https://drive.google.com/file/d/1O49gEaKO8CxMNPq92ZWcywsx2jHUJ-Pl/view?usp=sharing

Fig. 32. Photo of the surviving 2 mice of the experimental group on 20.07.2019 at the age of 27.7 months or 86 years by human standards.

On 19.07.2019 all the mice in the control group died. One died on 06.07.2019, and the second on 19.07.2019. Approximately 86 years by human standards.

In the experimental group on 20.07.2019 at the age of 27.7 months or 86 years by human standards, there are 2 mice left (Fig. 32). The mice remain quite mobile and their appearance has changed little.

Video made on 20.07.2019. The two remaining mice in the experimental group:

https://drive.google.com/file/d/1oTc4Z1hoqB9v-GNE2V823b85-NpdJH89/view?usp=sharing

Fig. 33. Photo of the surviving 1 mouse of the experimental group on 27.10.2019 at the age of 30.9 months or 96 years by human standards.

02.08.2019 the two remaining experimental mice were treated with radiation of young mice for the last time. Then they were left to just live out their lives.

One died on 07.08.2019 at 28.2 months or 88 years old according to the age of a person.

27.10.2019 in the experimental group at the age of 30.9 months or 96 years by human standards, one mouse is still alive (Fig. 33), it still moves well, does not look old and is in good condition.

Here is a video of this previously irradiated experimental mouse, taken on 27.10.2019 at the age of 30.9 months or 96 years by human standards, 100 days after the last mouse in the control group died. The appearance of the mouse for 7 months of the experiment (27.10.2021), for about 22 years by human standards, has practically not changed:

https://drive.google.com/file/d/1k_iF-IvV8HuVp0gsDa7n2g_ipdnLPhQh/view?usp=sharing

The last mouse from the experimental group died on 20.12.2019 at the age of 32.7 months or 102 years by human standards.

Figure 34 shows a graph of the survival rate of old mice of the control and experimental groups.

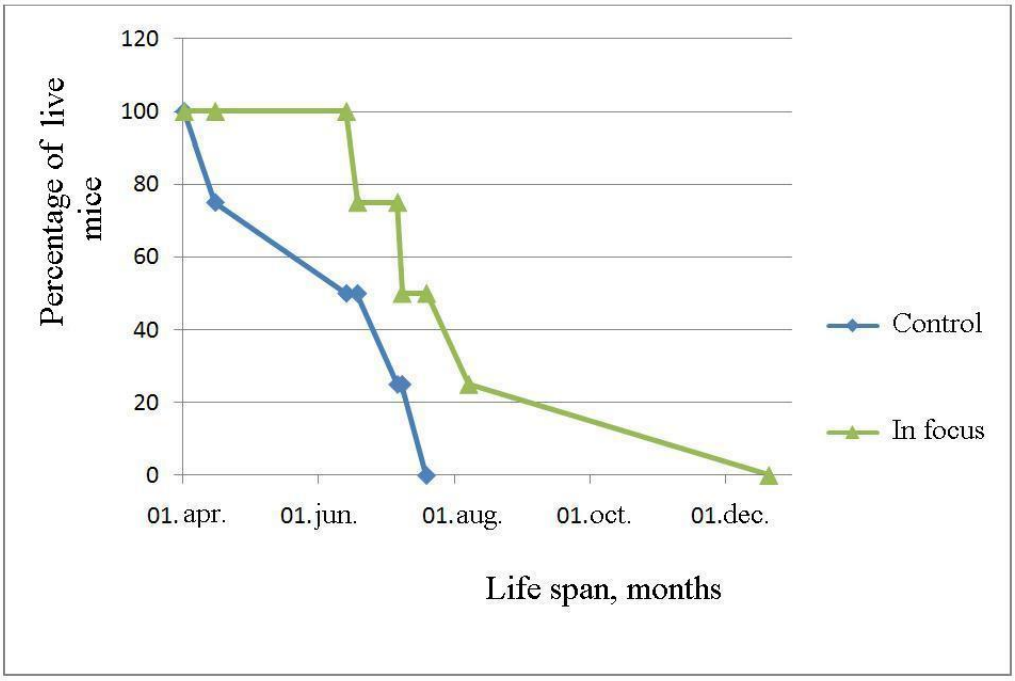

Fig. 34. Graph of the survival rate of old mice over time. The beginning of irradiation on April 1, 2019 at the age of 24 months. The last mouse died in the control at the age of 27.6 months, and under irradiation – at 32.7 months.

After 3 and a half months after the start of the experiment, all the control mice died. Since the beginning of the experiment, the average life span of the control group was 72 days, and the experimental group – 139 days, which is 67 days or, conditionally, about 7 years by human standards, more than in the control. Thus, the experimental animals after the start of irradiation in a Compact Biotron lived almost 2 times longer than the control ones! The maximum life span in the control from the beginning of the experiment was 111 days (11 years), and in the experiment 261 days (27 years), i.e. increased by 150 days, or about 16 years by human standards. Considering that the experiment began when the mice were already 2 years old, or conditionally about 75 years old by human standards, the result seems quite impressive.

The average life span in the control was 26.2 months (82 years), and in the experiment – 28.3 months (88 years), i.e. in the experiment it increased by 8.6% compared to the control. The maximum life span in the control is 27.6 months (86 years), and with irradiation − 32.7 months (102 years), i.e. it increased by 18.5%.

That is, on average, irradiated mice lived longer than non-irradiated mice by human criteria by 7 years, and their maximum life span was 16 (!) years longer.

In relation to a person, it would seem that radiation was started at a very old age at 75 (!) years, and, despite this, it was possible to increase the maximum life span by 27 years to 102 years, and in the control, a person could live a maximum by 11 years to 86 years. It was conditionally assumed that 1 month of living mice corresponds to 3.12 years in humans (See the tables at the end of the article in the "Note").

Since the beginning of April, the mice have also had their mobility measured in special round and square arenas according to an internationally recognized method (Buresh et al., 1991). The arenas are shown earlier in Fig. 20. The average mobility of the test group for the 6th measurement (21.6.2019) was 3 times higher than in the control group (Fig. 35).

Taking into account the preliminary results of the experiment on prolonging the life of very old mice by means of exposure to concentrated electromagnetic radiation of mice, it can be concluded that such an extension of life is quite real and quite significant. In addition, the quality of life and mobility of the mice of the test group compared to the control group is significantly higher.

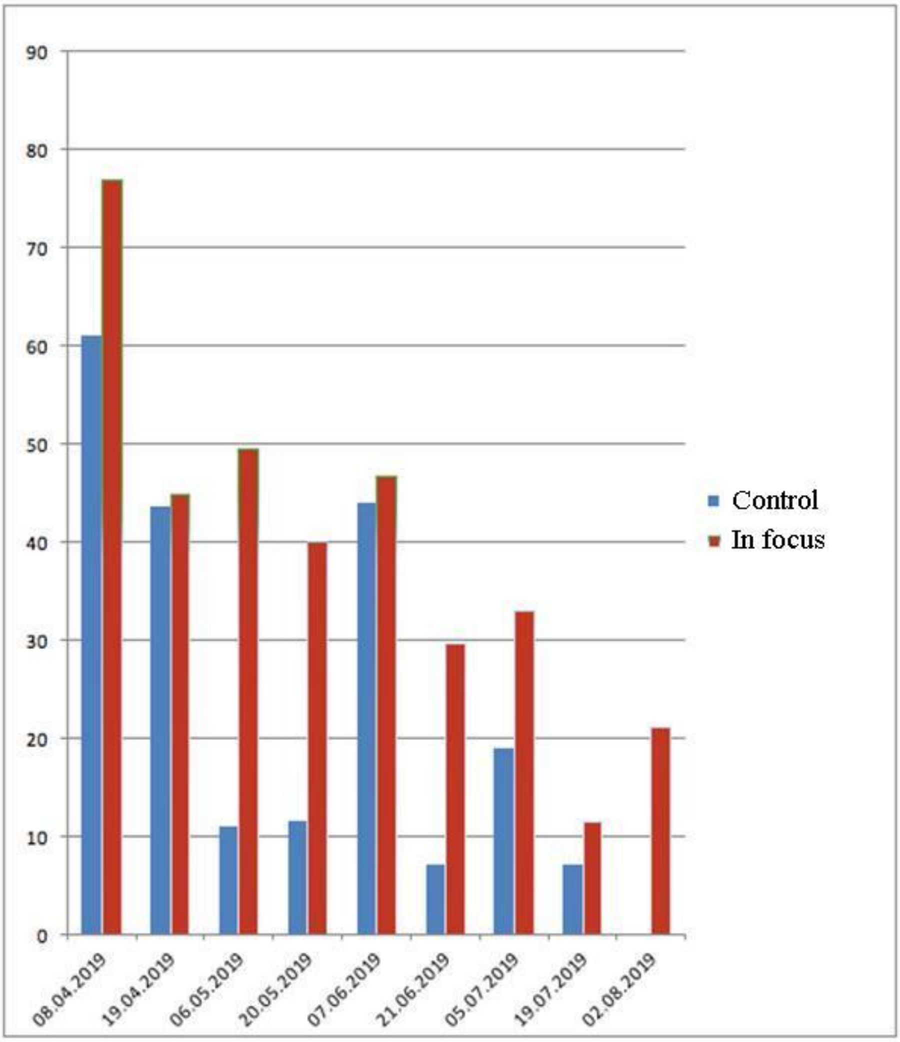

Fig. 35. A histogram of the average values of the total mobility of old mice. The mobility index (ball.) is shown vertically, and the time is shown horizontally, in months. The columns on the left refer to the mice of the control group, on the right − to the mice of the experimental group.

2. EXPERIMENTS ON NEMATODES

2.1. **Experiments on the effect on nematodes of concentrated biological electromagnetic radiation from seedlings of different plants in Large and Compact Biotrons**

Experiments on nematodes were carried out in a Large and several Compact Biotrons.

The nutrient medium for nematodes and food for them were prepared according to the protocol described on the website http://www.wormbook.org/ chapters/www. strainmaintain/ strainmaintain.html with some changes.

The following composition was used as the basis of the vital surface for nematodes in Petri dishes: 2 g of agar; 1 g of peptone; tap water up to 200 ml. The ingredients were placed in a 0.25 or 0.5 l glass bottle, mixed and closed the neck of the bottle with double foil. Then the bottle was placed in an autoclave for 40 minuts at a pressure of 1.8 atm. Immediately after sterilization, the composition was poured into sterile plastic Petri dishes with a diameter of 35 or 90 mm.

The food for the nematodes was E. Coli strain OP50. These bacteria were grown on a nutrient medium of the following composition: 1.5 g of agar; 4 g of peptone; 4 g of yeast extract; tap water up to 200 ml. The ingredients were also placed in a 0.25 or 0.5 l glass bottle, mixed and the neck of the bottle was closed with double foil. Then the bottle was placed in an autoclave for 40 minuts at a pressure of 1.8 atm. Immediately after sterilization, the composition was poured into sterile plastic Petri dishes with a diameter of 35 or 90 mm. After cooling, the dishes were seeded with E. coli from the primary culture using a bacteriological wire loop.

The temperature of the nematode content is 21^0C. All work with nematodes was carried out in a sterile laminar flow cabinet.

Nematodes were irradiated with barley, wheat or oat seedlings in different experiments.

It turned out that irradiation for 40 or 60 minutes had a significant increase in the average life span of nematodes, and for 20 minutes there was no effect.

The first experiment on nematodes was conducted in a Large Biotron in 2016. The effect of wheat seedlings on the life span of nematodes Caenorhabditis elegans strain No. 18 was evaluated. The nematodes were in Petri dishes.

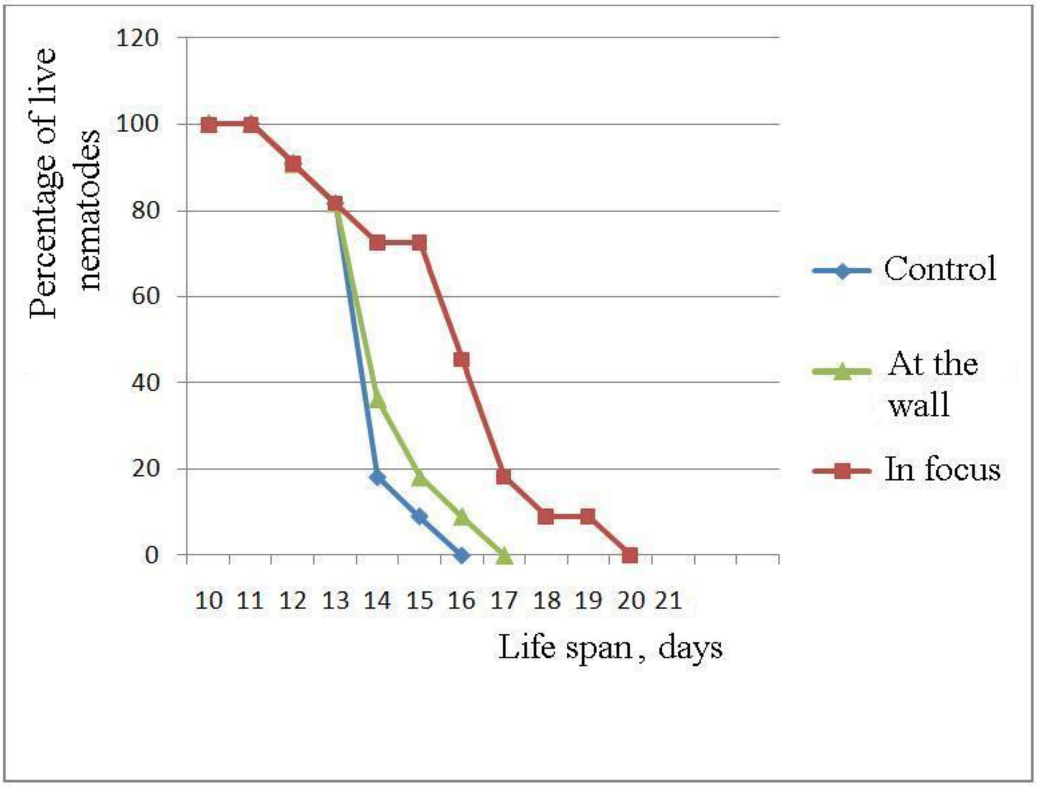

Fig. 36. The change in the percentage of live nematodes during their irradiation with wheat sprouts, depending on the time in the focus of the Large Biotron (the "In focus" line), in the control outside the Biotron (the "Control" line) and at the wall inside the Large Biotron (the second control –"At the wall" line).

Figure 36 shows that the life span of nematodes under the influence of biological radiation of wheat sprouts is significantly longer than in the control. This is confirmed by comparing the experience with two controls: 1) control outside the Biotron; 2) control in the Biotron, but not in focus - at the Biotron wall. The average life span of nematodes in the experiment was significantly higher than in the 1st control, by 15.4%; and compared with the 2nd control – "At the wall", by 12%. The maximum life span increases by 26.7% compared to the 1st control, and compared to the 2nd control – "At the wall"-by 17.6%. The increase in the maximum life span of nematodes “At the wall” compared to the control is only 6.7%.

Experiment 22.02.2019.

The influence of barley sprouts on the life span of nematodes Caenorhabditis elegans strain No. 18 was studied in Large and Compact Biotrons. In one experiment nematode eggs were seeded on 22.2.2019, and they began to develop in Petri dishes from 24.2.2019. Irradiation of nematodes began from 4.3.2019 on the 10th day of their life. We conducted 9 sessions. The nematodes were seeded in 15 Petri dishes with a diameter of 35 mm from Costar company, 5 nematodes per dish. The control 3 dishes were placed on the desk at a distance of 5-7 m from the Compact Biotron and 2 m from the outer wall of the Large Biotron. In the Compact Biotron, the experimental 6 dishes stood in a zone 24 cm from the bottom of the mirror and 67 cm from the left wall of the Biotron (Fig. 4). In the Large Biotron, the experimental 3 dishes stood in the center of the bed on a stand for seedlings at a height of 8 cm from the surface of the bed and 2 meters from the door (Fig. 2). The exposure time was 30 min 3 dishes and 60 min 3 dishes in a Compact Biotron and 60 min 3 dishes in a Large Biotron, the temperature in the thermostat was 21^0C, in the Biotrons – 21-22^0C.

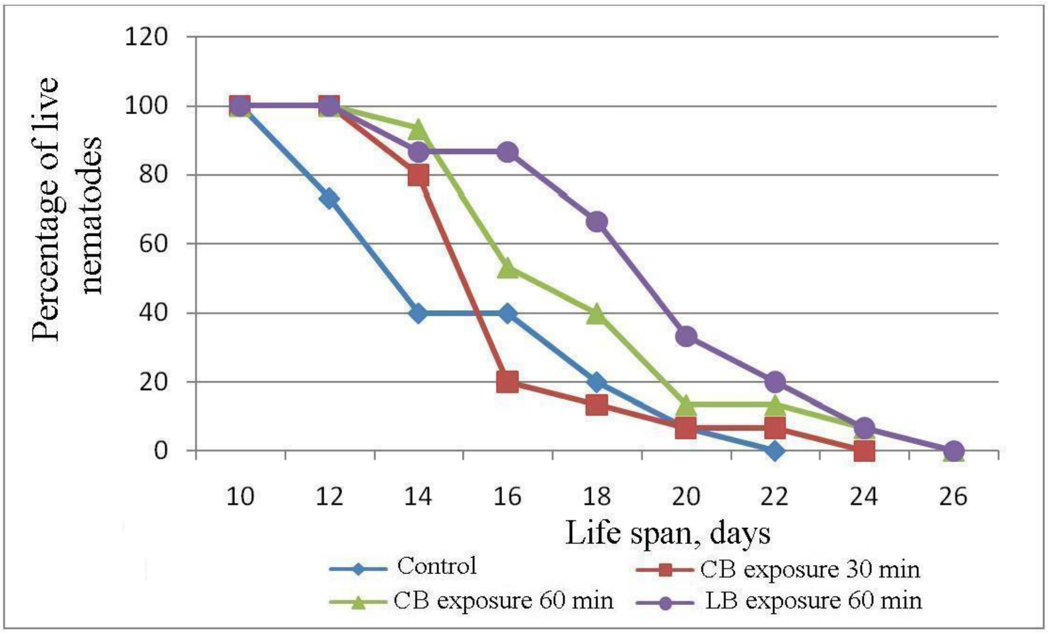

Fig. 37. The change in the percentage of surviving nematodes from time at 30 and 60 minutes of irradiation of nematodes in a Compact Biotron (CB) and 60 minutes of irradiation in a Large Biotron (LB).

The results are shown in figures 37 and 38. It was found that periodic irradiation for 60 minutes per day caused a significant increase in the average life span of nematodes in Compact (19.2%) and Large Biotrons (30.1%) (p=0.015 and p=0.001, respectively), and increase in the maximum life span in 19.0% in both Biotrons. At 30 minutes there was small non significant effect in Compact Biotron (6.4% increase in average life span and 9.5% - maximum life span). It is also seen that the survival curves in Compact and Large Biotrons under irradiation for 60 minutes are shifted to the right, which can also confirm the geroprotective nature of the action of biological radiation of plants.

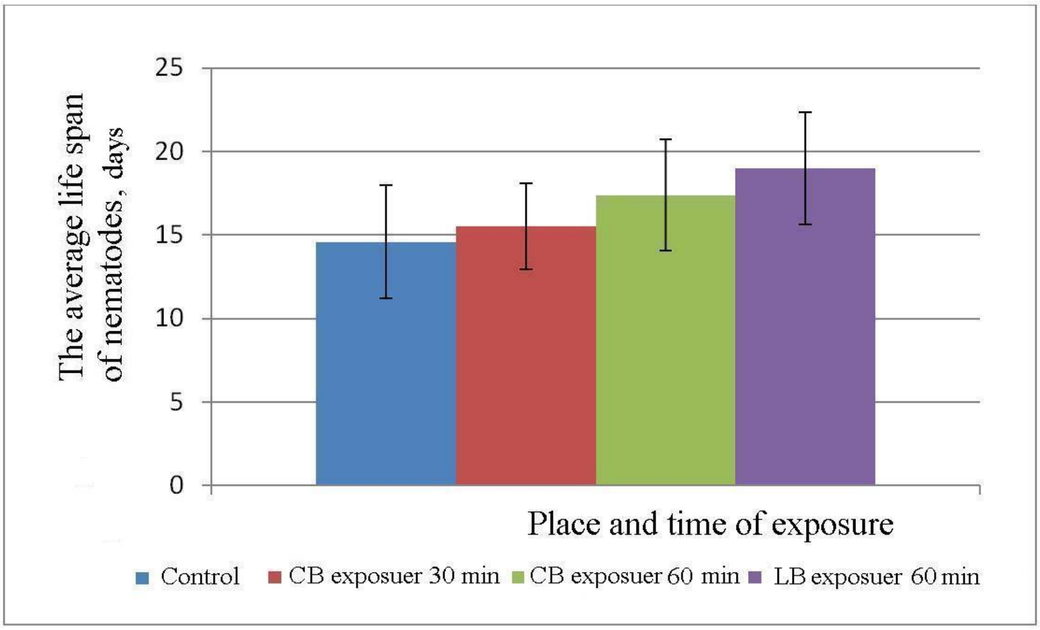

Fig. 38. The average life span of nematodes in the control (without irradiation), as well as at 30 and 60 minutes of irradiation in a Compact Biotron (CB) and 60 minutes of irradiation in a Large Biotron (LB). Standard errors are shown.

Experiment 16.03.2019.

Another experiment to assess the effect of radiation from barley sprouts on the life span of nematodes Caenorhabditis elegans strain No. 18 in Large and Compact Biotrons began on 16.03.2019. The beginning of the effect is 25.3.2019 on day 8 of nematodes life. We conducted 8 irradiation sessions. The nematodes were seeded in 9 Petri dishes with a diameter of 35 mm from SPL Lifesciences company, 2 nematodes per dish. The control 3 dishes were placed on the desk at a distance of 5-7 m from the Compact Biotron and 2 m from the outer wall of the Large Biotron. In the Compact Biotron, the experimental 3 dishes were placed in a zone 30 cm from the lower part of the mirror and 67 cm from the left wall of the Biotron (in the upper focus of the Compact Biotron). In a Large Biotron, 3 experimental dishes stood in the center of the couch on a stand for seedlings at a height of 8 cm from the surface of the bed and 2 meters from the door. The exposure time was 60 min 3 dishes in a Compact Biotron and 60 min 3 dishes in a Large Biotron, the temperature in the thermostat was 21^0C, in the Biotrons – 21-22^0C.

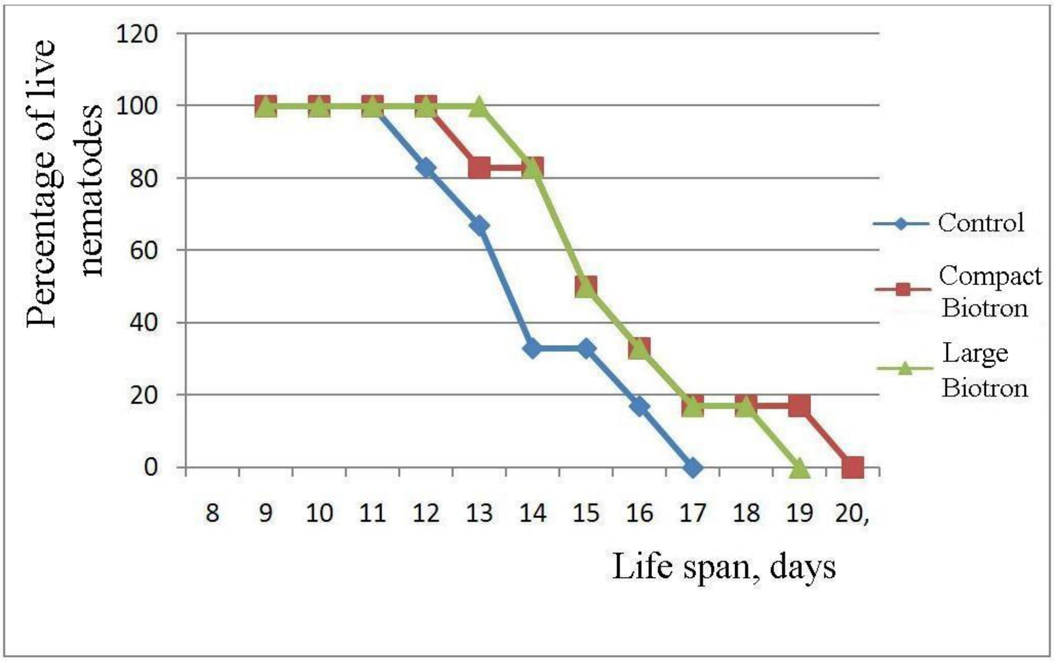

Fig. 39. Change in the percentage of surviving nematodes over time.

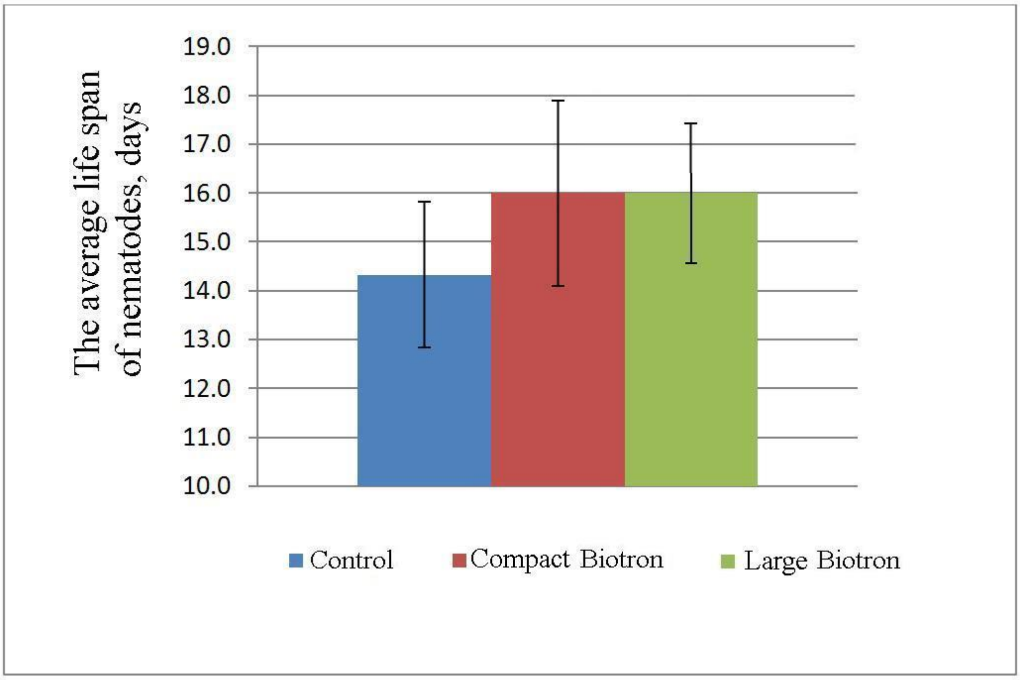

Fig. 40. The average life span of nematodes. Standard errors are shown.

Although the differences are not reliable according to the T-criterion compared to the control, they are close to this in a Large Biotron ($p=0.07$) with the necessary significance level for a reliable result of less than 0.05. It is also seen that the survival curves in Compact and Large Biotron are shifted to the right, which may indicate a geroprotective effect of radiation (Fig. 39 and 40). The average life span of nematodes under irradiation was increased in both cases by 11% and increase in the maximum life span by 17.6% and 11.8 in Compact and Large of Biotron, respectively. The unreliability of the difference from the control can be explained by the small initial number of nematodes.

Experiment 22.9.2019.

The effect of radiation from oat sprouts on the life span of nematodes Caenorhabditis elegans strain No. 18 in a Compact Biotron. Sowing of nematode eggs was carried out on 2.10.2019, the birth of nematodes on 24.10.2019. The beginning of the effect is 3.10.2019 on day 9 of nematodes life. We conducted 8 irradiation sessions of 60 minutes each. The nematodes were seeded in Petri dishes SLM company with a diameter of 35 mm. The surface of the dishes was divided into 3-4 sections with plastic inserts. A total of 22 nematodes in each group of control and experimental dishes. The control dishes were placed on the table at a distance of 0.5 m to the side of the Compact Biotron. The experimental dishes in the Compact Biotron were placed on cardboard boxes with cutouts in the upper focal zone at a distance of 31 cm from the bottom of the mirror and 67 cm from the left wall of the Biotron. There were 6 Petri dishes in total in the control and 6 in the experiment. The temperature in the thermostat is 21^0C, the temperature in the Biotron is $21-22^0$C.

The results show that the survival curve of nematodes under irradiation in a Compact Biotron is shifted to the right and the average life span of nematodes is significantly ($p=0.034$) increased by 11% (Fig. 41 and 42), and increase in the maximum life span by 20%.

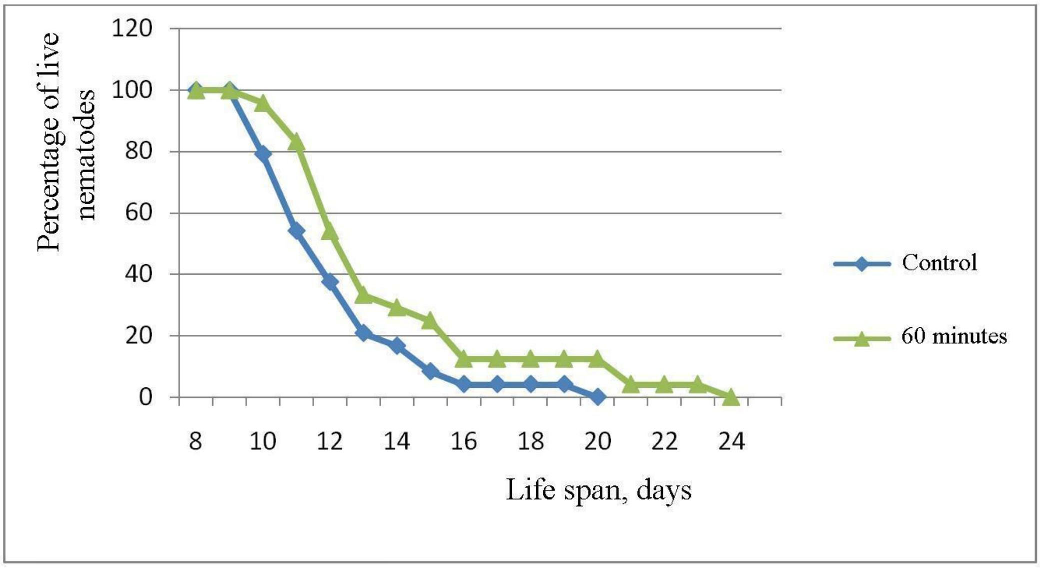

Fig. 41. The change in the percentage of surviving nematodes over time.

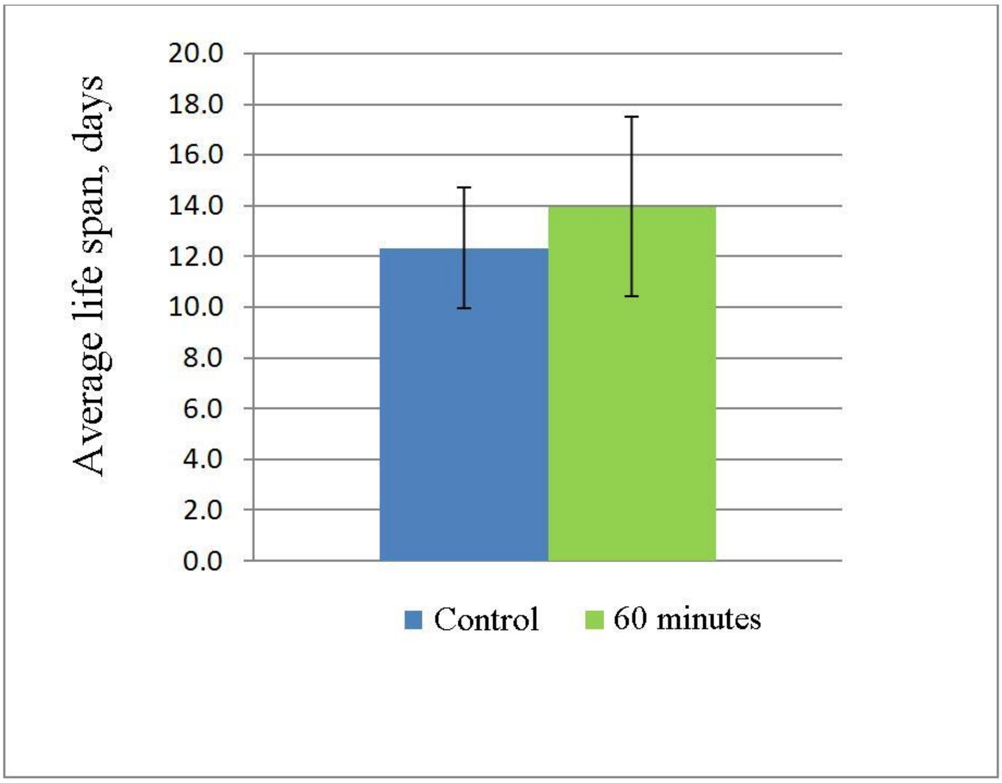

Fig. 42. The average life span of nematodes. Standard errors are shown.

Experiment 10.10.2019.

The effect of radiation from oat sprouts on the life span of nematodes Caenorhabditis elegans strain No. 18 in a Compact Biotron. Sowing of nematode eggs was carried out on 7.10.2019, the birth of nematodes on 9.10.2019. The beginning of exposure on 18.10.2019 for 9 day of nematodes life. We conducted 8 irradiation sessions of 60 minutes each experimental and “At the wall” groups. The nematodes were seeded in Petri dishes SLM company with a diameter of 35 mm, with inserts made of plastic plates. A total of 34 nematodes in each group of dishes: control ones outside the Biotron, experimental ones in the focus of the installation and inside the Biotron out of focus (“At the wall”) on the footrest (Fig. 4).

The experimental dishes in the Compact Biotron were placed on cardboard boxes with cutouts in the upper focal zone at a distance of 31 cm from the bottom of the mirror and 67 cm from the left wall of the Biotron.

The results show that the survival curve of nematodes under irradiation in a Compact Biotron is shifted to the right and the average life span of nematodes under irradiation is significantly (p=0.02) increased by 8.6% relative to the control, and compared with nematodes “At the wall” increased by 16% (p=0.0001) (Fig. 43 and 44) and increase in the maximum life span by 17.6% “In focus” compared with nematodes “Control”.

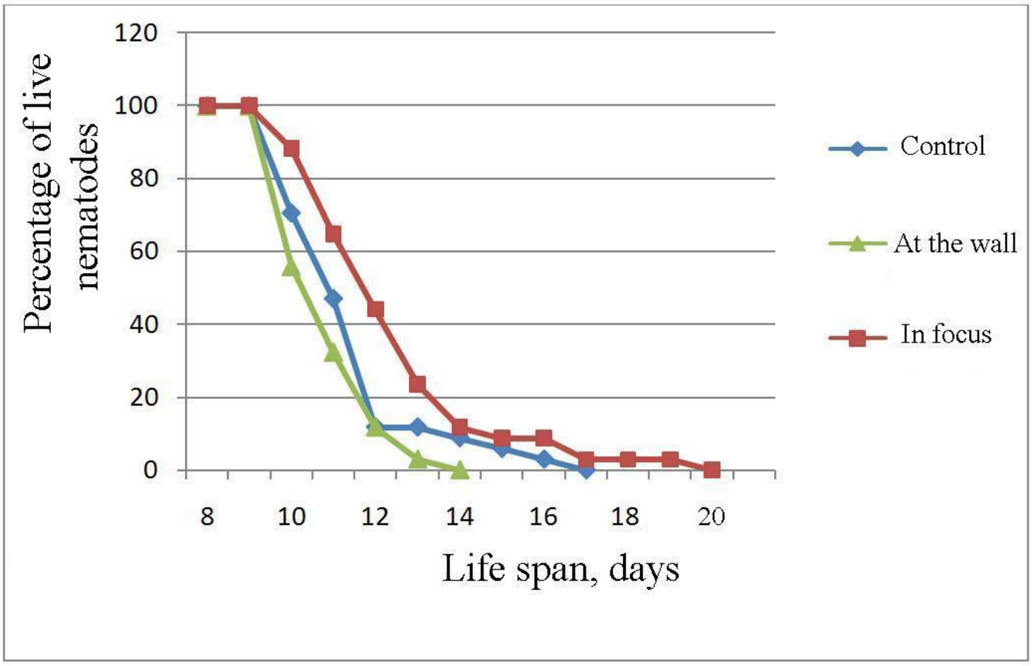

Fig. 43. The change in the percentage of surviving nematodes over time.

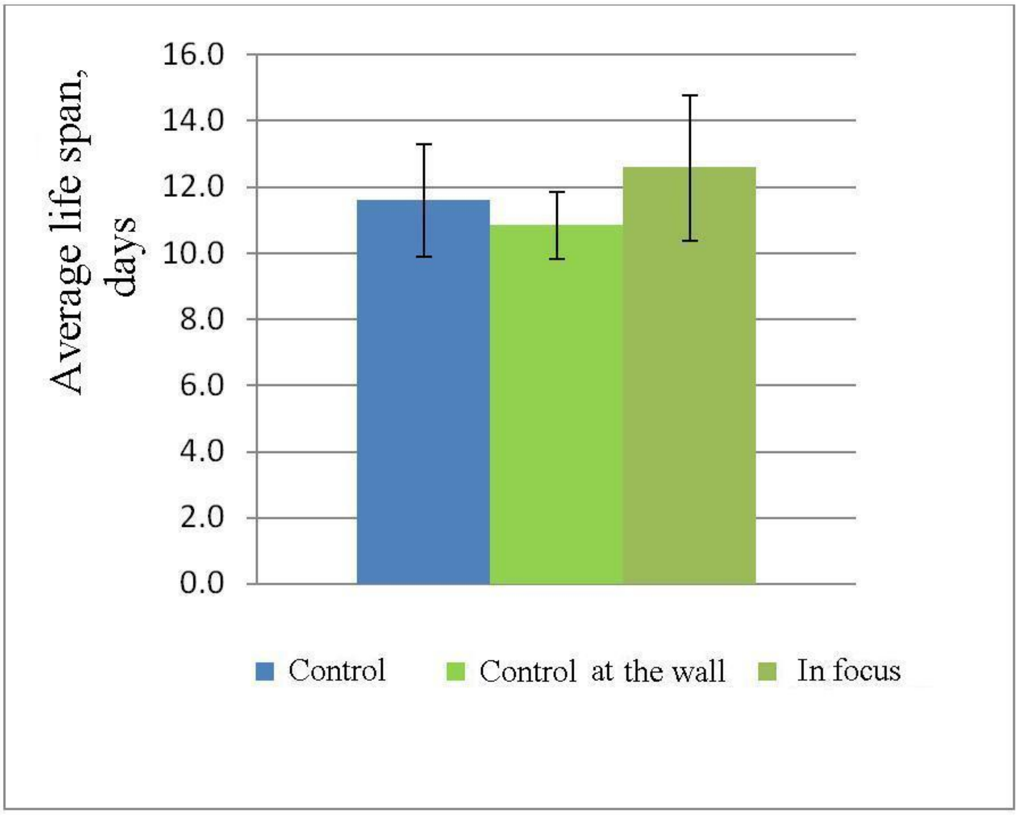

Fig. 44. The average life span of nematodes. Standard errors are shown.

2.2. **Experiments on the effect of concentrated biological electromagnetic radiation of young mice on nematodes in a Compact Biotron**

2 experiments were conducted to assess the possible influence of biological electromagnetic radiation of young mice on the life span of nematodes Caenorhabditis elegans strain No.18.

Experiment No. 1 from 28.4.2019.

Young mice (gray female DBF1 mice) at the age of 2.5 months were placed in a large plastic container with a plastic lid. The container was placed on the lower reflective mirror in a Compact Biotron. Petri dishes with nematodes were placed on a container with mice (Fig. 45). Petri dishes were placed in such a way that they fell into the lower focal area of the Compact Biotron at a distance of 24 cm from the lower mirror and 67 cm from the left wall, and the biological radiation of young mice was concentrated on nematodes growing in Petri dishes. Frozen cold accumulators were placed next to the dishes, since the temperature inside the Biotron with the lid closed was 2-3 degrees higher than the outside due to the thermal radiation of 30 young mice in the container. This was the first experiment where young mice were used as radiation donors and we did not know exactly what the impact would be. Therefore, 3 groups of nematodes were taken: one control, and two experimental ones − one was installed in a Compact Biotron for an hour, and the second for 3 hours.

Fig. 45. The location of a large plastic container with young mice standing on the mirror of a Compact Biotron and Petri dishes with nematodes standing on a large container in the focus of the installation (Photo by L. Yu. Prokhorov).

The control dishes were placed on the desk at a distance of 0.5 m from the Compact Biotron. The nematodes were seeded in Petri dishes from SLM company with a diameter of 35 mm. A total of 6 dishes with nematodes, 14 nematodes for each experimental group (Control, 60 min and 180 min). Sowing of nematode eggs was carried out on 28.4.2019, birth on 30.4.2019. The beginning of exposure is 6.5.2019 from the age of 6 days.

The exposure time is 60 minutes and 180 minutes, the temperature in the thermostat is 21^{0}C, in the Compact Biotron 21-22^{0}C. We conducted 14 sessions of radiation.

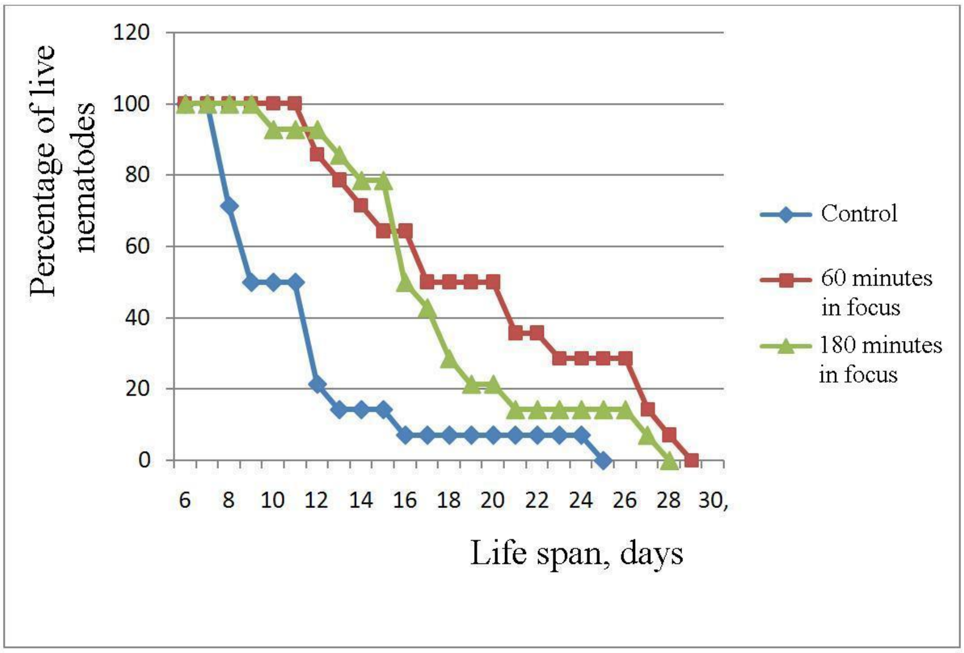

Fig. 46. The change in the percentage of living nematodes over time.

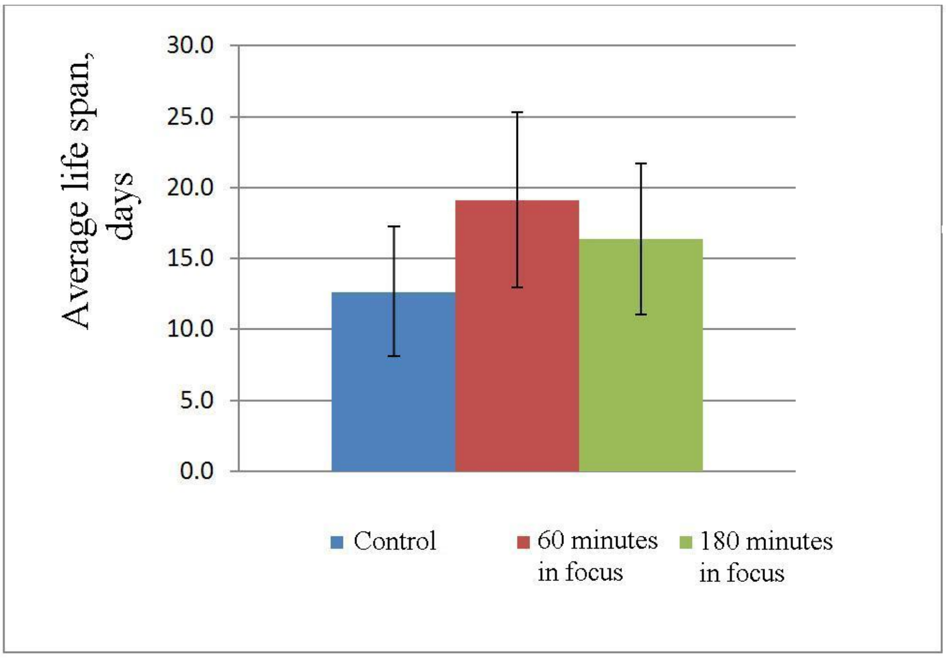

Fig. 47. The average life span of nematodes. Standard errors are shown.

The result was quite convincing and better than when treating nematodes with plant seedlings (Figs. 46 and 47). We started processing nematodes on the sixth day of their life on 06.05.19, but from May 9 to 12, nematodes were not processed. It also turned out that it was too long to process nematodes for 3 hours and this led to a decrease in their life span, especially during the second half of the experiment. It is quite possible that in the case of old mice, the duration of exposure of 3 hours is too long (See the section on experiments on mice). The reliability of increasing the life span of nematodes is very good. The significance level is 0.0008 for 60 min and 0.021 for 180 min. The average life span was 51.3% higher than in the control at 60 minutes of exposure and 29.5% higher at 180 minutes of exposure, and the maximum life span was 16 and 12% higher, respectively.

Experiment No. 2 from 10.5.2019.

Nematodes Caenorhabditis elegans strain No. 18. Sowing of nematode eggs was carried out on 10.5.2019, birth 12.5.2019. 30 young gray DBF1 female mice aged 2.5 months were used as a source of biological radiation, and from 4.6.2019 30 male white DBF1 mice aged 1.5 months were used. The beginning of exposure is 22.5.2019 from the age of nematodes 10 days. The nematodes were lived in Petri dishes from SLM company with a diameter of 35 mm, with plastic inserts. The control dishes were placed on the desk at a distance of 0.3 m to the side of the Compact Biotron. The experimental dishes in the Compact Biotron stood on a container with mice and on an empty lid. On the lid on the sides of the dishes were two frozen cold accumulators with antifreeze to reduce the temperature by 1.5-2 degrees to room temperature at which the control Petri dishes were located, since a large number of young mice in the lower container heat Petri dishes with nematodes. The experimental dishes were placed in the lower focal zone at a distance of 24 cm from the lower part of the mirror and 67 cm from the left wall of the Biotron. A total of 8 dishes with nematodes, 79 nematodes in each experimental group in 4 dishes (Control and irradiation for 60 minutes). The exposure time is 60 minutes, 8 irradiation sessions, the temperature in the thermostat is 21^0C, the temperature in the Biotron is 21-22^0C.

The results show that the biological radiation of young mice significantly increases the average life span of nematodes by 11.8% (Fig. 48 and 49). The significance level is 0.001. The maximum life span was increased by 7.1%.

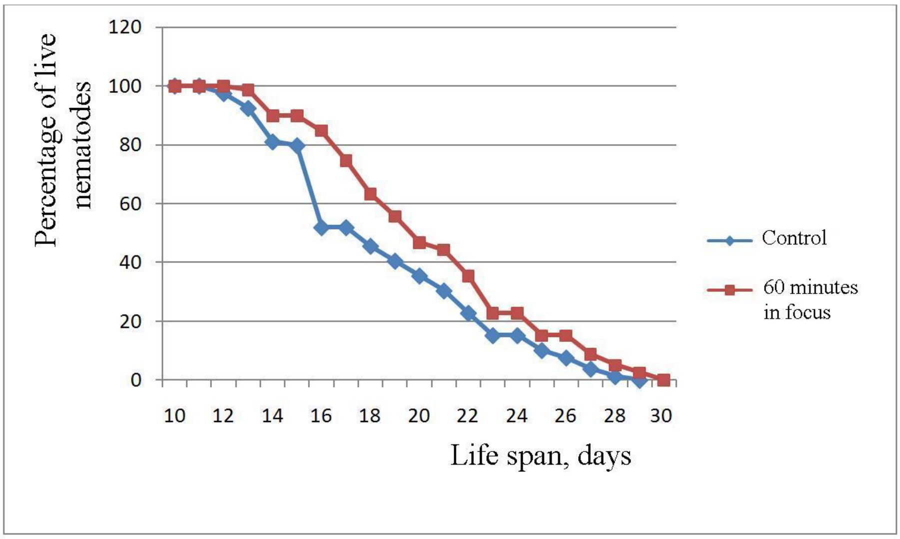

Fig. 48. The change in the percentage of living nematodes over time.

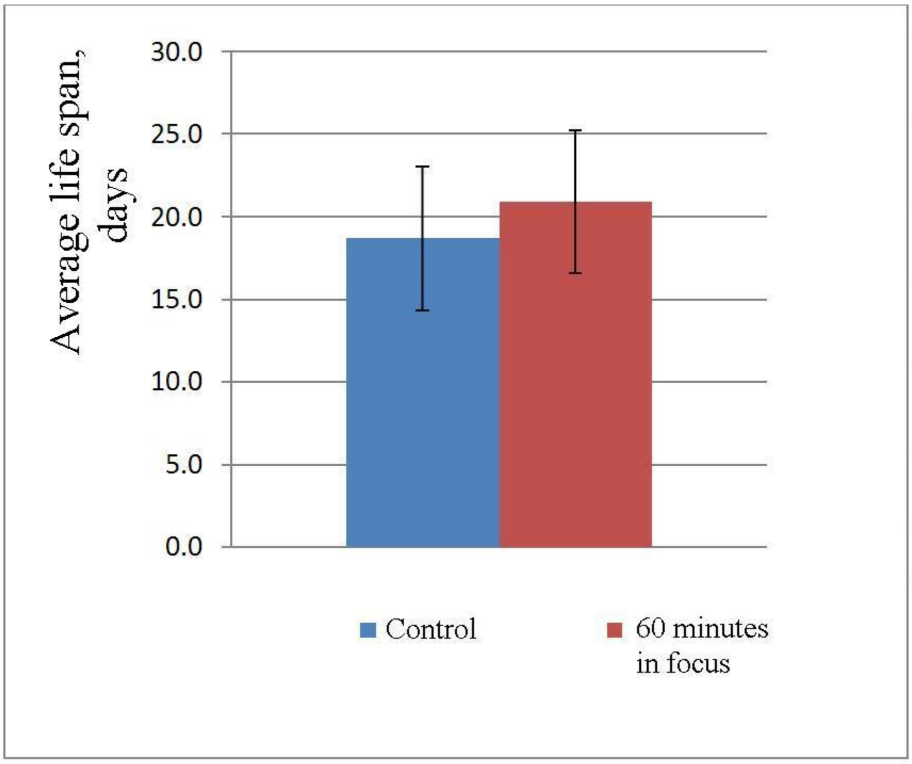

Fig. 49. The average life span of nematodes. Standard errors are shown.

3. STUDY OF THE ENERGY OF SEED GERMINATION UNDER THE INFLUENCE OF BIOLOGICAL ELECTROMAGNETIC RADIATION OF PLANT SEEDLINGS IN A COMPACT BIOTRON

The effect of radiation from wheat seedlings in a Compact Biotron on wheat seeds was studied. The seed germination energy was determined according to GOST 12038-84 (Russian National Standard). The seeds were prepared in four repetitions of 100 pieces in one Petri dish. The dishes of the experimental group were placed in the installation for 24 hours. After that, the control and experimental groups were germinated for three days in accordance with GOST 12038-84. The calculation of the germination energy showed that the seeds of the control group have reduced germination energy values of 83.25% and the seeds of the experimental group have increased values of 90.75%. This indicates that radiation from wheat seedlings in a Compact Biotron can accelerate the development of plant tissues.

4. ASSESSMENT OF THE INFLUENCE OF BIOLOGICAL ELECTROMAGNETIC RADIATION OF PLANT SEEDLINGS IN A COMPACT BIOTRON ON THE LIFE SPAN, GROWTH RATE AND SATURATION DENSITY OF ANIMAL CELLS IN CULTURE

An experiment was carried out (17.12.2019) on the preliminary assessment of the effect of radiation from barley seedlings in a Compact Biotron on the growth rate, saturating (maximum) density and life span of a culture of transformed Chinese hamster cells according to the "stationary aging" model (Prokhorov, 1999). The cells grew in plastic flasks with an area of 25 cm^2 without subcultivation and without changing the growth medium. The flasks were closed with black rubber stoppers and cells were grown at 37^0C and 5-7% CO^2 atmosphere. For cell growth, an Igla medium (MEM) with 10% of bovine serum was used. The cells in the flasks were counted on the day of irradiation, and after the end of the irradiation series − at intervals of 2-5 days. The cells were counted on an inverted microscope over the entire area of the microscope, the diameter of the field of the microscope is 1 mm, the conversion coefficient from the field of the microscope to the density of the culture in the flask, expressed as the number of cells per 1 cm^2 −127. On one flask, 5 microscope fields were calculated in pre-selected places and marked with a marker in the form of a small ring. First seeding of cells into flasks was carried out with a density of 13967 cells/ cm^2 in each flask.

Irradiation of cells was started on the 2nd day after cell ceeding of cultures and irradiated initially daily, and later with an interval of 2-3 days to 37 days of cell culture growth.

Irradiation of experimental cultures was carried out for 10, 30 or 60 minutes. The control flasks were not irradiated, they stood at a distance of 0.5 m from the right side of the Compact Biotron (Fig. 4).

In the control culture, 4 flasks were used, and in the irradiated cultures, 4 flasks were used for each irradiation time for 10, 30 and 60 minutes.

The plants were renewed at intervals of 6-9 days. The cells were irradiated with young plants (barley) aged from 2 to 17 days at a height of sprouts from 4 to 20 cm. The time intervals of plant growth that were used for irradiation were as follows: 2-8, 6-17, 6-13, 7-16 days in different batches of plants.

The results are presented in figure 51 and in table 3. Figure 52 shows the height of plants that were used to irradiate cells in a Compact Biotron.

Several parameters of growth and aging of cultures of transformed Chinese hamster cells were evaluated: the saturating or maximum density of the culture (cells/cm^2), the time to reach the saturating density (days), the number of cell divisions to the saturating density ($n = \log_2 (Ns/No)$, where Ns − is the number of cells per 1 cm^2 at the saturating density, and No − is the number of cells per 1 cm^2 at cell seeding), the growth rate of the culture to the saturating density (the average number of cell divisions per day), the "total" and "stationary" life span of cultures (TLS and StLS, respectively). The time from cell seeding to the moment of the "death" of the culture was taken as the TLS, the time from the moment of reaching the maximum density to the moment of the "death" of the culture was taken as the StLS. The moment when the density of the culture was below 10% of its maximum density was taken as the "death" of the culture.

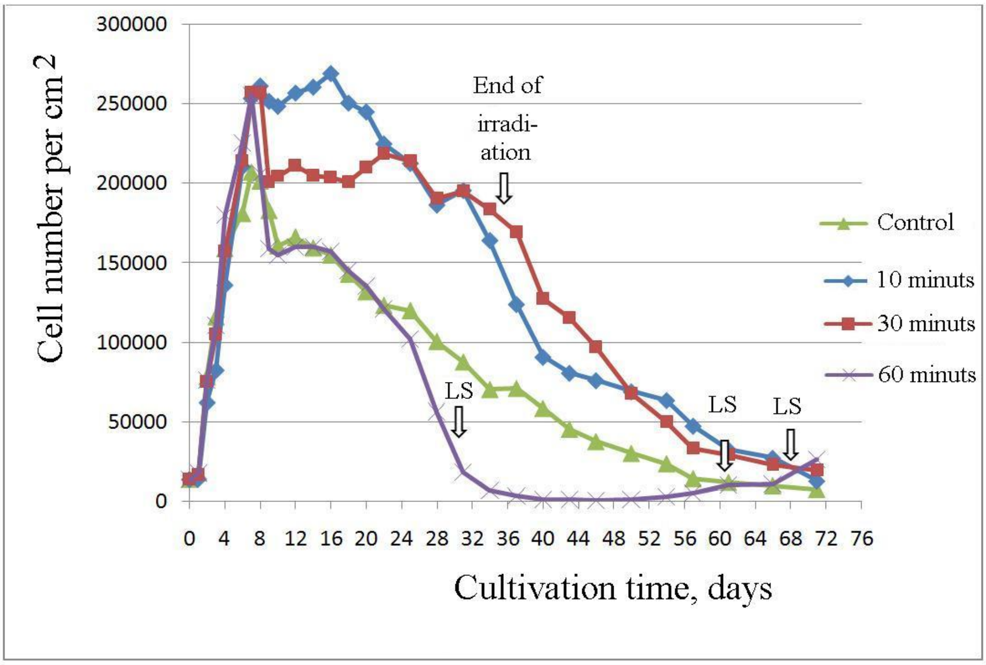

Fig. 51. The change in the number of live transformed Chinese hamster cells in plastic flasks when irradiated with barley seedlings in a Compact Biotron. The arrows with the abbreviation LS (life span) show the moment of "death" of cultures, and the arrow without the inscription LS – the last day of irradiation of cell cultures.

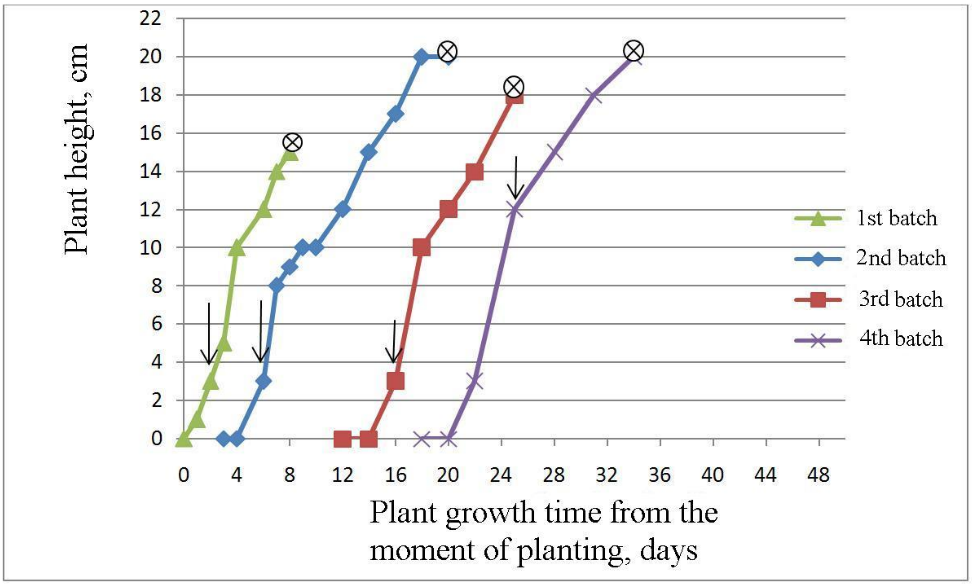

Fig. 52. The height of barley sprouts that were used for irradiation of cultures of transformed Chinese hamster cells in a Compact Biotron, depending on the growth time. The arrows show the beginning of the application of this batch of plants for irradiation, and the circle with a cross shows the moment of the last application of plants of this batch.

Cell cultures under the influence of irradiation from plant sprouts for 10, 30 and 60 minutes reach a higher maximum density compared to the control culture.

The number of cell divisions at all irradiation times until the saturation density is reached and the average rate of cell divisions are increased compared to the control (Table 3).

At 10 and 30 minutes there is a maximum positive effect, and at 60 minutes there is a positive effect at first, but later the cells begin to die faster than in the control. At the same time, the "total" life span of the culture at 60 minutes of irradiation was 26 days lower than in the control, and the "stationary" life span was 27 days less.

At irradiation times of 10 and 30 minutes, the "total" and "stationary" life span of cultures is increased by 13 and 11 days, respectively, and as a percentage it is 23 and 22%, respectively.

Table 3. Changes in various parameters during the growth and aging of the culture of transformed Chinese hamster cells (TLS and StLS – "total" and "stationary" life span of cultures, respectively.

Control, 0 min	Irradiation time, minutes		
	10 min	30 min	60 min
Seeding density, cells/cm^2			
13967	13967	13967	13967
Saturation culture density, cells/cm^2			
206832	253365	257048	254889
TLS, days			
56	69	69	30
StLS, days			
50	61	61	23
Time to reach the saturation culture density, days			
7	7	7	7
The ratio of saturation culture density to the seeding density			
18.70	22.91	23.25	23.05
The number of cell divisions up to the saturating density, $n=Log_2 (Ns/No)$			
4.23	4.52	4.54	4.53
Average rate of cell divisions to saturation density, divisions/day			
0.60	0.65	0.65	0.65

Irradiation was stopped after 37 days of culture growth. A total of 19 sessions were held.

Thus, irradiation with plant seedlings in a Compact Biotron at 10 and 30 minutes has a positive effect on the growth parameters and increases life span of stationary cell cultures.

5. PRELIMINARY ASSESSMENT OF THE IMPACT OF BIOTRONS ON HUMAN HEALTH

In all ongoing work that were described earlier, grain sprouts were used as donors. The same sprouts have been used for the restoration, rejuvenation and treatment of several thousand patients on Jiang Kanzhen Biotrons for more than 25 years and already about a two thousand patients on EKOM Biotrons who work in several cities of Russia (Moscow, Sochi, Irkutsk, Khabarovsk, Nizhny Novgorod, Perm, Vladikavkaz), in Germany ("Inakarb" clinic in Bonn), Israel, Kazakhstan, Vietnam.

Biotron has an exceptionally positive effect on people who have completed health improvement courses. No negative effects of Biotron devices on human health were detected. Contraindications are only pregnancy at any time and oncology.

Over the past year, a large amount of work has been done to diagnose 350 people who have undergone procedures in Office Biotron (Fig. 54, photo on the right). First of all, this applies to those who recovered after 2 or 3 courses, within 6-9 months. The course consisted of 12 sessions of 60 minutes for a month, then a 3−6-months break. The results are obtained from patient surveys and are confirmed by hardware diagnostics performed during each procedure on the devices "Life Expert", the Medical Expert Complex "KME" and the device O. P. Kuzmenko "Rada", all Russian-made.

1. Most patients initially had hyperfunction of the hypothalamus and pituitary gland, respectively, there was an imbalance of both hemispheres of the brain. This condition indicates premature aging of the body, which was indirectly confirmed by the excess of the biological age over the passport age up to 9 years. There was an alignment of the passport and biological age in the first year, and rejuvenation to 10 years in the 2nd and 3rd courses. There was a transition of the hypothalamus from an overexcited state to the norm, and this trend acquired a permanent character, as the total time spent in the Biotron accumulated.

2. Sleep was normalized, the duration of the slow sleep phase increased. The total sleep time was reduced, its efficiency increased. Patients have acquired a full rest during sleep.

3. The activity of the hormonal system improved. Those suffering from thyroid disease began to feel better, some of them, according to the decision of the attending doctors, reduced the doses of medications taken.

4. In patients with diabetes mellitus (almost 100 percent), blood sugar levels decreased. Their well-being has become more positive, their psycho-emotional instability has disappeared.

5. All patients have improved the activity of the reproductive system. Women and men have increased libido. To men who have lost their masculine strength, a nocturnal erection came, life began to play with new colors.

6. In the cardiovascular system, blood vessels are cleared of cholesterol plaques. In some sixty-year-old patients, the vessels become like those of thirty-year-olds.

7. Partially restored vision and hearing. The degree of recovery is better, the earlier it is started.

8. The mobility of the spine improves in all patients. If there were confirmed spinal hernias, then after 4-6 months they were not felt, disturbed or diagnosed, as was previously the case.

9. The intervertebral discs were restored. Their dehydration stopped. The height of the patients, which decreases with age, was restored (in some cases by 4 cm), the posture improved.

10. Salts and osteophytes were dissolved on the bones and in the muscles. Many cases of reduction of osteochondrosis from the third (maximum) to the first (minimum) degree have been recorded by hardware.

11. In 95 percent of patients, contamination of the body with heavy metal salts, pesticides, food additives of group E, electro-magnetic irradiation was recorded by hardware. Depending on the degree of contamination, the Bioptron contributed to the complete cleansing of the body in 3-6 months.

12. Approximately half of the clients have an acid-base balance level shifted to the acidic side. The procedures in the Biotron contributed to a rapid shift of the equilibrium to the alkaline side. The pH became higher than 7.37. As the number of procedures increased, this figure increasingly shifted towards increasing the pH, that is, there was a real rejuvenation of the organs and the entire body as a whole.

13. The work of the urinary system is significantly improved. For example, even in 90-year-old patients suffering from nocturnal urinary incontinence, after passing 1-2 courses in Biotron, night visits to the toilets decreased from 10 times per night to 1-2 times.

14. The general emotional state improves, suicidal tendencies are reduced, the desire to act and work on the household plot increases, especially in late old age.

15. In several cases, there was a cure for such a difficult-to-treat disease as restless legs syndrome. There have been cases of cure at the age of about sixty and even 88 years, and in the latter case, the woman was ill with this disease from the age of 25, i.e. more than 63 (!) years and other methods of treatment did not help.

16. There is real evidence of the effectiveness of using a Bioptron to increase the body's immunity and prevent viral diseases. There are facts when patients undergoing procedures in Biotron either do not get sick with Covid-19 at all, or the disease lasts 1-3 days without complications and hospitalization, as well as without the use of antibiotics.

17. More than thirty people have used Biotron in rehabilitation after Covid-19 diseases. All of them had hardware-detected lesions of the respiratory, cardiovascular and immune systems, the brain suffers in different variations. After the first course of procedures, microthrombs dissolve, the "beetroot" skin color disappears. The skin becomes a normal color. The bronchi and lungs recover quickly, but the cardiovascular system and brain take much longer to recover from Covid-19. Observing the condition of the affected organs with the help of diagnostic devices, there is experience in effectively building strategies and tactics for the complete rehabilitation of the body after this viral infection.

18. In the study of the blood of 26 patients, even after one session in the Biotron for 45 minutes, capillary blood fluidity increased in all patients without exception, the degree of sludge (adhesion, aggregation) of erythrocytes decreased by 50%, the number of platelet conglomerates decreased to the normal 3-5-7 ones in the field of view of the microscope, leukocytes were activated (revived) (Figures 53 and 54). These studies are especially important for patients who have suffered from Covid-19 virus disease, since their blood platelets have a pronounced aggregation (30-50 or more pieces in the field of view) at a rate of 3-5, which indicates a pronounced autoimmune process. Before this coronavirus infection, this was extremely rare, only with the exacerbation of chronic severe autoimmune processes or after chemotherapy.

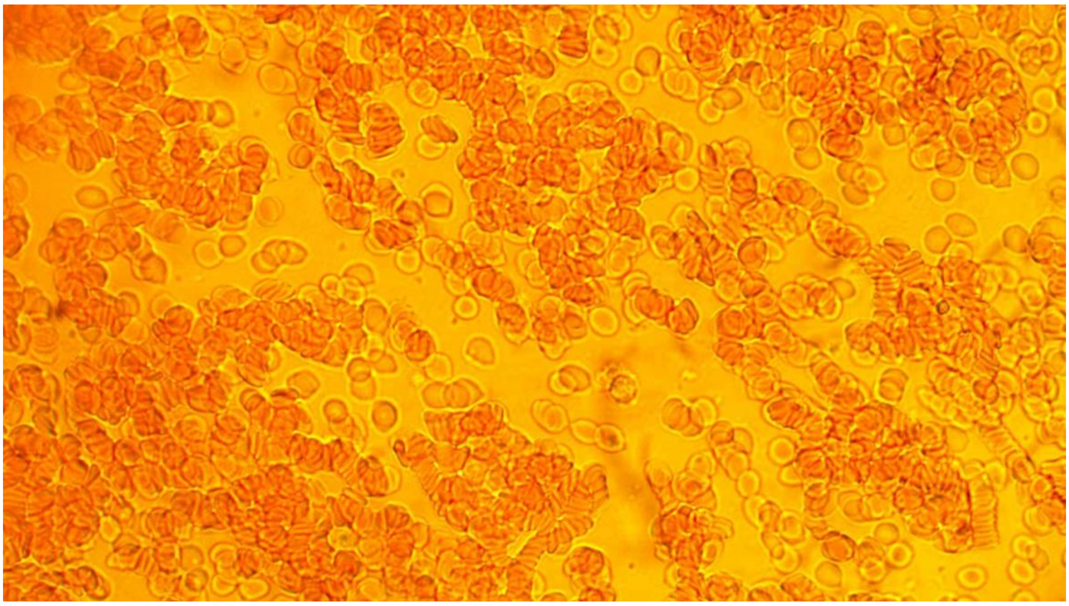

Fig. 53. Photo of a person's blood with a large number of clumped shaped elements before undergoing a course of rehabilitation in the EKOM Biotron (Photo by L. N. Tarasova).

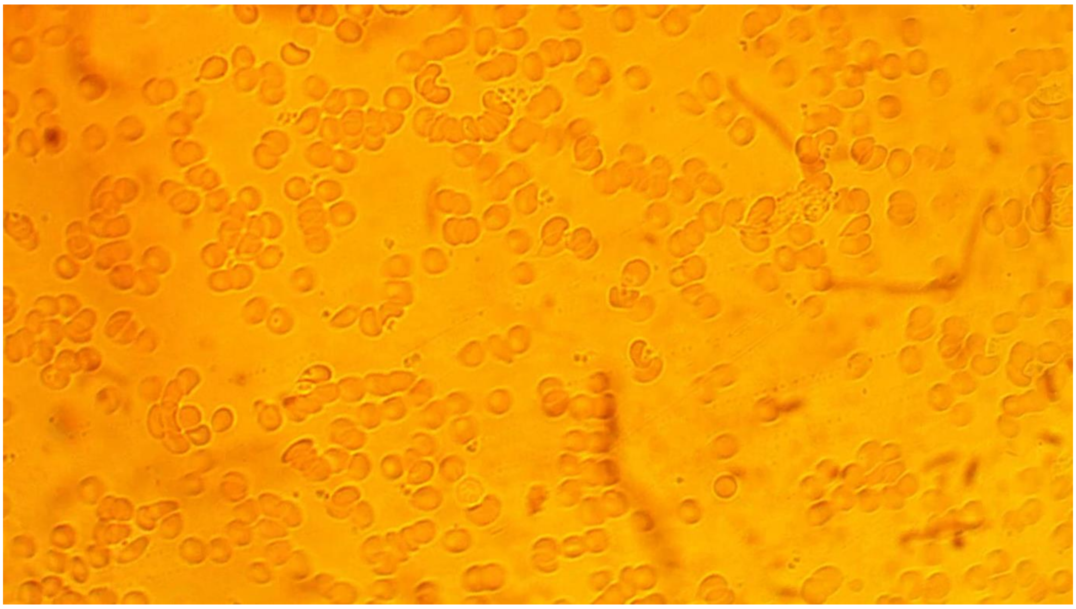

Fig. 54. Photo of human blood showing a decrease in the adhesion (aggregation) of red blood cells after undergoing a rehabilitation course in the EKOM biotron (Photo by L. N. Tarasova).

6. GENERAL CONCLUSIONS

EXPERIMENTS ON MICE

The average life span of elderly mice placed in the focus of a Large Biotron under the influence of radiation from barley seedlings increased by 5 months (24.5%) compared to the control group, and by human standards by 19(!) years. The average upcoming life span since the beginning of exposure increased same by 5 months, but in percentages this will 146% in relation to the control. The maximum life span in the experiment exceeded this parameter compared in the control by 5.5 months (23.2%) or 22 years by human standards.

The animals that were in the Biotron, but not in the focus "At the wall", showed the worst results in increasing life span and maintaining mobility. The average life span of the mice of the "At the wall" group increased by only 5.6%, and the mobility was about 2 times greater than in the control, but 2 times less, compared to the mice that were "In focus". This means that it is biological radiation directed at animals that increases their life span, and not phytoncides − active volatile substances of plants affect mice.

The mobility indicators of the group of mice irradiated in the focus of the installation are significantly higher than those of the control group, and since this increases the life span of mice, we can already talk about an increase in active longevity of people. It should be emphasized that since the above technology has been successfully used on elderly animals, it is possible to discuss the possibilities of using the method to increase the active healthy life of elderly people.

EXPERIMENTS ON NEMATODES

When irradiating nematodes with plant seedlings in a Compact Biotron for 20 and 30 minutes, a significant increase in average life span was not revealed.

When irradiated in Compact and Large Biotrons for 40 and 60 minutes, a significant increase in the average and maximum life span of nematodes is observed. The average life span of nematodes placed in the focus of Biotron-EKOM increased by 8.6-30.1%, compared with the control group, and maximum life span increased by 7.1-26.7%.

In none of the experiments, both in Large and Compact Biotrons, a significant decrease in the average or maximum life span of nematodes was recorded.

Also, irradiation, as a rule, shifts the survival curve of nematodes to the right, which indicates the geroprotective effect of Large and Compact Biotrons.

Thus, it is shown that both Large and Compact Biotrons can cause the effect of increasing the average and maximum life span of Caenorhabditis elegans nematodes.

EFFECTS OF RADIATION FROM YOUNG MICE ON OLD MICE AND NEMATODES

In experiment old mice aged 24 months as a result of periodic exposure to radiation from young mice in a Compact biotron lived for another 138 days, and in the control 2 times less − only 72 days. The average life span of mice increased by 8.6%, and the maximum life span increased by 18.5%. The average upcoming life span of mice under irradiation increased by 66 days or by 93% compared to the control. If we draw an analogy with a person and take into account the correspondence of 1 month the life of a mouse is equal to 3.12 years in humans, then this would be an increase in the average upcoming life span by 7 years (!), while irradiation seemed to begin at a very old age at 75 years, and it was possible to increase the life span of a person to an average of 89 years, compared to 82 years in the control.

In one of the experiments on nematodes, it was shown that irradiation of young mice can also significantly increase the life span of Caenorhabditis elegans nematodes. The average life span was 51.3% higher than in the control at 60 minutes of exposure and 29.5% higher at 180 minutes of exposure, and the maximum life span was 16 and 12% higher, respectively. In other experiment average life span of nematodes was increased by 11.8%, and the maximum life span − by 7.1%.

EXPERIMENTS ON CELL CULTURES

Cultures of transformed Chinese hamster cells under the influence of irradiation of barley seedlings for 10, 30 and 60 minutes reach a higher maximum density compared to the control culture.

The number of divisions and the average rate of cell division during the time from cell seeding to achieving saturation density at all irradiation times are also increased compared to the control.

At 10 and 30 minutes there is a maximum positive effect, and at 60 minutes there is a positive effect at first, but later the cells begin to die faster than in the control. At the same time, the total life span of the culture at 60 minutes of irradiation was 26 days lower than in the control, and the stationary life span was 27 days less.

At irradiation times of 10 and 30 minutes, the "total" and "stationary" life span of cultures was increased by 13 and 11 days, or by 23 and 22%, respectively.

EXPERIMENTS TO EVALUATE THE EFFECT OF A COMPACT BIOTRON ON SEED GERMINATION

The calculation of the germination energy showed that the wheat seeds of the experimental group after treatment in a Compact Biotron with the radiation of wheat seedlings during the day have increased values of the germination energy (90.75%), compared with the control seeds (83.25%). This indicates that irradiation with plant seedlings in a Compact Biotron can accelerate the development of plant tissues.

PRELIMINARY ASSESSMENT OF THE IMPACT OF BIOTRONS ON HUMAN HEALTH

Biotron has an exceptionally positive effect on people who have completed health improvement courses. No negative effects of Biotron devices on human health were detected. Contraindications are only pregnancy at any time and oncology.

7. FUTURE PROSPECTS

The experiments described above show in which direction it is necessary to look for the vector of influence of young organisms on old ones. Over the past decades, scientists have conducted thousands of experiments in which they tried to find ways to influence young organisms on old ones. Blood was transfused, organs and cells were transplanted, old and young mice were sewn together, organizing general blood circulation (parabiosis), etc. All these experiments were unsuccessful and did not give any reliable results. In our opinion, a very promising way to increase the active life span of older people and improve their health is the way of using the effective concentration of biological electromagnetic radiation of young organisms on old ones, using patented Biotrons devices.

Considering that in a Compact (Recumbent) Biotron has 2 focal zones – at a distance of 24 and 31 cm from the bottom of the Biotron, then the experiments were carried out using both the lower zone and the upper one. The lower zone does not work well with sprouts, since the lower reflector is used for its formation and the radiation from the seedlings should be directed down through the ground or mats, which reduces the effect of radiation. The results of experiments using the lower zone with sprouts are significantly worse than the upper one.

Another consideration is that if a person is located in the Biotron, then he partially shields the radiation coming from the plants from below with his body, and it does not fall on the upper mirror and does not irradiate the person from above.

In this regard, instead of a Compact Recumbent Biotron, another Biotron was developed, which was called a Compact Sitting Biotron (Fig. 53, picture on the left). In it, a person is sitting on a chair, and on all sides there are mirrors and trays with plants. Such a Biotron is more efficient, since all 4 reflectors are actively working, besides, it is cheaper and more convenient to operate.

The other Biotron is made entirely of aluminum sheets with a thickness of 2 mm. 40 large plant trays are used. The area of the reflectors on both sides has been increased. A couch and racks for plants on wheels. The Biotron is covered from above with a metal shielding fabric (Fig. 55, photo on the right, the metal shielding fabric is not shown).

Several other types of biotrons have also been developed, for example, "Personal Biotron" and “Office Biotron” (Fig. 56).

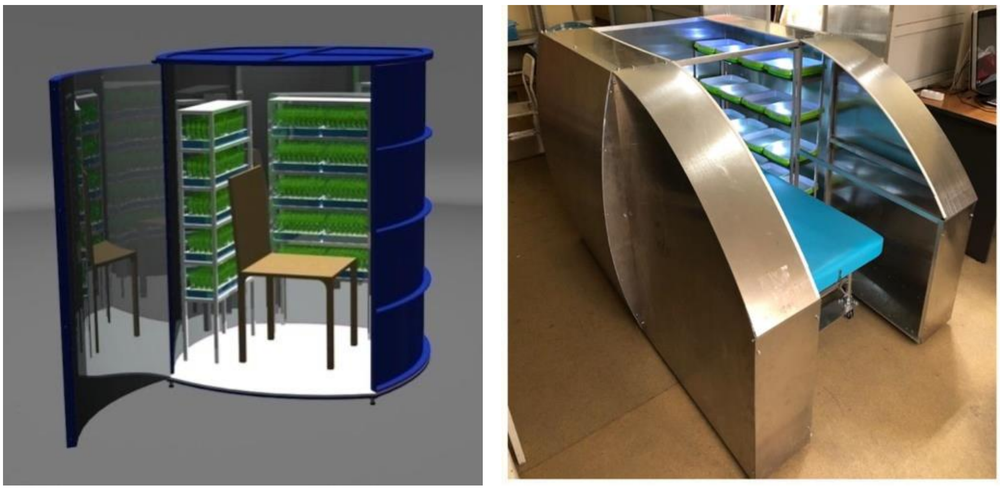

Fig. 55. Photo of a Sitting Biotron (Picture on the left; photo montage of the inventor of the EKOM Biotron − E. V. Komrakov) and a view of a Biotron made entirely of aluminum sheets (Photo on the right provided by E. V. Komrakov).

Fig. 56. Photos of the "Personal Biotron” (photo on the left) and the "Office Biotron” (photo on the right) (Photos provided by E. V. Komrakov).

ACKNOWLEDGEMENTS

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NOTE

Table 4. of approximate correspondence of the age of mice irradiated in a Large Biotron in exp. 11.2016 to the age of a person.

Date	Age of mice, months	The age of mice by human standards (Conversion coefficient 3.8), years
1.11.2016	17	65
23.02.2017	20.8	79
29.02.2017	21	80
29.03.2017	22	84
28.04.2017	23	87
20.05.2017	23.7	90
29.05.2017	24	91
10.06.2017	24.3	92
27.06.2017	24.9	95
1.07.2017	25	95
16.07.2017	25.4	97
24.07.2017	25.8	98
28.08.2017	27	103
18.09.2017	27.6	105
23.09.2017	27.8	106
28.09.2017	28	106
7.11.2017	29.4 (2 years 5 months и 7 days)	111

Table 5. of approximate correspondence of the age of mice irradiated in a Compact Biotron in exp. 04.2019 to the age of a person.

Date	Age of mice, months	The age of mice by human standards (Conversion coefficient 3.12), years
1.4.2019	24	75
20.07.2019	27.7	86
27.10.2019	30.1	94
20.12.2019	32.7	102