ADVANTAGES AND DISADVANTAGES OF ENERGY PLENTIFUL SUPPLY IN ANIMALS' ORGANISM

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In cells of an animal's organism the process of metabolic glucose oxidation is constantly going on and ATF molecules, which provide all biochemical reactions in the cell with energy, are being synthesized. The process providing the most effective energy generation is respiration. The respiration intensity is determined by the amount of oxygen and glucose which are delivered to cells by blood. At intensive loadings on the body animals intensify their breathing, but within relatively little limits. There is an opportunity to increase energy production by the cell on account of glycolysis (anaerobic lysis of glucose) intensification, which is carried out in cytoplasm of the cell and depends only on glucose availability. At large energy consumptions the body uses this method for the process of energy intensification, but it is of very little effect. At glycolysis a considerably less amount of ATF molecules appear. The energy intensification on account of glycolysis leads to sharp fall of glucose supply and biological accumulation of lactic acid.

Meanwhile, the success of the struggle for existence among dapper animals is governed in many ways by their speed. As distinct from plants, which are firmly pegged to one and the same place, animals use shelters, which often are located far from the source of food, for their being safe. Besides, individual selection, when the struggle for a sparring partner takes place, is very popular among animals. And intraspecific and interspecific competition for the niche of habitation demands from animals a great deal of energy expense in the short run. That is why an energy storage formation method appeared in higher animals. The accumulated energy fund allows for a comparatively short period of time consuming the energy, which manifold excels the energy created during the same period in the animal. For quick consuming the energy fund it should be stored in the form of made-up ATF molecules. Understanding this problem, scientists had been trying for long to find in the body a depot of ATF molecules, from where these molecules could be delivered to working cells by the blood flow. However, no ATF molecules were detected in the blood.

We paid attention to gap junctions between cells which were demonstrated in 1958. The gap junctions represent an interspace between cells about 3mcm wide, which take part in intercellular communication. The research showed that through the interspace made inorganic ions and other small molecules can pass from one cell into the cytoplasm of another one, promoting electric and metabolic coupling. The passage occurs by means of membrane connexons of neighbor cells, which form a continuous water canal of a comparatively small diameter at closed butt joint. For long the necessity of such junctions for germinal cells remained unclear, though the junctions were observed in early stages of embryogenesis already. The destination of gap junctions can be explained if taking into account that through the connexons cells can exchange ATF molecules which have a small enough size. At shortage of self-energy the crying out for energy cells can get the ATF molecules from other cells which are performing energy transporting functions. The cells providing the energy transportation must be multiple, have a small diameter and possess the chondriosome system which is able to synthesize ATF. To perform such a mission small lymphocytes are the most appropriate as they are able to penetrate practically into all points of the multicellular organism. A small lymphocyte is a round cell with the diameter of 5-8 mcm and high nuclear cytoplasmic ratio. There is a very little amount of chondriosomes and ribosomes in the cytoplasm. The sizes of a small lymphocyte provide a great penetrative capacity. It allows the lymphocyte to penetrate into all systems of the body promoting energy demands of actively self-duplicating cells.

So, we think that energy storage is formed as accumulation of lymphocytes which, as required, get to the most desperately crying out for complementary energy cells and give them the made-up ATF molecules through the gap junctions. The complementary energy gets to the cells through the lymphatic system. For the storage formation a recurrent increase of the number of lymphocytes able to produce ATF molecules is necessary.

Such an increase seems to occur during the rest time (sleep) which any animal needs so much. For long we considered that sleep is needed by a human to let brain cells have a rest.

However, the need of sleep can be explained also by energy recharge of the body. In the night's repose period the body decreases muscles and brain blood supply and intensifies blood flow through the lymphatic system promoting the lymphocytes duplication process intensification. Preferentially it occurs during the night's repose. But often the human falls asleep in the day time also, especially after heavy physical activity and rich meal. It is connected with energy redistribution in the body. Thus, the body controls energy flows providing the most needy organs and tissues in the specified period of time. The night's repose is the most appropriate period for the promotion of total energy reserve used during the oncoming working day. The more lasting sleep is common for children and young people who possess a great energy reserve. It is not occasionally that getting old the human starts lying wakeful at night that testifies to a little energy reserve and the body's ruin risk increase.

A great energy reserve is the cause of high radiation sensitivity.

It is known that mammals and birds are the most sensible to ionizing radiation. All poikilothermic animals are more radiation-proof several times as much. It is connected with a large reserve of energy in homoeothermic animals which provides them a year-round activity under any conditions. The calculations suggest that when exposed to the lethal dose of irradiation, mammals die from the energy which promotes heating up of the body by 0,002 ^{O}C as a whole. At the same time, when exposed to radiation, the body's temperature increase of all mammals by 1-5^{o}C is registered. Such heat production increase can be provided only on account of energy reserve of the body itself. Death of animals happens for the reason that the energy reserve, which the body must consume for the day-time, turns into heat proportionally to the irradiation dose when exposed to irradiation. At small radiation doses a little temperature increase occurs that is not dangerous and even useful sometimes. At large radiation doses the temperature rise leads to heat shock and necrocytosis. For this reason hyperthermia of the body during the radiation leads to radiation damage intensification, and hypothermia at the time of radiation creates the protective effect. High sensitivity of self-duplicating cells is conditioned by the fact that all dividing cells possess high energy. The hydrolysis of a multitude of ATF molecules leads to a considerable temperature rise that causes necrocytosis. And a delay of the dividing after radiation can be explained by inactivation of the chondriosome multitude and deficiency of ATF molecules which are necessary for mitosis.

Energy reserve in vivo is the cause of frequent virus infections.

The inflow of microbes into the animal body usually is considered as an aggression. And though the body tries hard to get rid of the "unwelcome visitor", the microbes have adapted for the introduction and propagation in the cells of higher organisms. What attracts a virus to the introduction into the cells of a higher organism? The variant of using the higher organism genome replication for the virus genome replication seems to be probable. The matter is that to double the genetic information before its self-duplication the cell has to synthesize an enormous amount of complex organic compounds. It needs a lot of metabolic costs. The genetic material replication occurs only at mitosis. It is determined by the higher organism demands, and the organism regulates the dividing process in accordance with the development program. The most intensive mitosis occurs in the young organism (children). When introduced into a child's organism there are more chances for viruses to get into a self-duplicating cell, i.e. there are more chances for them to multiply successfully. That is why children may be more susceptible to diseases compared to an adult organism.

When the dividing process happens in most cells of an organ, active blood supply of this organ occurs, which is attended with an increased heat production and temperature rise. However, with no active cells' dividing its blood supply is essentially lower. When getting into an adult organism, very often it appears to get into a cell which isn't dividing. Then the virus replication success will be determined by its ability to make the cell duplicate. To do it it is necessary to initiate the genome replication process and get complementary energy resources. To get the complementary energy on account of the cell's metabolism intensification isn't possible as it is not possible to intensify the blood flow in a separate cell. And to intensify the blood flow in the whole body is not possible for the virus. However, there is a real opportunity to obtain the complementary energy from lymphocyte reserve on account of the gap effect. To obtain the

complementary energy by means of the gap junction the cell must give a certain signal to the lymphocytes located in the nearest lymph gland. After receiving the signal lymphocytes, which must provide with their ATF molecules the oncoming dividing process of the infected cell, will make way to the infected cell. Nowadays no mode of signal transmission to lymphocytes is known. We suppose that these signals appear as the result of electronic reorganizations of excited atoms. The signals can appear at imbedding of a virus into the genome of a dormant cell. Electronic reorganizations are attended by bioluminescence which usually attends mitosis. Since the infected cell needs energy sources unconnected with metabolism intensification, the energy reserve created by the body in the form of a great amount of migrating lymphocytes is a "cutie pie" for the infection. Using ready for the replication structure of the infected cell and the energy of lymphocytes delivering ATF molecules through the gap junction viruses can easily and quickly boost their population very much.

The most radical method of the body defence is, in this case, decreasing energy reserve that will make difficult for the viruses to get energy for propagation. Our research showed that when exposed to ionizing radiation a considerable part of the body's energy reserve converts into heat. Thus, the ionizing radiation ray treatment can be used for the therapy of the organism having fallen ill with virus infection.

Ray treatment of laboratory mice with malignant tumors.

For checking purposes of energy reserve decrease influence on virus infection we selected laboratory mice females with spontaneous tumors of milk glands. The tumors in the animals were in different development stages. The earlier carried out observations had testified that such animals, as a rule, die. We decided to see how a single total radiation of an animal influences the tumor epigenetics. There were formed two animal groups, one of which was used as the control one, and the other one got a single total radiation in the dosage of 3Gy. The ray treatment of the mice was carried out using the source ^{137}Cs.

To study the tumor epigenetics sensory observation, length and radius measuring of the oncoma were carried out. The sensory observations testified that after the irradiation a clearer tumor boundaries determination takes place. After the exposure usually loosing weight by the animal and tumor recession were observed. At small-size tumor it stabilized and acquired cyanotic color but didn't resolve. If the tumor had sufficiently large sizes and evidently disturbed the animal, its being scratched and gnawed out were observed, that sometimes finished with the animal's death. The results of the tumor epigenesis in the radiation-exposed control mice testified that the tumor grows with different rate. In the control animals the tumor grew much faster (from 4 up to 10% a day). The average tumor increment in the radiation-exposed animals was within limits of 1-2%. The lifetime increase of the radiation-exposed animals was also marked. In the control animals metastases occurred; their being no in the irradiated mice. The data got testify that comparatively small dosages of total radiation essentially reduce the rate of spontaneous tumors' development in mice.

The results of laboratory mice ray treatment after introduction of staphylococcus infection.

It is known that bacteria have their own mitochondrial apparatus providing energy demands of a developing cell. However, when getting into an organism they can use the energy reserve of the animal, that will lead to their more successful propagation in the organism. To verify out supposition we carried out an experiment with radiation exposure of mice infected with Staphylococcus aureus.

To carry out the experiment there were formed 3 experimental and control groups of mice who one-day cultivation of aurococcus was introduced in different ways. The experimental groups were exposed to total radiation in the dosage of 3Gy from the source ^{137}Cs. The introduction of the staphylococcus was carried out in three ways:

1. introduction of a drop with the cell culture into a section the back;
2. introduction of a lawny strip with deposited cells of the staphylococcus into a section on the back;
3. subcutaneous introduction of 0, 05 ml of staphylococcus culture using a syringe.

The quantity of the introduced cells in all the cases differed insignificantly. Using three modes of administration was aimed at the detection of the most effective reaction registration of an organism on the introduction of staphylococcus culture.

Watching the animals' state according the wound repair rate on the place of the section didn't detect a significant difference between the animals. More authentic differences the registration of the radiation exposed and control animals showed. After the exposure which was carried out in 1-2 days after the infection introduction we observed a greater loosing weight of the radiation-exposed animals compared to the control ones. But on the 8th day already the weight gain of the radiation-exposed animals exceeded the weight gain of the control animals. On the 12th day the difference between the weight gain became authentic. Thus, we have made sure that the radiation-exposed animals recover from infectious diseases much quicker.

Conclusion

The carried out research testified that a single total irradiation can condition sick animals' state. The irradiation for oncology disease treatment is very often applied. Traditional methods of oncology disease treatment with the help of radiation therapy are focused on tumor cells inactivation (damage). The radiation is performed with a strictly directed narrow-beam-radiation which must affect only the radiation-exposed cells. At that a great radiation dose, which is able to kill cancer cells, is used. We offer applying total (wide-field) radiation, which covers not only cancer but also stromal cells. The doses used at that can not kill or somehow essentially damage most of the cells. The amount of the applied dose must reduce the energy economy of the cell. When goal making it is our understanding that usually observed the irradiated in front of stromal cells tumor size reduction is explained not only by some tumor cells death but also by dividing intensity decrease. The tumor cells dividing intensity in many ways is conditioned by the energy which the body additionally deliver to both self-duplicating germinal and tumor cells. After the total radiation all the cells of the body incur an energy deficit, that is why the dividing cells suffer particularly. Thus, real opportunities are created for using small dose of irradiation to decrease the intensity of malignant tumor development. At that there is no need to expose to radiation the tumor place locally. It is important to irradiate the whole body or its significant part to escalate the rivalry of the cells for the stored energy reserved in the body. Under the circumstances the tumor cells will get considerably less energy that will essentially slow the tumor growth. This method of preventive radiation of the body must be especially effective for virus infection.

At passed into the body bacterial cells self-duplicating the energy dependence is not so evident. That is why when introduced into the body the staphylococcus bacteria can multiply without using the body's energy. However, the carried out experiment testified that the body energy reduction at radiation takes toll on the bacterial cells (staphylococcus infection). Therefore, total radiation in small doses can be applied for therapy of infection processes which are caused both by viruses and bacteria.

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MODERN METHODS OF PSYCHOPHYSIOLOGICAL CORRECTION

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There is a range of methodical approaches of human functional state diagnostics, according to which one can firmly and objectively judge on the body's state and its changes [1, 2]. The research of Frolov M.V. [7] testifies that the emergency of emotional tension in a stress situation is attended by negative dynamics of spatial-temporal parameters of an electroencephalogram, and at the anxiety decrease the synchrony of alpha activity in anterior-posterior departments of the right hemisphere increases.

It was proved [6] that unlike symmetrical picture of intracortical connections normally, at the decrease of ergetics and human frame of mind the agitation of the right frontal region of the cortex and relative decrease of functioning of the left one are registered. At depressive positions the spectral capacity of practically all rhythms authentically decreases, excluding theta-