Natality and Mortality with Reduced RED-OX Potential Drinking Water

Pavel D. Kolesnichenko[1*], Konstantin M. Reznikov[2], Olga A. Efremova[3], Nina I. Zhernakova[4], Alexander A. Stepchenko[5], Vladimir V. Gureev[6], Andrew Y. Aleynikov[7], Irina A. Popova[8], Alhamzah Muhi Aldeen Azeez[9]

[1] Assistant professor, Research Institute of Pharmacology of Living Systems, Belgorod State University, 85, Pobedy St., Belgorod, 308015, Russia; E-mail: farpavel@narod.ru
[2] Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[3] Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[4] Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[5]Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[6]Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[7]Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[8]Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia
[9]Research Institute of Pharmacology of Living Systems, Belgorod State National Research University, 85, Pobedy St., Belgorod, 308015, Russia

Abstract

The article draws attention to the discovery of new physicochemical properties of water. It emphasizes the imperfection of the existing requirements for the quality of drinking water. In open publications, there are no experimentally valid recommendations for drinking-water Red-Ox potential. In the experiment, the rats took water that meets all existing standards. However, the standards do not take into account the Red-Ox potential that has been changed. The effect on longevity was investigated according to the abbreviated population method of preclinical study of medicinal substances. The effect on fertility was investigated according to the principles of GLP and instructions for preclinical testing of the embryotoxic action of medicinal substances. Mortality data were obtained when water was taken for two years with different Red-Ox potential. The results show that intake of water with a negative Red-Ox potential of minus 700 millivolts improves the end-point mortality rate by 40%. Water with a red-Ox potential of +700 mV and -700 mV does not affect fertility and fertility rates, does not have generative and embryotoxicity. Water with negative Red-Ox potential slightly modifies the development of rats. The boundaries of the therapeutic corridor for the Red-Ox potential of water are in the range of +700 to -800 mV. However, given the literature data, the most favourable for the body indicator of the Red-Ox potential is in the range from -50 mV to -500 mV.

Introduction

Some of the important characteristics of a nation's health are indicators of fertility and mortality, and in our study we tried to study them when drinking water with altered Red-Ox potential [1,2].

Currently, water with reduced Red-Ox potential through electrochemical activation (anolyte and catholyte) is becoming more and more used in various industries, agriculture and medicine. Water with a high Red-Ox potential at the conclusion of Rospotrebnadzor corresponds to GOST "drinking water" in all respects. In this case, GOST does not take into account the most important parameter - Red-Ox potential, which indirectly reflects the activity of electrons and the reactivity of the medium. Currently, water with altered Red-Ox potential is effectively used to treat many diseases [3]. However, their biological effects are not yet fully understood. At the same time, not all the results of biological and therapeutic action are confirmed by comparative methods and control studies, which dictates the need for a more complete study of the use of water with a modified Red-Ox potential[4,5].

Materials and Methods

This study was conducted on 90 white Wistar rats of both sexes, weighing 210-250g. The age of the rats at the beginning of the experiment was 2-3 months. All experiments were approved by the Ethical Committee FSAEI of the Belgorod State National Research University. Vivisection and all animal manipulations

were carried out in accordance with the ethical principles of the treatment of laboratory animals. CETS No. 123 ".

Previous studies showed that water intake with a 200% deviation from the parameters of the body is not toxic[6,7]. Therefore, to find out the upper limit of toxicity, we used water that differs by 700% and 900% of the parameters of body fluids. Water with a negative Red-Ox potential had a Red-Ox parameter minus 700 millivolts, and water with a positive Red-Ox potential had a Red-Ox parameter plus 700 millivolts. This was the only parameter that distinguishes experimental water from drinking water. All other parameters according to the results of the inspection of Rospotrebnadzor met the standards for drinking water[8,9]. The animals were divided into 3 groups of 30 rats: 1st control group (tap water), 2nd - experimental (water with negative Red-Ox potential), 3rd experimental (water with positive Red-Ox potential). The solutions were prepared daily and after checking the pH and Red-Ox potential using an ion meter, they were presented for drinking to rats in free access for 24 months. Every animal was weighed monthly. The condition and death of animals was recorded. It is believed that in order to calculate the mortality rate of a population, mortality statistics are needed, which are usually presented as a survival curve, that is, depending on the proportion of individuals that have survived to a given point in time[10]. Therefore, the only parameter directly measured in this case was the lifetime of an individual in a particular group (Fig. 1)

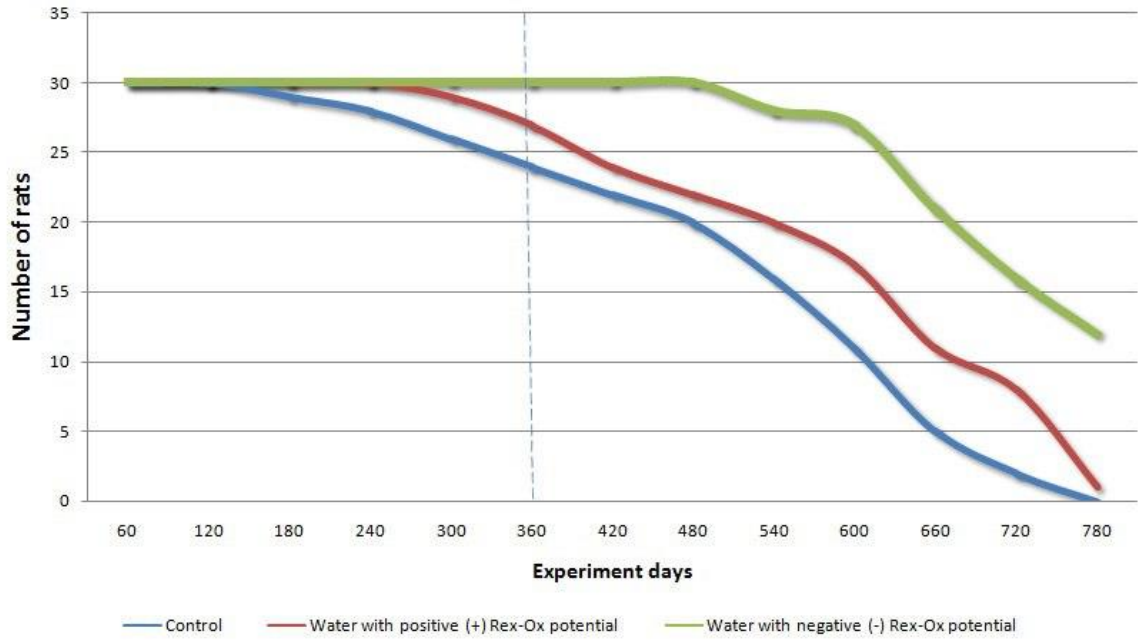

Fig.1. Comparative dynamics of life expectancy of white rats with long-term ingestion of liquids with different RedOx - Reduction/Oxidation values (I still can't change the data on the months in any version sent, it gives me the option "Change of connections", I don't have one. I suggest: I'll make a table matches, and you fix your chart in accordance with it)

Analysis of the data obtained showed that the mortality of rats from various natural causes in the group that received drinking tap water was 26%, by the 12th month it reached 100% by the 24th month. In the group that received water with a positive Red-Ox potential, the death rate was 20% by the 12th month and reached 95% by the 24th month of observation. In the group that received water with a negative Red-Ox potential, there was not a single case of death of the animal by the 12th month of observation and the death reached 40% by the 24th month. The average life expectancy was 14 months in the control group and 19.5 months in the group that received water with a positive Red-Ox potential. Since most of the animals remained alive, it was not possible to accurately calculate the average life expectancy of rats taking water with a negative Red-Ox potential. Roughly, the average lifespan of such rats exceeded that of the control group and the group that received water with a positive Red-Ox potential and was more than 24 months. There were no gender differences in mortality in the groups, except for rats that took water with a negative Red-Ox potential. At their end of 2 years of observation (starting from 21 months), pustular skin lesions were observed, turning into subcutaneous "abscesses" up to 2-3 cm in size. According to literature data (references), this phenomenon is possible due to the stimulating effect of the test fluid on some microorganisms[11]. With the exception of pustular lesions, there were also no noticeable differences in the appearance of the rats.

A study of generative toxicity was carried out according to the preclinical standard GLP test for water with altered Red-Ox potential. Data were obtained on the absence of death of rats at the beginning of the postnatal period of life against the background of water with an altered Red-Ox potential. It was established that the survival of rats in all the studied groups on the

7th day when receiving water with a modified Red-Ox potential by parents during 3 sexual cycles before fertilization, and by females also during pregnancy and breastfeeding is 100%. This fact indicates the absence of generative toxicity.

A study of embryotoxicity standard preclinical trials of GLP in the preparation of water with a modified Red-Ox potential. In experiments on males and females, the effect of water intake with altered Red-Ox potential on the rate of physical development of their rats was investigated. Observations were carried out for the pups during the breastfeeding period, the parameters of the development of offspring in the postnatal period of life were evaluated and recorded, such as the detachment of auricles, the appearance of hair coat, the appearance of nipples, the eruption of incisors, the opening of eyes. Rat rats born to parents who took water with a negative Red-Ox potential, as well as in the postnatal period were lagging behind in development in terms of opening eyes for 1-2 days

To obtain information on the effect of water intake with a modified Red-Ox potential on the internal organs of the offspring, we performed an autopsy of 133 rats at 30 days of age, whose parents received water with a modified Red-Ox potential in the period of 3 sexual cycles, and the females also during pregnancy and breastfeeding in order to study the anatomical changes, the topography and the mass of internal organs (the fork, the heart, the kidneys and the testes in male rat pups). On the 30th day of the postnatal period in the pups from all experimental groups, no significant changes in the absolute mass of the thymus gland, heart, kidneys and testicles were observed. At the autopsy, during visual examination in rats, no external anomalies were detected. Not found visible signs of dysfunction of the internal organs.

In addition, longitudinal sections of fetuses were analyzed at the 20th week of pregnancy. There were no morphological malformations in the fetuses when taking water with a modified Red-Ox potential by parents before conception and during pregnancy.

It has been established that there is no distant negative effect of water with a modified Red-Ox potential on the physical development of the offspring. Behind except for rats born from females who received during 3 sexual cycles before pregnancy, during the entire gestation period and during breastfeeding, water with a negative Red-Ox potential with free access. Their indicators, starting from the 3rd week of life, were less than the rest: an average body weight of 36% and a body length of 14% in comparison with cubs born from females from the control group.

Results and Discussion

It is known that water with a Red-Ox potential of + 600–900 mV has a pronounced antimicrobial and antiviral effect and can prevent infectious causes of mortality in animals [11,12]. However, such water did not cause an increase in life expectancy and did not have embryotoxicity and generative toxicity. The antioxidant properties of water by the negative Red-Ox potential, which has the property to stimulate cell growth and reproduction [13], explains the possibility of maintaining physiological regeneration processes at a high level, which can be the basis for increasing life expectancy. Some deceleration of development can be associated with a tenfold excess of the physiological parameter and may indicate the limit of normal, after which the drug becomes dangerous. But on the other hand, there is a direct link between slowing down aging and slowing down aging. If we take into account that WHO recommends Red-Ox potable water potential of no more than + 50, then, obviously, this indicator should be included in the state standard "Drinking water" [14,15]. Attention is drawn to the fact that water with a negative Red-Ox potential has pathogenetic and actual radioprotective effects, which are already used in some countries. Moreover, when studying the primary mechanisms of influence of biologically active substances on biological tissues, it is necessary to take into account the water component of cell function, and Of the characteristics of this component, special attention is paid to the magnitude of the Red-Ox potential [16,17]. Also, when considering the many processes of functioning of tissues, including the occurrence of pathological disorders, it is necessary to take into account the state of water resources of cells and tissues.

Conclusion

The boundaries of the therapeutic corridor for the Red-Ox potential of water are in the range of +700 to -800 mV. However, given the literature data, the most favourable for the body indicator of the Red-Ox potential is in the range from -50 mV to -500 mV. Redox potential is one of the most fundamental parameters of a living cell. The impact on this is one of the promising strategies for improving cellular life support [18].

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