

ANTIRADICAL ACTIVITY OF WATER WITH MODIFIED ISOTOPE COMPOSITION

Stepan Dzhimak

Kuban state university

Standards

1. **SMOW** (Standard Mean Ocean Water)

D /1H=(155,76±0,05) ppm

2. **SLAP** (Standard Light Antarctic Precipitation) **D/1H= 89 ppm**

Содержание тяжелой воды в некоторых бутилированных водах

Water brand	Content of deuterium (HDO), mg/l	Content of $^1\text{H}_2^{18}\text{O}$, g/l
<u>«Evian», France</u>	305	1,98
<u>«S.Pellegrino», Italy</u>	310	1,99
<u>«Vittel», France</u>	312	1,99
<u>«Borjomi», Georgia</u>	297	1,97
<u>«Narzan», Russia</u>	305	-
<u>«Mercuriy», Russia</u>	309	-
<u>«Kubay», Russia</u>	349	-
<u>DDW «Langvey 60», Russia</u>	127	1,77
<u>DDW «40 ppm», laboratory</u>	85	-

Effects

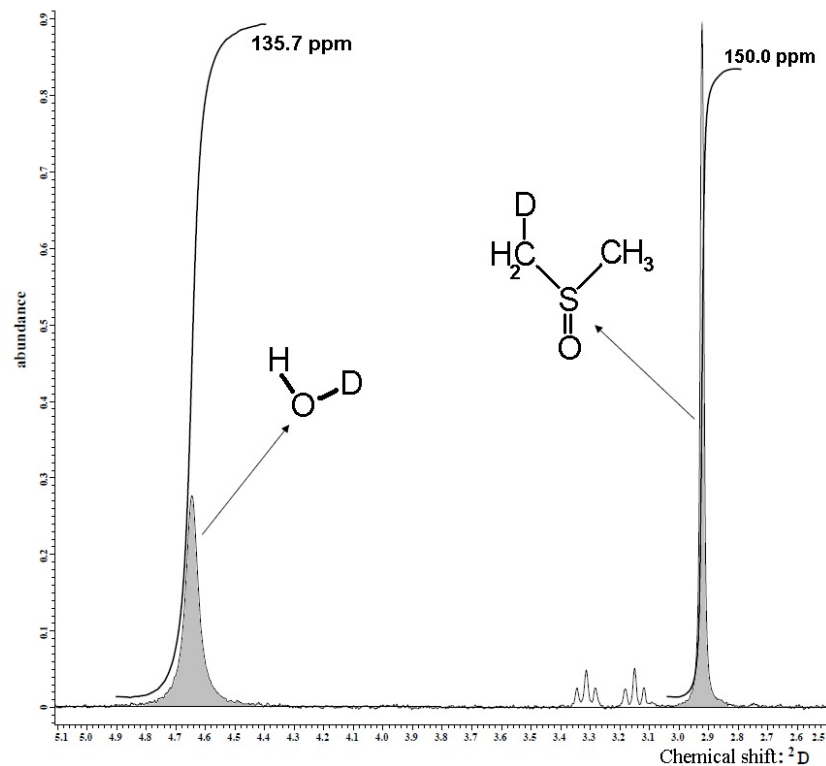
1. Hongqiang Wang Deuterium-depleted water (DDW) inhibits the proliferation and migration of nasopharyngeal carcinoma cells in vitro *Biomedicine & Pharmacotherapy* xxx (2013) xxx–xxx Article in press
2. Feng-song Cong Deuterium-depleted water inhibits human lung carcinoma cell growth by apoptosis experimental and therapeutic medicine 1: 2010. P. 277-283
3. Krisztina Krempels, Ildikó Somlyai and Gábor Somlyai A Retrospective Evaluation of the Effects of Deuterium Depleted Water Consumption on 4 Patients with Brain Metastases from Lung Cancer *Integr Cancer Ther* 2008; V. 7; №3. P. 172-181
4. Somlyai G. Naturally occurring deuterium is essential for the normal growth rate of cells // *FEBS Letters*. 1993. Volume 317, № 1,2. P.1-4.
5. Bild W, Năstasă V, Haulică I. In vivo and in vitro research on the biological effects of deuterium-depleted water: Influence of deuterium-depleted water on cultured cell growth // *Rom J Physiol*. 2004. № 41(1-2). P.53-67.
6. Раков Д.В., Ерофеева Л.М., Григоренко Д.Е. и др. Влияние воды с пониженным содержанием тяжелого стабильного изотопа водорода дейтерия и кислорода ^{18}O на развитие лучевых повреждений при гамма - облучении в низкой дозе // *Радиационная биология. Радиоэкология*. 2006. Т. 46, №4. С.475-479.

Growing of fish in DDW

1. Influence of DDW on weight and survival rate of *A. stellatus* (DDW 100 ppm has better results, than DDW 40 ppm, both better than water 150 ppm)
2. Influence of DDW on weight and survival rate of *A. nigrofasciata* (better grows, high survival rate)

1-5 generation of rats, drank DDW 40 ppm

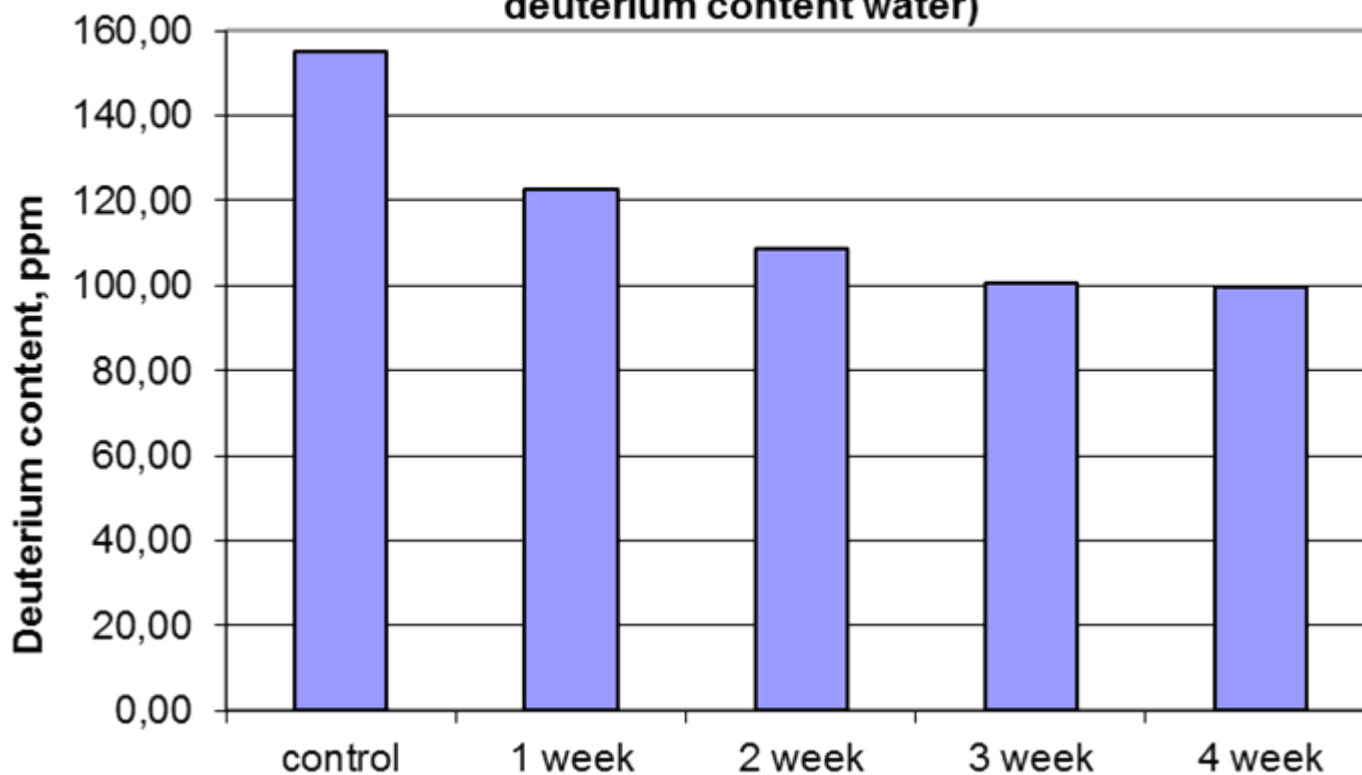
1. The same size
2. They have less number of children
(normal is 8-10, this have 3-4)
3. Early pubescence
4. Better immunity



Ratios of the integral intensities of the ^2D NMR signal of HDO with respect to the ^2D NMR signal of DMSOD1.

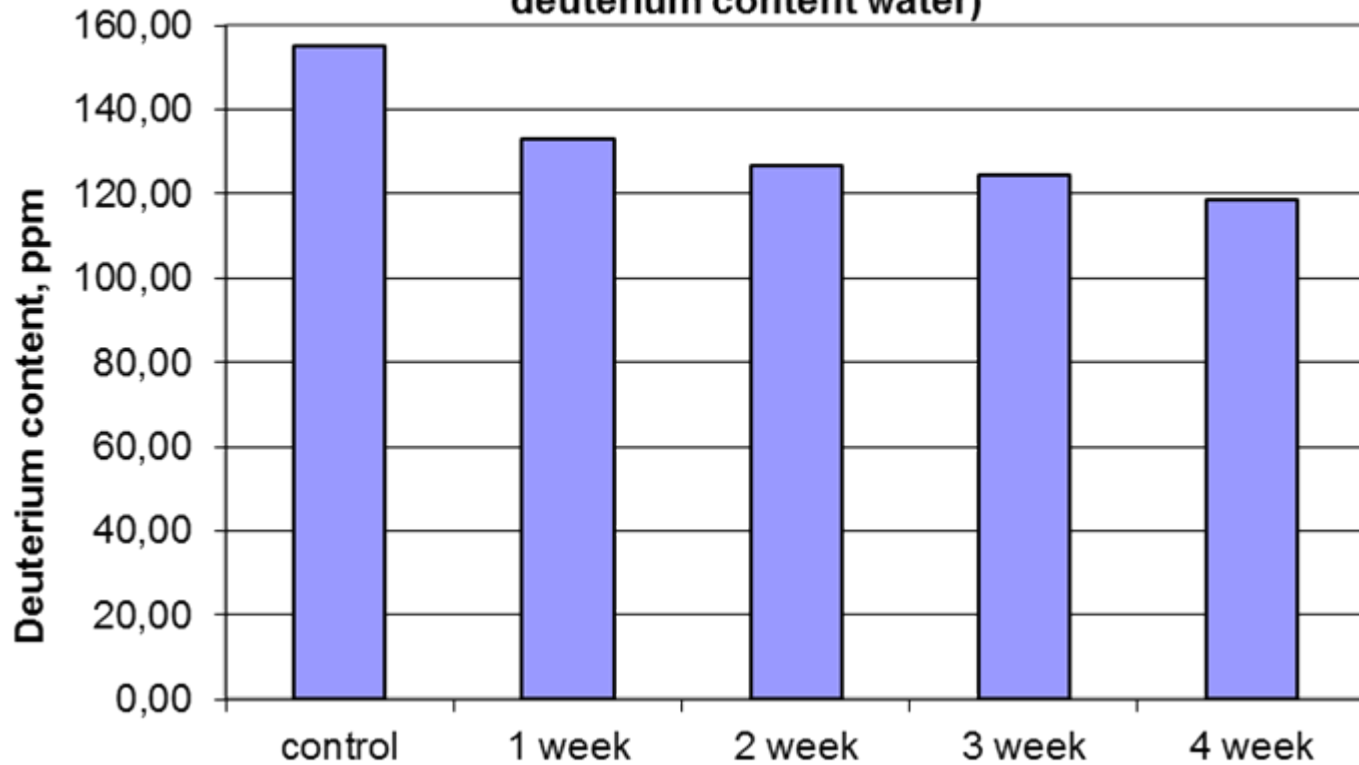
Барышев М.Г., Басов А.А., Болотин С.Н., Джимаков С.С., Кашаев Д.В. ЯМР и ЭПР исследование влияния воды с пониженным содержанием дейтерия на показатели прооксидантно-антиоксидантной системы у лабораторных животных // Экологический Вестник научных центров ЧЭС. Вып. 3. 2011. С. 16-20

Dynamics of the change in deuterium content in the blood plasma of laboratory animals (used 40 ppm deuterium content water)

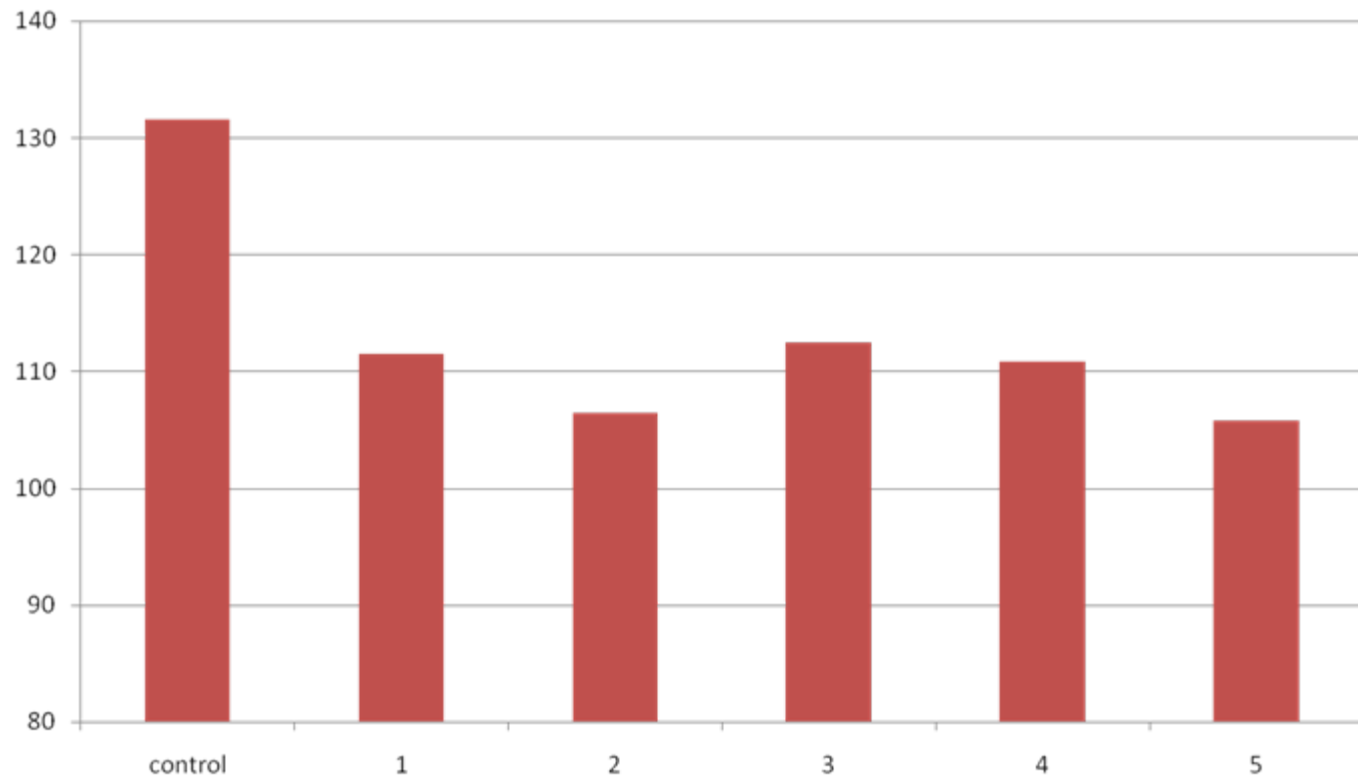


Baryshev M. G., Dzhimak S. S., Basov A. A., Timakov A. A. NMR, EPR, and Mass Spectroscopy Estimates of the Antiradical Activity of Water with Modified Isotope Composition // Bulletin of the Russian Academy of Sciences. Physics, 2012, Vol. 76, No. 12, pp. 1349–1352.

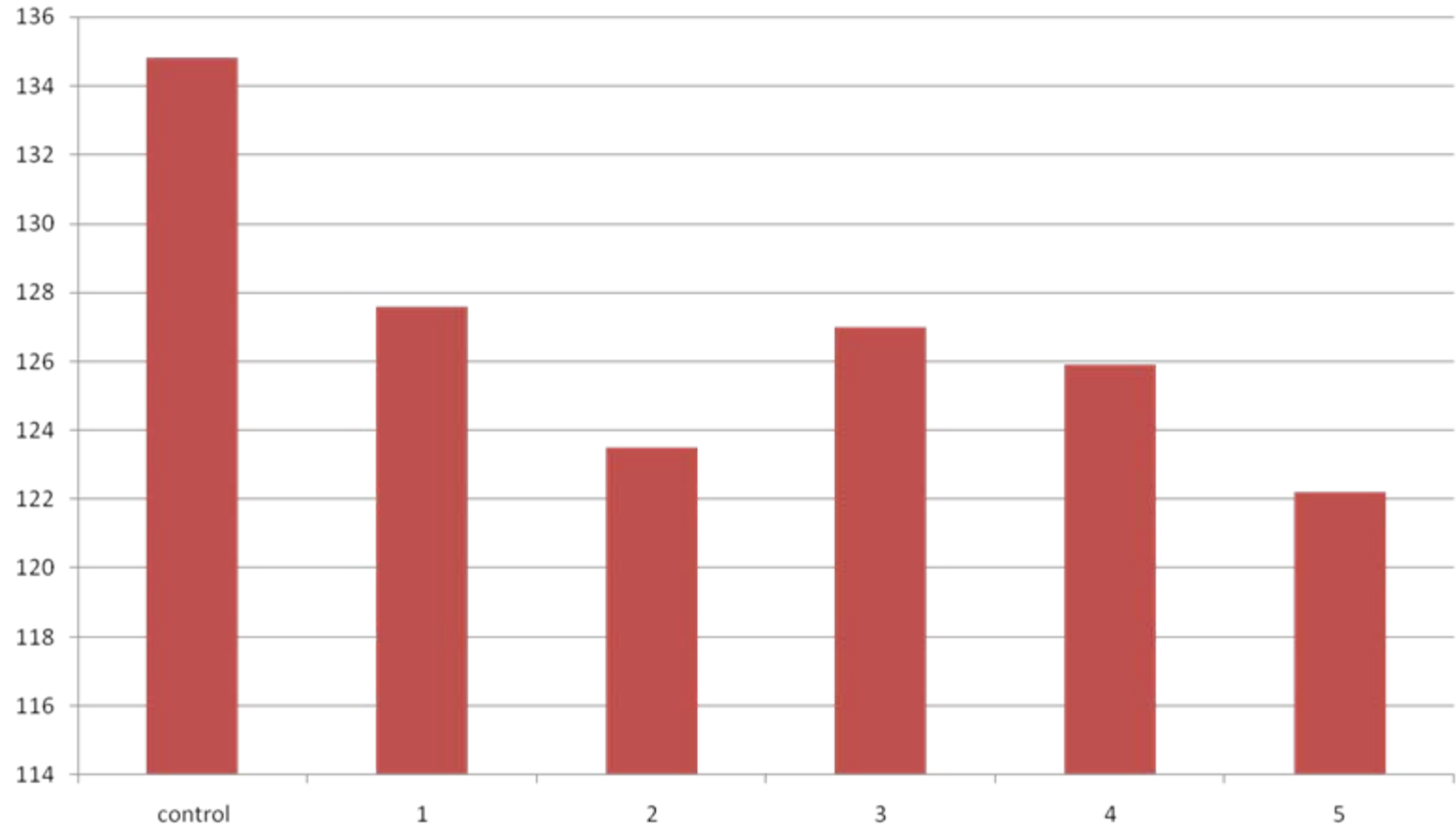
Dynamics of the change in deuterium content in the blood plasma of laboratory animals (used 100 ppm deuterium content water)



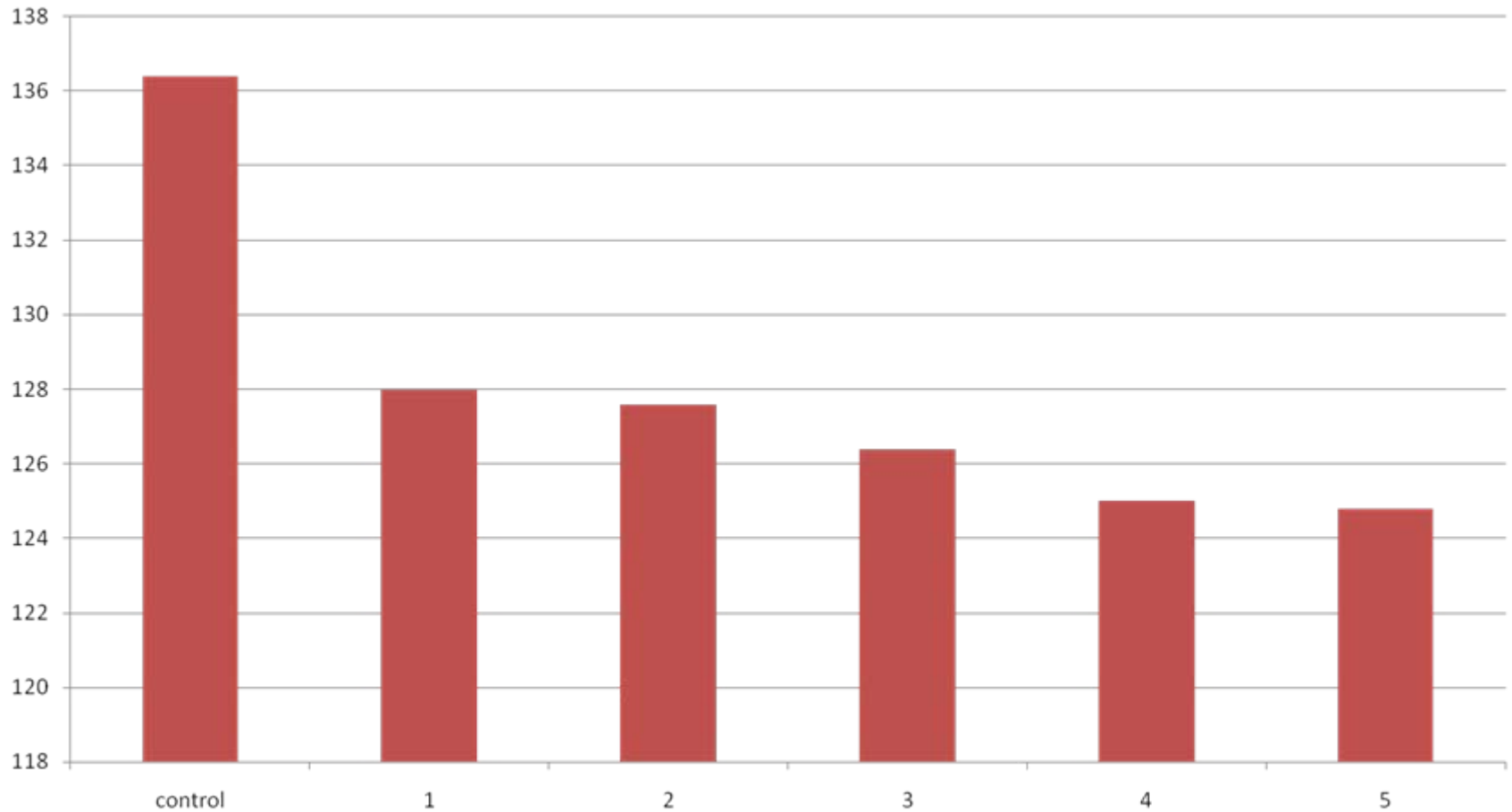
Content of deuterium in kidneys of 1-5 generation of rats, drank DDW 40 ppm



Content of deuterium in liver of 1-5 generation of rats, drank DDW 40 ppm

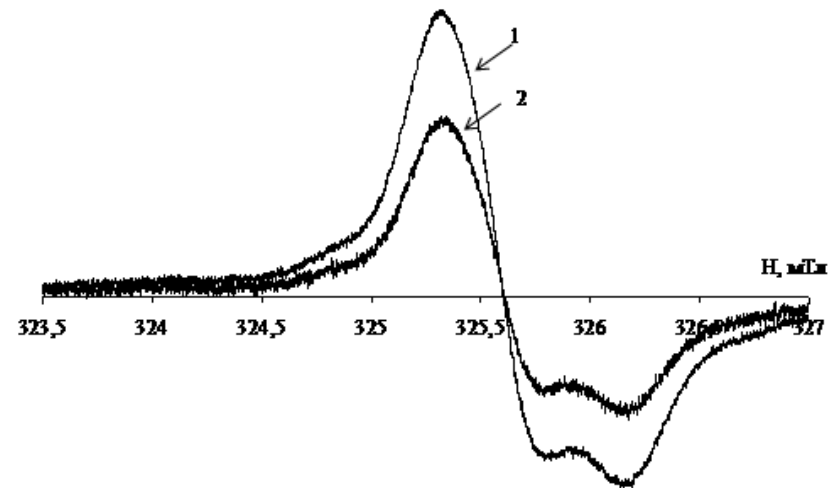


Content of deuterium in heart of 1-5 generation of rats, drank DDW 40 ppm

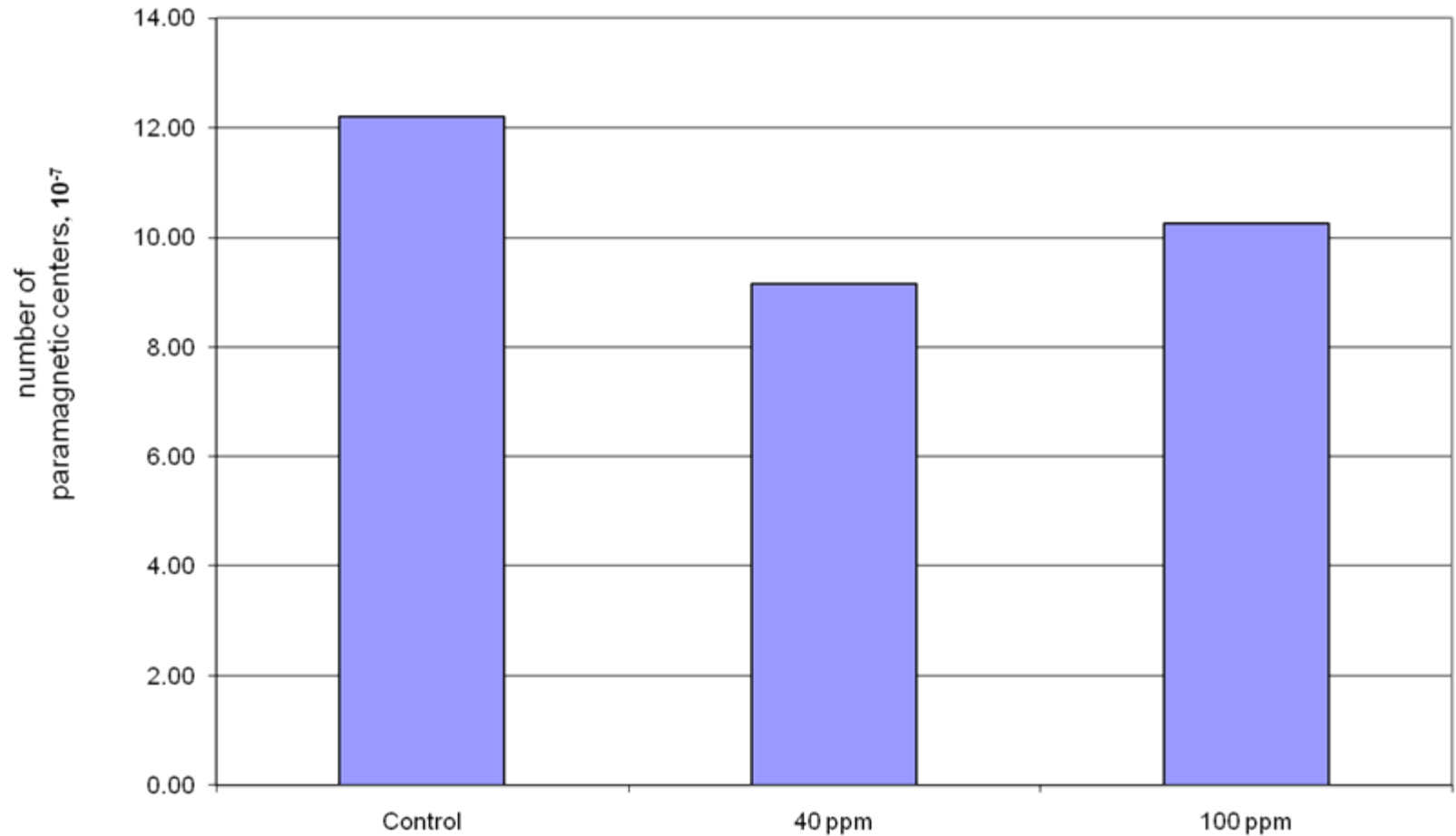


EPR spectra from lyophilized heart samples of laboratory animals are presented in picture. They contain an anisotropic singlet signal, the spin-Hamiltonian parameters of which ($g_{\perp} = 2.0074$, $g_{\parallel} = 2.003$) correspond to stable radicals. The EPR spectra of the liver and kidney samples were of a similar nature.

- A pronounced antioxidative effect in the rats that
- drank water with a residual deuterium content of
- 40 ppm was observed as early as the first week. In lyo-
- philized organs (liver, kidneys, heart), the number of
- paramagnetic centers (according to the EPR data) fell
- by approximately 32–38%, relative to the control
- group. This indicates a slowdown in the reduction of
- the free radical numbers and confirms the favorable
- effect of light water on the organism of animals. At the
- same time, a less pronounced antioxidative effect was
- observed in rats that drank water with a residual deute-
- rium content of 100 ppm: in lyophilized organs (liver,
- kidneys, heart), the number of paramagnetic centers
- (according to the EPR data) fell by approximately 24–
- 27%, relative to the control group.

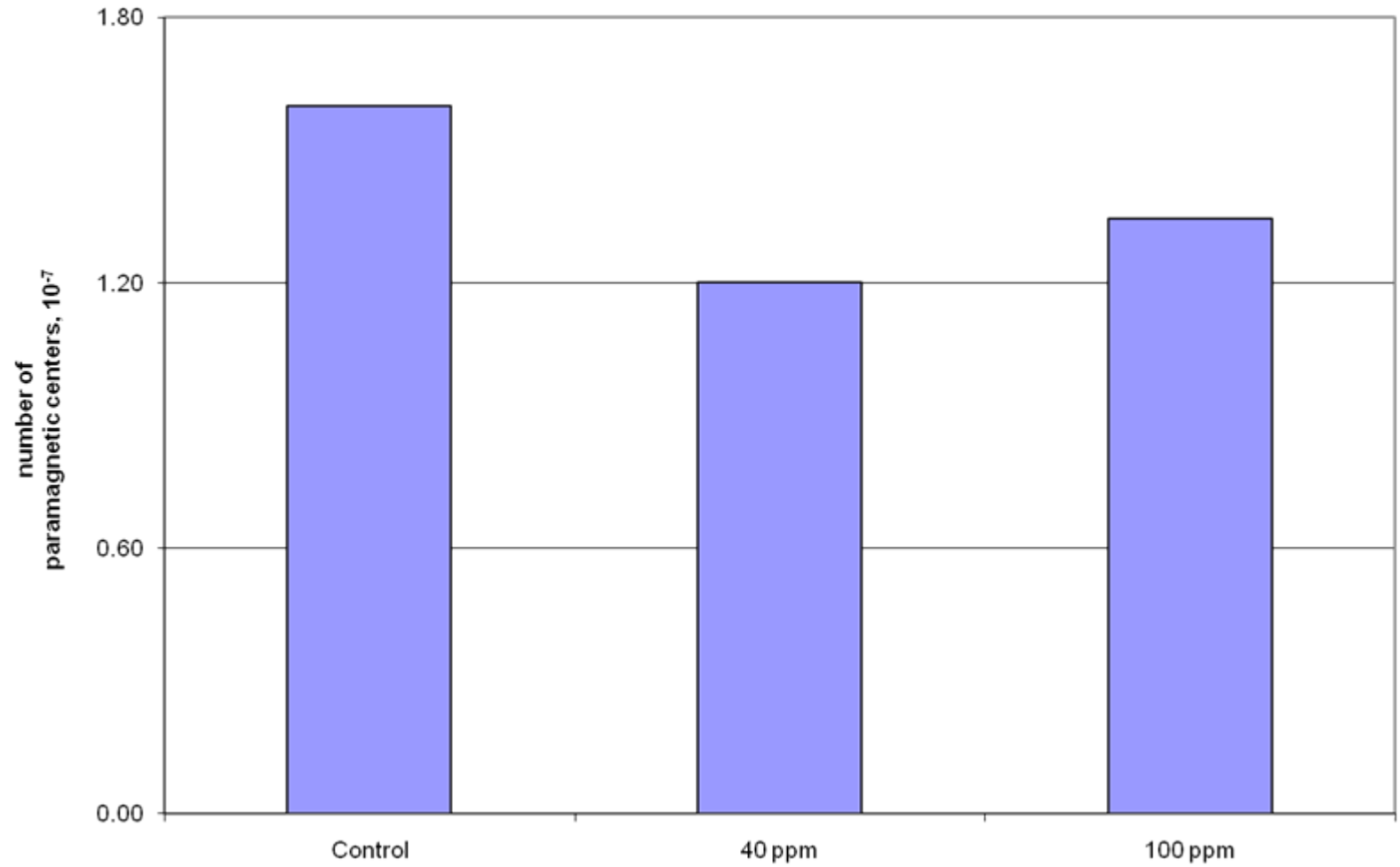


Changing of the number of paramagnetic centers (according to the EPR data) in hearts

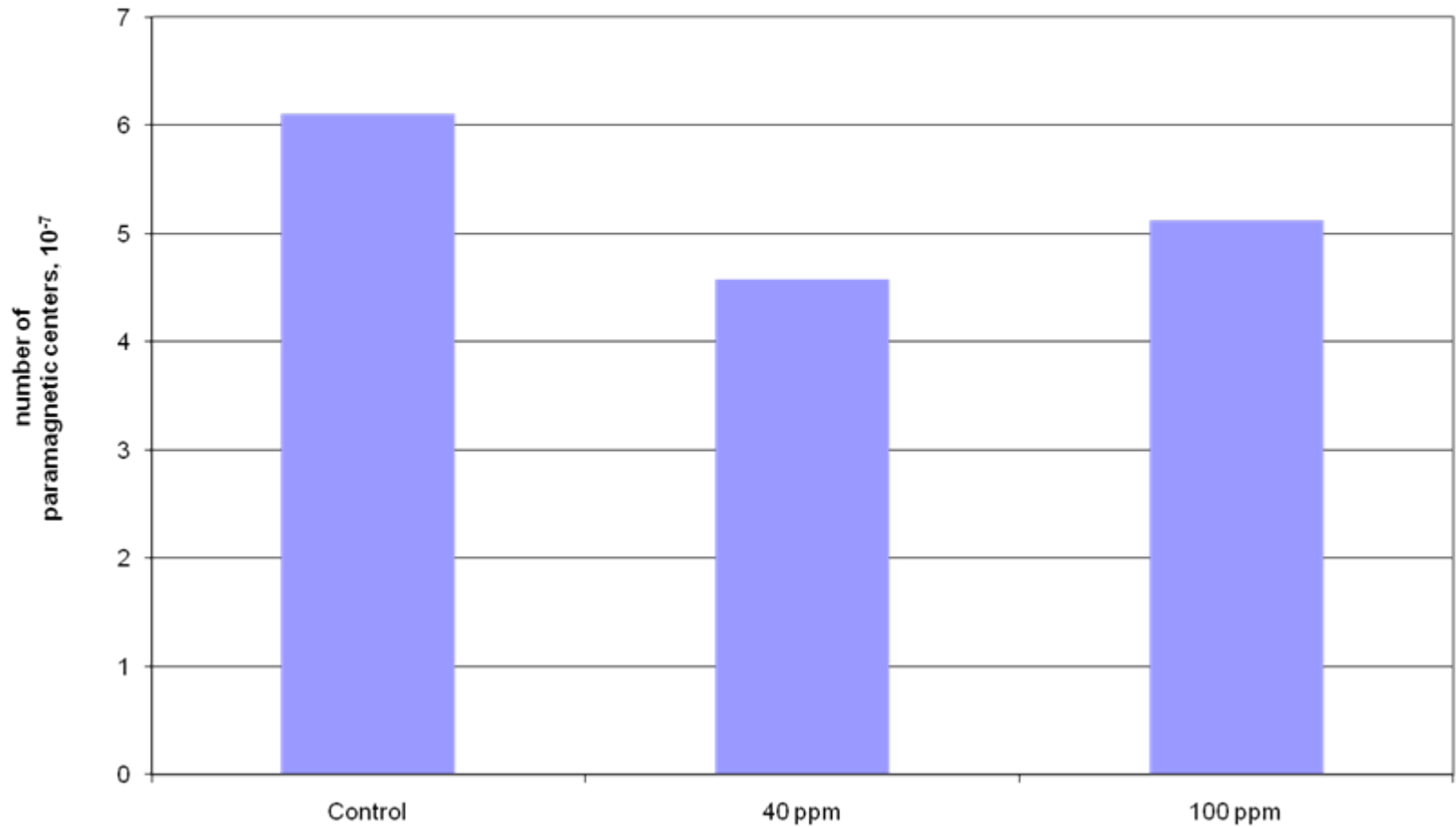


Басов А.А., Барышев М.Г., Быков И.М., Павлюченко И.И., Джимаков С.С. Воздействие воды с модифицированным изотопным составом на интенсивность свободнорадикальных процессов в эксперименте на лабораторных животных // Аллергология и иммунология. 2012. Том 13. №4. С. 314-320

Changing of the number of
paramagnetic centers (according to the EPR data) in liver



Changing of the number of paramagnetic centers (according to the EPR data) in kidneys



INFLUENCE OF WATER WITH THE LOWERED MAINTENANCE OF THE DEUTERIUM ON THE ORGANISM OF LABORATORY ANIMALS AT THE VARIOUS FUNCTIONAL CONDITION OF NONSPECIFIC PROTECTIVE SYSTEMS

Studied the water influence with the modified isotope structure with lowered, in relation to natural, maintenance of a deuterium (VMIS SSD) on an organism of animals in physiological conditions and at development of chronic endogenous intoxication of gepato-renalny genesis. Influence of VMIS SSD on isotope composition of plasma and fabrics (a liver and kidneys) at laboratory animals is studied. Influence of VMIS SSD on biochemical indicators (nuclear heating plant, ALT, creatinine, protein) and dynamics of laboratory animals body weight within 42 days is established. As a result of researches possibility of the preventive use of VMIS SSD for correction of metabolic processes is shown at a various condition of functional system of a detoxication of an organism.

Thank you