Scientific Researches about Deuterium Depleted Water and its effects on living organisms

1. Influence of Deuterium Depleted Water on Rat Physiology: Reproductive Function, Forming and Posterity Development

Lilia V. Fedulova, Stepan S. Dzhimak, Elena A. Kotenkova, Ekaterina R. Vasilevsky, Irina M. Chernukha
Life Science, Vol 6, No. 2(2016)

Abstract

Reproductive function and postnatal progeny development of rats in four generations treated with deuterium depleted water (40 ppm) were investigated. The targeted generations were parent (F0), first (F1), second (F2) and third (F3). Replacement of tap water to deuterium depleted water did not influence on fertility index as well as on survival and postnatal offspring development. Reproductive function, physical parameters and reflexes development in rats and pups consumed DDW was similar or more intensive in comparison with control group. Therefore, DDW consumption did not possess any toxic effects and may enhance general postnatal development.

2. Correction of metabolic processes in rats during chronic endotoxicosis using isotope (D/H) exchange reactions

Animal And Human Physiology
Biology Bulletin
June 2015, Volume 42, Issue 5, pp 440-448
First online: 30 August 2015

Abstract

The effect of isotope exchange reactions (deuterium/protium, D/H) on morphofunctional indices and the state of the antioxidant blood system in rats was studied under physiological conditions and during experimental chronic endotoxicosis of hepatorenal genesis. It was demonstrated that introduction of water with a decreased content of deuterium in the food rations of rats results in a decrease in its concentration in the blood plasma by 32–36% (to 98–106 ppm) and in lyophilized liver, kidney, and heart tissues by 13–17% (to 123–128 ppm). It was noted that it is accompanied by correction of metabolic processes, an increase in the functional activity of nonspecific protection system, and an increase in the body weight growth by the 42nd day in the group of animals that passed (for 14 days) the stage of preliminary adaptation with a change in the D/H ratio in the organism.

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3. Influence of deuterium depleted water on indicators of prooxidant-antioxidant and detoxifying systems in experimental diabetes

Endocrine Abstracts (2015) ***38*** *P290 | DOI:10.1530/endoabs.38.P290*

Stepan Dzhimak, Alexander Basov, Lilia Fedulova & Elena Kotenkova

Abstract

Studying the effect of deuterium depleted water (DDW) on isotope (D/H) composition and condition of an antioxidant-prooxidant plasma and lyophilized tissues of internal organs (liver, kidney) balance appropriate indicators in rats were compared: in group 1 (*n*=15) consumed mineralized water (150 ppm), which by a single intraperitoneal injection of alloxan (at a dose of 17 mg/100 g body weight) was established experimental model of diabetes; group 2 (*n*=15) consumed mineralized water (40 ppm) for 30 days before creation of a similar model of experimental diabetes. On day 5 after modeling of alloxan diabetes in rats of both groups was observed increase in blood glucose level in 2.2 times, increase in the activity of enzymes (aspartate aminotransferase, alanine aminotransferase), characterizing cytolytic processes, increasing concentrations of creatinine, bilirubin and urea.

It was found that in group 2 on 45 day drinking 40 ppm water deuterium content in the blood plasma was reduced to 99.7±0.4 ppm (*P*<0.05), which was on 34.1% lower in comparison with the group 1 (*P*<0.05). In addition, the integral index of the functioning of the low molecular unit prooxidant-antioxidant blood system (COMBer – patent number 2236008 RU) in group 1 was 17.9% higher than in group 2 (*P*<0,05), indicating that the perspective of DDW using at the complex correction of metabolic disorders in the antioxidant system, observed during the development of diabetes.

Also observed a decrease in the concentration of endogenous toxic substances in the blood of rats from group 2, which was confirmed by lower (on 27.1%, *P*<0.05) integral index values of endogenous intoxication in group 2 (94.2% hypercatabolism) compared with the group 1 (129.3% hypercatabolism), that indicating on increased functional activity of detoxifying system and increasing of nonspecific organism resistance when DDW administered in the rats diet.

4. Hepatoprotective Effects of Deuterium Depleted Water (DDW) Adjuvant with *Satureja rechingeri* Essential Oils

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Abstract

This study was carried out to investigate the hepatoprotective effect of **deuterium depleted water** (DDW) with and without *Satureja rechingeri* essential oil (E.O) mixture on paracetamol induced hepatotoxicity in rats. The animals were divided into 24 groups (n=5): The negative control group used tap water in 14 days following DMSO i.p injection at day 15th. The control group received tap water in 14 days following 500 mg/kg b.w. i.p injection of acetaminophen dissolved in DMSO. The treatment groups received only DDW (30 and 60 ppm) in 14 days concomitant with treatment groups receiving DDW plus i.p injection of *S. rechingeri* oil following acetaminophen injection at day 15th. Indeed, hepatoprotective activity was evaluated by the biochemical estimation of acetaminophen metabolism enzymes; cytochrome P450 (CYP450), glutathione s-transferase (GST) together with the level of glutathione (GSH). The markers of liver injuries (ALT, AST, and ALP) were also estimated in plasma. The results indicated that administration of DDW and DDW+E.O resulted in liver damage compensation as manifested by significant decrease in the activities of CYP450 and AST as well as significantly elevating the levels of GSH and GST. The present study reveals that the DDW could afford a significant protection against paracetamol- induced hepatocellular injuries

5. Local Exremum at 8.95 μm in Spectrum of Mountain Water as indicator for Health and Longevity

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Journal of Health, Medicine and Nursing, ISSN 2422-8419 (Online), Vol. 10, 2015

Abstract

In this paper are submitted data on longevity factors and mountain water in factorial research of phenomenon of longevity in mountainious and field areas of Bulgaria. The dependence was established among various internal and external factors on a phenomenon of longevity – residence area, health status, gender and heredity. It was shown that water is among the most important factors for longevity. Natural waters derived from various Bulgarian water springs were investigated by IR-spectroscopy, NES-, and DNES-method. It was shown, that the increased content of deuterium leads to physiological, morphological and cytology alterations of the cell, and also renders negative influence on cellular metabolism, while deuterium depleted water with decreased deuterium content on 20-30% has beneficial effects on health. By using IR-spectroscopy (NES and

DENS-method) were investigated various samples of water with varying contents of deuterium, received from Bulgarian water springs and blood serum of cancer patients as well. As estimation factor was measured the values of the average energy of hydrogen bonds (ΔEH...O) among H2O molecules, as well as local maxima in the IR-spectra of various samples of water and human blood serum at -0.1387 eV and wavelength – 8.95 μm. For a group of people in critical condition of life and patients with malignant tumors the greatest values of local maxima in IR-spectra are shifted to lower *energies* relative to the control group. The obtained results testify to necessity of consumption of clean natural water which quality satisfies mountain water from Bulgarian water springs.

Highlights:

This paper studies the influence of various internal and external factors on a phenomenon of longevity –residence area, health status, gender, heredity, isotopic composition of water with using non-equilibrium (NES) and differential non-equilibrium (DNES) spectrum of water. The research was carried out under the joint scientific project “NATURE, ECOLOGY AND LONGEVITY” conducted in Bulgaria.

Conclusion

Research conducted by us shows that the direct relationship of man and nature – clean air, natural food from eco-farms and physical activity explains the difference between the larger number of centenarians who live in the mountain regions of Bulgaria and Russia and their high average number. Natural water with increased content of deuterium seems to be one of the most important factors for longevity. In Bulgaria, most centenarians live in the Rhodope Mountains, while in Russia – in Dagestan and Yakutia. It worth to note that IR-spectrum of mountain water is most similar to the IR-spectrum of blood serum of healthy group of people with a local maximum at = 8,95 m. Similar spectral characteristics possess mountain water from Teteven, Bojana and other Bulgarian sources. Thus, the phenomenon of longevity is a complex phenomenon involving both genetic and phenotypic characteristics of the organism to external factors and environment – free radicals, radiation, heavy isotopes, as well as the structure and the isotopic composition of drink water. Other longevity factors are living area, health status, body mass, gender and heredity. Studying of human blood serum by NES and DNES-methods show that by measuring the average energy of hydrogen bonds among H2O molecules and the distribution function of H2O molecules on energies it is possible to drow a vital state statusof a person and associated life expectancy. These data indicate that water in the human body has the IR-spectrum resembling IR-spectrum of human blood serum. On the characteristics of the IR-spectrum of water exerts an influence also the presence of deuterium. Thus, the phenomenon of longevity is a complex multifactorial phenomenon involving both genetic (internal) and phenotypic (external) characteristics of the organism in its adaptation the environment. Further we are planning to continue this project for the research of phenomenon of human longevity in field area (Pleven region), sea area (Varna region) and mountainious area (Smolyan region) in Bulgaria. Although additional data for parents and grandparents of long-living people are needed, total statistical analysis for all these summary factors will be essential for further scrutinized conclusions.

6. Studying of Isotopic Effects of Deuterium in Biological Objects

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European Reviews of Chemical Research, 2015, Vol.(3), Is. 1

Abstract

This article describes the data on isotopic effects of deuterium in various biological objects as the cells of methylotrophic, chemoheterotrophic, photoorganotrophic microorganisms, green algae as well as animal cells. It was demonstrated that the increased content of deuterium in water leads to physiological, morphological and cytology alterations of the cell, and also renders negative influence on cellular metabolism, while deuterium depleted water (DDW) with decreased deuterium content on 20–30 % exerts beneficial effects on organism. The maximum kinetic isotopic effect measured at ordinary temperatures in chemical reactions leading to rupture of bonds involving hydrogen and deuterium lies in the range kH/kD = 6–8 for C**–**H versus C**–**D, N**–**D versus N**–**D, and O**–**H versus O**–**D-bonds. By IR-spectroscopy method water samples with varying content of deuterium were investigated.

Highlights:

- *Isotopic effects of deuterium in biological objects*
- *Biological effects of DDW*

Conclusion

Isotopic effects are determined by an increase in the nuclear mass of deuterium relative to protium, which may be sufficiently essential for the 1H/2H pair. The maximum kinetic isotopic effect measured at ordinary temperatures in chemical reactions leading to rupture of bonds involving hydrogen and deuterium lies in the range kH/kD = 6–8 for C**–**H versus C**–**D, N**–**D versus N**–**D, and O**–**H versus O**–**D-bonds. D2O of high content of deuterium (99,8 at.%) leads to physiological, morphological and cytology alterations of the cell, and also renders negative influence on cellular metabolism, while DDW with decreased deuterium content on 20–30% exerts beneficial effects on metabolism. The most sensitive to replacement of H on D are the apparatus of biosynthesis of macromolecules and a respiratory chain, i.e., those cellular systems which use high mobility of protons and high speed of breaking up of hydrogen bonds.

7. Deuterium-depleted water has stimulating effects on long-term memory in rats

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Neuroscience Letters,Volume 583, 7 November 2014, Pages 154–158

Highlights:

• *Deuterium-depleted water resulted in no significant changes in Y-maze.*

• *Reference memory errors were decreased in the DDW group in the radial 8 arms-maze.*

• *Time to finish the radial was reduced in DDW, compared to distilled water-controls.*

Abstract

Deuterium-depleted water (DDW) is a water which has a 6–7-fold less concentration of the naturally occurring deuterium (20–25 ppm vs. 150 ppm). While administrated for a longer period, it may reduce the concentration of deuterium throughout the body, thus activating cellular mechanisms which are depending on protons (channels, pumps, enzyme proteins). The aim of the present work was to study, for the first time in our knowledge, the possible influence of deuterium-depleted water (DDW) chronic administration in normal Wistar rats, as compared to a control group which received distilled water, on spatial working memory and the locomotor activity (as studied through Y-maze) or both short-term and long-term spatial memory (assed in radial 8 arms-maze task). Our results presented here showed no significant modifications in terms of spatial working memory (assessed through spontaneous alternation percentage) and locomotor activity (expressed through the number of arm entries) in Y-maze, as a result of DDW ingestion. Also, no significant differences between the DDW and control group were found in terms of the number of working memory errors in the eight-arm radial maze, as a parameter of short-term memory. Still, we observed a significant decrease for the number of reference memory errors in the DDW rats. In this way, we could speculate that the administration of DDW may generate an improvement of the reference memory, as an index of long-term memory. Thus, we can reach the conclusion that the change between the deuterium/hydrogen balance may have important consequences for the mechanisms that govern long-term memory, as showed here especially in the behavioral parameters from the eight-arm radial maze task.

8. Deuterium content of water increases depression susceptibility:The potential role of a serotonin-related mechanism

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Behavioural Brain Research, Volume 277, 15 January 2015, Pages 237–244

Highlights:

•Geographical distribution of deuterium correlates with depression rate.
•Deuterium depleted water reduces stress-induced depressive-like signs in mice.
•Hippocampal proliferation after stress is rescued by deuterium depleted water.
•Deuterium depleted water induces SSRI-like changes in EEG parameters of sleep.
•Above-indicated effects may be due to normalization of hippocampal 5-HTT level.

Abstract

Environmental factors can significantly affect disease prevalence, including neuropsychiatric disorderssuch as depression. The ratio of deuterium to protium in water shows substantial geographical variation,which could affect disease susceptibility. Thus the link between deuterium content of water and depres-sion was investigated, both epidemiologically, and in a mouse model of chronic mild stress. We performeda correlation analysis between deuterium content of tap water and rates of depression in regions of theUSA. Next, we used a 10-day chronic stress paradigm to test whether 2-week deuterium-depleted watertreatment (91 ppm) affects depressive-like behavior and hippocampal structure. The effect of deuterium-depletion on sleep electrophysiology was also evaluated in naïve mice. There was a geographic correlationbetween a content of deuterium and the prevalence of depression across the USA. In the chronic stressmodel, depressive-like features were reduced in mice fed with deuterium-depleted water, and SERTexpression was decreased in mice treated with deuterium-treated water compared with regular water.Five days of predator stress also suppressed proliferation in the dentate gyrus; this effect was attenuatedin mice fed with deuterium-depleted water. Finally, in naïve mice, deuterium-depleted water treat-ment increased EEG indices of wakefulness, and decreased duration of REM sleep, phenomena that havebeen shown to result from the administration of selective serotonin reuptake inhibitors (SSRI). Our datasuggest that the deuterium content of water may influence the incidence of affective disorder-relatedpathophysiology and major depression, which might be mediated by the serotoninergic mechanisms.© 2014 Published by Elsevier B.V.

9. HISTO-ANATOMICAL ASPECTS IN MAIZE (ZEA MAYS L.) SEEDLINGS DEVELOPING UNDER INFLUENCE OF DEUTERIUM DEPLETED WATER

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Analele Ştiinţifice ale Universităţii „Al. I. Cuza" Iaşi, s. II a. Biologie vegetală, 2014, 60, 2: 5-10

Highlights:

The addition of deuterium-depleted water in the growth of maize seedlings causes the appearance of aeriferous cavities in internal structure of the root. The number of vascular bundles is higher compared to the control. In the adventitious root, the root hairs are more numerous compared to the control.

Abstract

The paper presents histo-anatomical aspects, evidenced in seedlings of maize (Zea mays L.) grown under the influence of deuterium depleted water (DDW). The aim of this study was to identify the internal structure changes in maize seedlings resulted in this case. For histo-anatomical characterization, the vegetal material was fixed and preserved, following to be cut by hand microtome with botanical razor. The sections obtained were stained using double staining reagents. As compared with the control sample it was obsereved that deuterium depleted water determines a better development of the absorbents bristle and increase leading bundles number and central vessels in metaxilem. Keywords: deuterium depleted water, maize, histo-anatomical investigations

10. In Vitro Antineoplastic Effects of Deuterium Depleted Water

Soleyman-JahiS, Zendehdel K, Akbarzadeh K, Haddadi M, Amanpour S, Muhammadnejad S

Asian Pac J Cancer Prev. 2014;15(5):2179-83

Abstract

Background: In vitro, in vivo and clinical studies have demonstrated anti-cancer effects of deuterium depleted water (DDW). The nature of this agents action, cytotoxic or cytostatic, remains to be elucidated. We here aimed to address the point by examining effects on different cell lines. Materials and Methods: 3-(4, 5-dimethylthiazol- 2-yl)-2, 5-diphenyltetrazolium bromide (MTT) -based cytotoxicity analysis was conducted for human breast, stomach, colon, prostate cancer and glioblastoma multiforme cell lines as well as human dermal fibroblasts. The cell lines were treated with decreasing deuterium concentrations of DDW alone, paclitaxel alone and both. One way analysis of variance (ANOVA) was used for statistical analysis. Results: Treatment with different deuterium concentrations of DDW alone did not impose any significant inhibitory effects on growth of cell lines. Paclitaxel significantly decreased the survival fractions of all cell lines. DDW augmented paclitaxel inhibitory effects on breast, prostate, stomach cancer and glioblastoma cell lines, with influence being more pronounced in breast and prostate cases. Conclusions: DDW per se does not appear to have inhibitory effects on the assessed tumor cell lines as well as normal fibroblasts. As an adjuvant, however, DDW augmented inhibitory effects of paclitaxel and thus it could be considered as an adjuvant to conventional anticancer agents in future trials.

11. Deuterium-depleted water (DDW) inhibits the proliferation and migration of nasopharyngeal carcinoma cells in vitro

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Biomedicine & Pharmacotherapy, Volume 67, Issue 6, July 2013, Pages 489-49

Abstract

Recent studies have demonstrated that natural water that has 65% of the deuterium concentration depleted, can exhibit anti-tumor properties. However, the anti-tumor effects of DDW on various nasopharyngeal carcinoma (NPC) cells have not previously been reported. In the present study, NPC cell lines and normal preosteoblast MC3T3-E1 cells were grown in RPMI1640 media containing different deuterium concentrations (50–150 ppm). The effects of DDW on the proliferation and migration of NPC and MC3T3-E1 cells were investigated using the MTT, plate colony formation, and Transwell assays, as well as Boyden chamber arrays, flow cytometry (FCM), western blot and immunofluorescence. We found that DDW was an effective inhibitor of NPC cell proliferation, plated colony formation, migration and invasion. In contrast, the growth of normal preosteoblast MC3T3-E1 cells was promoted when they were cultured in the presence of DDW. Cell cycle analysis revealed that DDW caused cell cycle arrest in the G1/S transition, reduced the number of cells in the S phase and significantly increased the population of cells in the G1 phase in NPC cells. Western blot analysis revealed that treatment with DDW significantly increased the expression of NADPH:quinone oxidoreductase-1 (NQO1), while immunofluorescence assay analysis revealed that treatment with DDW decreased the expression of PCNA and matrix metalloproteinase 9 (MMP9) in NPC cells. These results demonstrated that DDW is a novel, non-toxic adjuvant therapeutic agent that suppresses NPC cell proliferation, migration, and invasion by inducing the expression of NQO1 and causing cell cycle arrest, as well as decreasing PCNA and MMP9 expression.

12. Deuterium depleted water (DDW) effects on survival of lung cancer patients and expression of Kras, Bcl2, and Myc genes in mouse lung

Gyöngyi Z, Budán F, Szabó I, Ember I, Kiss I, Krempels K, Somlyai I, Somlyai G.

Nutr Cancer. 2013;65(2):240-6.

Abstract

Although advances in cancer therapies continue to develop, the shortness of the survival of lung cancer patients is still disappointing. Therefore, finding new adjuvant strategies is within the focus of cancer cure. Based on observations that deuterium depletion inhibits the growth of cancer cell lines and suppresses certain proto-oncogenes, we have conducted a clinical study in 129 patients with small cell and nonsmall cell lung cancers who consumed deuterium-depleted drinking water (DDW) as a nontoxic agent in addition to conventional chemotherapy and radiotherapy. Median survival time (MST) was 25.9 mo in males and 74.1 mo in female patients; the

difference between genders was statistically significant ($p < 0.05$). Median survival of subjects with brain metastasis was 27.1 mo. Cumulative 5-yr survival probabilities were 19%,52%, and 33% in males, females, and all patients with brain metastasis, respectively. Gene expression analysis in mouse lung indicated that DDW attenuates 7,12-dimethylbenz(a)anthracene (DMBA)-induced expression of Bcl2, Kras, and Myc in females. In conclusion, DDW counteracts the DMBA-induced overexpression of Bcl2, Kras and Myc genes in mouse lung, and it may extend survival of lung cancer patients as a nontoxic anticancer dietary supplement, especially for women with tumors overexpressing cancer-related genes, because MST of DDW-consuming group was 2-4 times longer than it is generally observed in lung cancer patients.

13. Research progress of the inhibitory effect of deuterium-depleted water on cancers

Nan Fang Yi Ke Da Xue Xue Bao. 2012 Oct;32(10):1454-6. (Article in Chinese)Wang H, Liu C, Fang W, Yang H.

Sino-America Cancer Research Institute, Guangdong Medical College, Dongguan, China.

Abstract

Deuterium is an important predisposing factor for cancer. Deuterium-depleted Water,also known as low deuterium water, ultra-light water or no deuterium water, can be obtained by removing deuterium from natural water. Studies have shown that water with a low deuterium concentration (<65% percent of volume) can inhibit cancer growth. Clinical trials demonstrated that drinking DDW (10-20 ppm) caused growth arrest of malignant cells in cancer patients and significantly prolonged the patient survival with also improved quality of life. A wide range of anti-cancer drugs in current use are associated with severe adverse effects, while deuterium-depleted water appears to have virtually no pharmacological side effects and is convenient to administer.The authors review the advances in the researches of anti-cancer effects and the underlying mechanisms of deuterium-depleted water.

14. Anti-aging effects of deuterium depletion on Mn-induced toxicity in a C. elegans model

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Toxicol Lett. 2012 Jun 20;211(3):319-24, Epub 2012, Apr 26

Abstract

Work with sub-natural levels of deuterium (D) in animals has demonstrated an anti-cancer effect of low D-concentration in water. Our objective was to investigate whether deuterium-depleted water (DDW) can overturn reverse manganese (Mn)-induced reduction in life span, using the Caenorhabditis elegans (C. elegans) as a model system. DDW per se had no effect on worm's life span 48 h after treatment; however, it reversed the Mn-induced decrease in C. elegans life span. Mn reduced DAF-16 levels, a transcription factor strongly associated with life-span regulation. Low D-concentration (90 ppm) restored the Mn-induced changes in DAF-16 to levels

indistinguishable from controls, suggesting DDW can regulate the DAF-16 pathway. We further show that insulin-like receptor DAF-2 levels were unaltered by Mn exposure, tAKT levels increased, whilst superoxide dismutase (SOD-3) levels were decreased by Mn. DDW (90 ppm) restored the levels of tAKT and superoxide dismutase (SOD) to control values without changing DAF-2 levels. Treatment of Mn exposed worms with DDW (90 ppm) restored life-span, DAF-16 and SOD-3 levels to control levels, strongly suggesting that low D concentrations can protect against Mn toxic effects.

15. Hypotheses on the biophysical mechanisms of deuterium depletion on biological structures

Walther Bild, Ioan Stefanescu, Alexandru Popescu, Cristian Mladin

2nd International Symposium on Deuterium Depletion, 2012, Budapest, Hungary

Abstract

It is well known that the naturally-occurring deuterium levels in terrestrial waters is of 145-150 ppm, which means that *grosso modo,* out of 6500 atoms of hydrogen in the body, one is a deuterium atom. It seems an insignificant ratio, but for comparison, for each calcium ion in the intercellular fluid there are 1000000 molecules of water, and the entry in action of the calcium-dependent biological mechanisms needs at least a 100-fold increase in the calcium concentration. This demonstrates that even minute changes in the isotopic distribution can have important biological effects.

Isotopic effects are no doubt much more subtle, nevertheless they can be biologically significant. Since the discovery of deuterium by Urey in 1931, a lot of its biological effects have been identified. Kinetic effects reflect the involvement of protons and deuterons in chemical reactions. There are a series of hypotheses on the organization of water, in and out of biological statures in a group of super molecules like hydronium with hydration envelope and secondary hydration envelopes which might explain a series of unusual properties of water.

Water pores and channels also benefit from these characteristics, and water and proton passages through biological membranes are determinants of biological functions. Variations of the proton-deuterium radio are of major significance in these processes.

The present work tries to summarize the actual knowledge on the deuterium biological effects and to emit plausible hypotheses on the consequences of the alteration of the native deuterium-proton ratio by the use of deuterium-depleted water.

16. Deuterium Depletion may delay the progression of prostate cancer

András Kovács, Imre Guller, Krisztina Krempels, Ildikó Somlyai, István Jánosi, Zoltán Gyöngyi, István Szabó, István Ember, Gábor Somlyai

Journal of Cancer Therapy, Vol.2 No.4(2011), Article ID:7799,9 pages

Abstract

Deuterium-depleted water (DDW) is a new promising agent in cancer therapy. The efficiency of the method is based on the discovery, that cancer cells are extremely

sensitive to depletion of deuterium (D) and might cause necrosis of the tumor. The purpose of this study was to show the efficacy of D-depletion in prostate cancer (PC) patients. In the double blind, four-month-long, randomized Phase II clinical trial the daily water intake was replaced with DDW in 22 PC patients. Other 22 PC patients took normal water while both groups received the same forms of conventional treatment. In the retrospective study, 91 DDW-treated PC patients were evaluated and median survival time (MST) in the subgroups was calculated. The time course of changes in DDW dose and PSA is presented in two cases. In the prospective trial seven patients in the treated group and one patient in the placebo group achieved partial response ($p = 0.046$). In the treated group, the net decrease in the prostate volume was three times higher (160.3 cm^3 vs. 54.0 cm^3; $p = 0.0019$), urination complaints ceased at a higher rate (8vs.0 patients, $p = 0.0041$), and the one-year survival rate was also higher (2 vs 9 deaths; $p = 0.034$). The 91 retrospectively evaluated patients achieved an MST of 11.02 years, despite the fact that 46 of them suffered from distant metastasis. In the two monitored patients, drop of PSA level correlated with the DDW intake. In summary, D-depletion prolonged MST in patients with PC. The method proved to be safe thus its integration in the PC cure as an adjuvant or complementary therapy would be considered.

17. Deuterium-depleted water inhibits human lung carcinoma cell growth by apoptosis

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Exp. Ther. Med. 2010 Mar-Apr; 1(2): 277–283

Abstract

To investigate the in vivo and in vitro inhibitory effects of deuterium-depleted water (DDW) on human lung cancer and the possible mechanisms underlying these effects, we cultured and treated human lung carcinoma cell line A549 and human embryonic lung fibroblasts HLF-1 with various concentrations of DDW from 2 to 72 h. Cellular growth inhibition rates were determined using the 3-(4, 5-dimethyldiazol-2-yl)-2, 5-diphenyltetrazolium-bromide) (MTT) proliferation assay. A549 cells were treated with 50±5 ppm DDW, and the morphology and structure of cells were observed by scanning electron microscopy (SEM). We observed alterations in the cellular skeleton by transmission electron microscopy (TEM) and changes in cell cycle by flow cytometry. Our data showed that DDW significantly inhibited the proliferation of A549 cells at a specific time point, and cells demonstrated the characteristic morphological changes of apoptosis under SEM and TEM. The length of the S phase increased significantly in cells treated with 50 ppm DDW, whereas the G0 to G1 phase and G2 to M phase were decreased.

We observed DDW-induced cellular apoptosis using terminal eoxynucleotidyltransferasedUTP nick end labeling (TUNEL) and DNA fragment analyses. In addition, we established a tumor transplantation model by injecting H460 tumor cells into subcutaneous tissue of BALB/c mice treated with DDW for 60 days.

We determined the tumor inhibition rate of treated and control groups and found that the tumor weight was significantly decreased and the tumor inhibition rate was approximately 30% in the DDW group. We conclude that DDW is a promising new anticancer agent with potential for future clinical application.

18. Soft tissue malignant neoplasms. Clinical case presentation in treatment with deuterium depleted water

Trăilă Nicola, Ioan Ştefănescu, Cristian Mladin, Radu Tamaian, Gheorghe Titescu, Răzvan Ilina
1st International Symposium on Deuterium Depletion, 2010, Budapest, Hungary

Background

Deuterium depletion water has cellular antiproliferation effects. From experimental works and from clinical experience it is accomplished that its benefit effect in the treatment of different types of cancer. In Oncological Surgery Department we gave deuterium depleted water (DDW) in two types of cancer: advanced rectosigmoidian junction cancer and soft tissue sarcomas. There have been taken for study seven patients, with superior rectum cancer penetrating in iliac vessels. In these cases it has been administered intra-arterial chemotherapy by a catheter introduced in inferior sigmoidian artery (superior hemoroidal) and left out under the ribs through a Braun chamber. There have been performed 6 series with 5-Flourouracil and Calcium folinat. After the intestinal transit has been recovered, the DDW was given, 25 ppm, one liter per day.

To these patients has been discovered a good tolerance for chemotherapy, which we have put it on the DDW administration.We had another case in study, a 13 year girl who consumed DDW for 5 years (starting from 2005), in volume of 1 liter per day, 25 ppm. The patient has received 10 series of chemotherapy, according to the 2002 European protocol, for a juvenile rabdomiosarcoma of the scalp, on the right parietal region. After tumoral ablation the patient has been given DDW every day so far. At clinical examination and paraclinical examination there is no relapse.

Conclusions

For the patients with unrespectable rectosigmoidian cancer, we consider that DDW has decreased the side effects of chemotherapy, has contributed to life prolonging and has improved the quality of life.

For the patient with rabdomiosarcoma the effect of chemotherapy and DDW was spectacular. It is well known the gravity of such malignant tumors, and the fact that the patient is surviving 5 years after is a real success.

19. The effect of biologically active substances of Aralia Mandshurica and deuterium depleted water on the structure of spleen in Mus Muscullus

Cornelia Editoiu[1], Carmen Popescu[2], Greta Ispas[3], G. C. Corneanu , M. Zagnat , I. Stefanescu
Annals of RSCB Vol. XV, Issue 2, 2010

Summary

In this experiment it was analyzed the effect of some biologically active substances extracted from the cortex of the Aralia mandshurica plants (Chisinau population) on laboratory mice (Mus muscullus), compared with a stress factor (X- ray radiation). The dilutions were made in distilled water and in deuterium depleted water. The combined administration of Aralia mandshurica plants cortex extracts presented a protective effect against X-ray radiation but also an immunostimulating effect, especially if the dilution was carried out with DDW.

The deuterium depleted water / ultra light water (DDW) is low-deuterium water, 30-120 ppm deuterium; its physical aspect looks like colorless liquid, flavored water, with a low content in ion and hydrogendeuterium isotope. The effects of this kind of water are great: increased vascular reactivity, nonspecific immune stimulation, increased animal resistance to sublethal and lethal doses of radiation, remission of tumor cell lines, etc. (Titescu, 1999). DDW affects both the normal cells proliferation and the pathological ones, being involved in the processes of apoptosis and mechanisms anti carcinogens (Corneanu et al, 2005). In this experiment we analyzed the effect of administration of some biologically active substances in dilutions made with normal water or ultra light water, to the action of a stress factor, the X-rays.

20. Deuterium has a key role in tumour development – new target in anticancer drug development

G. Somlyai, A. Kovacs, I. Guller, Z. Gyongyi, etc

EJC Supplements 8, No. 5 (2010), 155-225

Abstract

It is known that the deuterium/hydrogen (D/H) mass ratio is the largest of stable isotopes of the same element, causing differences in the physical and chemical behavior between the two hydrogen isotopes. Although the concentration of D is more than 10 mM in living organisms the possible role of D had not been investigated for 6 decades after it's discovery in the early 30's.

In order to investigate the possible role if naturally occurring D in living organisms, in cell growth and tumour development, D-depleted water (DDW) was used.The experiments with DDW revealed that due to D-depletion the cell growth of various cell lines (PC-3 human prostate; Mda, human breast; HT-29, human colon; M14, human melanoma) were inhibited in vitro. DDW caused tumour regression in xenotransplanted mice (MDA and MCF-7, human breast; PC-3) and induced apoptosis in vitro and in vivo. Deuterium depletion inhibited the expression of certain genes (c-myc, H-ras, COX-2) having key role in tumour development.Breast tumours in 81 dogs and 14 cats showed a response rate higher than 70%; more than 50% of the pets were cured when DDW was used as a single treatment or in combination with surgery.

21. A retrospective evaluation of the effects of deuterium depleted water consumption on 4 patients with brain metastases from lung cancer

Krisztina Krempels, Ildikó Somlyai and Gábor Somlyai

Integr Cancer Ther. 2008 Sep;7(3):172-81

Hypotheses

Because of the number of sufferers and high mortality rate, the standard care and new therapeutic options in the treatment of brain metastasis from lung cancerare the subject of intense research.

A new concept based on the different chemical and physical behavior of protium and deuterium affecting cell signaling and tumor growth has been introduced in the treatment of cancer patients. The aim of this study was to investigate the impact of deuterium depleted water (DDW) consumption in addition to conventional forms of therapy on the survival of lung cancer patients with brain metastasis. Study design. A series of 4 case histories was retrospectively evaluated. The patients were diagnosed with brain metastasis deriving from a primary lung tumor and started consuming DDW at the time of or after the diagnosis of the brain metastasis, which was inoperable or the surgical intervention did not result in complete regression. The primary objective was survival. Methods. The daily water intake of the patients was replaced with DDW, which complemented the conventional forms of treatment. Patients were consuming DDW for at least 3 months. The treatment was continued with DDW of 10 to 15 to 20 ppm lower deuterium (D) content every 1 to 2 months and thus a gradual decrease was maintained in the D-concentration in the patient's body.

Results

DDW consumption integrated into conventional treatments resulted in a survival time of 6.6, 54.6, 21.9, and 33.4 months in the 4 patients, respectively. The brain metastasis of 2 patients showed complete response (CR), whereas partial response (PR) was detected in 1 patient, and the tumor growth was halted (no change or NC) in 1 case. The primary tumor of 2 patients indicated CR, and the lung tumor in 2 patients showed PR. Conclusions. DDW was administered as an oral anticancer agent in addition to conventional therapy, and noticeably prolonged the survival time of all 4 lung cancer patients with brain metastasis. We suggest that DDW treatment, when integrated into other forms of cancer treatment, might provide a new therapeutic option.

22. Deuterium depleted water effects on walker tumours

Stefănescu Ioan , Nicolae Manolescu, Virgiliu Comisel, Radu Tamaian, Gheoghe Titescu
National R-D Institute for Cryogenics and Isotopic Technologies – ICIT Rm. Vâlcea
Bulletin UASVM, Veterinary Medicine 65(1)/2008

Abstract

The usual concentration of deuterium in water is about 144 ppm D/(D+H). It is known that the increase of deuterium in the body of living animals is a naturally bioaccumulation process and could be enhanced by adding in their diet heavy water – with obviously dramatically changes in health state. The aim of this study was to investigate the effect of DDW over experimental Walker tumors inducted at Wistar rats and how far can influence the decrease of deuterium's value at treated animals. The result shows that DDW has a significant effect over the sub epidermal tumors and it has no side effects. The deuterium's analyses results show that DDW's rate of depletion is in correlation with a couple of factors (the concentration of deuterium depleting agent; the period of administration of deuterium depleting agent).

23. The effect of deuterium depleted water administration on serum glycoproteins of cytostatics treated rats

Aneta Pop, Emilia Balint, N. Manolescu, I. Stefanescu, Manuela Militaru

Roumanian Biotechnological Letters; Vol. 13, No. 6, supplement, 2008, pp. 74-77

Abstract

The aim of the current research was to investigate the deuterium depleted water (DDW) effect on animals treated with anticancer drugs Vinblastine, Cyclophosphamide, 5-Fluorouracil and Farmarubicine. There were used two groups of 10 rats for each cytostatic, one group received 60 ppm DDW as daily diet before, during and after chemotherapy and the second group received tap water in the same conditions. Other two groups housed in the same conditions received DDW and tap water without any medication. There were recorded differences in the amount of serum glycoproteins and also the glycosylation degree and pattern. DDW administration induced a significant decrease of serum total glycoproteins and of glycosylation degree in all animals, both cytostatics treated or not. Fucose Raphanus sativus lectin interaction revealed that DDW induced also changes in the glycosylated domain, because it interacted only with the sera from 5-Fluorouracil treated rats that had not received DDW.

24. Variation of the deuterium concentration in rats' blood after deuterium depleted water administration and intoxication with cadmium

*Petcu Mihaela Doina *, Lucia Olariu*, Stela Cună***, P. Berdea ***, F. Muselin *, Iuliana Cretescu**, Mihaela Pup*, Ileana Brudiu*, Letitia Stana**

**Faculty of Veterinary Medicine, Timisoara*

***Faculty of Animal Sciences and Biotechnologies, Timisoara*

National Institute for Research and Development of Isotopic and MolecularTechnologies, Cluj

Bulletin UASVM, Veterinary Medicine 65(1)/2008

Abstract

The effects of cadmium pollution are highlighted in many studies, [7,14]. Cadmium, absorbed within the organism, inhibits the action of some antioxidant enzymes, especially those which contain SH and affect especially the liver and kidneys. The level of deuterium in tap water is 150 ppm and in deuterium depleted water are under 80 ppm. Deuterium depleted water with a deuterium level of 30 ppm has an antioxidant effect on the organism [9, 10]. The present study has asses the effects of deuterium depleted water (30 ppm) on the deuterium blood level in the rats exposed to cadmium (20 ppm Cd/kg administered as CdCl2 solution in a single dose). The intoxication with cadmium modified the blood level of deuterium in the animals and the kidney, liver and spleen weight. The blood level of deuterium was determined through weight spectroscopy with the spectrophotometer SMAD1. We observed a protective effect of deuterium depleted water on the rat organism, for preventive administration, as well as treatment and the important role in eliminating cadmium.

25. The role of deuterium in DNA degradation

Kirk Goodall

The Official Newsletter of the American Academy of Anti-Aging Medicine, Fall 2003

Introduction

Evidence indicates that aging is coupled to an accumulation of errors in DNA that arise due to strand breakage, DNA replication errors, or dysfunctional DNA repair mechanisms. Naturally occurring background radiation is a pervasive mutagen known to adversely affect DNA. Deuterium oxide is also pervasive and adversely affects DNA. As a consequence and over time, through the mechanism of increased hydrogen bonding strength, deuterium may disrupt DNA repair enzymes and slow the rate of DNA replication, exposing it to a greater chance of corruption. The maximum lifespan that an organism can achieve is tied to its DNA. DNA is damaged by free radicals produced by radiation, mutagens, and normal metabolic processes.

Concluding remarks

Deuterium depleted water (DDW) does not change its chemical composition when digested and has a direct effect at the cellular level. Consumption of DDW can conceivably protect DNA from damage and assist DNA repair mechanisms, but it does not directly repair DNA. It remains undetermined, given present scientific knowledge, whether DDW consumption will "rejuvenate" the body, but it may become a new therapeutic approach or intervention that may assist in protecting cells and tissues of the body, enabling them to function more efficiently. It is the author's hope that future studies comparing deuterium in the drinking waters of inhabited and developed environments versus that of lesser developed and sparsely populated locations will elucidate a mechanism for DNA damage and its prevention or reversal.

26. Deuterium depleted water – antioxidant or prooxidant?

Lucia Olariu, Mihaela Petcu, Camelia Tulcan, Iuliana Chis-Buiga, Mihaela Pup,M.Florin, Ileana Brudiu.

Lucrari Stiintifice Medicina Veterinara Vol. XL, 2007, Timisoara

Abstract

In the present work we studied the changes in some red blood cell antioxidant enzymes which are involved in the organism's antioxidant system after administration of deuterium depleted water (DDW) in rats, during a 60 days experimental period. There was determined that in a short time treatment, DDW had a prooxidant effect (malondialdehide values are increasing) but after a loger time administration, DDW stimulated the cell antioxidant defense system. GSHred ($p < 0.001$), respectively SOD registered increased values ($p < 0.05$). This conclusions were revealed by the determination of glutathione average values,glutathione peroxidase, glutathione reductase, catalase and superoxide dismutase activities.A role for oxidative stress was postulated in many conditions: aging, inflammatory conditions, atherosclerosis, etc. In many cases, that follows after increased amounts of free radical damage products in body fluids. Lipid peroxidation is an inevitable accompaniment of cell death from any causes.

Evidence of oxidative stress installation should be detectable before the onset of tissue damage and increasing of antioxidant status at an early stage should either prevent or greatly reduce tissue damages (2,3,9). In this content many researchers

studied the benefic effects of many natural antioxidants. Since 1992, a great importance was revealed to deuterium content in water. It has been known for decades that due to the mass differences between hydrogen and deuterium, molecules with deuterium content behave differently in chemical reactions which are evident in the biological system as well.

27. Possibility of deuterium free water using as antitumoral means with reference to conditions of Martian expedition

Sinyak, Y.; Turusov, V.; Grigroriev, A.; Yaridze, D.; Gaidadimov, V.; Antoshina, E.; Gorkova, T.; Truhanova, L.

34th Cospar Scientific Assembly, The Second World Space Congress, held 10-19 October, 2002 in Houston, TX, USA meeting abstract

Abstract

The interplanetary space flights, Martian program as an example, will take place under conditions of increasing radiation level on crew. The search of methods for a decrease of oncologic risk produced by irradiation of astronauts, is one of the major factors of a successful implementation of a flight program. One of such methods is a usage by crew of potable water with the reduced concentrations of a heavy stable isotope of hydrogen - deuterium, which can be obtained in the regenerative life support systems. The heavy water (D2O) has toxic properties, distorting biochemical reactions in the cell, inhibiting process of DNA replication. It can be presumed that the replacement of deuterium in the water for protium will result in normalization of cell metabolism, reparation will take place and this will lead to the inhibition of tumor development. In this study the water with a decreased by 65% of deuterium was used. Antitumor properties of D 2-free water were studied with transplantable Lewis lung carcinoma in BDF1 strain of mice. First results show that average time of appearance of the first nodules at the site of transplantation was 14 % longer in mice fed D 2-free water as compared to control. The tumor volume in the experimental group (decreased content of D2) was always lower than in the control. Statistically significant differences in the tumor volume were registered at the 13, 15, 23, 26 and 28 -th days after transplantation. Inhibition of tumor growth was equal to 100% and 51% at the 5-th and 15-th days after- transplantation respectively. Increase of life span in the experimental group was 10%. The results indicate that the use by astronauts of water with decreased content of deuterium may decrease the risk of oncological diseases under conditions of high radiation level in the flight to Mars.

28. Deuterium variation of human blood serum

P. Berdea, Stela Cuna, M.Cazacu, M.Tudose

Studia Universitatis Babes-Bolyai, Physica, Special Issues, 2001

Abstract

The deuterium content of healthy human blood plasma is about 149-150 ppm. Some variations of deuterium content with age and sex were observed in blood plasma. We report for the first time the variation of deuterium content of blood plasma of the

patients with cancer disease. The deuterium content of blood plasma of cancerous human is diminished by about 5-7 ppm compared with the healthy one. The tumors cell have a higher speed of growth than the normal cell and this results in consuming a greater quantity of deuterium. The replacement of tap water with deuterium depleted water in a drinking water for the mice diminishes the growth rate of the tumors, and the slight increase in the deuterium concentration stimulates this growth.

29. Deuterium depletion can decrease the expression of C-myc, Ha-ras and p53 gene in carcinogen-treated mice

Zoltan Gyongyi and Gabor Somlyai

In Vivo. 2000, May-Jun;14(3):437-9.

Abstract

In spite of the fact that the deuterium concentration is over 10 mmol/l in all living organisms, its possible role has been ignored for six decades. Recent studies have shown that the depletion of the naturally occurring deuterium can result in tumor regression in mice, dogs, cats and humans. The effect of deuterium depletion on gene expression plays a key part in tumor development. The carcinogen, 7,12-dimethylbenz(a)anthracene (DMBA) was used to increase gene expression in "short term" investigations. The expression of c-myc, Ha-ras and p53 gene was followed in CBA/Ca sensitive inbred mice drinking tap water or deuterium-depleted water (DDW) after induction. By detecting the RNA expression 48 hours after exposure to the cancerinogen it was found that the expression of all genes investigated was inhibited in six different organs (spleen, lung, thymus, kidney, liver and lymph node) in the DDW-treated group. It is suggested that genes playing a key role in the cell cycle regulation and tumor development are sensitive to deuterium depletion.

30. Deuterium research concerning physiological effects of deuterium depleted water on unspecific immunity

Haulica Ion, Stefanescu Ioan, Bild Walther,Titescu Gheorghe, Tamaian Radu, Nastasa Veronica, Ionita Teodor

Rom J Physiol. 1999 Jul-Dec;36(3-4):205-18.

Abstract

On this research it was investigated the effect of deuterium-depleted water on Swiss mice for relieve of his capacity to influence the immunity. Results: 1. at animals with norma IS deuterium-depleted water stimulated unspecific immunity (increase of percent of PMN and lymphocytes, increase of value of NBT-test); 2. at animals with experimental infections deuterium-depleted water stimulation of immunity defense was stronger; 3. in the same time deuterium-depleted water wasn't modified the parameter of specific immunity.

31. The biological effects of deuterium-depleted water, a possible new tool in cancer therapy

G. Somlyai, G. Laskay, T. Berkenyi, Z. Galbacs, etc.

Z. Onkol. / J. of Oncol. 30, 4 (1998)

Abstract

It has been known for decades, that due to the mass difference between hydrogen and deuterium, the behavior of the molecules containing deuterium is altered in chemical reactions.

The difference between hydrogen and deuterium concentrations exerts a pronounced influence on the processes taking place in a given biological system. The significant effect of heavy water on the living organism is not a surprise, considering that an important part of the living body consists of water, and heavy water differs from ordinary water in many of its properties.In order to investigate whether deuterium has any role in living organisms we applied deuterium depleted water to prepare medium for tissue culture and also as drinking water to treat mice xenotransplanted with human breast tumor.

32. Naturally occurring deuterium may have a central role in cell signaling

G. Somlyiai, G. Laskay, Gy. Jakli, etc

Synthesis and applications of isotopically labeled compounds, 1997

Abstract

It is known that deuterium/hydrogen (D/H) mass ratio is the largest of stable isotopes of the same element, causing differences in the physical and chemical behavior between the two isotopes. The experiments carried out so far with D2O in different biological systems and other experiments which revealed the importance of hydrogen bond or intracellular pH in biological processes have neglected the naturally occurring deuterium, in spite of the fact that the concentration of D is about 150 ppm (over 16 mM) in surface water and more than 10 mM in living organisms.The results revealed that due to D-depletion the non-tumorous L929 fibroblast cells required longer time to multiply in vitro and DDW caused tumor regression in mice. Our recent results suggest that NOD may have a central role either in cell cycle regulations or in apoptosis.

33. Naturally occurring deuterium is essential for the normal growth rate of cells

Somlyai G, Jancsó G, Jákli G, Vass K, Barna B, Lakics V, Gaál T.

Febs Lett. 1993 Feb 8;317(1-2):1-4.

Abstract

In nature the ratio of deuterium to hydrogen (D/H) is about 1:6600; this means that the natural concentration of D is about 150 ppm (0.015 atom %). A worldwide survey of hydrogen isotopes in precipitation revealed [1,2] that the D content covers a range of 120 and 160 ppm depending mainly on the site of sampling and there are several

indications that the D/H ratio is not constant in living organisms either [3]. The effect of the replacement of hydrogen with deuterium in biological systems is well documented (e.g. [3,4]), however, the possible role of naturally occurring D in the living organism has never, so far as we are aware, been investigated.The role of naturally occurring D in living organisms has been examined by using deuterium-depleted water (30-40 ppm D) instead of water containing the natural abundance of D (150 ppm). The deuterium-depleted water significantly decreased the growth rate of the L, fibroblast cell line, and also inhibited the tumor growth in xenotransplanted mice. Eighty days after transplantation in 10 (59%) out of 17 tumorous mice the tumor, after having grown, regressed and then disappeared. We suggest that the naturally occurring D has a central role in signal transduction involved in cell cycle regulation.

34. The pathologic anatomy of deuterium intoxication

Paul Bachner, Donald G. MCKay; David Rittenberg
Departments of pathology and biochemistry,College of Physicians and surgeons of Columbia University, Communicated January 9, 1964
Proc Natl Acad Sci U S A. 1964 March; 51(3): 464–471.

Abstract

In 1933, when Urey first described the separation and properties of deuterium,' he suggested that a "marked effect upon living organisms" might be produced in view of the physicochemical differences that existed between hydrogen and its heavier isotope. Shortly thereafter, Lewis observed that tobacco seeds did not germinate in heavy water and did so only slowly in 50 per cent D20. This observation was the first in a long series of experiments that over the course of the ensuing thirty years has demonstrated the widespread and frequently unique effects on biological systems of deuterium oxide. The purpose of this communication is to present the results of our investigations into the nature of the anatomic changes attendant upon the replacement of one third or more of the total body water of a mouse with heavy water. Considerable information has accumulated during the past three decades on the pathophysiology of deuterium intoxication, however, very little information exists on the morphological effects observed in association with the extensive and diverse functional derangements that have been described.

Summary.-(1) Young male mice were given varying concentrations of heavy water ad libitum; their clinical behavior was observed and at death gross as well as microscopic examination was performed. (2) The clinical course was in accord with descriptions previously recorded in the literature and consisted of hyperactivity superseded by lethargy, coma, and convulsions. (3) Microscopic findings included focal renal tubular necrosis, profound alterations in testicular architecture and cellular morphology, and abnormalities of the excretory ducts of the salivary glands. (4) The relationship of the anatomic changes described to the pathophysiology of deuterium intoxication is discussed.

Patents

35. Deuterium Depleted Water (DDW) Using As Adjuvant In Cancer Therapy For Cytostatics Toxicity Reducing

Inventors: Nicolae Manolescu, Serban Constantin Valeca, Rodica Anghel, Ion Balanescu ,Rodin Traicu, Dumitru Marculescu, Ioan Stefanescu
Class name: Drug, bio-affecting and body treating compositions inorganic active ingredient containing ; Publication date: 2008-09-04;Patent application number: 20080213390

Abstract:

A method is provided for utilizing Deuterium Depleted Water (DDW) as an adjuvant in cancer therapy and for reducing cytostatic toxicity. The method includes administration of DDW having a concentration of about 60 ppm, as a daily diet, to animals. The cancer therapy can include a mono-chemotherapy where a single drug or cytostatic is used or a poly-chemotherapy where more than one drug or cytostatic is used. The drug or cytostatic that are used for chemotherapy can include one or more of Cyclophosphamide, 5-Flourouracil, Farmarubicine and Vinblastine. The method can be used to treat different types of cancer.

Claims:

1-2. (canceled)

3. A method of utilizing deuterium depleted water for the manufacture of a medicament for reducing the toxicity of cytostatics by administering of water having 60 ppm concentration, before, during and after mono-chemotherapy with at least one of cyclophosphamide, 5-fluorauracil, farmarubicine and vinblastine, as a daily diet.

4. A method of utilizing of deuterium depleted water for the manufacture of a medicament for reducing the toxicity of cytostatics by administering of water having 60 ppm concentration, before, during and after poly-chemotherapy with at least one of cyclophosphamide, 5-fluorauracil, vincristine and vinblastine, as a daily diet.

5. A method of treating an organism having cancer comprising administering deuterium depleted water, before, during and after chemotherapy, as a daily diet.

Results

All of these studies and examinations show post-therapeutically improvement of the immune system of these animals receiving 60 DDW and cytostatics, and therefore, their therapeutical remission is extended. All of these beneficial effects provide a better protection against cytostatic toxicity. Thus, a better therapeutic index was obtained, which results in prolongation of pets' lives and a remarkable improvement in the comfort of these animals that have different types of cancers.

The results obtained from the studies of the dogs confirm the results obtained from the studies of the rats, and show that 60 ppm DDW has certain properties for cancer organism detoxification, or for an organism that is subjected to the toxic stress generated by cytostatics (i.e., negative side effects) which are used in anti-cancer polychemotherapy.

Thus, 60 DDW can be used as an effective adjuvant, in reducing the toxicity of cytostatics that are used in cancer polychemotherapy, for all organisms including humans and pets.

36. Gerontical and antitumoral method of treatment

Inventor: Dragomirescu Silviu
Classification: - international: A61K33/00; A61K33/00

Abstract

The invention relates to a gerontological and antitumoral method of treatment, by means of deuterium depleted water, which consists in administering light water, respectively superlight SU1 and SU2 RDW-type, having a deuterium content of 120 ppm D2O, as beverage or concentrated beverage, in two successive 30- day stages, separated from each other by a period of 90 ... 180 days.

37. Method for treatment of patients with diabetes mellitus 2006-01-10

Inventor: Timakov Aleksandr Alekseevich, et al.
Published as: RU2004120854 (A)

Abstract

Treatment involves prescription to patient light water as drinking water with the total mineralization 200-500 mg/l, the deuterium content 100 ppm, not above, and the oxygen-18 content 1800 ppm, not above, on the background of dietetic therapy and insulin therapy or intake of hypoglycemic preparations in the daily dose 1000-1500 ml. The first intake is carried out before eating in the morning in the dose 200-250 ml and the remaining amount for a day, 30-40 min before eating or in breaks of eating every day. The curative course is from 28 to 45 days. Method provides declining the blood glucose content and to improve metabolic processes. EFFECT: improved treatment method.

38. Method for producing rice gruel,cream and curry of retort pack using deuterium depleted water (super light water), and effect through taking the same 2005-08-18

Inventor: Seki Kunihiro; Usui Tatsuo
Classification: - international: A23L1/30

Abstract

PROBLEM TO BE SOLVED: To provide a method for maintaining health by solving the following problem: usually retort foods such as rice gruel, cream, curry and the like are produced by using water, but they are impossible to more surely maintain human health by taking the same. SOLUTION: The retort pack foods such as rice gruel, cream, curry and the like are produced by using deuterium-depleted water (super light water). By taking the retort foods, one's health is possible to be maintained.

39. Treatment of cancer, diabetes,mellitus, leukemia, aplastic anemia and insomnia, treatment and prevention of severe acute respiratory syndrome (SARS), rejuvenation, activation of cell and promotion of increase of immune cell by soy sauce prepared by using deuterium-attrited water (super light water) as raw material and method for producing the same ; 2004-12-24

Inventor: Usui Tatsuo; Seki Kunihiro
Classification: - international: A23L1/238

Abstract

PROBLEM TO BE SOLVED: To provide a method for treating and preventing the following diseases and performing the rejuvenation, activation of cells and promotion of the increase of immune cells by solving problems such that, conventionary, the treatments of cancer, diabetes mellitus, leukemia, aplastic anemia and insomnia are usually coped with surgery, radiation treatments, medicinal treatments, and the like, and in these cases, patients visit directly to hospitals or clinics and receive treatments, but in the case of SARS, there is no treating method found. SOLUTION: This soy sauce produced by using deuterium attrited water (super light water) as the raw material can be used for the treatment and prevention of the cancer, diabetes mellitus, aplastic anemia, insomnia and SARS, rejuvenation, the activation of the cells and promotion of increase of the immune cells.