

BREGER, A.Kh.; ORMONT, B.F.; VITING, B.I.; GRIZHKO, V.M.; KOZLOV, V.A.;
KUTSEV, V.S.; CHAPYZHNIKOV, B.A.; CHEPEL', L.V.

Radioactivation method of determining oxygen in semiconducting
materials and metals on the basis of the photonuclear reaction
 $O^{16}(\gamma, n)O^{15}$. Trudy kon.anal.khim. 10:137-141 '60.

(MIRA 13:8)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova, Moskva.
(Oxygen--Analysis)
(Oxygen--Isotopes)
(Semiconductors--Oxygen content)

8/080/60/033/04/02/045

AUTHORS: Vlasov, V.G., Kozlov, V.A.TITLE: The Interaction of Uranium Trioxide With Solid Carbon

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 4, pp 760 - 765

TEXT: The rate of the process of direct reduction of uranium trioxide was investigated. Uranium trioxide was obtained by heating uranium peroxide for 6 hours in an oxygen flow at 400°C. The reducing agents were birch charcoal and sugar charcoal with a carbon content of 99.99%. The investigation was carried out in a high-vacuum installation with continuous control of the weight loss of the sample by means of spring scales. Reduction by birch charcoal was studied within the temperature range 350 - 400°C, and by sugar charcoal within the range 450 - 530°C. Birch charcoal proved to be the more active reducing agent. The activation energy of the reduction process in the case of birch charcoal was 43 kcal/mole and in the case of sugar charcoal 65 kcal/mole. The gaseous phase formed during reduction consisted only of carbon dioxide. The authors try to explain the mechanism of accelerating the reaction of carbon monoxide regeneration, which is the slowest stage in the process of direct reduction of uranium trioxide. There are: 4 graphs and 16 references, 10 of which are Soviet and 6 German.

SUBMITTED: August 24, 1959

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S/030/62/035/003/018/024
D202/D302

21.4100

AUTHORS: Vlasov, V. G. and Kozlov, V. A.

TITLE: Low-temperature carbothermal reduction of U_3O_8

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 3, 1962, 660-663

TEXT: A study of the kinetics of the reduction of U_3O_8 with solid carbon. The authors carried out experiments in a temperature range 625 - 725°C on an installation and by a method described in a previous publication and studied the effect of Na_2CO_3 added to the oxide or to the reducing agent. It was found that the addition of Na_2CO_3 to the carbon slows down the reduction; the addition of the latter to the oxide accelerates the process markedly. The rate of reaction does not depend on the degree of oxygen elimination until U_3O_8 is fully converted to U_4O_9 , but afterwards diminishes proportionally to the degree of reduction. This dependence may be ex-
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Low-temperature carbothermal ...

S/030/62/035/003/018/024
D202/D302

pressed by $\log \frac{a}{a-q} = k\tau$ where a is the degree of reduction (%) corresponding to UO_2 , q - the actual degree of reduction (%), k - a temperature constant and τ - time. Activation energy for the reduction is 56 - 58 kcal/mol. There are 2 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: D. Vangnan and R. W. Mardson, Preprint Nucl. Eng. a. Sci. conf. s.a., 13, 15, 1958.

SUBMITTED: January 30, 1961

Card 2/2

GOLICHENKOV, V.A.; POPOV, V.V.; VSEVOLODOV, E.B.; KOZLOV, V.A.

Protective action of β -mercaptoethylamine against radiation
injury of the crystalline lens exacerbated by trauma. Radio-
biologia 4 no.4:587-592 '64. (MIRA 17:11)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

L 17623-65 ENG(j)/ENT(a) AEDC(a)/APWL/SSD/AMD/PP-A
ACCESSION NR: AP5000096 870205764/004/006/0922/0923

AUTHOR: Delone, N. D.; Kozlov, V. A.

TITLE: The influence of beta-mercaptopyramine (MPA) in decreasing the number of chromosomal rearrangements in Tradescantia paludosa microspores during gamma irradiation ⁶

SOURCE: Radiobiologiya, v. 4, no. 6, 1964, 922-923 ¹⁹

TOPIC TAGS: gamma radiation, Tradescantia paludosa, microspore, radiation protection, beta mercaptopyramine, chromosomal rearrangement

ABSTRACT: This investigation was concerned with the influence of beta-mercaptopyramine (MPA) on the frequency of chromosome rearrangement in Tradescantia paludosa microspores following irradiation of their inflorescences with gamma rays. Chromosome rearrangement is one of the hereditary changes which occurs following exposure to ionizing radiation. The experiment included 4 variants: 1) A control group in which truncated inflorescences were placed in water, 2) a control group in which inflorescences were irradiated with gamma rays but not treated with MPA, 3) an experimental group exposed to gamma

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ACCESSION NR: AP5000096

rays and treated with MPA; 4) an unirradiated experimental group treated with MPA. All irradiated groups received a total dose of 27 r (12 r/hr) at a temperature of 16 ± 10 . The tabulated results show that there was a significant difference in the incidence of chromosome rearrangement between experimental and control groups. The incidence in irradiated inflorescences not treated with MPA was 5.49 ± 0.535 , as compared to 3.04 ± 2.84 % for those treated with MPA. The incidence for unirradiated, unprotected samples was 0.05 ± 0.09 % as compared to 0.07 ± 0.343 for unirradiated samples treated with MPA. The authors cannot explain the mechanism of MPA and can only state that MPA significantly ($R = 4.05$) decreases the number of chromosomal rearrangements following ionizing radiation. Orig. art. has: 3 table.

ASSOCIATION: none

SUBMITTED: 28Mar64

ENCL: 00

SUB CODE: LS

NO REF SOV: 004

OTHER: 001

ATD PRESS: 3151

Card 2/2

SAKSONOV, P.P.; ANTIPOV, V.V.; DOBROV, N.N.; SHASHKOV, V.S.; KOZLOV, V.A.;
PARSHIN, V.S.; DAVYDOV, B.I.; RAZDOVOROV, B.L.; MOROZOV, V.S.;
NIKITIN, M.D.

Prospects for pharmacochemical protection against radiation
injury in space flight. Probl. kosm. biol. 4:119-126 '65.
(MIRA 18:9)

ZHUKOV-VEREZHNİKOV, N.N.; RYBAKOV, N.I.; KOZLOV, V.A.; SAKSONOV, P.P.;
DOBROV, N.N.; ANTIPOV, V.V.; POCOPLELOV, I.I.; PARFENOV, G.P.

Summary of microbiological and cytochemical studies on "Vostok"
spaceships. Probl. kosm. biol. 4:261-269 '65. (MIRA 18:9)

ZHUKOV-VEREZHNIKOV, N.N.; VOLKOV, M.N.; RYBAKOV, N.I.; SAKSONOV, P.P.;
KOZLOV, Y.A.; KONSTANTINOV, P.A.; ANTIPOV, V.V.; DOEROV, N.N.;
ANISKIN, Ye.D.

New ways of studying chemical protection against genetic changes.
Probl. kosm. biol. 4:445-450 '65. (MIRA 18:9)

KOZLOV, V. I.

Role of meteorological elements in the seasonal dynamics of
physiological functions. Nek. voz. kldm. i kraev. pat. no.3:3-20
163.

(MIRA 18:10)

Авторы: С.К. ВОЛКОВА, С.К.; ВОЙНО-ЯСЕНЕЦКАЯ, Ye.M.

Изменения количества нейтрофильных лейкоцитов в крови в зависимости от изменений солнечной активности. Докл. АН СССР, 1973, т. 228, кн. 1, с. 183.

(MIRA 18:10)

KOZLOV, V.A.; PRISLAV, Ia.P.; BORISOV, V.K.

Differences of hematological changes in acute forms of epinephilia
in years of maximal and minimal solar activity. Dokl. Akad. Nauk
USSR, no.3:41-45 '63. (MIRA 18:19)

L 14295-66 EWT(m)/EPF(n)-2 GG/RD

ACC NR: AT6003878

SOURCE CODE: UR/2865/65/004/000/0445/0450

AUTHOR: Zhukov-Vereshnikov, N. N.; Volkov, M. N.; Rybakov, N. I.; Saksonov, P. P.;
Kozlov, V. A.; Konstantinov, P. A.; Antipov, V. V.; Dobrov, N. N.; Aniskin, Ye. D.

ORG: none

TITLE: New ways of studying chemical protection against genetic changes

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 445-450

TOPIC TAGS: bacteria, x ray irradiation, bacterial genetics, chemical agent

ABSTRACT: Aminothiols and some pyrimidine analogs were tested for their ability to block development of infectious phage from prophage after induction of E. coli K-12 (λ) with x-rays. Doses with a previously established non-toxic effect (0.05% concentration) were used. The desired chemical preparation was added to a bacterial culture diluted in a physiological medium. Experimental and control samples were subjected to x-ray irradiation (dose, 15,000 r) and then cultured on agar. The number of induced phage particles in irradiated samples with and without each preparation was then compared. 2-Mercaptopropylamine hydrochloride was

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ACC NR: AT6003878

most effective; cultures treated with it produced 119 times fewer phage particles than control samples. Other good inhibitors of induced phage formation were 2-(gamma-aminopropyl) disulfide dihydrobromide, sodium diethyldithiocarbamate and ammonium dithiocarbamate, which reduced phage production 76.3—70.1 times. Less effective were the salts of β -mercaptoethylamine tested: 2-mercaptoethylamine hydrobromide, 2-mercaptoethylamine disulfide hydrochloride, 2-mercaptoethylamine hydroiodide, and 2-mercaptoethylamine hydrochloride.

The experimental data show the essential connection between the chemical structure of the tested preparations and their ability to block the development of infectious phage. The antigenetic effect of β -mercaptoethylamine preparations is determined by their acid radicals as well as by their base. It may be possible to obtain even more effective preparations of this compound by forming salts with other acids. The failure of 3- β -aminoethylisothiuronium hydrobromide to produce an antigenetic effect is especially interesting because in previous experiments this compound decreased the death rate of animals subjected to a lethal radiation

dose by 70-100%. Orig. art. has: 1 table. [ATD PRESS: 4091-F]
SUB CODE: 06 / SUBM DATE: none / ORIG REF: 013 / OTH REF: 003
Card 2/2

L 14294-66

ACC NR: AT6003881

tained in the second generation. However, preparation P-46 completely removed the injurious radiation effect in that generation. Experimental data indicate the possibility of partially or completely removing the depressing effect of β -radiation on plants with the help of physiologically active compounds. Orig. art. has: 4 tables. [ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 005

CC

Card 3/3

L 23280-66 EWT(1)/EWT(m) SCTR DD

ACC NR: AP6011437

SOURCE CODE: UR/0020/66/167/004/0925/0927

AUTHOR: Kozlov, V. A.; Saksonov, P. P.; Dobrov, N. N.; Antipov, V. V.;
Parshin, V. S.

ORG: none

TITLE: Altered resistance of animals exposed to vibration to the action
of some chemical preparations and physical load

SOURCE: AN SSSR. Doklady, v. 167, no. 4, 1966, 925-927

TOPIC TAGS: vibration, cystamine, strychnine, radiation protection,
combined stress

ABSTRACT: Two series of experiments were conducted on 449 white mice weighing 20—24 g. In the first series, 240 mice were exposed to vibration (70 cps, 0.4 mm, 10 G, 1 hr exposure), after which they were given IP injections of cystamine chlorhydrate (400 mg/kg) or strychnine (1.5 mg/kg) 20 min or 4 hr later. These preparations were selected because they have a therapeutic effect for radiation sickness or injuries and may be used on prolonged spaceflights, should severe radiation conditions occur. It was established that the toxic action of these drugs was elevated in vibrated animals. In the control group, mortality was 45% for cystamine and 47% for strychnine. In the vibrated

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UDC: 629.198.61

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B

L 23280-66

ACC NR: AP6011437

group, these values increased to 53.7% and 61.2% respectively, although a statistical examination of the data revealed that the difference was insignificant. This indicated that vibration affects the reactivity of the organism to these drugs. In the second series, the ability of control and vibrated animals to adapt to hexanol (100 mg/kg) was tested (65 mice). The preparation was IP injected after 15 min or 4 hr of vibration, as well as on a daily basis thereafter. Table 1 shows the re-

Table 1. Duration of the anesthetic effect of hexanol on control and vibrated mice (mean duration by group in min)

Experimental action	No. of mice	Days of hexanol injection				
		1st	2nd	3rd	4th	5th
Hexanol alone	31	115	50	29	31	32
15 min of vibration prior to 1st hexanol administration	18	108	32	28	22	80
4 hr of vibration prior to 1st hexanol administration	16	110	32	27	31	48

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ACC NR: AP6011437

sults of this test. Three days after this test, the animals were given a toxic dose of strychnine (1.5 mg/kg) which was fatal for control mice in 50% of the cases. Mortality for animals which had been exposed to vibration 15 min or 4 hr prior to hexanol administration was 52% and 75%. For mice given hexanol alone, the mortality was 56%. The difference in mortality between these groups was found not to be statistically

Table 2. Swimming duration of control and experimental mice

Test no.	Experimental action	No. of mice	Swimming duration, min (M m)	Reliability		
				Rel. to test 1	Rel. to test 3	Rel. to test 4
1	Control	20	278 ± 12,0	—	—	—
2	Vibration, no cystamine	20	272 ± 0,5	0,4	—	—
3	Cystamine, no vibration	28	145 ± 0,0	10,4	—	—
4	Vibration plus cystamine	28	115 ± 4,8	12,0	3,0	—
5	Cystamine plus vibration	30	103 ± 7,0	12,0	4,5	1,4

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ACC NR: AP6011437

reliable. To test the effects of vibration and cystamine on the working ability of the organism, mice were exercised by swimming. Cystamine (225 mg/kg) was given either 15 min before or 15 min after vibration, whereupon the animals were placed in a tub of water ($24 \pm 1^{\circ}\text{C}$) until exhaustion occurred. Animals unable to swim for 1 hr were eliminated from this test. The results of this test are given in Table 2. These data show that vibration does not decrease working ability but that cystamine given before or after vibration does. Cystamine decreased the tolerance of the organism to exercise but statistically less so than when administered in combination with vibration. Orig. art. has: 2 tables. [CD]

SUB CODE: 06/ SUBM DATE: 29May65/ ORIG REF: 006/ ATD PRESS: 4231

Card

14/4 ULR

ACC NR: AT6036563

SOURCE CODE: UR/0000/66/000/000/0172/0173 6

AUTHOR: Zhukov-Verezhnikov, N. N.; Mayskiy, I. N.; Tribulev, G. P.; Rybakov, N. I.;
Podoplelov, I. I.; Dobrov, N. N.; Antipov, V. V.; Kozlov, V. A.; Saksonov, P. P.;
Parfenov, G. P.; Sharyy, N. I.

ORG: none

TITLE: Some results and trends in the study of the biological effect of cosmic radiation and dynamic flight factors using microbiological and cytological models [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966]

SCURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 172-173

TOPIC TAGS: manned space flight, space biologic experiment, tissue culture, lysogenic bacteria, cosmic radiation biologic effect, combined stress/Voskhod-1

ABSTRACT: Systems of lysogenic bacteria and single layer cultures of normal and cancer cells of man have been used on all spaceflights since the second orbital spaceship. This report presents the results of investigations performed on spaceships of the Vostok and Voskhod types. Biological experiments carried out on Vostok-3, -4, -5, and -6 indicate that phage production of lysogenic culture of E. coli K-12 increases with the duration of the flight. However, a direct linear relationship between the biological

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ACC NR: AT6036563

effect and the time of exposure in space was not established. The results obtained make it possible to assume that the biological effect in the above experiments depends on the combined effect of spaceflight factors, and specifically vibration, weightlessness, and radiation.

Ground experiments have indicated that the sensitivity of a lysogenic bacteria system to gamma irradiation (CO^{60}) increases if the bacteria were previously exposed to vibration. These results not only confirm this supposition but make a more differentiated approach to evaluation of various spaceflight factors possible. However, in order to obtain a more complete picture of the genetic and radiation hazard of such flights, it is necessary to consider data obtained with more highly organized biological objects. Consequently, the results of spaceflight experiments performed with single-layer cultures of somatic human cells are of definite interest. In the series of experiments carried out on Vostok-1, -2, and -4, it was found that viability, and such indices as the coefficient of proliferation, the percentage of dead cells, and the morphological, antigenic, and cultural properties of the tissues, did not differ substantially from controls which were kept at the cosmodrome or the laboratory.

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ACC NR: AT6036563

However, when tissues were subjected to a second spaceflight (on Vostok-4, Vostok-6, and Voskhod-1), the twice-flown tissues showed a definite prolongation in the latent period of the ability to grow, as well as certain other noticeable changes. This makes it possible to surmise that spaceflight factors may have a cumulative effect on human tissue cultures. Further investigations of the biological effects of spaceflight utilizing lysogenic bacteria and tissues of various cultures are contemplated. [W.A. No. 22; ATD Report 66-116]

SUB CODE: 06, 22 / SUBM DATE: 00May66

Card 3/3

ZHUKOV-VEREZHIKOV, N.N.; YAZDOVSKIY, V.I.; MAYSKIY, I.H.; TRIBULEV, G.F.
PEKHOV, A.P.; SAKSGNOV, P.P.; RYBAKOV, N.I.; ANTIPOV, V.V.;
ARTIM'YEV, N.S.; KOZLOV, V.A.; MISHCHENKO, B.A.; YUDIN, Ye.V.
RYBAKOVA, K.D.; ANICKIN, Ye.D.

Microbiological and cytological studies in conquering space.
Probl. kosm. biol. 3:184-192 '64. (MIRA 17:6)

EEC-2/ENG(j)/FSS-2/ENG(x)/ENT(1)/FS(v)-3/EEG(k)-2/ENG(v)/EWA(d)/
EWS(a)-2/ENG(c) Po-4/Fc-5/Pq-4/Pac-4/Pag-2/P1-4 WVH/TT/Lo/Gi

ACCESSION NR: AP5015678

VR/0293/65/003/003/0492/0494
629.198.3:576.809.51

AUTHOR: Zhurkov-Verezhnikov, N. N.; Mayskiy, I. N.; Pekhov, A. P.; Antipov, V. V.;
Babokoy, N. I.; Kozlov, V. A.

TITLE: Investigation of the biological effect of space-flight factors using
lysogenic bacteria in experiments on Vostok-5 and -6

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 3, 1965, 492-494

TOPIC TAGS: space flight, biological effect, E. coli, phage activity, bacteria,
genetics, lysogenic bacteria, chemical antiradiation agent

ABSTRACT: The genetic effects of space flight on lysogenic bacteria were studied,
and a chemical means of protection was investigated. The chemical agent was β -
mercaptopyrylamine, a substance which blocks the formation of induced phage par-
ticles during x-ray and gamma irradiation. As in eight earlier flights (four
Sputnik and four Vostok), a suspension of E. coli K-12 (λ) was used. The bacteria
were divided into three groups: experimental samples, laboratory controls, and con-
trols kept at launch site. Each group contained some untreated samples and some
with β -mercaptopyrylamine (0.05% concentration) added before flight. After each

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L 54862-65

ACCESSION NR: AP5015678

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flight the number of viable bacteria was determined, and an analysis of phage particles was made. Experimental results showed that the number of phage particles in untreated experimental samples significantly exceeded the number in the launch-site controls (3.68 times for Vostok-5). It was also established that phage formation in these experiments on Vostok-5 and Vostok-6 was about the same as during Vostok-3 and Vostok-4. Thus, space-flight factors have a stimulating effect on lysogenic bacteria, as demonstrated by the statistically reliable increase in phage production. However, no direct relationship between this stimulating effect and the length of exposure of the bacteria in space has been detected. Under space-flight conditions, 8-mercaptopyrrolamine almost completely prevents the formation of induced phage particles. In addition, this substance significantly lowers the level of spontaneous phage formation. The protective effect of 8-mercaptopyrrolamine consists of its ability to block the genetic reaction of formation of induced phage. Since the number of viable cells in control and experimental samples was the same, no conclusion can be made about the protective action of this substance against the lethal effects of space flight. Orig. art. has: 1 table. [JB]

ASSOCIATION: none

Card 2/15

L 23976-66 EWT(1)/EWT(m)/FCG/EWA(b) SCTB DD/RD/GW 5C

ACC NR: AT6003847 SOURCE CODE: UR/2865/65/004/000/0119/0126

AUTHOR: Saksonov, P. P.; Antipov, V. V.; Debrov, N. N.; Shashkov, V. N.;
Kozlov, V. A.; Parshin, V. S.; Davydov, B. I.; Razgovorov, B. L.;
Morozov, V. S.; Nikitin, M. D.

ORG: none

68
B+1

TITLE: Perspectives of pharmacochemical protection from radioactive damage during cosmic flights

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 119-126

TOPIC TAGS: astronaut, space medicine, radiation biologic effect, antiradiation drug, biologic acceleration effect, mouse, experiment animal, space physiology, closed ecology system, space flight

ABSTRACT: The authors consider cosmic radiation a real danger for astronauts, particularly during long flights. The work is a survey on existing radioprotectors and a general discussion of biologic conditions in cosmic flight, future research, and requirements for radioprotectors. The present chemical compounds, Mercamine HCL, its salicylate and disulfide, and AET appear sufficiently effective for clinical use against

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L 23976-66

ACC NR: AT6003847

X or gamma rays. Laboratory tests on mice showed that some compounds of the aminothiols series (cystamine, cysteamine, serotonin, AET) exerted significant protective effect in proton irradiation of 600 and 120 Mev. In the search for radioprotectors, other factors affecting the astronaut must also be taken into account, such as weightlessness, vibration, acceleration and changes in pressure. Tests on laboratory animals subjected to such conditions prior to irradiation showed no effect on radiation sickness, but vibration after irradiation was apt to prolong the sickness. Some of the radioprotectors tested in mice and dogs had an adverse effect on stability of the organism under vibration and acceleration. The authors call for studies to establish a stable ecologic system in the cabin which can accompany the astronaut on long trips, for models simulating cosmic flight conditions particularly in regard to radiation dose, and for radioprotective compounds to be compatible with all these conditions. Orig. art. has: none.

SUB CODE: 06, 22/ SUBM DATE: none/ ORIG REF: 040/ OTH REF: 028

Card 2/2 W

L 14245-66 FSS-2/EWT(1)/EWA(j)/FS(v)-3/EEG(k)-2/EWA(d)/T/EWA(b)-2 SGTB TT/DD/JK/RD/
ACC NR: AT6003860 GW SOURCE CODE: UR/2865/65/004/000/0261/0269

AUTHOR: Zhukov-Verezhnikov, N. N.; Rybakov, N. I.; Kozlov, V. A.; Saksonov, P. P.;
Dobrov, N. N.; Antipov, V. V.; Podolslov, I. I.; Parfenov, G. P.

ORG: none

TITLE: Results of ²⁴⁴⁵⁵microbiological and cytological investigations conducted
during the flights of "Vostok" type vehicles

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii,
v. 4, 1965, 261-269

TOPIC TAGS: bacteria, genetics, bacterial genetics, gamma irradiation, cobalt,
radioisotope, microbiology, cytology, space biologic experiment, radiation
biologic effect, biologic vibration effect

ABSTRACT: The biological objects used for space research are carefully selected
genetic indicators. E. coli K-12 (λ), frequently chosen for these experi-
ments, is a reliable biological dosimeter of the genetic effectiveness of
spaceflight factors. When normal and cancerous human cells were exposed
in the Vostok series, it was found that these experimental samples did not
differ essentially from control samples kept on earth. However, some
tendency to intensification of phage production was observed in cultures.

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ACC NR: AT6003860

of E. coli in this series (an increase by a factor of 1.2 on Vostok-2, 4.6 on Vostok-3, and 1.96 on Vostok-4). Data from repeated exposure of the same biological object indicate accumulation of the spaceflight effect, although the character of this accumulation is not clear. In a comparison of the results of Vostoks 3-6, it was not possible to establish a linear dependence of biological effect on time of exposure in space. However, factors causing a genetic effect (an increase in the phage-producing activity of a lysogenic culture) definitely operated during these flights.

The following derived values of induced phage production were calculated: 3 for Vostoks 3 and 5 (corresponding to the inducing effect of 3.2 rad of gamma-rays), and 1.8 for Vostoks 4 and 6 (corresponding to 0.8 rad of gamma-rays). Since the doses quoted are higher than those encountered in spaceflight, the observed genetic effect must therefore be partially due to other factors (such as weightlessness, acceleration, vibration, etc.).

To study the operation of one of these factors, E. coli K-12 was subjected to vibrations of 18, 35, 75, 100, and 700 cps for 15-30 min. and, in another series of experiments, to vibration in combination with Co^{60}

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L 14245-66

ACC NR: AT6003860

gamma-irradiation (dose, 100 rad; dose power, 21 rad/min). The experimental results show that vibration alone does not induce phage production but does increase the sensitivity of lysogenic bacteria to the subsequent influence of gamma-irradiation. It is suggested that vibration helps sensitize cells of a lysogenic culture to the influence of cosmic radiation, although it is also possible that the cause of genetic changes is weightlessness in combination with radiation. Orig. art. has: 1 figure and 4 tables.
[ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 009 / OTH REF: 002

FW
Card 3/3

L 08280-67 -- EWT(1) SCTB DD/GD
ACC NR: AT6036477

SOURCE CODE: UR/0000/66/000/000/0030/0031

AUTHOR: Antipov, V. V.; Kozlov, V. A.; Davydov, B. I. Dobrov, N. N.; Razgovorov, B. L.; Saksonov, P. P.

31
B+

ORG: none

TITLE: New data on changes in the reactivity of the organism under the effect of several spaceflight factors [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24-27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 30-31

TOPIC TAGS: space physiology, combined stress, biologic vibration effect, biologic acceleration effect, ionizing radiation biologic effect, rat, cystamine, strychnine, proton radiation biologic effect

ABSTRACT:

Experiments were performed to test changes in the reactivity of the organism which result from spaceflight factors (vibration, acceleration, ionizing radiation) and their combinations. The functional condition of the organism was evaluated using pharmacological and physical methods.

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L 08280-67 --
ACC NR: AT6036477

It was found that vibration (70 cps at 10 G, for 1 hr) did not affect the stamina of the animal to physical exercise (swimming). The administration of cystamine (225 mg/kg) either before or after vibration caused a marked decrease in the duration of the swimming by the animal. Cystamine alone decreased the stamina of the organism during exercise, but to a significantly smaller degree than in combination with vibration. Vibration had the effect of moderately increasing the sensitivity of the organism to cystamine (400 mg/kg) and strychnine (1.5 mg/kg).

Four hours after exposure to acceleration (8 G, chest-back, for 20 min), a statistically significant drop in the physical stability of the animals was observed. On the seventh day after exposure stability increased. Changes in the reactivity of centrifuged animals with respect to physical exercise corresponded to shifts in the ceruloplasmin in the blood.

Forty days after exposure to protons (energy 120 Mev, doses from 700--1770 rad), the stability of animals to physical loads was lowered. Preliminary centrifugation (8 G for 15 min four hours prior to irradiation with doses of 400 and 700 rad) increased somewhat the resistance of animals to radiation. [W. A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66
Card 2/2

ACC NR: AT6036632

SOURCE CODE: UR/0000/66/000/000/0335/0336

AUTHOR: Saksonov, P. P.; Antipov, V. V.; Dobrov, N. N.; Kozlov, V. A.; Shashkov, V. S.

ORG: none

TITLE: Problems of pharmacochemical protection of the organism against ionizing radiation on spaceflights [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24-27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 335-336

TOPIC TAGS: radiation protection, pharmacology, ionizing radiation biologic effect, cosmic radiation biologic effect, life support system, radiation tolerance, space medicine

ABSTRACT:

Although some pharmacochemical substances have a demonstrated ability to increase the radioresistance of both humans and animals, they cannot be used unconditionally in spaceflight. Special features of the cosmic radiation effect which must be considered in the search for effective

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ACC NR: AT6036632

radioprotective agents include: 1) the complex spectrum of cosmic radiation and its variable dose power (Protons of varying energies and undetermined RBE comprise 80% of cosmic radiation); and 2) alteration of the organism's reactivity to chemical substances, and to the combined effect of radiation and other spaceflight factors, such as acceleration, weightlessness, and altered pressure. Unfortunately, effective radioprotectors alter the organism's reactivity in such a way that it becomes less resistant to the effects of unfavorable flight factors, especially acceleration and vibration.

Before the problem of human pharmacological protection in spaceflight can be solved, a number of important studies must be conducted. First, the possibility of use of antiradiation agents during irradiation of biological objects with low, variable dose powers must be determined. Much more information about the effectiveness of such drugs under the combined influence of radiation and other spaceflight factors is necessary. Then it may be possible to eliminate the unfavorable effect of radioprotectors on the organism's tolerance to other spaceflight factors.

Radioprotective substances intended for use in spaceflight must offer good protection without altering the organism's resistance to other spaceflight factors, even after multiple administration. They must not hinder

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ACC NR: AT036632

work capacity even briefly, and also must be available in convenient medicinal form. In addition, radioprotectors used in spaceflight must not damage the hereditary structures or disrupt the physiological functions of links in the spacecraft life-support system.

[W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

Card 3/3

L 34975-66 EWT(1) SCTB DD/RD

ACC NR: AP6019602

SOURCE CODE: UR/0293/66/004/003/0482/0491

50
49
B

AUTHOR: Davydov, B. I.; Antipov, V. V.; Kozlov, V. A.; Saksonov, P. P.;
Shashkov, V. S.

ORG: none

TITLE: The problem of using radioprotective pharmacological agents under spaceflight conditions

SOURCE: Kosmicheskiye issledovaniye, v. 4, no. 3, 1966, 482-491

TOPIC TAGS: manned spaceflight, radiation protection, cystamine,
methoxytryptamine, acceleration, animal physiology

ABSTRACT: In tests on mice (exposed three times to 44.4 G, 1.4 G/sec accelerations, with 5 min per exposure and 5 min between exposures on a centrifuge with a 4.25 m arm length) and guinea pigs (exposed twice to 22.0 G, 0.7 G/sec with 5 min between exposures), lowered resistance to acceleration was noted after injections of cystamine (80-150 mg/kg), AET (15-150 mg/kg), 5-methoxytryptamine (75 mg/kg), serotonin (50 mg/kg), and aminazine (1-10 mg/kg). A change in resistance after injections of phenatine (2-10 mg/kg) and strychnine (0.05 mg/kg) was insignificant. Thirty min after the combined injection of phenatine (5-10 mg), strychnine (0.5-1.0 mg), and aminazine (2.5 mg), the EKG's and respiration of dogs exposed to 6-8 G (0.2-0.3 G/sec) did not differ from those of control centrifuged animals.

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UDC: 615.7.035.1:614.876(202)

L 34975-66

ACC NR: AP6019602

It was concluded that extreme caution should be exercised in recommending radio-protectors, especially AET, cystamine, and 5-methoxytryptamine, for use on space-flights. The authors thank S. N. Komarov for his active participation in the study. [CD]
Orig. art. has: 5 figures and 3 tables.

SUB CODE: 06,22/ SUBM DATE: 28Feb66/ ORIG REF: 017/ OTH REF: 013/ ATD PRESS: 5029

Card 2/2 JS

L 37643-66 FSS-2/EWT(1)/EEC(k)-2/FCC/T SCTB TT/DD/JK/GW
ACC NR: AP6024650 SOURCE CODE: UR/0216/66/000/004/0592/0593

AUTHOR: Zhukov-Verezhnikov, N. N.; Mayskiy, I. N.; Pekhov, A. P.;
Rybakov, N. I.; Dobrov, N. N.; Antipov, V. V.; Kozlov, V. A.;
Saksonov, P. P.; Podoplelov, I. I.

ORG: none

TITLE: Results of study of the effect of cosmic radiation and other
spaceflight factors on lysogenic bacteria and human cell cultures
[Paper presented at the Anniversary Symposium of the Institute of Bio-
physics of the Czechoslovak Academy of Sciences held in Brno in May
1965]

SOURCE: AN BSSR. Izvestiya. Seriya biologicheskaya, no. 4, 1966,
592-593

TOPIC TAGS: spaceflight effect, radiation effect, HeLa cell, lysogenic
bacteria / Vostok 4 spacecraft, Vostok 6 spacecraft, Voskhod 1 spacecraft

ABSTRACT: Single-layer cultures of normal human cells (fibroblasts and
amniotic cells) and human cancer cells (HeLa strain), together with
cultures of lysogenic bacteria (E. coli K-12), have been consistently
used as radiation indicators on Soviet spacecraft. Results of these
experiments have shown that repeated exposure of a culture of HeLa cells
to spaceflight factors on the Vostok-4 and Vostok-6 flights produced

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UDC: 629.195:577.391

L 37643-66

ACC NR: AP6024650

changes in experimental cells as compared with laboratory controls and with HeLa cells exposed on one spaceflight only. A longer latent period of recovery of growth capacity and other characteristics [not named] were noted in twice-flown cultures. In addition, the coefficient of proliferation for HeLa cells exposed on both Vostok-4 and Vostok-6 was one-half that for intact controls and for HeLa cells exposed to spaceflight only once. These data suggest that spaceflight factors have a cumulative biological effect on human cell cultures. However, a direct dependence of biological effect on length of spaceflight exposure has not been established in experiments with the other radiation indicator, the lysogenic bacteria *E. coli* K-12 (λ). It is interesting to note that when the same HeLa cells used on Vostok-4 and Vostok-6 were also exposed on Voskhod-1, a well-defined drop in the proliferation coefficient was observed in comparison with intact cultures. Experimental colonies were more compact, and there were more dead cells. Other reliable differences [not enumerated] were also found between intact controls and thrice-exposed cultures. However, no reliable differences could be detected between thrice-exposed HeLa cells and a control strain used only on Vostok-6. It is suggested that the biological effect of spaceflight may be the result of the combined influence of radiation, vibration, and weightlessness. [JS]

SUB CODE: 06/ SUBM DATE: none/ ATD PRESS: 5046

Card 2/2 vmb

L 03777-67 FSS-2/ENT(1)/EEC(k)-2/T SCIB TT/DD/JK/WD/CA
SOURCE CODE: UR/0293/66/004/004/0634/0640

ACC NR: AP6028343

AUTHOR: Zhukov-Verezhnikov, N. N.; Mayskiy, I. N.; Delone, N. L.; Rybakov, N. I.;
Kozlov, V. A.; Davydov, B. I.; Antipov, V. V.; Saksonov, P. P.; Rybakova, K. D.;
Tribulev, G. P.

ORG: none

TITLE: Biological investigations on the Voskhod-1 and Voskhod-2 spaceships

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 4, 1966, 634-640

TOPIC TAGS: biologic spaceflight, ~~effect~~, ~~lysogenic~~ bacteria, ~~E. coli~~, ~~EVA~~, ~~radiation~~
~~protective drug~~, ~~β-mercaptopypylamine~~, spaceflight, ~~factor~~, ~~plasma~~, wheat seed/
Voskhod 1, Voskhod 2 spacecraft

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B

ABSTRACT: Experiments were performed on the Voskhod-1 and Voskhod-2 spaceships to test the effects of spaceflight on lysogenic cultures of *E. coli* K-12 (λ). The cultures were carried in 1.5-ml ampules on board spaceships and in Leonov's spacesuit pocket during his EVA. Some of the ampules contained the radioprotective drug β-mercaptopypylamine. Controls were kept at the cosmodrome and at the home laboratory. Results showed that on the basis of viability there was no difference between samples carried on Voskhod-1 and the controls. Experiments on Voskhod-2 resulted in a slightly higher viability on the part of experimental cultures as compared to controls. Phage production of experimental cultures carried on the two flights also did

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UDC: 629.198.621:576.8

L 03777-67

ACC NR: AP6028343

not exceed phage production of controls. Thus, it was not possible to demonstrate the protective properties of β -mercaptopyrrolamine. An attempt was made to determine whether spaceflight sensitized lysogenic cultures of E. coli K-12 (λ) to consequent exposure to small doses of x-rays. Results showed that phage production in space-flown samples was almost identical to that of the controls. In addition, air-dried seeds of pine and winter wheat (PPG-186) were carried on Voskhod-2 and in Leonov's pocket during his EVA for the purpose of determining the genetic effects of space-flight factors. Results did not reveal any substantial differences between the two spaceflight-exposed groups of seeds and the controls. It is assumed that the absence of the effects of spaceflight factors on lysogenic bacteria and seeds of higher plants in these two flights is due to the particular conditions under which these flights took place. Orig. art. has: 5 tables. [BM]

SUB CODE: ²²06/ SUBM DATE: 21Apr66/ ORIG REF: 013/ OTH REF: 002/ ATD PRESS: 5063

Card 2/2 *hh*

L 29354-66 ENT(1)/FCC/T SCTB DD/GW/JK

ACC NR: AP6017503

SOURCE CODE: UR/0219/66/061/005/0064/0067

AUTHOR: Rybakov, N. Z.; Kozlov, V. A.

5-5
5-4

ORG: Laboratory of Microbiological Genetics, Institute of Experimental Biology, Moscow (Laboratoriya gentiki mikmorganizmov Instituta eksperimental'noy biologii)

B

TITLE: The effect of vibration as a spaceflight-related factor on lysogenic culture of E. coli K-12 (λ)

6

SOURCE: Byulleten' eksperimental'noy biologii i meditsiny, v. 61, no. 5, 1966, 64-67

TOPIC TAGS: spaceflight, combined effect, vibration, radiation, gamma ray, lysogenic culture/~~E. coli K-12~~ (λ)

ABSTRACT: Lysogenic cultures of E. coli K-12 (λ) were subjected to vibration alone and in combination with gamma irradiation from a Co⁶⁰ source. Vibration frequencies of 18, 35, 75, 100, or 700 cps were used for periods of 15, 30, or 60 min. It was found that vibration alone did not increase phage production as compared to spontaneous phage formation. The combined effect of vibration and gamma irradiation followed by a second exposure to vibration increased phage production by a factor of 1.4 compared to the effect of irradiation alone. A single exposure to vibration 1 1/2 hr prior to irradiation caused a slight increase in phage production. The effect of vibration after irradiation was negligible. Thus, the induced phage production on the Vostok-3, -4, -5, and -6 flights (which was greater than could be expected from

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UDC: 613.693:613.6441:576.851.095.57

L 29354-66

ACC NR: AP6017503

the physical dose of radiation) can be explained by the combined effect of radiation and vibration. It is assumed that vibration sensitizes lysogenic cultures to the effects of cosmic radiation. Orig. art. has: 2 tables. [BM]

SUB CODE:22,06 SUBM DATE: 15Apr64/ ORIG REF: 002/ ATD PRESS:5009

Card 2/2 *AA*

ROGOV, V.A.; CHEBASHKIN, I.I.; VOYKO-YAS'N BIKVA, Ye.M.

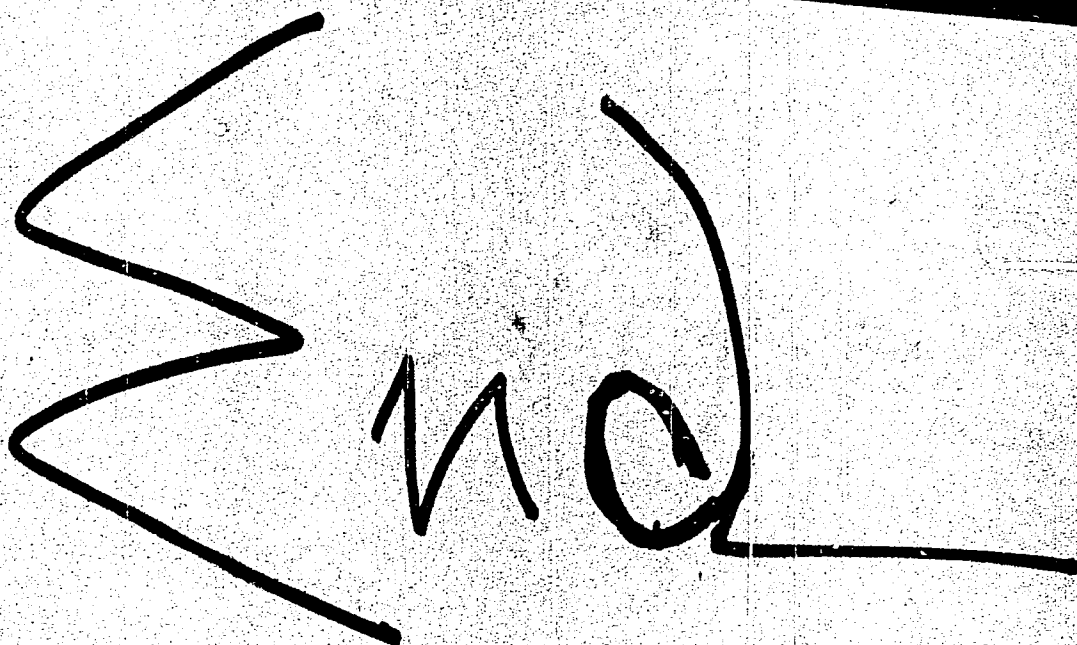
Seasonal fluctuations in the number of basophils in the
peripheral blood. *Probl. para. i parel. krvi* (no.10:16-22)
1964. (CMA 18:3)

1. Chivinskij meditsinskij institut.

REEL # 258

Kozhemyakin, V. G.
to

Kozlov, V. A.

A document page with a grainy, high-contrast background. The page contains several large, thick, black handwritten scribbles. On the left side, there are two large, jagged, zig-zagging lines. In the center, there are some less distinct scribbles that could be interpreted as the letters 'no'. On the right side, there is a large, curved scribble that resembles a 'Q' or a similar character, with a horizontal line extending to the right from its base.