5(2,3)

AUTHORS: Razuvayev, G. A., Corresponding Member, AS USSR, Grayevskiy, A. I. SOV/20-128-2-24/59

TITLE: On the Determination of Organoaluminum Compounds by the Indicator Method

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 309-311 (USSR)

ABSTRACT: The compounds mentioned in the title are used as catalysts in the polymerization of ethylene, propylene and other α-olefines, generally in the form of diluted solutions (0.1-10%). There is no quick and simple method of analyzing such solutions. It was of interest to clarify of what kind is the interaction of the aluminum alkyls, -aryls, and their derivatives with indicators and organic bases. It might be assumed that titration is possible in the presence of the usual acidic-alkaline indicators. The compounds mentioned below were, for this purpose, dissolved in toluene rid of oxygen, and mixed with solutions of methyl violet in dichloroethane. It was found that the indicator, by addition of $Al(C_2H_5)_3$ or its halogen derivatives, turns from

Card 1/3

violet (alkaline form) into yellow or green (acid form). $Al(C_6H_5)_3$ (supplied by Ye. V. Mitrofanova) and $Al(C_4H_9)_3$ (supplied by A. F. Popov) had a similar effect on the indicator. When an excess of any organic base is added to these yellow or green solutions, they turn violet again. Compounds of type AlR_2OR and $AlR(OR)_2$ do not change the color of the indicator.

The neutral properties of these substances can probably be explained by the screening of the 3p-level of the aluminum by free electron doublets of the oxygen. The authors titrated the compounds mentioned in the title with some organic bases: butyl- and ethyl acetate, dimethyl aniline, ethyl ether, pyridine, etc while indicators were used. Such indicators were chosen which are well soluble in organic solvents, and produce a distinct color change in the equivalent point. As a rule, they contained amino groups: methyl violet, crystal violet, gentian violet, etc. Figure 1 shows (a,b,v,g) the titration curves of $Al(C_6H_5)_3$ and $Al(C_2H_5)_2Cl$, of $AlC_2H_5Cl_2$, of the sesquichloride, and of $Al(C_2H_5)_2Br$ by dimethyl aniline in toluene

in the presence of methyl violet. The results obtained allow the following conclusions: 1) The said curves remind of those of the titration of strong acids by strong bases. The aluminum alkyls and -aryls are rather strong aprotonic acids. 2) Dimethyl aniline reacts with these acids in a ratio of 1 : 1. 3) $Al(C_2H_5)_2Br$ and $AlC_2H_5Cl_2$ are very different from $Al(C_6H_5)_3$ and $Al(C_2H_5)_2Br$ with respect to their strength. 4) $Al(C_2H_5)_2Br$ behaves like a dibasic acid, which circumstance has not yet been explained satisfactorily. 5) When $Al(C_2H_5)_2Cl$ and $AlC_2H_5Cl_2$ are present at the same time, they can be determined separately. Table 1 reveals that there is a parallelism between the results obtained by the dilution method, and the electrochemical data. On this basis, the authors put the acids in the following order with respect to their strength: $Al(C_2H_5)_3 < Al(C_2H_5)_2Cl < Al(C_2H_5)_2Br < AlC_2H_5Cl_2$. There are 1 figure, 1 table, and 2 references.

SUBMITTED: June 6, 1959
Card 3/3

S/190/61/003/001/011/020
B119/B216

AUTHORS: Smolyan, Z. S., Grayevskiy, A. I., Demin, O. I., Fukin, V. K., Matveyeva, G. N.

TITLE: Certain rules on polymerization of ethylene on heterogeneous catalysts

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 81-83

TEXT: The authors point out the fact that the catalysts of the type $TiCl_4$ plus organometallic alkylating agent used for the preparation of low-pressure polyethylene rapidly lose their high activity in the course of the reaction, dropping to one sixth of the initial activity within 30 to 40 min. The present work attempts to find the causes for this drop in activity. Experiments were carried out on polymerization of polyethylene on catalysts of the systems $TiCl_4 + AlR_3$ ($Al(C_2H_5)_2Br$, $AlC_2H_5Cl_2$, $Al(C_2H_5)_2\,OC_2H_5$, $Al(C_2H_5)_3$, $AlC_2H_5Cl(OC_2H_5)$ and other compounds). Polymerization was performed in an autoclave at 60°C and a pressure of 4 atm. abs. Individual

Card 1/3

Certain rules on polymerization of...

catalysts were prepared by mixing the components under argon in a special thermostat and kept there for use. Catalyst activity was determined from the initial polymerization rate and, with the same results, from the polyethylene yield. It was found that the activity of all the catalysts is low at the very outset but increases to a maximum within 4 to 5 min and then drops to practically zero within another 20 to 30 min. The same effect was observed on catalysts removed from the argon atmosphere and placed in the reaction vessel in the absence of ethylene for polymerization. The authors found that the activity of a catalyst of the type under study depends on the concentration ratio of Ti^{3+} and Ti^{4+} (low initial activity due to the sole presence of Ti^{4+}, maximum activity on reaching the optimum Ti^{3+} : Ti^{4+} ratio, followed by decrease with increasing Ti^{3+} content). Further experiments showed that the optimum Ti^{3+} : Ti^{4+} ratio and thus also the maximum activity may be maintained constant by careful addition of a corresponding quantity of oxidizing agent (to reoxidize excess Ti^{3+}). Air and O_2, respectively, were used as oxidizing agents. There are 3 figures and 3 non-Soviet-bloc references.

S/081/61/000/024/031/086
B117/B147

AUTHORS: Razuvayev, G. A., Grayevskiy, A. I., Demin, O. I., Minsker, K. S., Sukharev, Yu. G.

TITLE: Oxidation of triethyl aluminum and study of the catalytic properties of the oxidation products

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1961, 240, abstract 24Zh196 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 3, 1960, 373 - 380)

TEXT: The oxidation of solutions of $Al(C_2H_5)_3$ (I) and its derivatives in n-heptane has been studied at various temperatures and concentrations. Reaction products were analyzed as to their content of peroxide compounds and their decomposition products. Peroxide compounds with an amount increasing with decreasing concentration of the solution and decreasing reaction temperature are very unstable. At 20°C they decompose in very weak solutions almost immediately to give oxy derivatives of I. The following oxidation pattern of I is proposed:

S/081/61/000/024/031/086
B117/B147

Oxidation of triethyl ...

$I + O_2 \rightarrow [Al^{-}OO^{+}(C_2H_5)_3] \rightarrow (C_2H_5)_2AlOOC_2H_5 \rightarrow AlC_2H_5(OC_2H_5)_2$ (II);
$II + I \rightarrow 2Al(C_2H_5)_2OC_2H_5$ (III). The polymerizability of II and III in the case of α-olefins was studied on systems of I + II + III + $TiCl_4$. Oxidation products of I and of its derivatives are ordinary catalysts of the Ziegler type but much less reactive. When they are added to I, the quality of the resulting polymer is not deteriorated, but the catalytic activity of I and the molecular weight of the polymer are lowered. In order to eliminate the detrimental effect of the admixture, it is recommended that the total concentration of the $TiCl_4$/RAl catalyst and the ratio of C_2H_5 to Ti should be increased at the same time. [Abstracter's note: Complete translation.]

Card 2/2

S/062/62/000/009/003/009
B179/B101

AUTHORS: Razuvayev, G. A., Grayevskiy, A. I., Minsker, K. S., and Zakharova, V. N.

TITLE: Synthesis and some properties of diethoxy aluminum peroxy cumene

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 9, 1962, 1555 - 1559

TEXT: It is sought to synthesize stable aluminum organic peroxide compounds free from impurities. Three syntheses were studied: (1) the reaction of diethoxy ethyl aluminum with cumene hydrogen peroxide, (2) that of triethoxy aluminum with cumene hydrogen peroxide, and (3) that of diethoxy aluminum chloride with the Na-salt of cumene hydrogen peroxide. Reaction (1) takes place only at temperatures higher than 15 - 20°C and in practice is not completed. Reaction (2), occurring at a maximum temperature of 28 - 30°C likewise does not complete its course and the reaction mixture contains no compound with an R-Al bond. Best results were obtained for the reaction

Synthesis and some properties...

$$Cl\text{-}Al(OC_2H_5)_2 + Na\text{-}O\text{-}O\text{-}C_9H_{11} \rightarrow \left[Cl\text{-}\underset{\substack{| \\ Na\text{-}\ddot{O}| \\ |\ddot{O}\text{-}C_9H_{11}}}{\hat{A}l}(OC_2H_5)_2\right] \rightarrow NaCl + \underset{|O\text{-}\ddot{O}\text{-}C_9H_{11}}{Al(OC_2H_5)_2}\cdot$$

This took place at 5°C in xylene solution. NaCl precipitated as fine crystals, the surplus aluminum alcoholates were evaporated and the peroxide was extracted with ether. Sometimes an amorphous complex compound having the composition $AlCl(OC_2H_5)_2 \cdot NaOOC_9H_{11}$ was precipitated with the NaCl. The peroxide $C(C_2H_5O_2)AlOOC(CH_3)_2 \cdot C_6H_5$ is a solid, white, amorphous substance which melts and decomposes at 113°C; it is easily soluble in xylene, benzene and chloroform. Its solution in xylene decomposes appreciably fast even at room temperature. At 90°C the decomposition is energetic. Its products are dimethyl-phenyl carbinol, acetophenone, α-methyl styrene, ethyl alcohol and aluminum hydroxide. The polymerization of methyl methacrylate, styrene, acrylonitrile, vinylidene chloride and vinyl chloride using $(C_2H_5O)_2AlOOC(CH_3)_2 \cdot C_6H_5$ as radical catalyst, gave a good yield of polymers. In the case of vinyl chloride, the yield of polymer

Card 2/3

increased with increasing content of peroxide in the reaction medium. The polyvinyl chloride (decomposition temperature up to 150°C, thermostability 6 - 7 min) was amorphous and insoluble in either cyclohexanone or dichloro ethane, owing to strongly branched or net-like structure. There are 1 figure and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy institut khimii, Gor'kiy (Scientific Research Institute of Chemistry, Gor'kiy)

SUBMITTED: March 1, 1962

Card 3/3

3492

S/079/62/032/003/007/007
D204/D302

11.7141

AUTHORS: Razuvayev, G. A. and Gravevskiy, A.I.

TITLE: Synthesis of an organic peroxide of aluminum

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 3, 1962, 1006-1007

TEXT: The peroxide $Al(OC_2H_5)_2\ OOC(CH_3)_2C_6H_5$ was prepared by : (1) the interaction of $Al(OC_2H_5)_2Cl$ and $NaOOC(CH_3)_2C_6H_5$, (2) the interaction of $Al(OC_2H_5)_3$ and $HOOC(CH_3)_2C_6H_5$, with and without a solvent, and (3) by the interaction of $Al(OC_2H_5)_2Cl$ with $HOOC(CH_3)_2C_6H_5$ in the presence of Na/EtOH. In the latter case the yield was lower than in (1). The compound, a colorless powder, melted at 113°C with decomposition, was partially hydrolyzed in air and completely in acids and was extremely soluble in hydrocarbons. On heating with iso-PrOH it gave an almost quantitative yield of acetone. Like $Al(OC_2H_5)_2\ OOC_2H_5$, the compound promoted the polymerization of vinyl

Card 1/2

S/079/62/032/003/007/007
Synthesis of an organic... D204/D302

chloride and methyl methacrylate. There are 2 Soviet-bloc references.

SUBMITTED: December 13, 1961

Card 2/2

L 13705-63 EWP(j)/EPF(c)/EWT(m)/BDS ASD Pc-4/Pr-4 RM/WW

ACCESSION NR: AP3003513 S/0020/63/151/001/0110/0113 66

AUTHORS: Razuvayev, G. A. (Corr. member, AN SSSR); Minsker, K. S.; Sangalov, Yu. A.; Grayevskiy, A. I.

TITLE: Initiating low-temperature polymerization of vinyl chloride with triethylaluminum by co-catalytic action of oxygen

SOURCE: AN SSSR. Doklady, v. 151, no. 1, 1963, 110-113

TOPIC TAGS: low-temperature polymerization, vinyl chloride, triethylaluminum, oxygen, diethoxyethylaluminum, syndiotactic macromolecule

ABSTRACT: The induction period of low-temperature (-30C) polymerization of vinyl chloride with triethylaluminum and oxygen depends on the oxidation of triethylaluminum. A study of its 3 oxidation stages indicated high polymerization in the 2nd stage (diethoxyethylaluminum) but no or very small polymerization in the 1st (diethylaluminum ethoxide) and 3rd (diethoxyaluminum peroxyethyl) stages. PVC yield depends on solvent, increasing with solvents in which it is soluble, e.g. in dichlorethane or in halobenzene yield is 5 times greater than in aliphatic or aromatic hydrocarbons, in which PVC is not too soluble. In oxygen-containing solvents PVC yield is lowered: the electron-donor agents complex with TEA,

Card 1/2

L 13705-63
ACCESSION NR: AP3003513

competing with O for the catalyst. The PVC obtained by TEA-O catalyzed low-temperature polymerization differs from normal atactic and from highly crystalline macromolecules, almost similar to the syndiotactic PVC obtained by free-radical polymerization at analogous temperature. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 25Dec62 DATE ACQ: 30Jul63 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 004

Card 2/2

L 17062-63 EPF(c)/EWP(q)/EWT(m)/BDS S/062/63/000/004/006/022
AFFTC Pr-4 RM/WW/JD 63
AUTHOR: Minsker, K.S., Biryukov, V.I., Grayevskiy, A.I., and Razuvayev, G.A.

TITLE: Interaction Between Aluminum Alkyls and Hydrogen

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 4, 1963, 637-640

TEXT: The interaction of triethylaluminum with hydrogen on Ziegler type heterogenic complex catalysts was studied. In the gaseous phase of the reaction ethane is accumulated with the simultaneous formation of diethylaluminum hydride. A connection is shown for interaction of triethylaluminum and hydrogen with the effect of molecular hydrogen on the stereospecific polymerization of olefine under the effect of Ziegler catalysts. An analogy was noted in the activation mechanism of olefin and hydrogen molecules on the Ziegler complex catalysts. There are 2 figures.

SUBMITTED: June 19, 1962

Card 1/1

RAZUVAYEV, G.A.; GRAYEVSKIY, A.I.

Complexes formed by aluminum alkyls with alcohols. Zhur.ob.khim. 33 no.7:2423-2424 Jl '63. (MIRA 16:8)
(Aluminum organic compounds) (Alcohols)

RAZUVAYEV, G.A.; MINSKER, K.S.; SANGALOV, Yu.A.; GRAYEVSKIY, A.I.

Initiation of low temperature polymerization of vinyl chloride by triethylaluminum aided by the cocatalytic action of oxygen. Dokl. AN SSSR 151 no.1:110-113 Jl '63. (MIRA 16:9)

1. Chlen-korrespondent AN SSSR (for Razuvayev).
(Ethylene polymers) (Aluminum) (Catalysis)

MINSKER, K.S.; GRAYEVSKIY, A.I.; RAZUVAYEV, G.A.

Polymerization of methyl methacrylate in the presence of organo-aluminum compounds. Izv.AN SSSR.Ser.khim. no.8:1483-1487 Ag '63. (MIRA 16:9)

(Methacrylic acid) (Polymerization)
(Aluminum organic compounds)

RAZUVAYEV, G.A.; GRAYEVSKIY, A.I.; MINSKER, K.S.; BELOVA, M.D.

Oxidation of aluminum alkyls. Dokl. AN SSSR 152 no.1:114-116 S '63. (MIRA 16:9)

1. Chlen-korrespondent AN SSSR (for Razuvayev).
(Aluminum organic compounds) (Oxidation)

MINSKER, K.S.; SANGALOV, Yu.A.; GRAYEVSKIY, A.I.; RAZUVAYEV, G.A.

Low-temperature polymerization of vinyl chloride in the presence of the system organoaluminum compound - oxygen. Vysokom.soed. 6 no.2:269-273 F '64. (MIRA 17:2)

RAZUVAYEV, G.A.; GRAYEVSKIY, A.I.; MINSKER, K.S.; SANGALOV, Yu.A.; MALYSHEVA, K.M.

Some regularities in the polymerization of vinyl chloride in the presence of Ziegler-type catalysts. Vysokom. soed. 7 no.8:1364-1367 Ag '65. (MIRA 18:9)

1. Nauchno-issledovatel'skiy institut khlororganicheskikh produktov i akrilatov.

L 33530-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pa-4/Pr-4/Pa-4 RPL WW/RM

ACCESSION NR: AP5007567 S/0020/65/160/005/1093/1096

85
34
13

AUTHOR: Razuvayev, G. A. (Corresponding member AN SSSR); Minsker, K. S.; Grayevskiy, A. I.; Chernovskaya, R. P.

TITLE: Copolymerization of vinyl chloride with olefins on Ziegler systems

SOURCE: AN SSSR. Doklady, v. 160, no. 5, 1965, 1093-1096

TOPIC TAGS: polyvinylchloride, poly(vinyl chloride), polyolefin, Ziegler catalyst, alkylaluminum, titanium tetrachloride, copolymerization, vinyl chloride olefin copolymerization, ethylene, propylene

ABSTRACT: Copolymerization of vinyl chloride and ethylene or propylene was attempted on catalytic mixtures of the Ziegler catalyst type. Previous studies by some of the authors had indicated that vinyl chloride does not polymerize to solid polymers in the presence of mixtures of trialkylaluminum or dialkylaluminum halide with titanium tetrachloride, and that alkoxy derivatives of alkylated aluminum were catalytically active. Therefore, copolymerization of vinyl chloride with ethylene or propylene was conducted in the presence of a catalytic system consisting of diethylaluminum ethoxide and titanium tetrachloride or diethylaluminum ethoxide, ethyl(ethoxy)bromoaluminum, and titanium tetrachloride. The

Card 1/3

copolymerization was conducted at 60C and 10 atm. The polymers obtained contained 42—53% chlorine. The yields depended on the catalyst concentration in the reacting mixture. Di-isobutylaluminum isobutoxide was also catalytically active, but to a lesser degree. The copolymers obtained were either a fine white powder (in the case of ethylene) or a slightly granulated powder (in the case of polyethylene). The chlorine content affected the physical, physicochemical, and thermomechanical properties of the copolymers. As compared with homopolymers, the copolymers had a higher solubility in organic solvents; the glass transition temperature of copolymers was higher than that of the poly(vinyl chloride), but lower than that of the polyolefins. The flow point, according to the thermomechanical curves, was in the 60—90C range for the propylene copolymer and in the 90—128C range for the ethylene copolymer. Thermal stability of the copolymers changed within an interval of 3 to 40 minutes with a change in the chlorine content from 50 to 1%. The temperature of decomposition changed in the same manner. Orig. art. has: 1 table and 3 figures. [BN]

ASSOCIATION: Gosudarstvennyy soyuznyy nauchno-issledovatel'skiy institut khlororganicheskikh produktov i akrilatov (State All-Union Scientific Research Institute of Chloroorganic Products and Acrylates)

L 33530-65

ACCESSION NR: AP5007567

SUBMITTED: 080ct64 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 003 OTHER: 000 ATD PRESS: 3208

Card 3/3

SHADRIN, Yevgeniy Grigor'yevich; GRAYEVSKIY, A.M., red.; SYCHKIN, A.M., tekhn.red.

[The first step; results of the first year of the seven-year plan in Perm Province] Pervyi shag; itogi pervogo goda semiletki v Permskoi oblasti. Perm', Permskoe knizhnoe izd-vo, 1960. 46 p. (MIRA 14:3)
(Perm Province--Agriculture)

PETROV, Ivan Ivanovich; GRAYEVSKIY, A.M., red.; FILIPPOVA, K.G., tekhn. red.

[Towards a new upsurge in the agriculture of the western Urals] K novomu pod"emu sel'skogo khoziaistva Zapadnogo Urala. Perm', Permskoe knizhnoe izd-vo, 1960. 29 p. (MIRA 14:11)
(Ural Mountain region--Agriculture)

PLOKHINSKIY, Aleksey Andreyevich; GRAYEVSKIY, A.M., red.; SUKMANOVA, K.G., tekhn.red.

[Industrial equipment of communist tomorrow] Tekhnika kommunisticheskogo zavtra. Perm', Permskoe knizhnoe izd-vo, 1960. 60 p. (MIRA 14:2)
(Industrial equipment--Technological innovations)

BAKANOV, L.V.; GRAYEVSKIY, A.P.; LEBEDEV, V.D.; STABNIKOV, M.V.

Determining the composition of matter filling the sensitive layer of a diffusion chamber. Prib. i tekh. eksp. 9 no.1:197-198 Ja-F '64. (MIRA 17:4)

1. Fiziko-tekhnicheskiy institut AN SSSR.

GRAYEVSKY, E. J.

E. J. Grayevsky: "Thermopreferendum thermal optimum in freshwater mollusks and in arthropoda." (p. 455)

SO: Journal of General Biology Vol. 7, No. 6, 1944

GRAEVSKIY, E. Ya.

GRAEVSKIY, E. Ya. "Action of Ultra-violet Rays upon the Spores of Phycomyces notens at the Temperature of Liquid Air and at Room Temperature," Comptes Rendus (Doklady) de l'Academie des Sciences de l'URSS, vol. 53, 1946, pp. 843-846. 511 P444

SOURCE: SIRA SI 90-53 15 Dec. 1953

GRAYEVSKIY, E. Ya.

"The Action of Ultraviolet Rays at the Temperature of Liquid Air, and at Room Temperature, on the Spores of Phycomyces Nitens," DAN SSSR, 53, 9, pp 849-52, 1946.

GRAYEVSKIY, E. Ya.

"The Radiation-Sensitivity of Protoplasm at the Temperature of Liquid Air," Priroda 11, pp 57-58, 1947.

GRAYEVSKIY, E. Ya. and STRELIN, G. S.

Mbr., Central X-Ray, Radiological, and Cancer Institute, USSR Ministry of Public Health, -1947-

"Correlation Between Different Damage Indicators of an Isolated Muscle Damaged by Freezing," Dok. AN, 58, No. 2, 1947

GRAYEVSKIY, E. YA.

PA5/49T97

USSR/Medicine - Protoplasm May 48
Medicine - Cold, Effects

"Life and Low Temperature," E. Ya. Grayevskiy, 12½ pp

"Priroda" No 5

Discusses effect of near-freezing temperatures on protoplasm, crystalline condition of protoplasm and harmful effect of ice, and effect of deep freezing on protoplasm.

5/49T97

USSR/Medicine-Intestines, Bacteriology Nov/Dec 49
Medicine-Cold Resistance

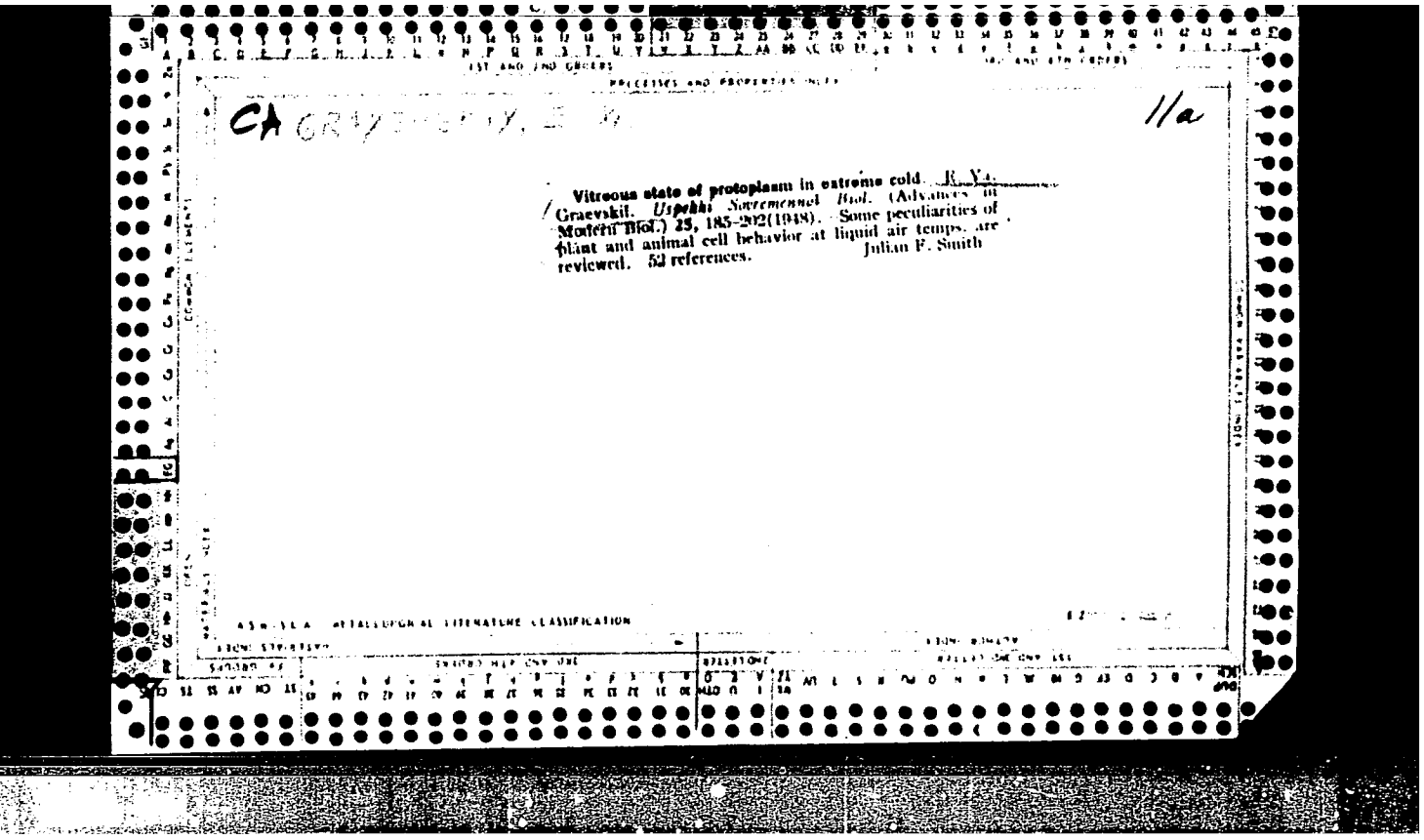
"Reasons for Protoplasmic Deterioration Due to Severe Cold," L. Ya. Troyevskiy, Yu. A. Medvedeva, Lab of Experimental Biol, Gen Roentgenol, Radiol and Cancer Inst, Leningrad, 1½ pp

"Zhur Obshch Biol" Vol IX, No 6

Describes series of experiments on various intestinal flora, e.g., Eberthella Typhosa, B. of Flexner, and Escherichia coli. Results show these bacteria were affected only at the moment of cooling and heating, when ice formation is possible, and not during the period when the object remained at the temperature of liquid air. Concludes that resistance to cold of bacteria containing a considerable amount of water is evidently due to their small size, which ensures rapid dehydration of cells when surrounding medium freezes, thereby facilitating vitrification of protoplasm. Under conditions favorable to crystallization however, extreme cold can kill even resistant bacteria.

Submitted 22 Jan 47

PA 49/49T63



CA CRYOBIOLOGY, 3 No.

11a

Vitreous state of protoplasm in extreme cold. R. V. Graevskii. *Uspekhi Sovremennoi Biol.* (Advances in Modern Biol.) **25**, 185–202(1948). Some peculiarities of plant and animal cell behavior at liquid air temps. are reviewed. 52 references. Julian F. Smith

CA GRAVESKIY, E., Va.

Photodynamic action. E. Va. Gracyskii. *Uspekhi Sovremennoi Biol.* **32**, 330–45(1951).—Photodynamic effects, e.g. of x-rays, are reviewed with respect to their influence on cell division and other biol. processes and their sensitivity to dyes such as methylene blue and neutral red 22 references. Julian F. Smith

GRAYEVSKIY, Ye.Ya.; OCHINSKAYA, G.K.; SHAAK, M.V.

Nature of the photodynamic process. Zh. obsh. biol., Moskva 13 no. 3:211-231 May-June 1952. (CLML 22:4)

1. Laboratory of Experimental and Pathological Morphology of the Central Roentgenological, Radiological, and Cancer Institute of the Ministry of Public Health USSR.

GRA[illegible]EVSKIY, Ye.Ya.

Relation of photodynamic process to temperature. Doklady Akad. nauk SSSR 83 no.2:215-217 11 Mar 1952. (CLML 22:1)

1. Presented by Academician N. A. Maksimov 2 January 1952. 2. Central Roentgenological, Radiological, and Cancer Institute, Leningrad.

GRAYEVSKIY, Ye. Ya.
GRAYEVSKIY, E. YA.

USSR

Photodynamic effect in the ultraviolet spectrum. E. Ya. Grayevskii (Central Roentgenol., Radiol. and Cancer Inst., Ministry of Health, Leningrad). *Doklady Akad. Nauk S.S.S.R.* 83, 303–6(1952).—To det. the bactericidal effect of the ultraviolet rays in the presence of absorbers a no. of dyes, methylene blue, New Methylene Sky Blue N, eosin, erythrosin, acridine red and orange, and trypaflavine, were added to cultures of *Escherichia coli* and *Paramecium caudatum*. No increased effect was noticed. The effectiveness of the dyes is apparently limited to radiation in the visible range. The 24-hr.-old cultures were dild. with a physiol. soln., and the dye was added to make a concn. of 0.005–0.00025%. After 30 min. the cultures were placed on slides and exposed to radiation for 5–30 min. 15 references.
B. Gutoff

GRAYEVSKIY, Ye. Ya.

Beta-rays sensitization of bacteria to the action of high and low temperature and to repeated effect of beta-rays. Doklady Akad. nauk SSSR 83 no.4:565-568 1 Apr 1952. (CLML 22:2)

1. Presented by Academician A. I. Oparin 31 January 1952.

GRAYEVSKIY, E. Ya.

Effect of oxygen on the harmful action of various ionizing radiations. E. Ya. Graevskiĭ and G. K. Ochinskaya. *Doklady Akad. Nauk S.S.S.R.* 89, 737–40(1953).—*Escherichia coli* were irradiated at 15° with x-, β-, or γ-radiation *in vacuo* or in contact with O-air. With β-radiation no significant difference in lethal action of radiation in the presence or absence of O was observed. With γ-radiation the lethal action of radiation was decreased *in vacuo* by a factor of about 2.3. With x-radiation the results were similar and the survival factor was 2.6. The results are correlated with those of Allsopp (*C.A.* 38, 4805[1]).
G. M. Kosolapoff

GRAYEVSKIY, E.Ya. (Moscow)

Biological effect of ionizing radiation. Usp.sovr.bio. 37 no.2: 158-176 Mr-Ap '54. (MLRA 7:5)
(Radiation--Physiological effect) (Ionization)

M-57, 6 Jan 55 - Translation

T-7

USSR/Human and Animal Physiology - Internal Secretion.
Hypophysis.

Abs Jour : Ref Zhur - Biol., No 18, 1958, 84339

Author : Grayevskiy, E.Ya., Meyfakh, A.A.

Inst : AS USSR

Title : The Role of Hypophysis in Impairments of Amphibian Ova Caused by General Ionizing Irradiation.

Orig Pub : Dokl. AN SSSR, 1956, 111, No 5, 1104-1106

Abstract : Frogs (F) were irradiated with gamma rays for 19 hours (7,000 r), and then kept in a temperature of 16-17° [C] for 14 days. In another test, irradiation doses of 10,000 r were used, and after irradiation the animals were kept at the above mentioned temperature for 21-30 days. Then, F were killed and their hypophysis was inserted into the lymphatic sac of female frogs, which have been kept at a

Card 1/2

GRAYEVSKIY, Ye. Ya.

Studies on the protection of animal organism against the harmful action of ionizing radiations. E. Ya. Graevskii. MD
Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii 1955, *Zasedaniya Otdel. Biol. Nauk*, 34–49. NW
—Tests of various substances were made with mice subjected to 700 r. of x-radiation or higher (lethal dose being 700 r.). A protective prophylaxis was obtained with CO, CO_2, heroin, morphine, adrenaline, and phenamine. A therapeutic protective action resulted from intravenous injections of bone marrow homogenate and to a lesser extent of nucleoproteins derived from cell nuclei, as well as dil. NaOH, $NaHCO_3$, and phosphate buffers. CO was the most effective agent found in the 1st group, bone marrow in the 2nd group. The protective action from a histological viewpoint is to some extent a delaying action for the damage cycle, and accelerative action in the regeneration cycle. The protective action of CO is that of general reduction or repression of the radiation effects. 51 references.
G. M. Kosolapoff

GRAYEVSKIY, E. Ya.

USSR/Biology - Experimental morphology

Card 1/1 Pub. 22 - 23/54

Authors : Graevskiy, E. Ya., and Korchak, L. I.

Title : Content of sulfhydryl groups in muscular tissue in the normal state and after application of X-rays in fatal doses

Periodical : Dok. AN SSSR 102/5, 939-941, June 21, 1955

Abstract : Experiments are described which were conducted to determine the effect of ionizing radiation, in fatal doses, on the content of sulfhydryl groups in muscular tissues of animals. The experiments were conducted with white mice exposed to X-rays of 700 r(roentgen). The content of sulfhydryl groups were measured in the brains, kidneys, liver, lungs, and spleen of normal animals and animals subjected to X-rays. Twelve references: 1 French, 2 USSR, 3 USA, 3 Germ. and 3 Brit. (1947-1953). Table.

Institution : The Acad. of Sc., USSR, A. N. Severtsov Institute of Animal Morphology

Presented by : Academician A. I. Oparin, February 17, 1955

GRAFOVSKIY, E. Ya.

USSR / General Biology. Physical and Chemical Biology. B-1

Abs Jour : Ref Zhur - Biol., No 2, 1958, No 4738

Author : Grafovskiy, E. Ya., Zinov'eva, E.G.

Inst : Not given

Title : The Effect of Small Quantities of Ionizing Radiation on Paramaecium Caudatum (on Radio-Stimulation).

Orig Pub : Dokl. AN SSSR, 1956, 110, No 3, 379-382

Abstract : The effect of small doses (0.005, 0.05, 0.5, 2.5 and 10 rep per hour) of radioactive emanations was studied on the rate of Paramaecium caudatum division. The radiation was conducted uninterruptedly for 7 days. S^{35} (in the form of $Na_2S^{35}O_4$) at a dose of 0.02 rep per hour and I^{131} (in the form of NaI^{131}) at doses of 0.05 - 5 rep per hour yielded

Card : 1/2

GRAYEVSKIY, Emanuil Yakovlevich; SHAPIRO, Nikolay Iosifovich; SHAPIRO, F.B., redaktor izdatel'stva; NICHIPOROVICH, A.A., otvetstvennyy redaktor; ASTAF'YEVA, G.A., tekhnicheskiy redaktor

[Present-day problems in radiobiology.] Sovremennye voprosy radiobiologii. Moskva, Izd-vo Akad.nauk SSSR, 1957. 93 p. (MLRA 10:5)

(Radiobiology)

On the Absence of the Protective Influence of the Histotoxic Hypoxia Under the Action of an Ionizing Radiation

is shortly discussed. Previous tests showed the following: Neither carbon monoxide nor potassium cyanide in the concentrations and durations of tests occurring here essentially changed the surviving quota of the bacteria and their capability of propagation. The results of these radiation-tests in bacteria are compiled in a table. In their action upon microorganisms before and during the radiation neither carbon monoxide nor potassium cyanide exerted a favorable influence upon the capability of propagation of the radiated bacteria. In most cases even a tendency toward intensification of the radiation-damage was noticed in the presence of potassium cyanide and carbon monoxide. Thus the oppression of the respiration-enzyme-systems does not change the sensitivity to radiation of the bacteria Escherichia coli. The authors further investigated the influence of potassium cyanide upon the radiation-damage of mammals (white mice). The introduction of potassium cyanide in almost lethal doses does not cause any essential increase in the surviving quota and no marked prolongation of the lives of the radiated animals. This is

GRAYEVSKIY E. YA.

AUTHORS: Grayevskiy, E. Ya., Korchak, L. I. 20-4-19/60

TITLE: The Influence of X-Radiation on the Distribution of Dyestuffs Intravenously Introduced in Mice Tissues (Vliyaniye rentgenovskogo izlucheniya na raspredeleniye v tkanakh myshey vnutrivenno vvedennykh krasiteley).

PERIODICAL: Doklady Akad.Nauk SSSR, 1957, Vol. 115, Nr 4, pp. 7o2 - 7o5 (USSR)

ABSTRACT: At first reference is made to 16 relevant earlier works. The present paper shall determine how the distribution of substances introduced into the organism changes under the influence of radiation and by what the changes are determined. The test was made with 6-8 weeks old white mice of both sexes with a weight of from 18 to 22 g. The entire animals were once irradiated with X-rays (dose 4o, 7oo and 5ooo r with a dose power of 47 -84 r/min). In the first series of tests the distribution of a neutral red dyestuff and of methylene blue in the organs of normal and irradiated mice was investigated. These dyestuffs were intravenously introduced at different times (2 and 6 hours, 1 and 3 days). 6o minutes after the introduction of the dyestuff the animals were beheaded and the dyestuff extracted from liver, spleen, brain, lungs, kidneys and intestines. The data thus obtained are expressed in percents of the dyestuffs accumulated in the corresponding organs of the non-irradiated control animals and compil-

Card 1/2

GRAYEVSKIY E YA

AUTHORS: Grayevskiy, E. Ya., Zinov'yeva, Ye. G. 20-3-16/59

TITLE: On the Problem of the Possibility of Changing the Radio-Sensitivity of a Cell by Means of Fluorochromes (K voprosu o vozmozhnosti izmeneniya radiochuvstvitel'nosti kletki pri pomoshchi fluorokhromov)

PERIODICAL: Doklady AN SSSR, Vol. 118, Nr 3, pp. 476-478 (USSR)

ABSTRACT: The sensitation of biological objects for ionizing radiation by means of fluorochromes would be of considerable interest for radio-therapeutics. Besides the finding of a correlation between the radio sensitivity of the cells and the hematoporphyrine, which is contained in them, would render possible the explanation of the mechanism of the initial reaction, which takes place under the influence of the radiation. In this connection the authors wanted to explain, how far this dye-like substance can change the radio sensitivity of a cell. The effect of the following dyes was investigated: Hematoporphyrine (0,001 - 0,005 %), trypaflavine (0,00002 - 0,0001 %), and fluorescine (0,00005 - 0,0002 %). 300 parametia (parametsiya) in a 0,3 ml non-

Card 1/3

On the Problem of the Possibility of Changing the Radio-Sensitivity of a Cell by Means of Fluorochromes

peptoneous medium (which contained the dye in one of the here given concentrations) and control-parametia of the same quantity and in the same medium, but without dye (control I) subjected in plexiglas cylinders to an action of X-rays (dose 100 kiloroentgen) once and at the same time. Also the other conditions of the irradiation are given. As second control for the darkness effect of the dye (control II) parametia were used, which were submerged for 60 minutes in the highest concentrations of the dye and which were not irradiated. The authors observed the velocity of cell division and the rate of survival of the animals. The results of these experiments are compiled in a table. An ionizing radiation of 100 kiloroentgen noticeably suppresses the tempo of the division of the infusoria on the first day after the action of the radiation. But the preparation velocity was normalized completely already on the second day. The here applied fluorescence-materials did not sensitize the infusoria against the Roentgen radiation. The dyes under the influence of 100 kiloroentgen did not become toxic either and the sensitivity of the irradiated parametia against the colours does not change noticeably in this case. The photo-

On the Problem of the Possibility of Changing the Radio-Sensitivity of a Cell by Means of Fluorochromes

dynamic effect is not very probable in case of irradiation with X-rays. According to the results found here the increase of the radio sensitivity of the organisms and tissues in the presence of fluorochromes is to be explained obviously by the summation of the effect of the ionizing radiations and of the chemical or photodynamical effect of th colour or of the pigment. There are 1 table and 9 references, 6 of which are Slavic.

ASSOCIATION: Institute for Morphology of Animals imeni A. N. Severtsov AN USSR (Institut morfologii zhivotnykh imeni A. N. Severtsova Akademii nauk SSSR)

PRESENTED: August 8, 1957, by A. I. Oparin, Member of the Academy

SUBMITTED: August 2, 1957

AVAILABLE: Library of Congress

Card 3/3

GRAYEVSKIY, E. Ya.

"Investigation of Local and Delayed Effects of Ionizing Radiation."

paper to be presented at 2nd UN Intl.' Conf. on the preaceful uses of Atomic Energy, Geneva, 1 - 13 Sept 58.

21(3)
AUTHORS: Grayevskiy, E. Ya., Zinov'yeva, Ye. G. SOV/20-121-5-19/50

TITLE: An Investigation of the Radiosensitivity of a Cell in a Repeated Influence of Ionizing Radiation (Issledovaniye radiochuvstvitel'nosti kletki pri povtornykh vozdeystviyakh ioniziruyushchey radiatsii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 5, pp 837 - 840 (USSR)

ABSTRACT: The authors investigated the ability of unicellular organisms to heal radiation damage and to adapt themselves to such affections. These experiments were carried out on Paramecium caudatum, the method of the investigations was discussed in previous papers (Refs 1,2). The variations of the rate of cell fission and of the percentage of the surviving organisms of Paramecium caudatum after single and repeated irradiations were used as criteria. The unicellular organisms were irradiated by a dose of 100 000 r at a temperature of 0°C. After such an irradiation, all the organisms continued to live if

Card 1/3

transplanted into a non-irradiated medium. But the rate of the cell fission is diminished by 80% on the first day after the irradiation. After 2-3 days, the fission velocity is restored to its initial value. The variations of the radiosensitivity of the Paramecia under the influence of radiation were investigated by repeated irradiation of the same dose (100 000r). There were various intervals between the initial and the repeated irradiations. After repeated irradiation of the parameciae by 100 000r (in intervals of 3 and 6 hours, total dose 200 kr) the death rate amounted to 93 and 87%, respectively. But the slowing down of the fission velocity was not noticeably different from the parameciae which were irradiated only once. The authors then investigated the radiosensitivity for the case that the total dose of radiation is gradually increased. The decrease of the fission velocity did not depend on the total dose, it was caused by the immediately received dose. The survival rate of the infusories depends on the manner of irradiation

in a more complicated way. As a rule, the survival rate was not changed by repeated irradiations. But in some cases very distinct periods of especially high sensitivity were observed on the background of the monotonous reactions caused by any repeated irradiation. According to these results, the vegetative functions affected by the radiation are quickly and practically totally restored if the cell is transplanted into normal conditions. There are 2 tables and 3 references, which are Soviet.

ASSOCIATION: Institut morfologii zhivotnykh im.A.N.Severtsova Akademii nauk SSSR (Institute of Animal Morphology imeni A.N. Severtsov, AS USSR)

PRESENTED: May 25, 1958, by A.I.Oparin, Academician

SUBMITTED: April 19, 1958

21(3) SOV/20-122-3-16/57

AUTHORS: Grayevskiy, E. Ya., Konstantinova, M. M.

TITLE: On the Antiradiation Protective Effect of Substances Blocking the Transport of Oxygen by Hemoglobin (O protivoluchevom zashchitnom deystvii veshchestv, blokiruyushchikh transport kisloroda gemoglobinom)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 381-384 (USSR)

ABSTRACT: The authors made a rough comparison of the variations of the accumulations of inactivated hemoglobin in blood with the protective effect at various instants of time after the beginning of the influence of the protective substances. The experiments were carried out on grown-up male and female white mice (weight 20 - 25 g, age 8 - 12 weeks). The animals were totally irradiated by a dose of 900 r of Co^{60} γ-radiation. The dose rate amounted to 600 r/min. The authors investigated the inactivation and the restoration of hemoglobin at various instants of time after the introduction of sodium nitrite into the organism or after placing the animals into an atmosphere containing carbon monoxide. The survival rate of the irradiated animals

Card 1/3

was determined for a time of 30 days. The amount of methemoglobin distinctly grows already 5 minutes after the introduction of sodium nitrite, and it reaches its maximum value (65 %) 40-60 minutes after the introduction of sodium nitrite. The content of methemoglobin maintains this value for 1 - 1,5 hours. A distinct protective effect of sodium nitrite cannot be observed before 20 minutes after its introduction into the organism. The maximum of the protective effect was observed 40 - 60 minutes after the introduction. The period of the maximum intensity of the protective action corresponds to the period of the highest content of methemoglobin in the blood. In the experiments with carbon monoxide, the coincidence of the curves of the hemoglobin inactivation and of the survival rate was still better. A connection between the quantity of the inactivated hemoglobin and the intensity of the protective effect was found. The protection due to carbon monoxide is more efficient. The following conclusion may be drawn from the data discussed in this paper: The protective effect of the prophylactic introduction of sodium nitrite or carbon monoxide before and during the irradiation is caused by the hypoxia due to the suppression of the oxygen transport. There

On the Antiradiation Protective Effect of Substances Blocking the Transport of Hemoglobin

are 2 figures and 14 references, 5 of which are Soviet.

ASSOCIATION: Institut morfologii zhivotnykh im. A. N. Severtsova Akademii nauk SSSR
(Institute of the Morphology of Animals imeni A. N. Severtsov, Academy of Sciences,USSR)

PRESENTED: May 22, 1958, by A. I. Oparin, Academician

SUBMITTED: May 15, 1958

STUDITSKIY,A.N., otv.red.; GRAYEVSKIY,E.Ya., red.; GRIGOR'YEV,T.A., red.; YELISEYEV,V.G., red.; ZBARSKIY,I.B., red.; LIOZNER,L.D., red.; MITSKEVICH,M.S., red.; FRIDENSHTEYN,A.Ya., red.; KHRUSHCHOV,G.K., red.; CHENTSOV,Yu.S., red.; SMIRNOV,Z., red.; LAVRENT'YEVA,G., tekhn.red.

[Transactions of the Second Histological Conference; plastic and restorative processes] Plasticheskie i vosstanovitel'nye protsessy; trudy Vtoroi gistologicheskoi konferentsii. Moskva, Mosk. nauchn.ob-vo anatomov, gistologov i embriologov, 1959. 319 p. (MIRA 14:5)

1. Kafedra gistologii Moskovskogo gosudarstvennogo universiteta im.M.V.Lomonosova, Moskva (for Studitskiy). 2. Laboratoriya radiobiologii Instituta morfologii zhivotnykh im.A.N.Severtseva AN SSSR, Moskva (for Grayevskiy, Zbarskiy) 3. Kafedra gistologii, i embriologii Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta, Leningrad (for Grigor'yev). 4. Kafedra gistologii i embriologii 1-go Meditsinskogo instituta im.Sechenova, Moskva (for Yeliseyev). 5. Gruppa biokhimii kletochnykh struktur Instituta morfologii zhivotnykh im.A.N.Severtsova AN SSSR, Moskva (for Zbarskiy). 6. Laboratoriya rosta i razvitiya Instituta eksperimental'noy biologii AMN SSSR, Moskva (for Liozner). 7. TSentral'naya nauchno-issledovatel'skaya Laboratoriya 2-go Moskovskogo meditsinskogo instituta im.N.I.Pirogova, Moskva, (for Khrushchov).
(HISTOLOGY--CONGRESSES)

GRAYEVSKIY, E.YA.

21(4); 17(0) PHASE I BOOK EXPLOITATION SOV/2808

International Conference on the Peaceful Uses of Atomic Energy. 2d, Geneva, 1958

Doklady sovetskikh uchenykh; radiobiologiya i radiatsionnaya meditsina (Reports of Soviet Scientists; Radiobiology and Radiation Medicine) Moscow, Izd-vo Glav. upr. po ispol'zovaniyu atomnoy energii pri Sovete Ministrov SSSR, 1959. 429 p. 8,000 copies printed. (Series: Vtoraya Mezhdunarodnaya konferentsiya po mirnomu ispol'zovaniyu atomnoy energii. Trudy, tom 5)

General Ed.: A.V. Lebedinskiy, Corresponding Member, USSR Academy of Medical Sciences; Ed.: Z.S. Shirokova; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This book is intended for physicians, scientists, and engineers as well as for professors and students at vtuzes where radiobiology and radiation medicine are taught.

COVERAGE: This is Volume 5 of a 6-volume set of reports delivered by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held on September 1-13, 1958, in Geneva. Volume 5 contains 32 reports edited by Candidates of Medical Sciences S.V. Levinskiy and V.V. Sedov. The reports cover problems of the biological effects of ionizing radiation, future consequences of radiation in small doses, genetic effects of radiation, treatment of radiation sickness, uses of radioactive isotopes in medical and biological research, uses of atomic energy for diagnostic and therapeutic purposes, soil absorption of uranium fission products, their intake by plants, and their storage in plants and foodstuffs. References accompany each report.

Reports of Soviet Scientists (Cont.) SOV/2808

Card 3/7

12

GRAYEVSKIY, E.Ya.; KORCHAK, L.I.

Factors which weaken the harmful action of ionizing radiations in mammals. Trudy Inst.morf.zhiv. no.24: 5-27 '59. (MIRA 13:3)
(X rays--Physiological effect)
(Radiation protection)

GRAYEVSKIY, E.Ya.; KORCHAK, L.I.

Distribution of dyes intravenously injected in the tissues of normal and X-rayed mice. Trudy Inst.morf.zhiv. no.24: 28-37 '59. (MIRA 13:3)
(STAINS AND STAINING (MICROSCOPY))
(X RAYS—PHYSIOLOGICAL EFFECT)

GRAYEVSKIY, E.Ya.; ZINOV'YEVA, Ye.G.

Effect of small doses of ionizing radiation on the survival and rate of division of Paramecium caudatum. Trudy Inst.morf.shiv. no.24:160-171 '59. (MIRA 13:3)
(Radioactivity--Physiological effect)
(Paramecium)

GRAYEVSKIY, E.Ya.; SHAPIRO, I.M. (Moskva)

Cell destruction and repair following injury of the organism by ionizing radiations. Usp. sovr. biol. 47 no.2:185-203 Mr-Ap '59. (MIRA 12:7)
(RADIATIONS, eff.
cell destruction & post-irradiation regen., review (Rus))
(REGENERATION,
post-irradiation, review (Rus))

SOV/20-59-124-2-56/71

24(0)

AUTHORS: Brodskiy, V. Ya., Grayevskiy, E. Ya., Suyetina, I. A.

TITLE: On the Ways of Action of the Ionizing Radiation on the Content of Free Nucleotides and Nucleosides in the Bone Marrow Cells (O putyakh vliyaniya ioniziruyushchey radiatsii na soderzhaniye svobodnykh nukleotidov i nukleozidov v kletkakh kostnogo mozga)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 2, pp 440-443 (USSR)

ABSTRACT: Nucleic compounds are early and easily depolymerized in the organism if radiation reaction develops. In vitro relatively small doses of irradiation are sufficient (Refs 4,8,10). The synthesis of nucleic acids is disturbed in directly irradiated as well as in screened body parts (Refs 11-13). Several investigations (Refs 14-16) have shown that the damage of the cells due to irradiation is not directly connected with the preceding change of the amount of nucleic acids. It had to be determined whether the changes of the content of free nucleotides is due to local irradiation effects or to remote action. Experiments were carried out with white mice of both sexes. They were irradiated with 700 r X-rays. The following variants were applied: 1) total irradiation; 2) irradiation of the right part of the body; 3) irradiation of one back extremity; 4) screening of both back extremities with lead plates of a

On the Ways of Action of the Ionizing Radiation on the Content of Free Nucleotides and Nucleosides in the Bone Marrow Cells

thickness of 3 mm. The mice were killed 6 hours after the irradiation. The amount of nucleotides in the nuclei of the myeloblasts and neutrophiles in the bone marrow of the irradiated and screened extremity was determined by means of ultraviolet cytophotometry. Figure 1 and 2 show the measurement results of the optical density (of the proportional concentration) of free nucleotides in the myeloblast nuclei of normal and irradiated animals. In the case of total irradiation the average optical density of the acid-soluble fraction decreases by five times approximately. Unexpectedly, the optical density is clearly reduced (by about 50 %) also in the screened extremities, irrespective of the size of the surface which was screened. From the experimental results the authors draw the conclusion that the remote action of irradiation exerts almost the same effect on the amount of nucleotides. A somewhat stronger effect at direct irradiation as compared to the screened bone marrow may be due to the fact that the factors causing the remote action had been formed in the immediate vicinity of the parts investigated. The problem of the connection between the dynamics of the change of the amount of nucleotides, a premature destruction of the cells in the irradiation-sensitive systems, and the suppression of their

On the Ways of Action of the Ionizing Radiation on the Content of Free Nucleotides and Nucleosides in the Bone Marrow Cells

mitotic activity in the irradiated organism has hitherto not been solved. The reduction of the content of free nucleotides and nucleosides is due to remote action. The processes of destruction are totally, the disturbance of cell division is largely caused by the local action of irradiation (Ref 18).-There are 3 figures and 18 references, 9 of which are Soviet.

ASSOCIATION: Institut morfologii zhivotnykh im. A. N. Severtsova Akademii nauk SSSR (Institute of Animal Morphology imeni A. N. Severtsov of the Academy of Sciences, USSR)

PRESENTED: September 19, 1958, by A. I. Oparin, Academician

SUBMITTED: June 26, 1958

KONSTANTINOVA, M.M.; GRAYEVSKIY, E.Ya.

Tissular hypoxia as a mechanism of the protective action of adrenaline, heroin, and morphine against radiation. Dokl.AN SSSR 132 no.6:1427-1430 Je '60. (MIRA 13:6)

1. Institut morfologii zhivotnykh im. A.N. Severtsova. Predstavleno akademikom A.I.Oparinym.
(RADIATION PROTECTION) (ANOXEMIA)

82526

S/020/60/133/04/30/031
B016/B067

5.3900

AUTHORS: Grayevskiy, Ye. Ya., Konstantinova, M. M.

TITLE: Study of the Mechanism of the Radioprotective Action of Some Sulfur Containing Substances

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 969-972

TEXT: The authors present five hypotheses on the radioprotective effect of some sulfhydryls and some thiuronium compounds which are structurally related with them. These substances are one of the most effective radioprotective substances. The data of publications do not allow the establishment of a connection between the radiation resistivity of an organism and the state of its regulating systems. The protective effect has approximately the same degree in biological objects at different stages of development. The authors mention further inadequate explanations of the protective effect (Refs. 11, 15). The assumption that the protective effect of sulfur containing compounds is due to the so-called "oxygen effect" (Refs. 10, 16-25) is the most probable. In conclusion, the authors state that the

Card 1/4

Study of the Mechanism of the Radioprotective Action of Some Sulfur Containing Substances

S/020/60/133/04/30/031
B016/B067

hypothesis according to which the protective effect of the substance concerned is based on the anoxia in the organism, that it is also based on rather contradictory data, and that it must not be regarded as proved. The authors wanted to explain the role of the level of molecular oxygen in tissues for the protective effect. For this purpose they used grown-up white mice. The above-mentioned effect and the oxygen tension in the liver and the spleen were studied at different periods after subcutaneous injection of the following compounds: cysteamin, cystamin, Br.HBr-2-aminoethyl isothiuronium (AET), Br.HBr-2-amino-5-isothiuronium-methyl-thiazolin (AIMT), furthermore, HCl.cysteine and SH glutathione. The animals were once totally irradiated with gamma rays of Co^{60} (dose: 900r; dose intensity: 378 r/min, for 2 min 21 sec). They were irradiated 15, 30, 60, 120, and 180 min after the injection. The duration of life was observed within a period of 30 days. Table 1 shows the number of experimental animals. Fig. 1 shows the results obtained with cysteamin. This substance has a considerable protective effect; it does, however, not reduce the O_2 content, but increases it in the spleen. Fig. 2 shows that also cystamin does not reduce the oxygen tension during the duration of the protective effect.

Study of the Mechanism of the Radioprotective Action of Some Sulfur Containing Substances

S/020/60/133/04/30/031
B016/B067

In introducing AET 15 min before the irradiation the protective effect becomes distinctly marked (Fig. 3 A). The O_2 content is only slightly reduced. Analogously, AIMT has a weaker effect on the O_2 level; its protective effect is also much weaker and only of a short duration (Fig. 3 B). Cystein (Fig. 4) and SH gluthathione tension hardly change the O_2 in both organs, they have, however, a considerable protective effect. From these results the authors draw the conclusion that the protective effect is not caused by tissue hypoxia. At the same time it is assumed that the effect of the above-mentioned protective substances is, nevertheless, connected with the "oxygen effect". Hence, it may be assumed that this effect is not necessarily connected with the radiolysis of water. Perhaps, it may be explained by the formation of potential disturbances in biological objects, which may take place only during the oxidation by molecular oxygen. In this case, the protective effect of the substances under consideration can be related to their capability of preventing the oxidation by molecular oxygen of the "structures" damaged by radiation. The authors thank V. M. Fedoseyev for the synthesis of AET and AIMT. There are 4 figures, 1 table, and 27 references: 7 Soviet, 1 US, 3 Intern. Conf., and

Card 3/4

82526

Study of the Mechanism of the Radioprotective Action of Some Sulfur Containing Substances

S/020/60/133/04/30/031
B016/B067

1 German.

ASSOCIATION: Institut morfologii zhivotnykh im. A. N. Severtsova Akademii nauk SSSR (Institute of Animal Morphology imeni A. N. Severtsov of the Academy of Sciences, USSR)

PRESENTED: April 4, 1960, by A. I. Oparin, Academician

SUBMITTED: April 7, 1960

Card 4/4

GRAYEVSKIY, E.Ya.; KONSTANTINOVA, M.M.

Radiation protective effect of some agents and the "oxygen effect." Radiobiologiia 1 no.2:270-277 '61. (MIRA 14:7)

1. Institut morfologii zhivotnykh imeni A.N.Severtsova AN SSSR, Moskva.
(RADIATION PROTECTION) (OXYGEN--PHYSIOLOGICAL EFFECT)

30366
S/205/61/001/005/001/005
D299/D304

27.1220

AUTHORS: E.Ya. Grayevskiy, and M.M. Konstantinova

TITLE: A study of the mechanism of the protective action of aminoethyl-isothiuronium on rats irradiated in a state of hypothermy

PERIODICAL: Radiobiologiya, v. 1, no. 5, 1961, 650 - 652

TEXT: The lack of defensive action from cysteine after irradiation in animals with a normal metabolism and its presence in chilled hybernating animals tends to indicate that protective compounds, if at all capable of weakening the radiation reaction when introduced after irradiation, can only do this when the development of the radiation reaction is strongly inhibited. To check this assumption a study was made of the protective effect of aminoethyl-isothiuronium (AET) Br.HBr. on animals irradiated in varying states of hypothermy. The experiments were conducted with white mice exposed to single gamma-radiation from a Co^{60} source in a dose of 900 r ($LD_{100/15}$) at an intensity of 320 r/min. The body temper-

Card 1/3

A study of the mechanism of ...

ature of the mice at the time of irradiation in the three test groups was 37, 18, and 6° C. The protective agent was injected subcutaneously at 9-10 mg per mouse in 0.05 ml of distilled water 15 min before irradiation or 10 - 20 sec after it. The number of animals that survived for more than 30 days after irradiation and the life span of those animals which died beyond this period was taken as the criterion of the effectiveness of AET. The results showed that prophylactic injection of AET into mice with a body temperature of 37° C gave a marked increase in the survival rate of the irradiated animals and increased the average life of the animals which died. The prcpylactic effect was lower in mice with a body temperature of 18° C. At 6° C no protective action was noted, due perhaps to disturbance of the resorption and admission of the AET to the radiation-sensitive systems or to inhibition of its conversions. The AET was ineffective in all cases when introduced after irradiation. The authors' findings conform to those of D.E. Smith (Ref. 5: Radiation Res., 12, 79, 1960) who found that the administration of cysteine after irradiation to animals of the genus Citellus irradiated in a state of hibernation with a body temperature of 5° C had no protective

Card 2/3

A study of the mechanism of ...

effect. The authors conclude that the postradiation administration of protective agents to homiothermal mammals cannot weaken radiation lesions of the body. There are 1 table and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publication reads as follows: D.E. Smith, Radiation Res., 12, 79, 1960.

ASSOCIATION: Institut morfologii zhivotnykh im. A.N. Severtsova, AN SSSR (Institute of Animal Morphology im. A.N. Severtsov, AS USSR), Moscow

SUBMITTED: July 26, 1961

Card 3/3

32750
S/205/61/001/006/010/022
D268/D305

27.1220 ab.22209

AUTHORS: Alekseyeva, S.I., Grayevskiy, Ye.Ya., Korogodin, V.I., Nekrasova, I.V., and Tambiyev, A.Kh.

TITLE: The effect of cell suspension density on radiosensitivity of yeasts

PERIODICAL: Radiobiologiya, v. 1, no. 6, 1961, 878 - 886

TEXT: The correlation between concentration of suspensions and radiosensitivity was studied in 5 yeast strains: the haploid Zygosaccharomyces bailii, diploid Saccharomyces vini Megri 139-B, and 3 strains of S. cerevisiae, haploid 127-12 d, diploid WY-110, and tetraploid 16 x 32. Strains were cultured on wort agar at 28 - 30°C and irradiated after 2 - 3 days development. Either aliquots obtained by scraping hard medium or by centrifuging dense solutions, or suspensions with a concentration of 10^9 - 10^4 cells/ml. were irradiated. A РУП-200 apparatus (RUP-200 industrial X-ray unit 200) with a dose rate of 5,400 r/min. was the X-ray source, and a ГУТ-Co-400 apparatus (GUT-Co-400, therapeutic gamma unit Co 400) the

Card 1/5

The effect of cell suspension ...

gamma-ray source. Strains were also irradiated in 5 - 10 % egg protein solution. Cell viability was determined by counting macro- and micro-colonies, incubated on wort agar at 30°C, according to methods previously described by Korogodin (Ref. 8-9: Biofizika, 2, 178, 1957; 3, 206, 1958). Oxygen content in aqueous suspensions at different concentrations was determined polarographically by a method described by Konstantinova and Grayevskiy (Ref. 10: Dokl. AN SSSR, 132, 1427, 1960). Aqueous suspensions of the 3 S. cerevisiae strains exposed to X-rays showed a fall in dose effectiveness as the cell suspension concentration increased. The oxygen content was determined polarographically in suspensions at different concentrations. Results showed a clear fall in oxygen tension as the suspension concentration increased. Respiration intensity was determined in Z. Bailii and Megri 139-B and showed that the Q_{O_2} for the former was 840 ± 156, and for the latter 3,100 ± 320 µl./hour for 10^{10} cells. It was much lower in haploid than in diploid cells. Accordingly the concentration effect would be weaker in Z. bailii than in Megri 139-B. If the effect were due to oxygen deficiency, suspension concentration would affect radiosensitivity rather less

32750
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D268/D305

The effect of cell suspension ...

with irradiation in oxygen-free conditions than in aerated water, especially in a strain with low respiration intensity. This would be in line with the views of Gunter and Kohn (Ref. 3: J.Bacteriol., 72, 422, 1956). 10^6 cells/ml. suspensions and aliquots from both strains were exposed to gamma-irradiation in the atmosphere and in a vacuum, and viability determined according to micro-colonies. Results completely confirmed the proposition. The dose effectiveness reduction coefficient for the haploid strain irradiated in air was 0.81, and for the diploid 0.47. In conditions of anoxia, no concentration effect was observed for the former, while in the latter the dose effectiveness reduction coefficient was 0.81. Oxygen content in suspensions in a vacuum was 3 - 5 % compared with that in dilute suspensions in the air. Irradiation of 10^6 cells/ml. suspensions of haploids and diploids in 5 and 10 % egg protein solutions with gamma-rays showed no protective reactions by the proteins. According to Gunter and Kohn yeast cells are also only very mildly sensitive to H_2O_2. Tests were made with 4 strains. Results showed that though they differed in their sensitivity, haploids being most sensitive, H_2O_2 only affected viability noticeably at concentrations

Card 3/5

The effect of cell suspension ...

of 13.4 and 28.8 µg./ml. Experiments were also made to determine the effect of suspension concentration at the time of irradiation on post-radiation recovery with Megri 139-B, whose post-radiation recovery has been already described by Korogodin (Ref. 7: Biofizika, 3, 703, 1958). Exposure was to gamma-irradiation. Part of the suspension was sown on nutrient medium immediately after irradiation and part at 24 - 48 hours. Viability was determined by macrocolonies. In both cases change in dose effectiveness was largely dependent on suspension concentration at irradiation. The extent of post-radiation recovery of yeast cells was virtually independent of their concentration at irradiation, the dose effectiveness reduction coefficient fluctuating within 0.41 ± 0.03. It is concluded that at concentration effect was produced when yeast cells were irradiated with X- and gamma-rays in normal air and in one case with oxygen deficiency. Radiosensitivity was independent of suspension density up to a concentration of 10^6 cells/ml., but increased proportionally to the concentration logarithm with a further increase in density. The concentration effect was more pronounced in the strain with greater respiration intensity. The very poor sensitivity of yeast cells to H_2O_2 was demonstrated, as well as the reduct-

The effect of cell suspension ...

ion in oxygen tension with increase in suspension concentration. There are 5 figures, 3 tables and 14 references: 8 Soviet-bloc and 6 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: S. Gunter and H. Kohn, J. Bacteriol., 72, 422, 1956; T. Alper, Radiation Res., 5, 573, 1956; T. Alper and N.E. Gillies, Radiation Res., 9, 86, 1958; N.E. Gillies and T. Alper, Nature, 183, 237, 1959.

ASSOCIATION: Biologo-pochvennyy fakul'tet MGU, Institut morfologii zhivotnykh im. A.N. Severtsova AN SSSR, Moskva (Biological-Soils Faculty, Moscow State University, Institute for Animal Morphology im. A.N. Severtsov, AS USSR, Moscow)

SUBMITTED: July 26, 1961

Card 5/5

GRAYEVSKIY, E.Ya.

International symposium on primary and initial processes occurring in living cells during the action of ionizing radiation. Usp. sovr. biol. 51 no. 2:257-260 Mr-Ap '61. (MIRA 14:4)
(RADIOBIOLOGY--CONGRESSES)

20366

S/020/61/136/005/032/032
B103/B208

21.6300

AUTHORS: Grayevskiy, E. Ya. and Konstantinova, M. M.

TITLE: Mechanism of antiradiation effect of dithiols

PERIODICAL: Doklady Akademii nauk SSSR, v. 136, no. 5, 1961, 1219-1222

TEXT: The authors studied the antiradiation effect of dimercapto compounds: 1) of unithiol, and 2) of dimercapto propionic acid (DMPA) on white mice. They compared the efficiency of these dithiols with the hypoxia caused by the latter (due to oxygen tension). There are only few contradictory data available on this problem. The mice were totally irradiated with γ-rays of Co^{60} with a dose of 357 r/min, and with an absolutely lethal dose of 900 r, once for 2 min 28 sec. The mentioned protective substances were injected subcutaneously in 0.5 ml distilled water in the following quantities: unithiol: 20, 14, and 9, DMPA 1.0 and 0.75 mg per animal. Unithiol was applied at 11 intervals between 10 and 180 min, DMPA at 6 intervals between 15 and 180 min prior to irradiation. The criterion of the efficiency was the percentage rate of the surviving animals, and the lifetime of the killed animals up to

Card 1/3

Mechanism of antiradiation effect ...

the 30th day from irradiation. The change of oxygen content in liver and spleen was determined polarographically within 3 hr after injection in vivo and in vitro by means of a platinum electrode of the "open type". (Methods have been previously described in Ref. 2). The curve illustrating the percentage of the animals with a reduced oxygen tension (by more than 50%) (Fig. 1, curve 4) served as an additional criterion. The authors found this to be the minimum of hypoxia which effects a protection from radiation. They draw the following conclusions from their experiments: The two substances tested effect a distinct protection which remains active for a long time after injection. It is striking that lower dithiol doses (within certain limits) exert a more powerful protection than higher doses. This may be explained by a higher toxicity of maximum doses of dithiols for irradiated animals. Such doses are better tolerated by non-irradiated mice. The two tested protective agents reduce considerably and for a long time oxygen tension in the tissue. This effect coincides with the time of the most [illegible] pronounced protective effect in unithiol doses of 14 and 9 mg, and in DMPA doses of 0.75 mg. The authors conclude from the data obtained

20366

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Mechanism of antiradiation effect ...

that the protective effect of dithiols is probably due to hypoxia caused by these dithiols in organs sensitive to radiation, in contrast with the effect of the best known sulfur-containing compounds (β-mercapto ethyl amine, or 2-aminoethyl isothiuronium-B·HBr, etc.). The formation mechanism of this hypoxia could not yet be explained. There are 2 figures and 8 references: 4 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut morfologii zhivotnykh im. A. N. Severtsova Akademii nauk SSSR (Institute of Animal Morphology imeni A. N. Severtsov, Academy of Sciences, USSR)

PRESENTED: August 22, 1960, by A. I. Oparin, Academician

SUBMITTED: August 18, 1960

Card 3/6

GRAYEVSKIY, F.Ya.; KONSTANTINOVA, M.M.

Independence of the radiation protective action of aminoethyl-isothiuronium · Br · HBr from the "oxygen effect." Dokl. AN SSSR 140 no.3:705-708 S '61. (MIRA 14:9)

1. Institut morfologii zhivotnykh im. A.N.Severtsova AN SSSR. Predstavleno akademikom N.M.Sisakyanom.
(Pseudourea) (Radiation protection)

GRAYEVSKIY, YE. YA.

Investigations on Radiation Protection in Mammals

E. Ya Grachevskiy, N. F. Barakina, M. M. Constantinova and I. B. Smirnova

Radiation protectors varying in their structure and physiological effect can be divided by their mechanism of protective action into two groups. One group acts by causing tissue hypoxia, while the protective action of the second group appears not to be related to the oxygen effect.

Protectors of the second group show a clear morphological protection of animals exposed to radiation, decreasing the damage to the intestine and haemopoietic tissues. Under the action of an example of this group, aminoethylisouronium-Br·HBr (AET), repair processes are accelerated, and fewer chromosomal aberrations are seen and the ability of cells to undergo division is restored, although there is no diminution in the initial number of cells of the intestinal crypts disrupted as a result of irradiation.

Haemopoietic tissue, irradiated in the presence of AET, shows a greater number of intact cells and regeneration is greatly accelerated.

The intensification of repair processes observed in radiosensitive tissues seems to be determined by a smaller initial damage of their component cellular elements.

Institute of Animal Morphology, Academy of Sciences of the USSR, Moscow

report presented at the 2nd Intl. Congress of Radiation Research, Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

3,956
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D268/D302

27.2400

AUTHORS: Gravevskiy, E.Ya., Nekrasova, I.V., and Shul'mina, A.I

TITLE: A study of the radioprotective action on protozoa of some protective substances

PERIODICAL: Radiobiologiya, v. 2, no. 1, 1962, 148 - 155

TEXT: The radioprotective effect of AET (aminoethyl-isothiouronium Br. HBr) at 0.017 and 0.0033, cysteinamine at 0.005 - 0.02, cystinamine at 0.0017, 0.003, and 0.0166, and heroin at 0.0017 - 0.0066 mg/ml. was studied in "Paramecium caudatum" cultured individually in Lozina-Lozinskiy medium at 21°C. AET was dissolved in twice distilled water, made alkaline with NaOH to pH 6.9 - 7.2, and the other protectors in twice distilled water alone. After 15 min. in the respective medium infusoria were irradiated with x-rays at a dose of 100 kr. at 1 - 3°C with 100 "Paramecia" /0.1 ml. medium in glass vessels within a plexiglass container in which vacuum conditions could be produced. AET clearly increased survival of infusoria both with pH 5 and neutral medium and there was some protection

Card 1/3

A study of the radioprotective ...

taking the fission rate of the infusoria as a criterium. Cysteinamine also increased survival, but failed to mitigate the effects of radiation on the fission rate. At 0.0166 mg/ml., however, it had a somewhat adverse effect in both respects, even with irradiation in vacuo. Cysteinamine and heroin gave no protection. None of the substances increased protection with irradiation in vacuo. Injury to infusoria under infusoria under irradiation to a large extent was due to the products of the radiolysis of water, and by the decline in radiosensitivity accompanying increase in their concentration in the aqueous medium. The effect of the protectors was studied on the hydrogen peroxide yield under irradiation and its content in irradiated medium to which the protectors were added immediately after irradiation, with negative results. AET added to the medium irradiated normally and in vacuo immediately following irradiation clearly reduced toxicity to irradiated and non-irradiated infusoria. It is, therefore, concluded that the protective effect of AET was at least partially due to its action on the organism, as a result of which susceptibility to hydrogen peroxide and possibly to other products of the radiolysis of water was reduced. AET irradiated at the con-

Card 2/3

A study of the radioprotective ...

centrations studied had some toxicity for the infusoria, and markedly increased the injurious effect of irradiated aqueous solutions. The comparatively weak protective effect of AET on infusoria irradiated in aerated solutions and the absence of any supplementary protective effect in vacuo are thought to be due to toxicity acquired under irradiation. There are 9 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: R.F. Kimball, Ann. N.Y., Acad. Sci., 59, 638, 1955.

ASSOCIATION: Institut morfologii zhivotnykh im. A.N. Severtsova AN SSSR Moscow (Institute for Animal Morphology im. A.N. Severtsova, AS USSR, Moscow)

SUBMITTED: July 26, 1961

Card 3/3

GRAYEVSKIY, E.Ya.; SHAPIRO, I.M.

Review of V IU. Urbakh's book "Mathematical statistics for biologists and physicians". Radiobiologiia 3 no.4:628-629 '63. (MIRA 17:2)

GRAYEVSKIY, E.Ya.; KONSTANTINOVA, M.M.; NEKRASOVA, I.V.; TARASENKO, A.G.

Mechanism of the radioprotective action of cystamine (2-aminoethyl-disulfide). Radiobiologiia 3 no. 6:891-897 '63. (MIRA 17:7)

1. Institut morfologii zhivotnykh imeni A.N.Severtsova AN SSSR, Moskva.

GRAEVSKI, E.I. [Grayevskiy, Ye. Ya.]

Theoretical aspects of the chemical protection of mammals against ionizing radiation. Analele biol 17 no. 4:35-57 Jl-Ag '63.

GRAYEVSKIY, E. Ya.

Theoretical aspects of chemical protection of mammals from ionizing radiations. Zhur. ob. biol.24 no.1:3-22 Ja-F'63 (MIRA 16:11)

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GRAYEVSKIY, E.YA; BARAKINA, N.F.; KONSTANTINOVA, M.M.; SMIRNOVA, I.B.

Studies on radiation protection in mammals. Zhur. ob. biol. 24 no.3:182-193 My-Je'63. (MIRA 16:8)

1. A.N.Severtzov Institute of Animal Morphology, Academy of Sciences of the U.S.S.R., Moscow.
(RADIATION--PROTECTIVE AGENTS)

GRAYEVSKIY, E.Ya.; KOROGODIN, V.I.; KUZIN, A.M., ; MOSKALEV, Yu.I.; SMIRNOV, K.V.; STREL'TSOVA, V.N.; SHAPIRO, N.I., doktor biol. nauk; SHIKHODYROV, V.V.; EYDUS, L.Kh.; ALEKSAKHIN, R.M., red.

[Principles of radiobiology] Osnovy radiatsionnoi biologii. Moskva, Nauka, 1964. 402 p. (MIRA 18:1)

1. Akademiya nauk SSSR. Institut biologicheskoy fiziki.
2. Chlen-korrespondent AN SSSR (for Kuzin).

ACCESSION NR: AP4027966 S/0205/64/004/002/0197/0202

AUTHOR: Grayevskiy, E. Ya.; Zherebchenko, P. G.; Konstantinova, M. M.; Sokolova, O. M.; Shevchenko, A. N.

TITLE: Relation of radioprotective activity of indolylalkylamines to tissue hypoxia and the role of vascular changes in its development

SOURCE: Radiobiologiya, v. 4, no. 2, 1964, 197-202

TOPIC TAGS: radioprotective action mechanism, indolylalkylamine radioprotective action, tissue hypoxia, vessel spasm, tryptomine derivative, radioprotective preparation, 4-,5-chlortryptamine, 4-,5-metoxytryptamine, serotonine, alpha-methyltryptamine, LSD, cystamine, oxygen intensity, cystamine radioprotective action

ABSTRACT: Literature studies have established that indolylalkylamine radioprotective action is related to tissue hypoxia. This work investigates the mechanism of this action by determining 1) whether the position of a substitute in a tryptamine molecule affects its capacity to produce tissue hypoxia, 2) how the introduction of alpha-methyltryptamine and LSD affects the hypoxic and vasoconstrictive

Card 1/3

ACCESSION NR: AP4027966

action of the preparations, and 3) how the combined use of 5-metoxytryptamine and cystamine affects oxygen level and vessel reaction in tissues. The following preparations were administered intraperitoneally to experimental white mice: 4-chlortryptamine (60 mg/kg), 5-chlortryptamine (60 mg/kg), 4-metoxytryptamine (60 mg/kg), 5-metoxytryptamine (60 mg/kg), and serotonine (50 mg/kg) 1 hr after administering alpha-methyltryptamine, cystamine (150 mg/kg) combined with metoxytryptamine (50 mg/kg), and LSD (10 mg/kg) combined with serotonine. Oxygen intensity in the liver and spleen of the animals was measured by a polarographic method. Vessel tone was determined by the accumulation of neutral red in the organs 30 min after being introduced (65 mg/kg in a 0.5 ml physiological solution). Findings show that tryptamine derivatives with substitutes in the fifth position (5-metoxy-, 5-chlortryptamine) are highly effective radioprotectors because of their capacity to produce hypoxia in radiosensitive organs by vessel spasms. Tryptamine derivatives with substitutes in the fourth position (4-chlor-, 4-metoxytryptamine) do not produce hypoxia or vessel spasms and are ineffective radioprotectors. Alpha-methyltryptamine and LSD remove the radioprotective effect of indolylalkylamines by preventing the development of vessel spasm and subsequent tissue hypoxia. Cystamine enhances the

Card 2/3