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SCIENCE & TECHNOLOGY

USSR; LIFE SCIENCES

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INDUCTION-SUPPRESSION HYPOTHESIS OF PHYTOIMMUNITY

Moscow ZHURNAL OBSHCHEY BIOLOGII in Russian Vol 47, No 6, Nov-Dec 86
(manuscript received 22 Apr 85) pp 748-758

[Article by L. V. Metlitskiy (deceased), Yu. T. Dyakov and O. L. Ozeretskorskaya, Institute of Biochemistry, USSR Academy of Sciences, Moscow; Biological Faculty, Chair of Lower Plants, Moscow State University imeni Lomonosov]

[Abstract] In recent years interesting experimental results were obtained especially in studies by Japanese scientists permitting generalization of various physiological-biochemical plant resistance factors and pathogenicity of plant parasites. The goal of the present work was to analyze these factors which expand parasitism and symbiosis phenomena in plant world. The role of induction and suppression of protective reactions was viewed from the aspect of host-parasite relationships. Suppression can be specific or non-specific and this range of a continuum determines specialization of parasites. The more specific the suppression, the more effectively it overcomes protective reactions. Induction as a rule is non-specific. Suppressors are weapons of parasites overcoming protective reactions of host-plants. This is the chief property differentiating them from non-parasites. References 35: 14 Russian, 21 Western.

7813/12955
CSO: 1840/758

EFFECT OF DEHYDRATION AND HEATING ON BIOELECTRICAL REACTION OF LEAVES OF PLANTS DIFFERING IN DROUGHT RESISTANCE

Leningrad TSITOLOGIYA in Russian Vol 28, No 8, Aug 86 (manuscript received 18 Jul 85) pp 818-827

[Article by I. G. Zavadskaya, T. A. Antropova and S. A. Stadnik, Botanical Institute, USSR Academy of Sciences, Leningrad, Nikitskiy Botanical Garden, Yalta]

[Abstract] A study of the bioelectrical reaction (BER) of barley leaves of varieties differing in drought resistance under different degrees of dehydration and under the effect of heat is described and discussed. BER was induced in drought-resistant Krasnodarskaya 2929 and drought-sensitive Winer varieties by pulsed 5 second cooling to 9 degrees C below room temperature. BER was characterized by its maximum potential difference. The varieties studied showed significant differences in BER resistance to the direct effect of dehydration but BER was very sensitive to dehydration in both varieties. The drought-resistant variety recovered after rewatering, after much deeper dehydration, than the drought-resistant variety. After normalizing the water regime of plants subjected to a 4-day drought, the water deficit in the leaves reached 30-35 percent and BER resistance to heating increased only in the drought-resistance variety. Restoration of BER suppressed by heating, in such plants of both varieties, occurred more intensely than restoration occurred in plants not dried before heating. Dehydration stimulated the reparative capacity of the plant cells. Figures 3; references 13: 11 Russian; 2 Western.

2791/12955
CSO: 1840/546

INHERITANCE OF SELECTED TRAITS IN F_1 - F_5 HYBRIDS OF TRITICUM PALEOCOLCHICUM WITH INCOMPLETE WHEAT-STRAND WHEAT(ELYM) ALLOTETRAPLOID. PART 1. PLANT AND SPIKE MORPHOLOGY

Moscow GENETIKA in Russian Vol 22, No 2, Feb 86 (manuscript received 15 Apr 85) pp 282-289

[Article by M. A. Maslova and V. I. Semenov, Main Botanical Garden, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted on the inheritance of 6 morphological characteristics of whole plant and spike in the F_1 - F_5 generations of hybrids of Triticum paleocolchicum with incomplete wheat-strand wheat (Elym) allotetraploid. The various traits were found to be subject to different modes

of inheritance. In F_1 , for example, plant height exhibited a positive superdominance. However, the number of productive stems and the length of the main spike were traits inherited by either complete or almost complete dominance of the superior parental strain. An intermediate mode of inheritance applied to traits such as the total number of stems, number of spikelets per spike, and the spike density/cm length. References 3 (Russian).

12172/12955
CSO: 1840/638

UDC 575.222.75

CYTOGENETIC STUDIES ON HYBRIDS BETWEEN BARLEY (*HORDEUM VULGARE*) AND WHEAT (*TRITICUM AESTIVUM* AND *T. TIMOPHEEVII*)

Moscow GENETIKA in Russian Vol 22, No 2, Feb 86 (manuscript received 27 May 85) pp 290-295

[Article by I. M. Surikov, N. I. Kissel and I. N. Orlova, All-Union Scientific Research Institute of Plant Husbandry imeni N. I. Vavilov, Leningrad]

[Abstract] Embryonic culture methods were used to produce barley (*Hordeum vulgare*) and wheat (*Triticum aestivum* and *T. timopheevii*) for a cytogenetic evaluation. Assessment of a large number of hybrid combinations demonstrated haploid meiosis with a low level of chromosomal conjugation. Rarely observed bivalent associations were apparently due to autosyndesis, although isolated allosyndetic chromosomal associations could not be excluded. The hybrids were male and sterile. However, tetraploid meiotic cells suggested the feasibility of allotetraploid barley-wheat plants. Figures 2; references 20: 2 Russian, 18 Western.

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UDC 575.11:576.312.32:633.16

GENETIC CONTROL OF SELECTED, QUALITATIVE MORPHOLOGICAL AND BIOCHEMICAL TRAITS AND LOCATION OF 3 GENETIC FACTORS ON BARLEY (*HORDEUM VULGARE*) CHROMOSOMES 1 AND 5

Moscow GENETIKA in Russian Vol 22, No 2, Feb 86 (manuscript received 1 Apr 85; in final form 17 Jun 85) pp 296-303

[Article by R. M. Biyashev, V. P. Netsvetayev and A. A. Sozinov, Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow; All-Union Breeding and Genetics Institute, Odessa]

[Abstract] An analysis was conducted on the nature of inheritance of the loci $Ml-a_{ma}$, sex 6, Pgd 3, Prx 1 and reciprocal translocation $Tl-?$ with

genes Nn, Hrd A, Hrd B, Pgd 2 and r previously mapped on chromosomes 1, 5 and 7 in barley (*Hordeum vulgare*). The crossing studies among the various varieties demonstrated that Ml-a_{ma} was located on the short arm of chromosome 5 between Hrd A and Hrd B. The gene sex 6 was mapped proximally to the centromere on the long arm of chromosome 1; recombination between sex 6 and Nn was on the order of 13.3%. In addition, the Nigrinudum variety was shown to carry the reciprocal translocation T1-? which involves the short arm of chromosome 1. Polyacrylamide gel electrophoresis of 6-phospho-gluconate dehydrogenase and peroxidase with cathodal mobility, the respective products of genes Pgd 3 and Prx 1, appeared to indicate that the latter were not located on chromosomes 1, 5 or 7. Figures 2; references 23: 4 Russian, 19 Western.

12172/12955
CSO: 1840/638

UDC 575.11:581.134.4:633.11

PHENOTYPIC MANIFESTATIONS OF INTERACTIONS OF GENES CONTROLLING WHEAT GLIADIN EXPRESSION

Moscow GENETIKA in Russian Vol 22, No 8, Aug 86 (manuscript received 15 Aug 85) pp 2107-2114

[Article by S. Ye. Peltek, T. A. Pshenichnikova, B. I. Sarapultsev and O. I. Maystrenko, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Polyacrylamide gel electrophoresis of gliadin components was employed to establish a correlation with chromosomal location in Chinese Spring wheat. Nullisomic-tetrasomic and ditelosomic variants possessed additional gliadin components in comparison with the components inherent in the euploid variety. The additional components were designated DK1, DK2 and DK3 in increasing order of mobility. Each of these components was related with the nullisomic state of a defined chromosome and its shoulder: DK1 with chromosome 1D, short arm; DK2 with chromosomes 6DS and tetrasomy of chromosome 2A; and DK3 with nullisomy of chromosome 6BS. Comparison of the compensated nullisomic-tetrasomic varieties of Chinese Spring wheat with synthetic wheat with a genomic formula described by AAGGDD suggested that each wheat genome possesses a unique control system for gene expression. The interaction of such a system in complex wheat genotypes leads to inhibition of some genes, a thereby altering the detected gliadin components. Figures 3; references 25: 11 Russian, 14 Western.

12172/12955
CSO: 1840/644

CYTOLOGIC STUDIES ON F_1 WHEAT-RYE HYBRIDS

Moscow GENETIKA in Russian Vol 22, No 8, Aug 86 (manuscript received 5 Jul 85; in final form 16 Oct 85) pp 2126-2134

[Article by F. M. Shkutina, N. P. Kalinina, T. K. Usova and I. N. Bogdevich, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] A cytological study was conducted on 7 wheat-rye hybrids, employing 7 wheat varieties for crossing with one rye (Onokhoyskaya) variety. Determination of the nature of the meiotic pairings demonstrated that blockage at any stage of meiosis led to infertility. However, these findings did not exclude the possible formation of unreduced gametes and, hence, the production of fertile pollen. Differences between the combinations were attributed to the wheat genotype, while differences between plants within a combination were dependent on the heterozygosity of rye. Figures 5; references 23: 10 Russian, 13 Western.

12172/12955

CSO: 1840/644

GENETIC AND ENVIRONMENTAL EFFECTS ON RESULTS OF BACKCROSSING OF TRITICUM DURUM WITH T. TIMOPHEEVI

Moscow GENETIKA in Russian Vol 22, No 10, Oct 86 (manuscript received 14 May 85; in final form 20 Nov 85) pp 2469-2476

[Article by V. F. Kozlovskaya and L. P. Grigoryeva, Altay Scientific Research Institute of Soil Management and Crop Breeding, Barnaul]

[Abstract] A study was conducted on the genotypic characteristics of F_1 hybrids obtained by crossing T. durum with T. timopheevi and recurrent parental varieties, in conjunction with evaluation of environmental effects on the results of the first backcross. The results of the first T. durum x T. timopheevi backcross demonstrated that the F_1 hybrids were more affected by the durum wheat genotype when used as the original and recurrent parent. Single factor dispersion analysis revealed that in 66% of the cases the differences between the various combinations were statistically significant. Environmental conditions were found to have a profound impact on the results of backcrossing regardless of the genotypic characteristics of the hybrids and the recurrent strains. Consequently, optimal conditions of cultivation appears to be a universally applicable means of improving first backcross plants. References 13: 6 Russian, 7 Western.

12172/12955

CSO: 1840/646

GENETICS OF BETA-AMYLASE ISOZYMES IN RYE

Moscow GENETIKA in Russian Vol 22, No 10, Oct 86 (manuscript received 29 Jul 85; in final form 6 Jan 86) pp 2493-2499

[Article by N. V. Kudryakova and A. V. Voylov, Biological Scientific Research Institute, Leningrad State University imeni A. A. Zhdanov; All-Union Scientific Research Institute of Plant Science imeni N. I. Vavilov, Leningrad]

[Abstract] Beta-amylase isozyme patterns were analyzed in a polyacrylamide gel isoelectric focusing modality to study the genetics of this enzyme in rye (*Secale cereale*). Results obtained with hybrid plants indicated that the isozymes were under the control of 5 alleles (a, b, c, d, e) under the control of locus beta-Amy-1. In addition, the gene beta-Amy-1 was mapped on the long arm of chromosome 5R in wheat-barley hybrid derivative lines. Concomitant analysis of the esterase genes Est A and Est B demonstrated that there was no linkage between them and beta-Amy-1. Figures 2; references 11: 2 Russian, 9 Western.

12172/12955
CSO: 1840/646

UDC 633.11:631.528

EFFECTS OF MUTAGENIC FACTOR ON INHERITANCE OF QUANTITATIVE TRAITS IN WHEAT HYBRIDS

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 40, No 2, Feb 87 (manuscript received 19 May 86) pp 145-147

[Article by A. A. Gulyan, Scientific Research Institute of Agriculture, Armenian SSR State Agricultural Program, Echmiadzin]

[Abstract] An analysis was conducted on the inheritance pattern of quantifiable traits in mutant x breeding variety crossings in wheat. The studies were conducted with both primary mutant lines and plants obtained from irradiated seeds, in order to be able to combine in one generation mutagenesis and recombination. The resultant data demonstrated that the variability of certain traits in F_1 and F_2 hybrids and the nature of segregation in the F_2 generation in case of irradiation of the maternal variety are determined largely by genotypic specificity. The combination of mutagenesis with hybridization has been shown promising in breeding highly productive varieties characterized by early maturation and short-stem characteristics. References 7 (Russian).

12172/12955
CSO: 1840/831

INDUCTION OF POLYPLOIDY IN POTATO CULTURES IN VITRO

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 3, Mar 87 (manuscript received 28 May 86) pp 66-68

[Article by E. D. Zhila and A. A. Kuchko, Ukrainian Scientific Research Institute of Potato Culture]

[Abstract] In vitro trials were conducted on the induction of polyploidy in in vitro cultures of dihaploid ($2n = 2x = 24$) potatoes. The study demonstrated that exposure of Gatchina potato cultures to 200 mg/liter colchicine for 15-20 days and subsequent growth in a colchicine-free medium favored developed of polyploid varieties. After 20 days of exposure to colchicine, the yield of tetraploids was 12.5%, and of triploids 20.0%. The yield of chimaeric plants with a chromosome number of $2n = 25-47$ was 35% of the total. These findings demonstrated the utility of the colchicine technique in inducing polyploidy in potatoes. References 9: 3 Russian, 1 Polish (in Eng.), 5 Western.

12172/12955
CSO: 1840/669

INHERITANCE OF WHEAT AND RYE TRAITS IN F_1 TRITICALE OBTAINED BY EMBRYO CULTURE

Minsk VYESTSI AKADEMII NAUK BSSR. SYERYYA BIYALAHICHNYKH NAUK in Belorussian No 1, Jan-Feb 86 (manuscript received 4 Sep 86) pp 31-34

[Article by L. V. Khotyleva, L. F. Khodortsova and I. A. Gordey, Institute of Genetics and Cytology, Belorussian SSR Academy of Sciences]

[Abstract] Embryo culture was employed for the production of F_1 triticales in order to study inheritance of various traits from wheat and rye parents. Analysis of various traits (stem length, productivity, grain production, etc.) revealed considerable variability among the different combinations and pure lines. Electrophoretic analysis of gliadins demonstrated a co-dominant inheritance of the different gliadin components. Differences between the F_1 triticales and the parental forms consisted of elimination of individual components and in differences in the intensity with which other components were stained. Within a given variant, however, constancy of the components characteristic of a variant was observed. Tables 4; references 6: 5 Russian, 1 Western.

12172/12955
CSO: 1840/679

PRODUCTIVITY AND QUALITY OF MAIZE AND MAIZE HYBRID FEED IN SOUTHERN
BELORUSSIA

Minsk VYESTSI AKADEMII NAUK BSSR. SYERYYA BIYALAHICHNYKH NAUK in Belorussian
No 1, Jan-Feb 86 (manuscript received 6 Feb 86) pp 43-48

[Article by A. V. Gavrilov and V. A. Khilkevich, Gomel State University]

[Abstract] Studies were conducted on the relative values of maize and its hybrid varieties as feed products when cultivated in the Gomel Rayon of Southern Belorussia. Because of hybrid vigor Luch-160, Dneprovskiy-141 T, and Slavutych-161 varieties yielded 2.0- to 2.5-fold as much silage as the regionalized varieties Bukovinskiy-3 and Zherebkovskaya-86. The effects of hybrid vigor were evident in such traits as plant height, stem diameter, leaf size, ear length, and grain weight. The protein and carbohydrate levels and the caloric value of the hybrid plants also exceeded the values typical of the regionalized maize varieties. When cultivated on a 400 ha field at the Sinelkovskiy Experimental Breeding farm in the Gomel Rayon the hybrids provided an additional 6,200 tons of feed. References 18 (Russian).

12172/12955

CSO: 1840/679

UDC 577.336:577.352.335:547.993.615

FLUORESCENT-PROBE STUDY OF INTERACTION OF COBRA VENOM CYTOTOXINS WITH LIPOSOMES

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 6, Nov-Dec 86
(manuscript received 20 Mar 86) pp 755-759

[Article by T. F. Aripov, U. M. Beknazarov and V. G. Omelyanenko, Institute of Bioorganic Chemistry, Uzbek SSR Academy of Sciences, Tashkent]

[Abstract] A study was conducted on the interactions of cytotoxins $V_c 1$, $V_c 5$ and $V_c 6$ with fluorescent probe (pyrene or diphenylhexatriene)-labeled liposomes (phosphatidylcholine:palmitic acid = 1:1). Using a label:liposome ratio of 1:100 resulted in the demonstration that the cytotoxins reacted with hydrophobic regions of the liposomes, resulting in the placement of positive charges on the negatively-charged liposome surface. Evaluation of energy transfer between the labels showed that addition of cytotoxins and the appearance of a positive charge led to aggregation of the liposomes, with retention of liposomal patency. Figures 2; references 12: 9 Russian, 3 Western.

12172/12955
CSO: 1840/709

UDC 547.953:665.37

SYNTHESIS OF HEPTAPEPTIDE CONGENER OF ACTH₄₋₁₀ FRAGMENT

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 6, Nov-Dec 86
(manuscript received 2 Jul 86) pp 759-763

[Article by Ye. P. Krysin, V. N. Karelskiy, A. K. Rabinovich and S. Yu. Borovkova, All-Union Scientific Research Institute of Technology of Blood Substitutes and Hormonal Preparations, Moscow]

[Abstract] The mixed anhydride method was used to synthesize congeners of the ACTH₄₋₁₀ fragment, as a method offering simplicity and high yields.

Steps are described for the synthesis of dipeptide fragments and their subsequent condensation to give the final ACTH₄₋₁₀ analogs. The products were chromatographically homogeneous and, in terms of the angle of optical rotation and behavior on HPLC, analogous to those previously reported from the Institute of Molecular Genetics of the USSR Academy of Sciences. Figures 1; references 3: 2 Russian, 1 Western.

12172/12955
CSO: 1840/709

UDC 542.91:547.1

REACTION OF MAMMALIAN CHOLINESTERASES WITH N-(BETA-HYDROXYPROPYL)-PIPERIDINE ESTERS AND THEIR METHIODIDES

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 6, Nov-Dec 86
(manuscript received 16 Jun 86) pp 763-766

[Article by A. G. Dobrenkov, Z. Tilyabayev, D. N. Dalimov and A. A. Abduvakhabov, Institute of Bioorganic Chemistry, Uzbek SSR Academy of Sciences, Tashkent]

[Abstract] Studies were conducted on the reaction of human RBC acetylcholinesterase (AChE) and equine serum butyrylcholinesterase (BChE) with N-(beta-hydroxypropyl)piperidine esters and their methiodides, analogous in structure to the substrate acetyl-beta-methylcholine. Kinetic studies with CH₃ to C₄H₉ compounds showed that at pH 7.5, 25°C, most of the compounds were competitive inhibitors of AChE and BChE, with inhibition depending little on the alkyl radicals in the acid portion of the molecule. Iodomethylation diminishes the effects of these compounds on AChE to a greater extent than on BChE. Compounds with the propyl radical inhibited the activities of AChE and BChE to an equivalent extent. References 12: 10 Russian, 2 Western.

12172/12955
CSO: 1840/709

ENKEPHALINE-FORMING ENZYMES (SURVEY OF LITERATURE)

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 3 Apr 85) pp 15-20

[Article by O. O. Grigoryants and O. A. Gomazkov, Institute of Medical Enzymology, USSR Academy of Medical Science, Moscow]

[Abstract] Generalized information about enkephaline-forming enzymes was collected by a survey of the literature and some findings were discussed briefly. The article described precursors of enkephalines, formation of enkephalines from these precursors, which involves participation, basically, of three groups of enzymes (SH-dependent endopeptidase, a trypsin-like enzyme and a carboxypeptidase-B-like enzyme). Studies of each of these are cited and described briefly. Some studies describing the regional activity of enkephaline-forming enzymes in the brain and hypophysis are discussed briefly. Enkephaline-forming enzymes comprise a complete biochemical system, localized in the brain and peripheral tissue and their function is determined by formation of physiologically-active peptides. Properties of enkephaline-forming enzymes are presented in a table. Figure 1; references 52; 2 Russian; 50 Western.

2791/12955
CSO: 1840/589

SPECIFIC FEATURES OF IMMOBILIZATION AND CATALYTIC PROPERTIES OF DOMESTIC COMMERCIAL L-ASPARAGINASE IN LIPOSOMES FORMED FROM SOYBEAN PHOSPHOLIPIDS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 22 Jan 85) pp 68-72

[Article by V. S. Mikhaylin, A. A. Kondrashin and T. T. Berezov, Department of Biochemistry, Friendship of Peoples University imeni Patrice Lumumba, Moscow]

[Abstract] A study of incorporation of L-asparaginase into liposomes formed from soybean phospholipids (azolectin) is described and discussed. Fluorescent analysis with the use of celcein stain showed that only 1 percent of the aqueous phase volume is located inside the liposomes while the degree of incorporation of L-asparaginase reached 60 percent. A large part of the protein molecules was adsorbed on the outside of the liposomes due, mostly, to electrostatic and hydrophobic interactions. K_m of free L-asparaginase was $1.8 \cdot 10^{-5}M$ under conditions of the experiment while K_m of L-asparaginase bound with the liposomes was only slightly higher at $2.7 \cdot 10^{-5}M$ and was probably due to decreased rate of diffusion of the substrate near the surface of the liposomes. Phospholipids from soybeans increased the L-asparaginase thermostability during temperature increase to 70°C. Presence

of the enzyme inside of the liposomes and its adsorption on the membrane surface protects against proteolysis. The half-life of free L-asparaginase in serum was almost 8 hours while that of liposome-bound enzyme was almost 50 hours (6 times as great). The study confirmed the possibility of the use of azolectin liposomes to immobilize Soviet L-asparaginase. Figures 5; references 13: 7 Russian; 6 Western.

2791/12955
CSO: 1840/589

UDC 577.15.022+541+182.6+577.112+4

IMPARTING MEMBRANE ACTIVE PROPERTIES TO WATER SOLUBLE ENZYMES BY ARTIFICIAL HYDROPHOBIZATION--NEW APPROACH TO REGULATION OF KINETIC CHARACTERISTICS OF ENZYMIC REACTIONS IN SURFACTANT-WATER-ORGANIC SOLVENT SYSTEMS

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA: SERIYA 2, KHIMIYA in Russian
Vol 27, No 6, Nov-Dec 86 (manuscript received 25 Dec 85) pp 591-594

[Article by A. V. Kabanov, A. V. Levashov and K. Martinek, Department of Chemical Enzymology]

[Abstract] Interest in the comparison of kinetic regularities of reactions, catalyzed in a system of reversed micelles, by hydrophobized enzymes and by their unmodified precursors prompted this study using the reaction of hydrolysis of N-trans-cinnamoylimidazole (XT) in a system of reversed micelles of a sodium salt of di-(2-ethylhexyl) ether of sulfosuccinic acid (aerosol AT, AOT) in octane. The dependence of catalytic constants (rate of deacylation) on AOT concentration for unmodified and stearylated enzymes was compared. No dependence of the rate of deacylation on the AOT concentration was seen for the unmodified enzyme but a strong dependence was seen for the stearylated enzyme. Hydrophobization of alpha-chymotrypsin by stearic acid residues changed the kinetic regularities of action of this enzyme significantly. Figure 1; references 14: 8 Russian, 6 Western.

2791/12955
CSO: 1840/578

THREE-DIMENSIONAL STRUCTURE OF GAMMA-MELANOTROPIN

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR, SERIYA BIOLOGICHESKIKH
NAUK in Russian No 6, Nov-Dec 86, pp 118-123

[Article by N. A. Akhmedov and G. A. Akhverdiyeva, Azerbaijan State University
imeni S. M. Kirov]

[Abstract] A semiempirical approach was taken to a three-dimensional analysis of the structure of gamma-melanotropin, which revealed that this molecule may be described by 14 low-energy conformations. Tabulated data are provided for the relative energies and the energy contributions of hydrogen bonds and electrostatic and torsional interactions. The tyr¹-gly⁴ segment of the gamma-melanotropin appears to constitute the conformationally labile entity that imparts mobility to the N-terminus. The fact that the molecule is capable of a number of low-energy conformations would appear to be responsible for the polyfunctional nature of gamma-melanotropin. Figures 2; references 16: 5 Russian, 11 Western.

12172/12955

CSO: 1840/830

THEORETICAL CONFORMATIONAL ANALYSIS OF PRO037-LYS38-GLU39-GLN40-LYS41
PENTAPEPTIDE SEGMENT OF HUMAN SOMATOTROPIN

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR, SERIYA BIOLOGICHESKIKH
NAUK in Russian No 6, Nov-Dec 86, pp 124-127

[Article by K. D. Mzareulov, Azerbaijan State University imeni S. M. Kirov]

[Abstract] A theoretical analysis was conducted on the conformational status of the pro037-lys-glu-gln-lys41 pentapeptide segment of human somatotropin, using the energy minimizing approach via variation of dihedral angles. The conformational energy was determined as the sum of nonvalent and torsional contributions. For all the low-energy conformations of the peptide, a strong electrostatic interaction was characteristic for the lysine moieties with glutamic acid. In addition, the full energy potential of the peptide was also affected by the contact of gln40 with glu39 and lys41, as well as the interaction of pro with the other 4 residues. The contributions of nonvalent, electrostatic and torsional factors to the energy of the globular conformation were, respectively, 26.5, 2.5, and 4.3 kcal/mole. The pentapeptide sequence in question appears to play a key role in determining the molecular flexion of the entire somatotropin molecule. Figures 1; references 16: 8 Russian, 8 Western.

12172/12955

CSO: 1840/830

MULTIPLE FORMS OF CARDIOACTIVE NEUROHORMONES FROM HYPOTHALAMUS

Yerevan NEYROKHIMIYA in Russian Vol 5, No 4, Oct-Dec 86 (manuscript received 25 Feb 85) pp 354-365

[Article by A. A. Galoyan, R. M. Srapionyan, R. O. Karapetyan, Zh. G. Abelyan, F. M. Saakyan, S. A. Saakyan, S. S. Abramyan, L. A. Grigoryan, A. B. Odabashyan and I. F. Bochko, Institute of Biochemistry, ArSSR Academy of Sciences, Yerevan]

[Abstract] Multiple forms of cardioactive neurohormones "K", "S" and "G" were isolated from bovine hypothalamus and some properties of them are described and discussed. The compounds were isolated from a succinic acid extract of hypothalamus tissue by the Galayan and Aleksanyan method or by dissociation of their protein carriers. Change of the coronary dilating activity of the hormones due to different factors is discussed briefly. Differences in effect of the hormones on cAMP phosphodiesterase activity and on phosphorylase activity in various organs and differences in biological activity are also discussed briefly. The study confirmed the existence of multiple forms of cardioactive hormones and demonstrated their structural, molecular and biological differences. Figures 4; references 25: 16 Russian, 9 Western.

2791/12955
CSO: 1840/594

UDC 577.112.017.23:612.82+577.112.4

PRESENCE OF NEUROSPECIFIC PROTEIN S-100 IN PORE-LAMINA COMPLEX OF BRAIN NUCLEUS CELLS AND ITS EFFECT ON PHOSPHORYLATION OF NUCLEAR MEMBRANE PROTEINS

Yerevan NEYROKHIMIYA in Russian Vol 5, No 4, Oct-Dec 86 (manuscript received 29 Dec 85) pp 365-370

[Article by A. A. Kapralov, V. I. Tyulenev and Ya. V. Belik, Institute of Biochemistry imeni A. V. Palladin, UkSSR Academy of Sciences, Kiev]

[Abstract] The possibility of detecting S-100 protein in brain nuclear pore-lamina was demonstrated and its effect on phosphorylation of nuclear membrane proteins was described. The pore-lamina complex was obtained from bovine cerebellum grey matter. Phosphorylation was studied by the Perumal and Rapport method. Use of S-100 protein increased phosphorylation of brain nuclear membrane by 67 percent, mainly due to proteins with molecular weight of approximately 70 kD. Phosphorylation of some protein fractions decreased. There was a definite relationship between the increase of nuclear membrane ATPase activity and phosphorylation of proteins. It was assumed that S-100 protein intensifies nuclear-cytoplasmic transport of RNA and increases ATPase activity of the nuclear membrane. The effect of S-100 protein on nuclear

membrane functioning may be caused by change of phosphorylation of proteins of these membranes. Figures 3; references 24: 5 Russian, 19 Western.

2791/12955

CSO: 1840/594

UDC 577.112.083

ISOLATION AND CHARACTERIZATION OF UROKINASE TYPE PLASMINOGEN ACTIVATOR FROM HUMAN EMBRYONAL LUNG FIBROBLASTS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 3, May-Jun 86
(manuscript received 17 Jul 85) pp 778-788

[Article by A. Ya. Shevelev, T. N. Barshevskaya, A. A. Bologurov, G. A. Kratasyuk, L. Ye. Goryunova and R. Sh. Bibilashvili, Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Isolation and determination of characteristics of a plasminogen activator (AP), synthesized by human embryonal lung fibroblasts, which were proposed as a source of mRNA for cloning the urokinase gene, are described and discussed. Phosphocellulose P11 chromatography was used in the first stage of purification and p-aminobenzamidine agarose affine chromatography was used subsequently. Electrophoretic separation of AP on polyacrylamide gel showed that the purified preparations contain two major and one minor protein bands with molecular weight of 53, 32 and 17 kDa, respectively. The high molecular weight and low molecular weight forms of AP have a comparable level of enzymic activity, while fragment 17 kDa is inactive. The high molecular weight form with specific activity of 130,000 IU/mg consists of 2 polypeptide chains (31 kDa and 20 kDa) and displays high affinity for fibrin-cetele, lysine-sepharose and heparin-sepharose while the low molecular weight form (190,000 IU/mg) showed affinity to these same sorbents but to a much lesser extent and its chromatographic properties closely resemble those of low molecular weight urokinase. Monoclonal antibodies to urokinase inhibited activity of both forms of AP. The enzymologic, chromatographic and immunologic properties revealed indicated that the AP from lung fibroblasts is of the urokinase type. Figures 5; references 32: 1 Russian, 31 Western.

2791/12955

CSO: 1840/569

UDC 577.158.1

MOLECULAR MECHANISM OF WATER PHOTO-OXIDATION DURING PHOTOSYNTHESIS: CLUSTER CATALYSIS OF MULTI-ELECTRON REACTIONS

Moscow MOLEKULARNAYA BIOLOGIYA in Russian Vol 20, No 3, May-Jun 86
(manuscript received 19 Jun 85) pp 728-736

[Article by A. G. Volkov, Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow]

[Abstract] Examination of a possible mechanism of oxygen liberation during photosynthesis, based on experimental data, hypotheses and theoretical studies of many authors is described and discussed. A four-electron mechanism of water photo-oxidation in a magnesium cluster of a photosystem 2 was proposed. It was assumed that water can be oxidized by a complex which liberates oxygen and which consists of at least seven polypeptides, bound with magnesium ions, chlorophyll molecules, pheophytin molecules and plastoquinone molecules. The plastoquinone, cytochrome, polar groups of proteins and ATP-synthetase regulated proton equilibrium. Inhibitory analysis of O_2 liberation was discussed. Thermodynamic, kinetic and structural analysis of the possibility of occurrence of a four-electron reaction is presented. The architectonics and electron paths of the reaction center of photosystem 2 are examined. The role of manganese ions in photosynthesis is discussed and mechanisms of cluster catalysis of multi-electron reactions discussed. Figures 5; references 39: 17 Russian, 22 Western.

2791/12955

CSO: 1840/569

HYPERBARIC STORAGE OF BLOOD CELLS BELOW 0°C

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 19 Dec 85) pp 15-19

[Article by I. I. Gitelzon, corresponding member, USSR Academy of Sciences, R. A. Pavlenko and Yu. A. Kudenko, Institute of Biophysics, Siberian Department, USSR Academy of Sciences, Krasnoyarsk]

[Abstract] Various hyperbaric modalities of blood preservation at low temperatures were tested for their utility, in order to avoid the need for preservative agents. The resultant data led to the identification of storage at $-4 (+0.5)^{\circ}\text{C}$ under a pressure of 400 atm as constituting the optimum preservation modality. Erythrocyte loss over a 28 day period was limited to 2-3%, with only a 1% loss after 14 days. In addition, leukocytes retained phagocytic activity for up to 20 days. These observations, as well as evaluation of other parameters, demonstrated that blood storage under these conditions was essentially equivalent to storage at $+4^{\circ}\text{C}$ with preservatives, with the key advantage that preservatives were eliminated. Figures 1; references 15: 10 Russian, 5 Western.

12172/12955

CSO: 1840/684

ENVIRONMENT

UDC 614.73:[621.311.25:621.621.039

TASKS AND RESEARCH SCOPE OF RADIOLOGICAL LABORATORIES OF OBLAST SANITARY-EPIDEMIOLOGICAL STATIONS IN PROXIMITY TO ATOMIC POWER STATIONS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 86 (manuscript received 2 Apr 85) pp 74-76

[Article by Yu. A. Tomilin, Nikolayev Oblast Sanitary-Epidemiological Station]

[Abstract] The principal task of Sanitary-Epidemiological Stations in the area of radiation hygiene is to monitor institutions involved in radioactive operations, including atomic power stations (APS). Radiologic control at these institutions consists of internal and external dosimetry of water, soil, vegetation, air etc. This, however, is not sufficient to protect the population living in the area of APS. Specific isotopes (^{90}Sr , ^{137}Cs , ^{134}Cs , ^{131}I , ^{60}Co , ^{57}In) should be monitored in atmospheric air collected at various distances from APS, from the cooling system water and in food produced locally (milk, bread, fish). Background contamination should be determined prior to the opening of APS if possible. To do this, modern laboratory equipment is necessary. Only centralized control over this problem will assure adherence to these requirements.

7813/12955

CSO: 1840/722

UDC 576.895.2:616.9

THEORY OF CONNECTIONS BETWEEN TYPES OF FEEDING AND DIGESTION IN BLOOD-SUCKING
ARTHROPODS AND THEIR ABILITY TO ACT AS SPECIFIC VECTORS OF TRANSMISSIBLE
INFECTION AGENTS

Leningrad PARAZITOLOGIYA in Russian Vol 19, No 1, Jan-Feb 86 (manuscript
received 3 Apr 84) pp 3-7

[Article by A. N. Alekseyev, Institute of Medical Parasitology and Tropical
Medicinen imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow]

[Abstract] An attempt is made to develop a theory connecting feeding and
digestive processes in arthropods with their ability to transmit infectious
diseases. One of the more important factors separating them into two groups
is the presence of singular or dual glycocalix layers on the intestinal
microvilli where the agents can penetrate into the body of the arthropod
and replicate. The following barriers were identified for the single glyco-
calix layer group: absence of blood feeding, presence of "vulgar microflora"
in the diet of larvae with absence of blood, absence of exclusive blood
feeding in all phases of metamorphosis, necessity for transphasic transition
of pyroplasms and extremely high peptidase activity of the intestines.
References 10: 6 Russian, 4 Western.

7813/12955

CSO: 1840/749

APPROACHES TO OPTIMIZATION OF EPIDEMIOLOGIC SURVEILLANCE OF INFECTIOUS DISEASES IN USSR

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 86 (manuscript received 5 Nov 85) pp 3-7

[Article by V. I. Pokrovskiy, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

[Abstract] It is noted that, whereas in most countries the system of epidemiological surveillance (ES) began only recently, in the USSR it existed from the early days of the Soviet rule. With spreading of infectious diseases in recent years, it becomes necessary to improve this ES system, to bring it to the level of current state of the art. Specific cases of ES being carried out in several areas are recounted. Inclusion of ES in full scale public health practice requires reorganization of all components of the sanitation-epidemiological and therapeutic service including technological and material resupply. First of all, automated control systems should become routine; computer analysis of information collected at various levels of ES and creation of mutual links permitting operational decision making on timely and rational basis. Improvement in the microbiological service should provide better and faster diagnosis, planned use of antibiotics, monitoring of the environment, etc. Finally, new cadres of epidemiologists, hygienists, microbiologists and other specialists should be educated and assigned to the public health service. References: 10 Russian (2 by Western authors).

7813/12955
CSO: 1840/622

PRINCIPAL TENDENCIES IN EPIDEMIC PROCESS OF DIPHTHERIA AND POSSIBILITY OF ITS LIQUIDATION UNDER LARGE CITY CONDITIONS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 86 (manuscript received 7 Dec 85) pp 20-24

[Article by B. A. Zamotin, F. Ye. Kravtsov, L. S. Naumovich, G. P. Zhdanov, G. A. Averina, V. A. Zyromyatnikova, G. V. Dorozhkin, V. G. Shironina, N. A. Tkachenko, I. G. Usyskina, V. S. Penzina and N. I. Pekunova, Ryazan Medical Institute]

[Abstract] The goal of this study was to analyze the epidemic processes of diphtheria at the level of a large city in order to determine ways of regional liquidation of this disease. Monthly and annual diphtheria dynamics was analyzed for the years 1975 to 1984; the large city from which the data were collected is not mentioned [possibly Ryazan?]. In these years a tendency was noted to activation of epidemic process of diphtheria: higher incidence

of disease, circulating levels of toxigenic and nontoxigenic *Corynebacterium diphtheriae* and low but stable antitoxic immunity indices among children and adults. In order to develop an effective control program for diphtheria at regional level, additional studies are needed in the area of pathogenesis and epidemiologic characteristics of the bacterial carriers and antibacterial immunity. In addition specific prophylactic methods need to be developed which would prevent appearance of new cases and control the bacteria carriers so as to stop the circulation of these pathogens among the population. References 2 (Russian).

7813/12955
CSO: 1840/622

UDC 614.7[(103-6)SEV]"1981-1985"

COOPERATION OF CEMA MEMBER COUNTRIES IN ENVIRONMENTAL HYGIENE AREA DURING 1981-1985

Moscow GIGIYENA I SANITARIYA in Russian No 9, Sep 86 (manuscript received 18 Feb 86) pp 36-38

[Article by G. I. Sidorenko, N. N. Litvinov, N. A. Rakhmanina and V. V. Vashkova, Scientific Research Institute of General and Community Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow]

[Abstract] The problem of the prevention of environmental contamination and rational use of natural resources is closely connected with scientific-technological revolution taking place world-wide. During the 1981-1985 period, the members of CEMA proposed a program consisting of two parts: I- "Development, improvement and coordination of methodological principles for hygienic regulation of environmental factors" and II- "Development, improvement and coordination of methodology for sanitary preservation of environmental objects". The organizations participating in this effort are listed. During this cited period, 22 agreements were signed between these countries for exchange of scientists working on these problems and 69 documents were developed for publication. The center of information exchange is at the Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin [USSR]. Preparatory work has already been carried out for the 1986-1990 period, covering 13 tasks. The overall program unites individual national plans in one cooperative venture. References 4 (Russian).

7813/12955
CSO: 1840/724

POPULATION GENETICS OF DIFFERENTIAL FERTILITY IN URBAN POPULATIONS

Moscow GENETIKA in Russian Vol 22, No 2, Feb 86 (manuscript received 10 Jun 85) pp 304-311

[Article by A. N. Kucher and O. L. Kurbatova, Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] A population genetics study was carried out on a cohort of 1365 women past the reproductive period (45-50 years old) in the Lenin Rayon of Moscow, to identify selection parameters in differential fertility of an urban population. The data revealed a history average of 4.03 ± 0.08 pregnancies per subject ($\sigma = 2.98$) with a mean number of live births of 1.12 ± 0.02 ($\sigma = 0.77$). At the end of the active reproductive period 7.4% of the subjects had never been gravid, while 19.5% had never delivered a child. Calculation of the various Crow indices for the population at hand in relation to differential fertility and mortality, demonstrated that selection at the prenatal stage and that due to infertility were still significant. In the urban population, differential fertility (decision to have children and number of children) makes a greater selective contribution than differential mortality in the postnatal period. Figures 3; references 27: 11 Russian, 16 Western.

12172/12955
CSO: 1840/638

PROPERTIES AND USE OF PHASMIDS IN GENETIC ENGINEERING. PART 1. PLASMID VECTOR CONSTRUCTION

Moscow GENETIKA in Russian Vol 22, No 8, Aug 86 (manuscript received 15 Nov 84; in final form 8 Aug 85) pp 2035-2041

[Article by M. Yu. Fonshteyn, Ye. M. Khurges, N. K. Yankovskiy and V. G. Debabov, All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow]

[Abstract] Technical details are presented on the construction of a phasmid (phage-plasmid chimera) designated as λ pMYF11, through the insertion of plasmid pBR322 into one of 2 EcoRI sites on the DNA of phage λ 47.1. The recombinant DNA was packaged in phage λ capsid, with in vivo recombination with prophage 434 changing the cI^- allele to cI^+ . The λ pMYF11 phasmid may be used for substitution of DNA fragments at a number of restrictase sites. The size of the foreign DNA fragment that may be cloned in the phasmid at the BamHI site ranges from 3 to 19 kb pairs, and for HindIII, SalGI and XhoI restrictases the size ranges are, respectively, 5-21, 2-18, and 0-9 kb pairs. λ pMYF11 functions most efficiently for the creation of a E. coli C600 gene bank in conjunction with BamHI, with retention of the cI^+ marker that is a prerequisite for its stable existence. Figures 1; references 14 (Western).

12172/12955
CSO: 1840/644

PROPERTIES AND USE OF PHASMIDS IN GENETIC ENGINEERING. PART 2. IN VITRO PACKAGING AND LYSOGENIZATION OF E. COLI K-12

Moscow GENETIKA in Russian Vol 22, No 8, Aug 86 (manuscript received 21 Jun 85; in final form 10 Dec 85) pp 2042-2047

[Article by M. Yu. Fonshteyn and N. K. Yankovskiy, All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow]

[Abstract] A selected E. coli $recA^-$ culture was infected with phasmid pMYF11 (prepared from phage λ 47.1 and plasmid pBR322) at a low multiplicity of infection, resulting in the isolation of monomeric circular λ DNA. The efficiency of in vitro packaging into phage λ capsid ranged from 2×10^5 to 0.7×10^7 clones per 1 μ g DNA, the latter figure practically equivalent to packaging of control phage λ DNA which is a linear molecule. These observations demonstrated that the altered state of λ pMYF11 DNA representative of the lysogenic state may serve as a convenient vector for exogenous DNA

inserted by means of restrictases. Additional phasmids λ pMYF15 and λ pMYFL6 were constructed and used to demonstrate that acquisition of the CI^+ allele was a prerequisite for lysogenization, as a result of in vivo recombination with prophage 434. Figures 1; references 15: 1 Russian, 14 Western.

12172/12955
CSO: 1840/644

UDC 575.13:577.21:579.25.5

COMPARATIVE STRUCTURAL ANALYSIS OF PLASMID NPL-1 AND ITS CONGENERS
RESPONSIBLE FOR NAPHTHALENE OXIDATION IN PS. PUTIDA

Moscow GENETIKA in Russian Vol 22, No 10, Oct 86 (manuscript received
18 Dec 85; in final form 5 Feb 86) pp 2389-2397

[Article by I. A. Kosheleva, T. V. Tsoy, A. N. Kulakova and A. M. Boronin,
Institute of Biochemistry and Physiology of Microorganisms, USSR Academy
of Sciences, Pushchino-on-Oka, Moscow Oblast]

[Abstract] A comparative analysis was conducted on the structural organization of plasmid NPL-1, responsible for naphthalene oxidation by *Ps. putida* on an inducible basis, as well as on the mutant plasmid NPL-41 responsible for constitutive synthesis of the biodegrading enzymes. NPL-1 and NPL-41 were shown to be transferred by conjugation within a wide spectrum of gram negative bacteria (*Pseudomonas* sp., *E. coli*, *Klebsiella pneumoniae*, *Rhizobium meliloti*, *Agrobacterium tumefaciens*). In addition, by comparison with plasmid pBS7, a spontaneous mutant that lost the Nah^+ phenotype, the *nah* genes were mapped to a 23 kbp DNA segment in NPL-1 and NPL-41. Conversion of NPL-1 to NPL-41 involved inversion of a 4 kbp DNA segment in the vicinity of the *nah*-region, resulting in the transformation of naphthalene dioxygenase from an inducible to a constitutive status. Figures 5; references 22: 6 Russian, 16 Western.

12172/12955
CSO: 1840/646

UDC 591.881:57.043

ULTRASTRUCTURAL CHANGES IN ISOLATED MECHANORECEPTOR NEURONS AFTER HELIUM-CADMIUM LASER MICROIRRADIATION

Leningrad TSITOLOGIYA in Russian Vol 28, No 5, May 86 (manuscript received 12 Apr 85) pp 512-516

[Article by G. M. Fedorenko and A. B. Uzdenskiy, Institute of Neurocybernetics, Rostov University]

[Abstract] The goal of this work was to investigate the ultrastructure of isolated mechanoreceptor neurons during various phases of their impulse reactions to blue-laser microirradiation at the wavelength of 441.6 nm. Experiments were performed on isolated, slowly adapting sensor neurons of crayfish stretch receptors. It was shown that the most sensitive structure was the mitochondria; they swelled, cristae were destroyed and the electron density matrix decreased. Analogous behavior was also observed at different wavelength. Other intracellular structures were not affected but in some cases swelling of endoplasmatic network and reduction of Golgi complexes were observed along with formation of meylin-like bodies and nuclear envelope invaginations towards the irradiated area. These changes occurred as early as phase I when the primary changes in mitochondria were still insignificant. References 17: 7 Russian, 10 Western.

7813/12955

CSO: 1840/750

HELIUM-NEON LASER DOSE EFFECTS ON ESCHERICHIA COLI K-12

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 40, No 2, Feb 87
(manuscript received 29 Dec 86) pp 102-105

[Article by A. G. Arutyunyan, Ts. M. Avakyan, K. Sh. Voskanyan and
N. V. Simonyan, Scientific Research Institute of Condensed Media Physics,
Yerevan State University; Yerevan Physics Institute; USSR State Committee
on the Use of Atomic Energy]

[Abstract] E. coli K12 cells subjected to helium-neon laser irradiation
(633 nm, 0.6- 4.8 mW output) yielded dose-effect type of death curves.
Exposure of the target cells to alpha-particle irradiation (21 Gy/min, 110
keV/ μ m) followed by laser irradiation within 120 sec showed that the latter
possessed radioprotective effects against alpha-particle killing. The
effectiveness of the laser irradiation was inversely related to the output
power of the LG-70 helium-neon laser. The laser radioprotective effect
was evident within a narrow energy spectrum ($7-8.5 \times 10^3 \text{ J/m}^2$), with maximum
efficiency evident at $8 \times 10^3 \text{ J/m}^2$. Figures 2; references 10 (Russian).

12172/12955

CSO: 1840/831

UDC 574.5/59.08/599.537

METHOD OF COUNTING BLACK SEA DOLPHINS

Vladivostok BIOLOGIYA MORYA in Russian No 6, Nov-Dec 86 (manuscript received 14 Aug 85) pp 64-68

[Article by V. L. Yukhov, A. G. Petukhov, deceased, and A. I. Korkhov, Azov-Black Sea Scientific Research Institute of Marine Fisheries and Oceanography, Odessa Department, Moscow University, Biology Faculty, Chair of Invertebrate Zoology, Moscow University]

[Abstract] A dolphin-counting method provides a dolphin count in a pertinent area during different regimes of operation of the ship and provides data concerning the distribution, movement and behavior of the dolphins. Counts were made from the moving ship and at anchor. The method can be used to count other cetaceans. Use of the method in 1984 produced counts which were practically the same as previous counts. There were four dolphins/10 km² in the Black Sea shelf area and two dolphins/100 km² in the open sea. There are 55,000-60,000 dolphins in the Black Sea at present with the white-sided dolphin being the most abundant species. Figure 1; references 7: 6 Russian, 1 Western.

2791/12955

CSO: 1840/582

MEDICINE

UDC 617.51-001-036.17-07:[616.153.95:547.943+615+154.814.32:577.175.325

BETA-ENDORPHIN AND CORTICOTROPIN IN BLOOD OF PATIENTS IN ACUTE PERIOD OF
MAJOR CRANIO-CEREBRAL TRAUMA

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 14 Feb 85) pp 95-98

[Article by R. A. Mirzoyan, A. A. Potapov and M. V. Pisetskaya, Scientific Research Institute of Biological Testing of Chemical Compounds, Kupavna, Moscow Oblast Institute of Neurosurgery imeni N. N. Burdenko, USSR Academy of Medical Sciences, Moscow]

[Abstract] Participation of beta-endorphins in the neuroendocrinal response of the body to brain trauma was studied by determining the beta-endorphin level in patients in the dynamics of the period of major cranial trauma in comparison with the level of corticotropin and cortisone, which play major roles in formation of adaptational reactions of the body to a grave state. The study included 22 patients, ranging in age from 17-55 years, with major cranial trauma and 10 healthy persons in the control group. Group I patients (10) were in deep stupefaction or sopor upon admission and Group V patients (12) were in moderate or deep coma. Eleven patients underwent surgery for treatment of subdural, epidural or intracerebral hematomas and seven died within 3-20 days after trauma. The study showed two types of changes of blood corticotropin level on the 1st day after trauma. Group I patients showed a 2-10-fold increase of blood corticotropin level and an 8-fold cortisone level increase, on the average. The beta-endorphin level increased and the corticotropin level decreased within 1 day after surgery. There was no correlation between beta-endorphin and corticotropin levels. The study showed that changes in beta-endorphin and corticotropin level after major cranial trauma may differ. In some cases an increase of beta-endorphin level appeared with reduction of blood corticotropin level. The difference in changes of level of these peptides may be connected with autonomous pathways of regulation and synthesis of beta-endorphin as well as with pathways in common with corticotropin. References 12: 1 Russian, 11 Western.

2791/12955
CSO: 1840/589

ELIMINATION OF CHOLESTEROL LIPOPROTEIN COMPLEXES FROM BLOOD PLASMA WITH USE OF SILOCHROMES

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 11 Jan 85) pp 55-57

[Article by I. P. Andrianova, V. V. Zuyevskiy, A. B. Rabovskiy, M. V. Tsybul'skaya, Yu. S. Nikitin and T. D. Khokhlova, Second Moscow Medical Institute, Chemical Faculty, Moscow State University]

[Abstract] A study of Soviet industrial silochromes (S-120, SH-3, SH-2, SH-1.5 and SH-1) showed them to be effective carriers of hemosorbents and plasma sorbents for removing atherogenic complexes of cholesterol from blood in vitro. SH-1.5 with pore diameter of 180-200 nm and a capacity of 12-14 mg of cholesterol per 1 mg of adsorbent was the most efficient of the silochromes in this respect. SH-3 with pore diameter of 70 nm and specific surface of $110 \text{ m}^2/\text{g}$ was the most effective adsorbent of plasma proteins. Use of SH-1.5 for plasma adsorption in a rabbit with experimental hypercholesterolemia reduced the plasma cholesterol level from 360-215 mg percent, that is, 40 percent, with no complications appearing in the postoperative period. Figures 2; references 11: 6 Russian, 5 Western.

2791/12955
CSO: 1840/589

PROTECTIVE ACTION OF PHOSPHATIDYL CHOLINE CONTAINING LIPOSOMES IN EXPERIMENTAL TOXIC HEPATITIS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 22 Jan 85) pp 65-68

[Article by N. B. Boldanova, V. L. Migushina, C. Z. Sahtinina and O. V. Dobrynina, Second Moscow Medical Institute imeni N. I. Pirogov, Moscow]

[Abstract] The effectiveness of restoration of damaged hepatocyte plasma membranes by use of phospholipids as basic components of a lipid matrix of biological membranes is assessed and discussed. The hepato-protective effect of the phospholipids was determined by the action of fructose-1-monophosphate aldolase in blood serum. Mongrel rats (600) (weight 100-120 g), after 24 hour fast with unlimited water, received a 50 percent solution of CCL_4 in liquid petrolatum intragastrically (0.25 ml/100 g of weight) or a 10 percent solution intraperitoneally (40 microliters/100 g of weight), were decapitated after 20 hours and fructose-1-monophosphate aldolase activity was determined by a modified Shapiro method. The study confirmed the possibility of intra-vitam restoration of damaged hepatocyte membranes with the

aid of egg phosphatidyl choline administered in the form of liposomes or micelles. The phosphatidyl choline can form and support a stable bilayer in an aqueous environment which is necessary for restoration of the damaged lipid matrix of the membrane. The rate of aldolase normalization depends upon the liposomes composition and the method of their administration (intravenous, intraperitoneal or intragastric). Figures 2; references 9: 5 Russian, 4 Western.

2791/12955
CSO: 1840/589

UDC 616-001.3-036.17-06-07

COMPUTER-BASED PREDICTION OF INFECTIOUS AND SEPTIC COMPLICATIONS OF SEVERE TRAUMA

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 138, No 2, Feb 87 (manuscript received 18 Dec 85) pp 59-62

[Article by O. P. Vrublevskiy and N. V. Edeleva, Institute of General Resuscitation Science, USSR Academy of Sciences; Moscow Clinical Hospital imeni S. P. Botkin]

[Abstract] A case review of 156 patients with severe trauma disclosed that in 44% of the cases, infectious and septic complications developed. Furthermore, in that category of patients the mortality rate approached 56%. On the basis of these observations a computerized study was conducted to assess the risk factors indicative of the possibility of septic complications in 56 patients presenting with severe trauma and in stage II-IV shock. In 35 of the subjects infectious/septic complications did develop. Evaluation of the tabulated data demonstrated that such complications are likely to occur in patients with a high leukocytic index of intoxication for 1-10 days, and instability of hemodynamic parameters. Specifically, a leukocytic index of intoxication of 4.2 or better and arterial systolic hypotension below 80 mm Hg, in combination with hemodynamic instability of 30 min or longer, are highly indicative of eventual infectious/septic complications. References 8: 7 Russian, 1 Western.

12172/12955
CSO: 1840/811

KEY ASPECTS OF AUTOTRANSFUSIONS IN SCHEDULED OPERATIONS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 138, No 2, Feb 87 (manuscript received 15 Oct 86) pp 120-125

[Article by I. G. Dutkevich, G. V. Golovin, A. I. Gorbashko, A. F. Malinovskiy, Z. M. Chanchiyev, Yu. I. Grigoryeva, O. I. Ilyina, V. V. Kurenkova and E. V. Rechkunova, Chairs of Transfusion Sciences and Hematology, of Surgery 3 with Endoscopy Course, and of Thoracic Surgery, Leningrad Institute for the Advanced Training of Physicians; Nos 15 and 16 Leningrad Hospitals]

[Abstract] An analysis was conducted on the factors affecting and influencing autotransfusion for scheduled operations, showing that using the patient's own blood was feasible and advisable in 68% of the cases. This parameter varied from 14% of the urologic patients, to 60% of gynecologic patients. The amount of blood taken and preserved for use in surgery commonly varied from 580 to 760 ml, with autotransfusion of 500 ml of the blood felt to reduce 2- to 3-fold the volume of heterologous blood that may be required. A tabulated list is provided of contraindications for securing blood for autotransfusions (anemia, hypoproteinemia, cardiovascular disorders, low body weight, general debility, etc.). The final recommendation is made that blood transfusion services be evaluated on the number of autotransfusions performed at general hospitals, with the notation that such donations can be readily carried out at hospitals and ambulatory facilities. References 8 (Russian).

12172/12955
CSO: 1840/811

UDC 616.419-089.843-06:[616.98:578.825.12

CYTOMEGALOVIRUS INFECTIONS AS COMPLICATIONS OF BONE MARROW TRANSPLANTS

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86 (manuscript received 29 Jul 85) pp 13-15

[Article by V. A. Martynova, doctor of medical sciences, Ye. B. Lazareva, L. S. Lyubimova, S. A. Demidova (dec.), V. N. Martynova and T. V. Golosova, professor, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Serological, histological, and virological work-ups were conducted on 16 patients receiving bone marrow transplants (allogeneic, syngeneic, or autologous) in connection with acute leukemia or hypoplastic anemia. In 10 of the patients bone marrow grafting was eventually followed by elevation of serum levels of antibodies against cytomegalovirus to significant levels (1:8 to 1:128), indicating an active infectious process.

The lack of correlation between antibody titers in donor and recipient sera suggested that the infections were of endogenous origin attributable to activation of subclinical or latent infections by pre-grafting immunosuppressive treatment. Figures 1; references 9: 1 Russian, 8 Western.

12172/12955
CSO: 1840/684

UDC 615.384:547.221],015.4:616.151.5

EFFECTS OF PERFLUOROCARBON COMPOUNDS ON BLOOD COAGULATION FACTORS

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 11 Apr 85) pp 36-38

[Article by S. M. Panchenko and N. I. Afonin, doctor of medical sciences, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] In vitro studies were conducted on the effects of the perfluorocarbon compound perfucol on the coagulation factors of donor blood. The tabulated data demonstrate that perfucol was essentially innocuous in relation to in vitro blood coagulation, showing moderate activation of thrombocytes. Perfucol favors the interaction of coagulation factors with anticoagulant components, resulting in a new anticoagulation effect. Dextran (polyglucin), by contrast, activates blood platelets resulting in the release of factors 3 and 4, and stimulates consumption of plasma coagulation factors. Figures 1 (no references).

12172/12955
CSO: 1840/684

UDC 615.384.015.4

TESTING OF SAFETY OF PLASMA EXTENDER POLYGLUSOL

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 23 Jan 85) pp 38-42

[Article by T. M. Prostakova, N. D. Kachalova, Ye. N. Glasko, T. V. Polushina, deceased, professor, and M. P. Khokhlova, professor, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] Safety testing was conducted with outbred mice, chinchilla rabbits, and guinea pigs to assess polyglusol, a dextran-based plasma extender supplemented with salts simulating plasma electrolyte composition. The multifaceted studies demonstrated that polyglusol was a preparation with a large margin of safety, having no adverse effects on blood, blood coagulation,

or the internal organs. Furthermore, the preparation was nonantigenic and nontoxic for the site of injection on intravenous administration in acute and chronic experiments. In rabbits, polyglusol was eliminated via the kidneys within the first 2 days of injection. One month after administration the tissues were free of polyglusol, indicating lack of cumulative characteristics and pointing to rapid metabolism. Figures 1; references 8: 5 Russian, 3 Western.

12172/12955
CSO: 1840/684

UDC 615.385.1.014.413(477.63-25

ERYTHROCYTE CRYOPRESERVATION AT DNEPROPETROVSK OBLAST BLOOD TRANSFUSION STATION

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 23 Jul 85) pp 60-61

[Article by L. A. Kislyakova, Dnepropetrovsk Oblast Blood Transfusion Station]

[Abstract] Cryopreservation of blood components was initiated in 1972 at the Dnepropetrovsk Oblast Blood Transfusion Station, with numerous improvements and innovations introduced since then. In the latest approach, erythrocytes are thawed and washed with a 25% solution of glucose, glucose-sucrose, or glucose-mannitol by centrifugation, followed by centrifugation for 7 min at 1500 rpm in solution "8v," and resuspension in the latter solution. Such preparations are free of free hemoglobin, and even after 2-3 days of storage the free hemoglobin concentration is negligible. An ongoing project, novel techniques are constantly being developed by the station to further improve the preservation and use of cryopreserved erythrocytes.

12172/12955
CSO: 1840/684

UDC 579.852.11:579.222:547.466].08

IN VITRO UTILIZATION OF AMINO ACIDS BY BACILLUS ANTHRACIS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 23 Apr 85) pp 30-34

[Article by P. I. Naymanov, Ye. P. Golubinskiy, Yu. I. Sorkin and V. V. Kondrashov, Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] A comparative analysis was conducted of the utilization of amino acids during in vitro cultivation of *Bacillus anthracis*, using both virulent and vaccine strains under conditions of batch cultivation on a synthetic medium with 18 amino acids. The most active utilization of amino acids occurred during the exponential growth phase. In the stationary phase high utilization of serine was evident, along with decreased requirements for proline. In addition to the general similarities in the requirements for amino acids by the virulent and vaccine strains of *B. anthracis*, a key difference between them was exemplified by the failure of the vaccine strain to utilize lysine, histidine, arginine and tryptophan. The latter amino acids were readily utilized by the virulent strain. References 7:
4 Russian, 3 Western.

12172/12955
CSO: 1840/613

EFFECTS OF CULTIVATION CONDITIONS ON CYTOTOXIN PRODUCTION BY *LEGIONELLA PNEUMOPHILA*

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 27 Apr 85) pp 34-37

[Article by Yu. F. Belyy, I. S. Tartakovskiy, V. V. Neustroyeva, Yu. V. Vertiyev, Yu. V. Yezepchuk and S. V. Prozorovskiy, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] *Legionella pneumophila* (Philadelphia I strain, serogroup 1) was grown in a Difco proteoseptone liquid medium to assess the effect of the conditions of cultivation on the formation of cytotoxin. Testing on CHO cells demonstrated that the cytotoxin in the culture filtrate was stable for 3 months at 4°C. The cytotoxin was completely inactivated by heating at 60°C for 30 min, while heating at 50°C for the same period of time resulted in a 3-fold loss of cytotoxic activity. As synthesized and found in the culture fluid, the cytotoxin -- reported to be a 6 amino acid peptide -- appears to be firmly bound to a high MW carrier protein since the activity is retained by Servapore membrane, with a 10,000 D cutoff. Cytotoxin production commences after 24 h of cultivation, reaching a peak at 36-48 h, i.e., at the end of the logarithmic phase of growth. Maximum production is obtained at pH 6.65-7.0 and a temperature of 30-37°C. Figures 1; references 13: 1 Russian, 12 Western.

12172/12955
CSO: 1840/613

UDC 616.98:579.841.11]-02-07

BIOLOGY OF *PSEUDOMONAS PSEUDOMALLEI*

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 26 Jun 85) pp 96-100

[Article by L. A. Ryapis, 1st Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] A discussion is presented of the biological characteristics of *Pseudomonas pseudomallei*, the etiologic agent responsible for melioidosis. The organism enters the body via skin abrasion or by inhalation. It may then result in a benign disease mimicking tuberculosis or a fungal disease, or lead to the development of a fulminating septicemia with a high fatality rate. The extreme antigenic variability of the organism has prevented the development of effective vaccines and other immuno-therapies, and treatment rests almost entirely with antibiotics. All of these factors, in conjunction with the agent's adaptability to a wide range of environmental settings, have to be considered in promoting preventive measures and devising therapeutic approaches. References 50: 27 Russian, 23 Western.

12172/12955
CSO: 1840/613

BIOLOGICAL AND PHYSICOCHEMICAL CHARACTERISTICS OF BACILLUS ANTHRACIS AND B. CEREUS CULTURE FILTRATES DURING IN VITRO TOXIN PRODUCTION

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 18 Jun 85) pp 106-107

[Article by E. Ye. Tafelshteyn, L. S. Blinova, Ye. Yu. Markov and Yu. I. Sorkin, Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] A comparative analysis was conducted on the products found in filtrates of *B. anthracis* and *B. cereus* grown in liquid casamino acid medium at pH 7.4-7.5 and 37°C. *B. anthracis* culture fluid contained adenylate cyclase activity when the protein concentration in the samples was on the order of 0.001 µg, while the activity was lacking in filtrates of *B. cereus* cultures even in the presence of 1-10 µg protein. The *B. cereus* filtrate possessed hemolytic activity at a protein concentration of 0.1 µg, while similar activity was not detected in the *B. anthracis* filtrate even with 100 µg protein per sample. Electrophoretograms of the *B. anthracis* polypeptides in the filtrate revealed intensively stained peaks corresponding to 80, 85 and 90 kD polypeptides. These peptides were correlated with the MWs of purified components of the anthrax toxins (lethal, protective and edematogenic). The analogous components were lacking in the *B. cereus* filtrates.

12172/12955
CSO: 1840/613

BATTERY OF INDICATOR CULTURES FOR DETECTION AND ISOLATION OF CHOLERA PHAGES

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 27 Mar 85) pp 114-115

[Article by M. S. Drozhevskina, Yu. I. Arutyunov, I. K. Aleksandrova, L. D. Makedonova and L. R. Cherkasova, Rostov-on-Don Scientific Research Antiplague Institute]

[Abstract] Studies were conducted to identify a useful battery of indicator cultures for the detection of lysogeny in cholera vibrios and isolation of the phages. Among the findings were the facts that *Vibrio cholerae* Pl and V. El Tor 757 did not lead to identification of any additional phages in comparison with those detected with other indicator strains, and that the use of *V. cholerae* 154 and V. El Tor 75M and P-6216 permitted detection of all 9 phages from the classical cholera biotype. The study resulted in the formulation of new battery of indicator strains for the detection of phages produced either by spontaneous lysis or after UV-induction.

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PHENOMENOLOGY AND MOLECULAR MECHANISMS OF SHIGELLA SONNEI DISSOCIATION:
IN VIVO AND IN VITRO MUTATION IN MODEL SYSTEMS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 86 (manuscript received 20 Jan 86) pp 46-51

[Article by G. D. Kaminskiy, N. K. Skoblilova, Ye. V. Kiryanova, Yu. V. Kravtsov and O. V. Chakhava, deceased, First Moscow Medical Institute imeni I. M. Sechenov; Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences]

[Abstract] The dynamics of accumulation of *S. sonnei* the most widely spread etiological agent of dysentery, was studied during an infection process in germ-free rats. When the rats were infected with *S. sonnei* 1-941-HP-Km^r, a stage of apparent absence of phase II was noted followed by an increase of its occurrence and stabilization with preservation of small quantities of S-forms. Dynamics of the appearance of phase II in vivo is different from that in vitro. Cultivation with 0.15% sodium desoxycholate (NaDC) leads to increased phase II during the exponential and atrophy phases. Dissociation from phase I to phase II in exponential culture is significantly higher in presence of NaDC. During the colonization process in rat's intestine and cultivation with NaDC, Kanamycin resistant phase II appears; it is accumulated more rapidly in vivo than in vitro. All stable, dissociative forms of *S. sonnei* used contain two large plasmids in phase I: 120 and 60 Md along with smaller ones; in phase II only the 60 Md plasmid was noted. Plasmid DNA in phases I and II contains 13 identical EcoRI restriction fragments; 3 fragments were missing in phase II (6.7, 9.0, 16.6 Md) and two new ones were found (2.4 and 1.6 Md). Figures 4; references 18: 13 Russian, 5 Western (1 by Russian authors).

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GENETICS OF PHYTOPHTHORA INFESTANS RESISTANCE TO METALAXYL FUNGICIDE

Moscow GENETIKA in Russian Vol 22, No 10, Oct 86 (manuscript received 27 Dec 85; in final form 28 Jan 86) pp 2423-2429

[Article by A. V. Dolgova and Yu. T. Dyakov, Chair of Lower Plants, Moscow State University imeni M. V. Lomonosov]

[Abstract] A study was conducted on the genetic basis of *Phytophthora infestans* resistance to metalaxyl, induced by spore pretreatment with 0.005% nitrosomethylurea for 18-24 h at pH 7.0-7.2. Resistant mutants were obtained with a frequency of 6.9×10^{-6} , which was some two orders of magnitude

greater than that with which resistance to some common antibiotics was induced (streptomycin, acriflavin, trichothecin, etc.). Some of the resistant mutants retained their pathogenetic characteristics. Resistance to metalaxyl was inherited as a dominant trait via the nucleus. Parasexual recombination techniques demonstrated that the metalaxyl resistance gene was linked to the streptomycin resistance gene, but not to the genes responsible for acriflavin or trichothecin resistance genes. Conceivably, under field conditions resistant isolates could accumulate at a rate predicated not only on the rate of mutation, but also on degree of heterokaryotization and the rate of recombination. Figures 1; tables 6; references 17: 7 Russian, 10 Western.

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UDC 582.282.23.017

NATURE OF STIMULATING SUBSTANCES FOUND IN PRODUCTS OF VITAL ACTIVITY OF YEAST-LIKE FUNGI

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 2, Mar-Apr 86 (manuscript received 25 Sep 84) pp 198-204

[Article by Ye. P. Yakovleva, L. Ye. Alekseyeva, O. S. Kuznetsova, A. I. Korshunov and V. I. Sukharevich, All-Union Scientific Research Technologic Institute of Antibiotics and Medicinal Enzymes, Leningrad]

[Abstract] A study of some substances found in filtrates of microorganisms having different effect on levorin synthesis is described and discussed. The lipid fraction of the filtrate of the different microorganisms studied did not stimulate levorin biosynthesis but addition of succinic acid to the enzymic medium did. A 0.15-0.2 percent concentration of succinic acid increased levorin formation by 48-50 percent in comparison with the control. Higher concentrations (from 0.5-1.0 percent) did not increase levorin synthesis. Different salts of succinic acid (K-, Na-, NH_4 -succinates) produced the same results on intensification of levorin, indicating the effect of the succinate ion. The effect produced by pure succinic acid differed significantly from that produced by its powder form. The stimulating effect of the biostimulator increased in proportion to the succinic acid level and peaked at the same level as that in a pure preparation. Succinic acid was not the sole cause of elevation of levorin synthesis. It was assumed that there are other active substances in products of vital activity of the yeasts which stimulate levorin synthesis. References 20: 18 Russian, 2 Western.

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FIBRINOLYTIC ACTIVITY OF SOME BACILLUS MESENTERICUS STRAINS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 2, Mar-Apr 86 (manuscript received 13 Apr 84) pp 217-222

[Article by A. A. Imshenetskiy, I. D. Kasatkina, G. V. Cherkesova and I. M. Lebedeva, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] Data concerning selection of highly-active proteinases producers among bacillary forms were obtained by comparing fibrinolytic, thrombolytic and caseinolytic activity of collection strains (21) of *Bacillus mesentericus*. Thrombolytic activity of cultures was determined by the rate of dissolution of blood clots in experiments in vitro under the effect of a culture broth containing proteinases. The capacity of these cultures to hydrolyze fibrin and casein was determined concurrently. All but two of the strains studied (8 and 64) had low levels of caseinolytic activity. These strains dissolved blood clots in 7 hour experiments. Time of fibrin dissolution in blood clots varied from 6-6.5 hours for strain 8 and equalled 4 hours for strain 64. Culture broth of both strains had high caseinolytic activity. The optimum nutrient medium for biosynthesis of *B. mesentericus* 8 proteinases consisted of 10 percent potato broth, 0.5 percent peptone and 0.5 percent lactose, which increased both fibrinolytic and caseinolytic activity of the culture broth. Culture broth obtained after growing the bacteria on this medium dissolved blood clots in vitro in 2.5-3 hours. Figure 1; references 14: 10 Russian, 4 Western.

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CHARACTERISTICS OF PLASMID pBS272, CONTROLLING ϵ -CAPROLACTAM DEGRADATION BY PSEUDOMONAS BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 2, Mar-Apr 86 (manuscript received 29 Oct 84) pp 231-236

[Article by A. M. Boronin, V. G. Grishchenkov, L. A. Kulakov and R. P. Naumova, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino; Soil Biology Faculty, Kazan State University]

[Abstract] Data concerning a study of plasmids which control ϵ -caprolactam degradation by *Pseudomonas* bacteria during its use as the sole source of carbon and nitrogen are presented and discussed. It was found that the capacity for growth on ϵ -caprolactam, as the sole source of carbon and nitrogen, of five strains of *Pseudomonas* bacteria, isolated from cleaning installations of chemical industry enterprises, is controlled by conjugative plasmids. All of the plasmids have a high molecular weight of their DNA

(about 330 MD) and control ϵ -caprolactam degradation at least down to succinate. One of the plasmids (pBS271) which belongs to the incompatibility group P-2 restricted the growth of a wide range of *P. aeruginosa* bacteriophages and some *P. putida* phages. References 14: 5 Russian, 9 Western.

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UDC 579.83.017.7:631.46

STRAIN OF ACINETOBACTER CALCOACETICUS WITH WIDE RANGE OF UTILIZATION OF AROMATIC COMPOUNDS, CARRYING PLASMID FOR RESORCIN DEGRADATION

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 2, Mar-Apr 86 (manuscript received 6 Jul 84) pp 237-240

[Article by A. L. Barkovskiy and G. M. Shub, Saratov Medical Institute]

[Abstract] A study of an *Acinetobacter calcoaceticus* bacteria strain, isolated from Saratov Oblast soil, treated by herbicide and possessing the capacity to degrade a broad spectrum of aromatic compounds is presented and discussed. Results of a study of the plasmid which determines the utilization of resorcin by the strain were presented. The culture was identified as *Acinetobacter calcoaceticus* var. *lwoffii*. The culture utilizes, as the sole source of carbon and energy, the following aromatic compounds: resorcin, 2-, 3-, 4- hydroxybenzoic acid, protocatechnic acid, gentisic acid and 2-chlorobenzoic acid. Degradation of resorcin by strain *A. calcoaceticus* BSW27 is determined by plasmid genes. Electrophoretic analysis of the donor strain and transconjugates obtained showed that they contained plasmid DNA with molecular weight comparable to that of DNA of phage λ . The strain carries a transmissible plasmid pBSW13 which determines resorcin utilization by the ortho pathway with the following stages: resorcin-hydroxyhydroquinone-maleyl acetate-beta-ketoadipic acid. Conjugative transfer of the plasmid into recipient strains of *A. calcoaceticus* 5734 CCM rif^r , *E. coli* J-53 $\text{met}^- \text{pro}^- \text{rif}^r$ and *Klebsiella* sp was realized. Figures 1; references 13: 4 Russian, 9 Western.

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UDC 617-001.17-06:616.15-008.6]-085.38.015.2:615.246.2

COMBINED TRANSFUSION AND HEMOSORPTION THERAPY IN BURNS COMPLICATED BY TOXEMIA

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 3 Apr 85) pp 10-12

[Article by B. S. Vikhriyev, professor and L. A. Kuznetsova, Military Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] Therapeutic trials were conducted on the utility of a combined therapy involving transfusion and hemosorption in the management of severe burns cases. The cohort consisted of 55 patients with burns over 15-65% of body surface. Hemosorption involved an activated carbon-based AT-mod. 196 apparatus, a veno-venous shunt, and a perfusion rate of 100-150 ml/min to give a perfusion volume equivalent to 2- to 3-fold circulating blood volume. Immediate subjective and objective improvements were noted in 42 patients which persisted for several days, with best results obtained in cases with less than 20% body surface damage. In patients with 30% or more surface damage, improvement required 2 to 3 perfusions for a telling therapeutic effect. This particular modality, in conjunction with conventional therapy and colloid/crystalloid replacement, reduced the blood levels of medium-MW peptides, conjugated dienes, and malonic dialdehyde by ca. 50% as well as attenuated proteolytic activity 1.5- to 2-fold. Hemosorption treatment was deemed a key factor in reducing mortality in patients with less than 20% body surface burns from 38.2 to 15.3%, and in patients with 21-30% body surface damage to 46.6% from 66.5%. However, the survival figure was not significantly improved for patients with burns over more than 30% of the body surface, with respective mortality figures of 88.5% for the control subjects and 84.3% for the hemosorption cases. References 13 (Russian).

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MODELING PSYCHOSES INDUCED BY HALLUCINOGENIC PHENYLALKYLAMINES

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 39, No 10 Oct 86
(manuscript received 19 Apr 85) pp 889-896

[Article by R.R. Safrazbekyan from the Institute of Fine Organic Chemistry imeni A.L. Mndzhoyan from the Armenian SSR Academy of Sciences, Yerevan; first paragraph, BIOLOGICHESKIY ZHURNAL ARMENII introduction]

[Text] The influence of two hallucinogens--mescaline and a derivative of amphetamine--on the behavior of animals has been studied. It has been tried to compare shifts in the behavior of animals with changes in the metabolism of more important biogenic amines--dopamine, serotonin, noradrenalin--in the brain.

With respect to their pharmacological effect, phenylethylamine derivatives belong to two classes--stimulators of the nervous system and hallucinogens. Phenylethylene itself and its derivatives that do not contain methoxy groups in the benzene ring have an indirect sympathomimetic effect and exert a stimulating effect on the central nervous system. Some phenylethylamine derivatives are well known as substances liberating serotonin from the nerve endings. The hallucinogenic properties are inherent to phenylethylamine derivatives containing methoxy groups in different positions of the benzene ring. Thus, the metabolite of dopamine, 3,4-dimethoxyphenylethylamine [DMPETA], which has been isolated from the urine of those suffering from schizophrenia, possesses a weak hallucinogenic effect. The well-known hallucinogen 3,4,5-trimethoxyphenylethylamine--mescaline--is a derivative of phenylethylamine [2, 10, 15].

Discussing the relation between the structure and effect of hallucinogens is beyond the scope of this article. It should be noted though that in the phenylethylamine series, hallucinogenic properties are markedly expressed in compounds containing three methoxy groups. Mescaline is the most active. With respect to hallucinogenic effect, 3,4-dimethoxyphenylethylamine surpasses mescaline more than fivefold. The substitution of a methyl radical for one of the hydrogens on the alpha-carbon in the side chain of methoxyphenylethylamines facilitates an intensification of the hallucinogenic effect. The majority of derivatives of alpha-methyl-phenylethylamine (amphetamine) surpass mescaline with respect to their hallucinogenic effect. Thus, 2,5-dimethoxyamphetamine [DMA] and 3,4,5-trimethoxyamphetamine [TMA] are

severalfold more active than mescaline. With respect to the strength of their hallucinogenic effect, the compounds presented in the Figure may be arranged in the following order: DOB > 2,5-dimethoxy-4-methyl-amphetamine [DOM] > DMA > PMA > TMA > mescaline > DMPETA. The minimum hallucinogenic dose of mescaline is approximately 300 mg, and that of DOM is about 3 mg. When injected into animals, hallucinogenic phenylalkylamines induce behavioral changes that may be considered adequate for their hallucinogenic effect. There is a definite correspondence between the hallucinogenic effect of substances and the behavior of animals. With respect to effect on the behavior of rats, DOB > PMA > DOM > DMA > TMA > mescaline > DMPETA. Mescaline impairs behavior in doses from 120 to 200 mg/kg, and PMA and DOM impair behavior in doses between 10 and 40 mg/kg. Different with respect to the strength of their effect, these compounds are similar as far as their hallucinogenic effect and effect on the behavior of animals is concerned [12, 24, 30, 31, 33-35].

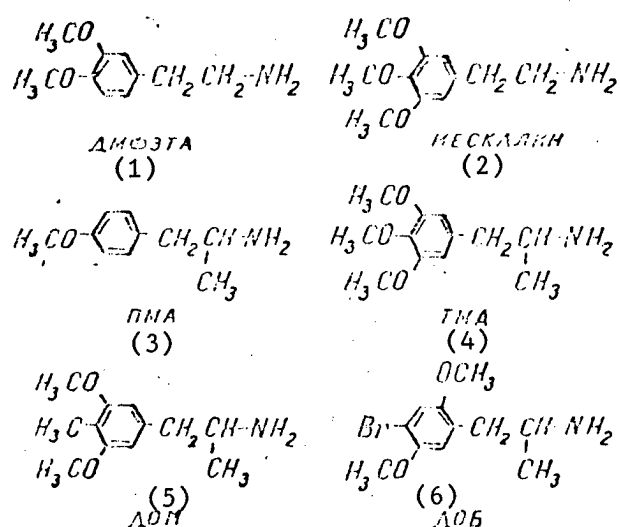


Figure. Hallucinogenic phenylalkylamines.

Key:

- | | | |
|-----------|--------------|--------|
| 1. DMFETA | 2. Mescaline | 3. PMA |
| 4. TMA | 5. DOM | 6. DOB |

In the following section the effect of hallucinogens on the behavior of animals is compared by using mescaline and DOM for examples, and an attempt is made to compare behavioral changes with changes in the exchange of biogenic amines--noradrenalin, dopamine, and serotonin [5-HT].

Changes induced by mescaline. Mescaline, 3,4,5-trimethoxy-beta-phenylethylamine is the active principle of the Mexican hallucinogenic cactus known as "peyote" or "mescal." The plant has long been used by the Indians in religious ceremonies. It induced a state of ecstasy and dulled the senses of hunger and fear. Mescaline was isolated in its pure form at the end of the last century by Hefter and was synthesized in 1919 by Shpat. One hour after ingestion (or injection) of approximately 500 mg mescaline, a healthy

individual will often experience a feeling of nausea that quickly passes. Mental impairment generally begins after 2 hours and is characterized by euphoria, vivid visual hallucinations, and impairment in perception of the "body scheme." The sense of time may be impaired--several minutes may be perceived as an entire hour. Perception of the shape and true size of surrounding objectives is impaired. Catatonia develops after mescaline is injected in large doses [3, 25].

Ten minutes after labeled mescaline (120 mg/kg) is injected into mice, a small amount of radioactivity appears in the brain. In different sections of the brain the content of mescaline and its metabolites reaches a maximum after 1 hour and decreases sharply after 3 to 6 hours. Twelve hours later radioactive products may be detected in the hypothalamus, in the hippocamp, and near the amygdaloid nucleus. When it is metabolized, mescaline forms 3,4,5-trimethoxybenzoic acid and N-acetyl-mescaline. Mescaline is resistant to the action of monoaminoxidase, and only a small quantity of it is deaminated to 3,4,5-trimethoxyacetic acid [26-29].

When injected intraperitoneally into mice in a dose of 10 mg/kg, mescaline increases tactile sensitivity and reduces the exploratory reaction. In animals with high motor activity mescaline causes depression; in calm animals it increases motor activity. A characteristic stereotypical scratching of the ears appears. After 30 mg/kg is injected, the increase in tactile sensitivity is more expressed, and the stereotypical scratching of the ears, snout, and neck becomes more strongly expressed. Tremor is observed. The stereotypical movements and tremor are periodically interrupted by episodes of unidirected movements around the chamber (circular motions). In individual animals coordination is impaired. When the dose is further increased to 100 mg/kg, signs of an effect on the vegetative nervous system are added to the aforementioned symptoms. These new symptoms include lacrimation, piloerection, and change in the frequency and depth of respiration. Coordination and the erector-spinal reflex are impaired [21, 23].

When injected into mice in doses of 120 and 200 mg/kg (intraperitoneally), mescaline causes a "treading" of the frontal extremities, abduction of the rear extremities, tremor, and rolling of the head from side to side ("head weavings")--symptoms characteristic of excitation of 5-HT receptors. After 200 mg/kg is injected, lethargy and hyperemia of the ears and extremities are also observed [1, 4, 13, 18, 32, 33].

In doses of 25 to 75 mg/kg injected intramuscularly into cats, mescaline initially causes vegetative impairments--lacrimation, vomiting, increase in the frequency of breathing, and mydriasis. Animals have a terrified appearance, they hide, they assume unusual poses, and they try to hit imagined objects with their paw. Next, there develops a depression that progresses and culminates in catalepsy [5, 37].

In dogs receiving mescaline in a dose of 20 mg/kg intravenously, vegetative impairments--urination, defecation, increased frequency of breathing, lacrimation, hyperemia--are observed after 10 to 20 minutes. Four hours later the animals lie and stand without movement. Reaction to external stimuli--auditory, visual, pain--is reduced. This state is reminiscent of catatonia.

When compelled, a dog moves slowly and carefully, but without signs of ataxia or hypotonia [37].

One hour after mescaline is injected in doses of 10 and 20 mg/kg, a significant reduction in the content of endogenous noradrenalin is observed in the rat brain. Ten minutes after a dose of 200 mg/kg is injected, mescaline does not exert a visible effect on the amine level [20, 33, 36]. In a dose of 25 mg/kg injected intracysternally it does not affect the level of [3H]-noradrenalin. Twenty minutes after mescaline is injected, the level of [3H]-deaminated metabolites rises sharply, which confirms the intraneuronal liberation and metabolism of noradrenalin. Then the content of radioactive deaminated products decreases rapidly, almost to control values. The quantity of [3H]-normethanephine--a product of the extraneuronal metabolism of noradrenalin--is increased gradually, by 20 and 40 percent respectively. The content of deaminated O-methylated metabolites does not change [36].

A decrease in the dopamine content in the brain is observed 10 minutes after mescaline is injected in a dose of 200 mg/kg. In a lesser dose (10 mg/kg) the hallucinogen does not affect the level and metabolism of amine [20, 33].

One hour after rats are injected with mescaline, the content of tyrosine, a precursor of catecholamines, increases in the brain. The amino acid concentration in the blood decreases [39].

After a large dose of mescaline (200 mg/kg), no effect on the metabolism of 5-OT in the rat brain is detected in the first 10 minutes. However, the endogenous level of 5-OT is increased in the brain 30 and 90 minutes after the injection of mescaline in doses of 1 and 10 mg/kg. The concentration of 5-oxyindolacetic acid [5-OIUK]--a metabolite of 5-OT--decreases simultaneously. Thirty and 90 minutes after mescaline is injected in a dose of 15 mg/kg, the formation of 5-OIUK increases; however, the level of 5-OT in the tissue remains high. In rats that have received the hallucinogen in a dose of 20 mg/kg the content of 5-OT in the neurons of the medial and dorsal nuclei of the suture of the interstitial portion of the brain increases after 1 hour, whereas the level of catecholamine in the cells does not change. At a dose of 5 mg/kg of mescaline there are decreases in the content of tryptophan, a precursor of 5-OT, in the brain and blood of rats [8, 9, 11, 33, 38, 39].

P-chloro-phenylalanine, an inhibitor of 5-OT synthesis, does not affect the behavioral effects of mescaline in mice. In a dose of 20 mg/kg, however, mescaline counteracts the depletion of reserves of 5-OT and p-chloro phenylalanine. BOL, an antagonist of 5-OT, prevents the behavioral symptoms induced by mescaline [33, 38].

In doses depleting reserves of noradrenalin in the brain, alpha-methyl-p-tyrosine, which inhibits synthesis of catecholamines, significantly depresses the motor stimulation induced by mescaline in mice. In rats mescaline does not have an effect on the reduction in the level of catecholamines that is caused by alpha-methyl-p-tyrosine; it does, however, potentiate a liberation of amines by alpha-methyl-m-tyrosine [20, 23, 33].

The neuroleptics aminazine and promazine specifically depress the mescaline stereotype [21]. Thus, during the course of several hours, mescaline stimulates the liberation of noradrenalin and reduces the amine content in the brain. On the other hand, it appears to stabilize reserves of 5-HT.

Changes induced by DOM. In 1967 mention of the use by hippies in the United States and Canada of a hallucinogenic substance known as STP (an acronym for "scientifically treated petroleum") appeared in the foreign press. Chemical and physical analysis of STP tablets made it possible to identify the active principle of a hallucinogen with 2,5-dimethoxy-4-methyl-amphetamine [DOM]. Research showed that the following vegetative impairments occurred in healthy individuals tested 1 hour after being injected with 2 to 15 mg DOM: dilation of the pupil, acceleration of the pulse, and increase in blood pressure and temperature. Mental changes develop 1 to 2 hours later and consist of a number of components--euphoria; vivid visual hallucinations; and impairment in the perception of the shape and size of surrounding objects, the "scheme of the body," and sense of time. The effect of DOM reaches a maximum 3 to 5 hours later and fades after 7 to 8 hours. The intensity and continuity of symptoms depends on the dose of hallucinogen. As far as the passage of DOM's effect is concerned, memory of what has been experienced is maintained. The clinical picture of DOM-induced intoxication is reminiscent of that induced by mescaline; however, euphoria and excitement are more marked after administration of DOM [7, 24, 35].

When injected into animals DOM easily penetrates through the blood-brain barrier and is distributed primarily in those sections of the brain that control the emotional sphere--in the hippocampus, amygdaloid nucleus, geniculated bodies, hypothalamic nuclei, and caudate nucleus. Regardless of the dose injected, 20 percent of the DOM is detected in the urine in unaltered form over the course of 24 hours. The peak of elimination occurs in 3 to 6 hours, which coincides with the maximum clinical effect [16, 17, 35].

Increase in the frequency of respiration, piloerection, increase in motor activity and exploratory reaction, and stereotypical nodding and shaking of the head occur in rats into which DOM has been injected intraperitoneally in doses of 1 to 3 mg/kg. In large doses--20 to 60 mg/kg--it also causes rolling of the head from side to side (head weaving), reciprocal movements of the frontal extremities ("treading"), and abduction of the rear extremities--all of which are symptoms characteristic of excitation of the serotonergic structures. Backward motion (retreating) is also observed. The effect develops over the course of 5 minutes and lasts 15 to 60 minutes depending on the dose [7, 19, 33].

Mice react to an injection of DOM (0.2 to 0.4 mg/kg) with a characteristic shaking of the head [24].

When injected intravenously into rabbits in doses of 0.5 to 1.0 mg/kg, DOM exerts a marked sympathomimetic effect--acceleration of respiration, mydriasis, lacrimation, hypersalivation, intensification of bronchial secretion, and piloerection. Reaction to external stimuli increases. The animal assumes a characteristic pose--open mouth, protruding tongue ("panting dog" symptom). Increased respiratory activity alternates with a stuporous state and catatonic

poses. Large doses of DOM (1 to 2 mg/kg) cause convulsions that result in death of the animals [7].

When injected intraperitoneally into cats in a dose of 0.25 mg/kg, DOM induces behavioral changes similar to those observed in rabbits--open mouth, protruding tongue, and periods of depression alternating with motor excitation. The animal refuses food and fails to recognize the researcher. Increasing the dose (0.5 to 10 mg/kg) results in the manifestation of hallucinatory behavior--a steady, nonfixed gaze; jumping around the cage from side to side; and attempting to catch nonexistent objects. Breathing becomes difficult, and catatonia and a reaction of anger to external stimuli are observed. The effect of DOM develops over the course of 5 to 10 minutes. Depending on the dose, the changes last 1 to 6 hours or more [7, 17, 33].

One hour after injection into mice in a dose of 50 mg/kg, DOM increases the content of noradrenalin and 5-HT in the brain but has no effect in a dose of 10 mg/kg [17].

In a dose of 60 mg/kg it reduces the content of noradrenalin and dopamine in the rat brain. The increase in dopamine precedes a reduction in its level. After DOM is injected, the inclusion rate of tyrosine in noradrenalin is increased, which indicates an increase in the rate of amine circulation. The hallucinogen does not affect the inclusion of amino acid in dopamine [19].

Thirty to 60 minutes after doses of 0.5, 1.0, 5.0, and 60 mg/kg, DOM increases the content of 5-HT in the rat brain. In the earlier periods of its effect (40 mg/kg) it was not detected in the amine content. At doses of 0.5 and 1 mg/kg of DOM a decrease of the content of 5-HT in the brain was noted. In a dose of 60 mg/kg it retards the inclusion of labeled triptophan in 5-HT. The use of cytofluorimetric technology has made it possible to discover an increase in the level of 5-HT in the neurons of the medial and dorsal nuclei of the suture of the interstitial portion of the brain [9, 11, 19, 33].

Thus DOM apparently stabilizes reserves of 5-HT and depresses the circulation of amine.

In rats, inhibition of 5-HT synthesis by p-chloro-phenylalanine does not affect the development of DOM's behavioral effects. However, the latter reduces the depleting effect of p-chloro-phenylalanine on reserves of 5-HT. In a dose of 5 mg/kg, a 5-HT antagonist of BOL receptors prevents DOM's 5-HT-dependent behavioral effects--"treading," abduction of the rear extremities, rolling and tremor of the head. In doses of 2 to 5 mg/kg (in rabbits and mice), the neuroleptic aminazine counteracts the sympatomimetic effects of low doses of DOM, but it does not exert a protective effect in the presence of large doses of the hallucinogen. In addicts taking large doses of DOM a deterioration in condition is noted when aminazine is used as an antidote. Under conditions of a controlled experiment on volunteers receiving moderate doses of DOM, aminazine reduced the intensity of hallucinations [7, 19, 33, 35].

Thus, the changes observed in animals after they are injected with mescaline or DOM consist of a number of components--a sympatomimetic effect, an increase in motor activity and sensitivity to external stimuli, stereotypical behavior,

5-OT-dependent behavior, and "abnormal" behavior. The increase in motor activity is more characteristic of the effect of DOM. "Abnormal behavior" in rats is manifested in the form of retreating, circular motions, and shaking of the torso. In rabbits the abnormal behavior occurs in the form of catalepsy and hallucinatory behavior. The sympatomimetic effects and motor excitation induced by the hallucinogens may be explained by the intensified extraneuronal liberation of noradrenalin. Selective depression of the mescaline stereotype by aminazine and promazine indicates the participation of dopamine in the development of the syndrome. The capability of mescaline and DOM to induce 5-OT-dependent syndrome, whose development is prevented by the 5-OT antagonist, confirms the hallucinogens' stimulation of the postsynaptic serotonergic receptors. This does not exclude stabilization of reserves of 5-OT that is to some degree induced by the excitation of the presynaptic serotonergic receptors, which results in a compensatory depression of the liberation of amine. On the other hand, it is well known that the excitation of the alpha-adrenergic receptors located on the serotonergic nerve ends also results in a depression of the liberation of 5-OT [6, 22]. This does not exclude the possibility that these presynaptic heteroreceptors also take part in stabilizing the reserves of 5-OT induced by the hallucinogens.

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TOXIC HEART-DAMAGE IN ACUTE CHEMICAL POISONING

Moscow KARDIOLOGIYA in Russian Vol 26, No 5, May 86 (manuscript received 15 Apr 85) pp 5-11

[Article by Ye. A. Luzhnikov, A. S. Savina and I. Ye. Galankina, Republic Center for Acute Poisoning Therapy (Director: Professor Ye. A. Luzhnikov), Division of Pathomorphology (Director: corresponding member of USSR Academy of Medical Sciences N. K. Permyakov), Scientific Research Institute of First Aid imeni N. V. Sklifosovskiy, Moscow]

[Abstract] During acute chemical poisoning, heart damage may occur due to specific cardiotoxic action of the chemical or due to secondary nonspecific damage of homeostasis resulting from chemical trauma and exotoxic shock. EKG shows specific characteristic patterns during chemical poisoning. For example, increased systolic index is used as a diagnostic test for organophosphorous poisoning. The basis for heart damage is toxic cardiomyopathy. The clinical picture during cardiotoxic poisoning has two paths: ectopic tachyarrhythmia and bradyarrhythmia of the quinine-like effect. Treatment is based on rapid removal of the toxic substance followed by antidote pharmacology, electric stimulation and hemosorption. In secondary cardiotoxic effect, the exotoxic shock is treated, followed by artificial detoxification. Figures 2; references 31: 18 Russian (2 by Western authors), 13 Western.

7813/12955

CSO: 1840/746

STRUCTURE AND PHYSIOLOGICAL ACTIVITY OF N-ACYLONIUM SALTS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 3, Mar 87 (manuscript received 8 Jul 86) pp 72-74

[Article by S. A. Lapshin, L. M. Kapkan, I. V. Komissarov and V. I. Kumpan, Institute of Physicoorganic Chemistry and Carbon Chemistry, Ukrainian SSR Academy of Sciences, Donetsk; Donetsk Medical Institute]

[Abstract] Pharmacological and toxicological studies were conducted with 1-N-N-dimethylcarbamyl-3-methylimidazolium chloride (I), a N-acylonium salt stable in water and organic solvents. The LD₅₀ values for outbred mice was determined at 2.59 ± 0.24 mg/kg (13.5 ± 1.2 moles/kg). Studies on outbred rats demonstrated that I behaved as an m-cholinomimetic agent, but had no effect on n-cholinoreceptors. Instillation of 0.5% I into the conjunctival sac of rabbits resulted in 4.5 h myosis and a reduction in the intraocular pressure by 3 mm Hg (14%). References 10 (Russian).

12172/12955

CSO: 1840/669

COMPARATIVE EVALUATION OF IMMUNOSTIMULATING EFFECTS OF SELECTED 8-AZASTEROIDS, ISOPRINASINE AND LEVAMISOLE

Minsk VYESTSI AKADEMII NAUK BSSR. SYERYYA BIYALAHICHNYKH NAUK in Belorussian No 1, Jan-Feb 86 (manuscript received 19 Jun 86) pp 79-84

[Article by B. B. Kuzmitskiy, I. G. Dadkov, Yu. L. Zhuravkov, N. A. Konoplya, G. A. Shafranskaya, O. V. Gulyakevich, V. N. Pshenichnyy and V. A. Khripach, Institute of Bioorganic Chemistry, Belorussian SSR Academy of Sciences]

[Abstract] In vivo and in vitro human lymphocytes and inbred mice were used to evaluate, on a comparative basis, the immunostimulating effects and modes of action of selected 8-azasteroids, Isoprinasine and levamisole. Analysis of the antibody response to SRBC and cell cooperation demonstrated that the 8-azasteroids exceeded levamisole and Isoprinasine as immunostimulants in a variety of conventional test situations. In addition, the effects of the 8-azasteroids were largely due to activation of helper cells, whereas the effects of levamisole and Isoprinasine in low concentrations were due to activation of the helper cells, but at higher concentrations they also activated T suppressors. One of the 8-azasteroids (H at positions 2 and 3; 2 CH₃ groups at D ring) increased the survival of C57Bl/6 mice by 22.5% after implantation of adenocarcinoma 755, as a result of pretreatment with three

20-30 mg/kg doses of the compound. However, drug administration after implantation of the tumor enhanced tumor growth. Figures 1; references 15: 1 Belorussian, 7 Russian, 7 Western.

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UDC 615.285.7:547.558.1].07

CHARACTERISTICS OF TOXIC ACTION OF CYCLOPHOS UNDER CONDITIONS OF CONTINUOUS AND INTERMITTENT EXPOSURE

Moscow GIGIYENA I SANITARIYA in Russian No 8, Aug 86 (manuscript received 26 Mar 86) pp 42-44

[Article by P. G. Zhminko, All Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev]

[Abstract] Cyclophos (40% emulsion) is a new organophosphorus insectoacaricide used to control pyroplasmids of cattle, tick encephalitis and chicken ectoparasites. It is considered to be of the 3rd class of danger. Intra-peritoneal administration to rats at a dose of 630 mg/kg (LD_{50}) resulted in lowered activity of cholinesterase in blood and liver. In an attempt to find out about its effect resulting from intermittent exposure, experiments were done on white rats, measuring the activity of cholinesterase. It was shown that either of the application methods (continuous or intermittent) led to lowered cholinesterase activity in blood. In kidneys and in liver, only the continuous exposure showed an effect. Thus it was shown that continuous exposure is more dangerous than intermittent. References 4: 2 Russian, 2 Western.

7813/12955
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UDC 615.285.7.099.015.4:616.12

HYGIENIC ASSAY OF CARDIOTOXIC ACTION OF SOME PESTICIDES

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 86 (manuscript received 26 Nov 85) pp 4-7

[Article by A. P. Shchitskova, N. I. Nikolayeva and I. D. Gadalina, Scientific Research Institute of Hygiene imeni F. F. Erisman, Moscow]

[Abstract] Chemization of agriculture is considered by the Communist Party as the most important element of its technical progress. At the same time, it is obvious that chemicals enter the food chain and thus have an effect on practically all organisms. Most of the pesticides show a wide spectrum

of neurohormonal activity on cardiovascular system. In general, changes in cardiovascular system develop within 3 months after initial exposures. Low pesticide doses exhibit some variations in their effect on the cardiovascular system, depending on the chemical structure of the agent. The effect is also noticeable in the offspring of individuals exposed to pesticides. Animal experiments coupled with cytomorphologic, histochemical, biochemical and electrophysiological techniques have shown that all of the pesticides studied at high doses affected the functions and structures of cells, vessels and microcirculatory processes. It was shown to be possible to detect some of these changes at an early stage of development. Figures 3 (no references).

7813/12955
CSO: 1840/722

UDC 615.38+615.361.419].014.413

EFFECTS OF INTRAVENOUS ADMINISTRATION OF HYDROXYETHYLATED GLYCEROL ON
CYTOCHROME OXIDASE ACTIVITY OF BONE MARROW CELLS IN RABBITS

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 8 Apr 85) pp 33-35

[Article by E. I. Oboznaya and M. M. Guchok (deceased), Institute of Cryobiological and Cryomedical Problems, Ukrainian SSR Academy of Sciences, Kharkov]

[Abstract] Chinchilla rabbits were used in an evaluation of some of the physiologic and toxicologic sequelae of intravenous administration of hydroxyethylated glycerol (HG), a potential cryoprotective agent. In acute experiments administration of 10 and 15% HG solutions in lethal doses ($LD_{50} = 13 \text{ g/kg}$), and cytochemical monitoring of cytochrome oxidase (CO) activity. Administration of HG in $1/20 LD_{50}$ doses in multiple injections over the course of a month showed that depression of bone marrow CO activity remained within the lower limit of normal values. The latter effects were deemed to be reversible since they were unrelated to any intracellular changes in the physiologic processes. Figures 3; references 7: 5 Russian, 2 Western.

12172/12955
CSO: 1840/684

EFFECT OF EXOGENOUS DNA ON CONVULSIVE ACTIVITY

Moscow BIOLOGICHESKIYE NAUKI in Russian No 12, Dec 86 (manuscript received 8 Apr 85) pp 50-53

[Article by M. V. Khanbabyan, R. A. Zakharyan, S. N. Ayrapetyan, R. Sh. Sarkisyan, A. S. Agabalyan and M. A. Suleymanyan, Department of Physiology, Armenian State Pedagogic Institute]

[Abstract] RNA and DNA are capable of altering metabolic activity of a cell participating in regenerative processes in growth regulation and affecting restorative processes in tissue cells. Many forms of epilepsy are due to genetic factors but some are also due to metabolic defects, trophism of the brain tissue. Effect of exogenous DNA on a convulsive bodily state was investigated on white rats using two models of experimental epilepsy: penicillin and corazole. Also, the effect of DNA are on pacemaker activity of Helix Rpa-1 neurons of the Roman snail was investigated. On the basis of the obtained data, it was concluded that the mechanism of epileptogenic action of DNA is evidently due to the depressive effect of DNA on the pacemaker activity. Exogenous DNA inhibited convulsive activity of the brain and thus could be used in anticonvulsive therapy. Figures 2; references 18: 7 Russian, 11 Western.

7813/12955

CSO: 1840/759

ELECTROPHYSIOLOGICAL EVALUATION OF NERVE GROWTH FACTOR SUBFRACTIONS

Minsk VYESTSI AKADEMII NAUK BSSR. SYERYYA BIYALAHICHNYKH NAUK in
Belorussian No 1, Jan-Feb 86 (manuscript received 18 Feb 86) pp 67-71

[Article by S. V. Shmaley, L. G. Yermilov and V. S. Lukashevich, Institute
of Physiology, Belorussian SSR Academy of Sciences]

[Abstract] In vitro electrophysiological studies were conducted on the nerve growth factor isolated from the submaxillary gland of mice, using sympathetic ganglia isolated from 6- to 14-days old guinea pigs. The 7s nerve growth factor complex is represented by a pentamer consisting of 1 beta-, 2 alpha-, and 2 gamma-subunits. The studies demonstrated that specific activation of neural transmission was obtained with the beta-subunits, while the alpha- and the gamma-subunits inhibited transmission in the sympathetic ganglia. The activity of the nerve growth factor in enhancing neural transmission was thus shown to be due to the beta-component of the pentamer. Figures 2; references 18: 2 Belorussian, 6 Russian, 10 Western.

12172/12955

CSO: 1840/679

UDC 613.68:612.886.2]-07:612.821.7

EFFECT OF SHIP'S ROLLING MOTION ON FISHERMEN'S SLEEP AND PHYSIOLOGICAL FUNCTIONS

Moscow GIGIYENA I SANITARIYA in Russian No 9, Sep 86 (manuscript received
19 Feb 86) pp 61-63

[Article by V. A. Skrupskiy, Scientific Research Institute of Water Transport
Hygiene, USSR Ministry of Health, Moscow]

[Abstract] Because the data on this subject are limited, the effect of ship motion on sleep of seamen was studied during long voyages at low latitudes where storm days reach 70% of the duration of the trips. In all, 41 men aged 27-35 years were followed. It was shown that cabin orientation perpendicular to the longitudinal axis of the ship caused maximal angle acceleration, negatively affecting the sleep and lowering mental and physical performance of the subjects. This was corrected by placing the cabins parallel to the ship's axis. Special equipment minimizing boat motions could also be used. Figure 1; references 7: 4 Russian, 3 Western.

7813/12955

CSO: 1840/724

EFFECTS OF MET-ENKEPHALIN ON CONDITIONED FOOD REFLEX

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR, SERIYA BIOLOGICHESKIKH NAUK in Russian No 6, Nov-Dec 86 pp 89-92

[Article by R. Sh. Ibragimov and O. N. Volgina, Institute of Physiology imeni A. I. Karayeva, Azerbaijan SSR Academy of Sciences]

[Abstract] Adult cats were employed in a study designed to assess the effects of met-enkephalin on the conditioned food-reflex, in conjunction with an evaluation of changes in EEG activity. The study approach, using animals with implanted electrodes in several brain formations and subjected to a conditioned stimulus consisting of 5 Hz 5 sec light flashes, demonstrated significant sequelae of met-enkephalin administration. Specifically, intraperitoneal administration of 100 µg met-enkephalin resulted in a statistically-significant reduction in the latent time of the response, demonstrating enhancement of goal-oriented behavior in this situation. Furthermore, analysis of the cross-correlation coefficients of the biopotentials for selected structural pairs (sensorimotor cortex--hypothalamus, sensorimotor cortex--striatum, hypothalamus--amygdala, hypothalamus--septum, hippocampus--hypothalamus) revealed a significant reduction in the values of the coefficients following administration of the opiate. These observations demonstrated that the behavioral changes noted here under the influence of exogenous met-enkephalin were accompanied by profound changes in functional interrelationships in the brain. Figures 2; references 8: 4 Russian, 4 Western.

12172/12955
CSO: 1840/830

UDC 577.171.4:327.2

PEPTIDES, BRAIN-SPECIFIC PROTEINS AND AGGRESSIVE BEHAVIOR

Yerevan NEYROKHIMIYA in Russian Vol 5, No 4, Oct-Dec 86 (manuscript received 14 Feb 86) pp 423-434

[Article by V. V. Sherstnev, A. L. Rylov and A. I. Gromov, Scientific Research Institute of Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] A survey of the literature was aimed at examination of the most significant studies concerning participation of endogeneous oligopeptides in regulating aggression in man and animals and at discussion of some open questions concerning possible mechanisms of action of neuropeptides as modulators and regulators of aggression. Three basic types of effect of opiates on animal aggression were presented in some detail. Contradictory reports on effects of opiate receptor antagonists were discussed. The report contains some of the authors' personal experimental data. Changes of the acid proteins

spectrum, including brain-specific S-100 proteins, of some brain structures during development of aggressive behavior are discussed. The findings suggested that the discovery and study of peptides which are connected with brain-specific proteins under natural conditions may provide information about neurochemical mechanisms of aggressive behavior and may reveal new peptide factors involved in regulation of aggression. References 80: 20 Russian, 60 Western.

2791/12955
CSO: 1840/594

UDC 612.

INDIVIDUAL DIFFERENCES IN ADAPTATION TO HYPOXIA AND COLD BASED ON EMOTIONAL-BEHAVIORAL CRITERION OF BODILY REACTIVITY

Moscow USPEKHI FIZIOLOGICHESKIKH NAUK in Russian Vol 17, No 4, Oct-Dec 86
pp 68-84

[Article by V. B. Zagustina, Z. A. Aleksanyan and N. N. Vasilevskiy,
Scientific Research Institute of Experimental Medicine, USSR Academy of
Medical Sciences, Leningrad]

[Abstract] Hypoxia is one of the more critical problems in modern medicine. Resistance to hypoxia depends on the level of the development of the nervous system. The most sensitive to oxygen insufficiency are animals with poor higher nerve activity. Those without fear, insensitive to provocational factors and those showing tendency to social domineering are more resistant to acute hypoxia. Data on individual differences to the adaptation to hypoxia are reviewed here. The role of emotional-behavioral reaction is pointed out. Adaptation to cold and hypoxia appears to be based on complex system interaction. This is especially crucial in rapid adaptations and should be considered carefully in optimizing training of alpinists. References 63: 49 Russian, 14 Western.

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CSO: 1840/752

EFFECT OF SYNTHETIC TETRADECAPEPTIDE, HOMOLOGOUS TO AMINO ACID SEQUENCE
31-44 OF HUMAN SOMATOTROPIN, ON RAT BLOOD LIPIDS AND LIVER

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian Vol 32, No 3, May-Jun 86
(manuscript received 7 Mar 85) pp 108-111

[Article by V. Ye. Ryzhenkov, Yu. A. Pankov, A. M. Chistyakova, Yu. M. Keda,
D. S. Serrano, M. I. Ryabtsev and Yu. P. Shvachkin, Institute of Experimental
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mental Endocrinology and Chemistry of Hormones, USSR Academy of Medical
Sciences, Moscow]

[Abstract] A study of the effect of synthetic tetradecapeptide [TDP], with
amino acid sequence of 31-44 of human growth hormone, on liver and blood
lipids, the lipoproteins spectrum and lipolytic activity of rat blood serum
enzymes is described and discussed. Male rats (weight 260-280 g) received
intraperitoneal injections of TDP (100 µg/1 kg of body weight in 0.5 ml
of physiological solution) for 14 days, in the morning after fasting for
17 hours a day. Control rats received an equal volume of physiological
solution. Weight loss was about the same for both groups of rats and the
weight of the adrenal gland and liver was about the same in both groups.
Blood cholesterol level was higher in rats in the experimental group but
phospholipids level was about the same in both groups. The study reconfirmed
the stimulating effect of hunger on lipolysis in fatty tissue of rats.
In spite of the significant fat mobilizing effect of TDP, triglycerides
and atherogenic lipoproteins did not accumulate in the rat blood, showing
the promise of the use of TDP to stimulate lipolysis in fatty tissue.
References 23: 9 Russian, 14 Western.

2791/12955
CSO: 1840/589

UDC 616.89-008.441.13-057:656.61]-036.2-07

SOME SOCIAL-AND-HYGIENE FEATURES OF ALCOHOL ABUSE AMONG SAILORS

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 7, Jul 86
(manuscript received 4 Feb 85) pp 29-33

[Article by N.P. Bychikhin, P.I. Sidorov and A.G. Kalinin from the Arkhangelsk Medical Institute under the "Life-Style and Health" rubric: "Some Social-and-Hygiene Features of Alcohol Abuse Among Sailors"]

[Text] Alcoholism among sailors is one of the most serious sociomedical problems. The widespread nature of the abuse of alcoholic beverages among sailing crews and the frequency and pronounced nature of its consequences have compelled the fleet medical service to concentrate its efforts on solving this problem and improving preventive and therapeutic antialcohol campaigns.

The widespread nature of alcoholism among Scottish sailors is 2.5- to threefold higher than in the general population [4]. Thirty to 50 percent of those in the sailing crews in the French merchant fleet suffer from alcoholism [5], and the rapid and malignant development of the disease combined with its pronounced psychic pathology has been noted. In the United States alcohol abuse has advanced to third place among the direct causes of sailors' hospitalization and has become an important risk factor. Sailors abusing alcohol have a five-fold higher mortality than those in the general population [2,3].

This study was intended to discover the factors facilitating the development of alcohol abuse among sailors and to describe the distinctive features of the abuse of alcoholic beverages by sailors. A specially developed chart was used to poll 169 sailors and 70 fliers (the control group). Flight crew members were selected as a control group because they belong to a transport specialty. Both groups contained individuals that could be categorized as abusers of alcoholic beverages by virtue of Yu.P. Lisitsyn and N.Ya. Kopyt's sociohygiene classification system for alcoholism as well as individuals who abused alcoholic beverages but did not manifest symptoms of alcoholism. The groups did not differ with respect to age or length of time in profession. Thus the mean age of the sailors was 29.5, and that of the fliers was 29.8 years. The mean length of service for the sailors was 7.6 years, and that of the fliers was 8.1 years.

Analysis of the data obtained made it possible to discover basic differences with respect to the two contingents compared as far as the frequency of hereditary afflictions with various somatic and neuropsychic diseases [Table 1].

Table 1. Frequency of Hereditary Afflictions in the Contingents Studied ($M \pm m$)

Parents' Disease	Sailors	Fliers	t
Neuropsychic	5.1 ± 1.1	15.7 ± 2.1	4.5
Alcoholism	6.0 ± 2.0	14.1 ± 4.3	1.7
Cardiovascular	30.6 ± 3.1	45.3 ± 2.6	3.6
Metabolic-endocrine	5.9 ± 1.2	15.6 ± 2.4	3.6
Oncologic	9.7 ± 1.4	20.3 ± 3.5	2.8

It should be stressed that the two groups were not statistically different with respect to the prevalence of alcoholism in the family. This is of fundamental importance if one considers the fact of the significant effect of parents on the development of their offspring's ethanolic acid system.

Generally speaking, the hereditary background with respect to groups of diseases compared seemed worse among the fliers. Evidently, however, their unfavorable hereditary predisposition was realized in terms of workplace factors to a lesser degree than in the sailors. Thus none of the fliers presented with ill health, whereas 22.4 percent of the sailors did. One-hundred percent of the fliers and 86.6 percent of the sailors were completely satisfied with their health and feeling of well-being.

An analysis of morbidity indicated a definite predominance in the fliers of diseases of the respiratory system (34.4 percent), urologic pathology (9.4 percent), infectious disease (23.4 percent), and surgical interventions (59.4 percent). The sailors were significantly differentiated by virtue of the frequency of diseases of the nervous system (10.5 percent). They were the only one to manifest sexual dysfunction (9.7 percent) and craniocerebral trauma with a loss of consciousness (8.2 percent). It is noteworthy that more than half the sailors with head trauma did not seek medical assistance since they were in a state of alcohol intoxication.

The groups compared did not differ with respect to the main features of physical and mental development during childhood and adolescence. In the sailors there was, however, a significantly higher incidence of effaced neurotic reactions in puberty--nightmares and impairment in sleep rhythm (24.6 percent), syncopal state (3.7 percent), increased irritability (13.4 percent), and phased mood dysfunction (17.2 percent).

In the fliers, the schooling period was generally distinguished by great well-being and better progress. They also surpassed the sailors with respect to the level of professional preparation. Thus 93.7 percent of the fliers had

higher and secondary special education as opposed to 66.3 percent of the sailors. At the time of the study, 98.5 percent of the fliers aspired to professional growth, including continuing education, as opposed to only 47.8 percent of the sailors ($t = 11.1$).

The leading motives in selecting a profession (Table 2) were singled out as factors indicating personality stability and social maturity in order to make an indirect evaluation of the dispositional and value orientations of the contingent being studied.

Table 2. Leading Motives in Selecting the Profession ($M \pm m$)

Professional Motivation	Sailors	Fliers	t
Material interest	32.8 $\pm$ 4.0	3.2 $\pm$ 1.2	7.1
Romance of occupation, calling	42.5 $\pm$ 4.2	58.7 $\pm$ 6.2	2.2
Family tradition	8.9 $\pm$ 1.1	19.1 $\pm$ 3.9	2.5
Example of friends	3.7 $\pm$ 1.3	7.9 $\pm$ 3.4	1.1
By chance	11.9 $\pm$ 2.8	11.1 $\pm$ 3.0	0.2

In both groups, perception of a calling was the main method of selecting a profession. It is noteworthy that material interest was the second most frequent motive for the sailors, whereas it was in last place for the fliers. The nature of motivation for labor activity also appeared in work attitudes; 16 percent of the sailors were either indifferent or negative toward work ("I don't like it") as opposed to only 1.5 percent of the fliers. More fliers had interests and hobbies (sports, techniques, music, collecting, etc.).

An attempt was made to explain the distinctive features of family relations (Table 3) by considering the unique life-style of sailors (shore-sea) and their significant lengths of time away from their families.

As is evident from Table 3, the sailors experienced difficulties in creating a harmonious family. The families of the sailors and fliers did not differ with respect to structural characteristics (they had an equal frequency of bachelors, married persons, and divorced individuals). With respect to function, however, every fourth sailor's family was "weak." Psychological disharmony in spousal relationships that was made more acute by the husband's absence (20.6 percent) and frequent alcohol consumption (5.2 percent) were the main reasons for conflict in the sailors' families.

Table 3. Structure of Self-Evaluations of Family Relationships ($M \pm m$)

Evaluation of Relationships in Family	Sailors	Fliers	t
Excellent and good	77.6 $\pm$ 4.3	94.1 $\pm$ 0.9	3.8
Satisfactory	19.4 $\pm$ 2.5	5.9 $\pm$ 2.3	3.9
Strained and poor	3.0 $\pm$ 0.7	--	4.3

The sailors' first acquaintance with alcohol came at the age of 16.6 years as opposed to 17.0 years for the fliers. The age of first significant intoxication after which systematic intake of alcoholic beverages began was considered.

Situational and communicative motivations and conditions were the greatest motivations for alcohol consumption in sailors (Table 4), which confirms their comparatively low level of general culture and lack of knowing how to organize their spare time constructively.

Table 4. Conditions Provoking Alcohol Abuse ($M \pm m$)

Conditions and Situations	Sailors	Fliers	t
Holidays	97.8 $\pm$ 1.2	82.8 $\pm$ 4.7	3.1
Meetings with friends	94.8 $\pm$ 1.9	71.9 $\pm$ 5.6	3.9
Birthday	97.8 $\pm$ 1.0	87.5 $\pm$ 4.1	2.4
Pay and advance	24.6 $\pm$ 1.3	4.7 $\pm$ 2.0	8.3
"Wipe out" a debt for drinks purchased	30.6 $\pm$ 3.0	17.2 $\pm$ 4.7	2.4
Troubles at work	11.2 $\pm$ 1.2	4.7 $\pm$ 2.0	2.8
Presence of free money	17.2 $\pm$ 3.2	4.6 $\pm$ 1.9	3.4
Falls in mood	54.5 $\pm$ 4.3	29.7 $\pm$ 5.7	3.5
To make conversation easier	52.9 $\pm$ 4.1	21.9 $\pm$ 5.1	4.7

Motives confirming the sailors' growing attraction to alcohol appear in the stage of abuse of alcoholic beverages: "I love to drink" (6.7 percent), "It's pleasant to drink" (6.7 percent), "I'm pulled toward drinking" (1.5 percent), "I'm thirsty" (1.5 percent), "I fell into the habit" (0.75 percent), and "I drink to forget" (7.5 percent).

There were no differences between the two groups with respect to preferred alcoholic beverage. The most popular alcoholic beverages among the sailors was vodka (51.5 percent), with cognac and liqueur (11.9) coming in next, following by fortified and dry wine and champagne (29.9 percent), and beer (4.5 percent). The only difference between the two groups as far as criteria for selecting an alcoholic beverage was in the desire to "obtain a more-

pronounced intoxication"--the figure was 12.9 percent for the sailors versus 3.1 percent for the fliers. The sailors' orientation toward strong alcoholic beverages and consumption of large doses of alcohol should also be noted. Among the fliers individuals with an alcohol tolerance of about 0.5 L was encountered most frequently, whereas among the sailors there were more individuals who were used to doses of more than 1 L.

The data on volume of alcohol consumed are inversely proportional to the frequency of alcohol consumption among the contingents studied (Table 5).

Table 5. Distribution of Contingent Based on Frequency of Alcohol Consumption ($M \pm m$)

Form of Consumption	Sailors	Fliers	t
Episodic (less than 1 to 2 times per month)	47.0 ± 4.3	21.9 ± 5.1	3.8
Nonsystematic (2 to 3 times per month)	47.8 ± 2.3	59.4 ± 4.1	2.5
Regularly (2 to 3 times per week)	5.4 ± 1.2	18.8 ± 1.5	6.9

It follows that the fliers drink more frequently but in lesser doses than do the sailors. Among the sailing crew the periods of intensive alcohol consumption are noted to predominate during port calls and during meetings and contacts.

The average monthly expenditure on alcohol is an informative and distinctive feature of the alcoholic life-style (Table 6).

Table 6. Mean Monthly Expenditures for Alcohol ($M \pm m$)

Total, rubles	Sailors	Fliers	t
None	5.3 ± 2.0	--	2.6
Up to 10	34.2 ± 5.4	35.5 ± 0.6	0.2
11 to 30	40.8 ± 2.8	56.5 ± 4.0	3.2
31 to 50	11.8 ± 1.8	8.0 ± 1.6	1.6
51 to 100	7.9 ± 2.8	--	2.8

The large spread among the sailors with respect to the scale of expenditures for alcohol is noteworthy--the amount ranges from complete abstinence to high (up to 100 rubles) expenditures. As a rule, the heavy spenders consisted mainly of young and unmarried persons who represented the "male force, dignity, and breadth of spirit" (in the words of one of our patients).

When generalizing the materials obtained in the study, it should be noted that despite the more-expressed hereditary affliction of the fliers with respect to somatoneurologic diseases, they have no complaints about their health and have a significantly lower general morbidity compared with the sailors. Evidently the sailing crew was more subject to the effect of unfavorable, frequently extreme factors in the workplace that increase somatoneurologic morbidity, mental stress, and an increased frequency of compensatory alcohol consumption. Among these factors, special mention should be made of monotony and sensory isolation, a round-the-clock work pattern, hypodynamia and hypokinesia, combination of the work environment and habitat, and overburden by a dynamic stereotype in the context of a significant difference in the order of life aboard ship and ashore.

The predominantly situational and communicative nature of the motivation for alcohol consumption among sailors is closely related to the level of education and general culture and the ability to organize work time constructively and use spare time productively. Periods of pseudodrunken intoxication in days of meetings and partings are a factor potentiating the development of alcoholism. Sailors are geared toward a more malignant alcoholic life-style with the consumption of strong alcoholic beverages in large doses.

The following are also among the factors promoting alcoholism in sailors: escape from the control of the family and valued social environment during port calls; "accumulation" of days off, which creates a 3- to 4-month leave in conjunction with a lack of knowing how to use free time rationally and productively; undeveloped spiritual interests and low cultural level in a portion of sailors; tense, monotonous, and watchman-type work; disproportion between high wage in sailors (several months together) and a shortage of quality goods and poor operation of the service sphere; permissive attitude of the fleet management toward the growing "sailor alcohol habit" with wide-scale use of alcoholic beverages for the sake of appearances and distribution of "tropical wine."

In the development of the alcoholization of some sailors it is possible to identify a "deformation" mechanism that is manifested against the background of a general dispositional and ethical immaturity on the one hand and a high level of material support and authoritative management style in the fleet that presupposes a stereotypical framework of role behavior on the other hand. In this situation some sailors decrease their social and political activity, stifle their socially significant aims, narrow themselves to a circle of unstable interests, and begin to avoid responsible situations and decisions.

A personality leaning is formed that is based on an incapability of complex activity with a simplification and reorganization of one's hierarchy of behavioral motives in the plane of readiness for alcohol abuse. What is formed is the "alcoholic personality before the disease" that blindly and indiscriminately accepts all the alcoholic habits of its microenvironment.

The alternation of periods of complete abstinence during a voyage with intensive alcohol consumption during port calls creates conditions for the rapid breakdown of reactivity and suppression of protective mechanisms. Among

the phases of alcohol abuse in sailors it is possible to identify both the "boutlike-progredient" and "boutlike-regredient" phases. On the one hand, there is an intensive formation of symptoms on shore, and on the other hand, there is the possibility of the reverse development of initial clinical symptoms during complete abstinence during the voyage.

Good attitudes in the production collective and harmony in family life and creative work that is devoid of monotony and a manual nature create a field for healthy self-affirmation, thereby eliminating "compensatory-alcoholic" forms of behavior. The materials obtained in this study indicate that medical and biologic factors are not as important in predicting alcoholism as are dispositional and value personality traits, social maturity, psychological harmony, preservation of a striving toward professional growth and continuing education, the ability to see a future in life, and active civic involvement. Today the sequential fight against user psychology and parasitic aims among some sailors--the ground for amorality and alcoholism--is an urgent task. For this reason, activating political and educational work and giving sailors high sociopolitical and moral ideals while they are still in schools and naval schools is undoubtedly the best guarantee against alcoholism. The way to do this is through self-abandonment to leading labor activity; active involvement of sailors in social life; and comprehensive development of creativity and self-help, physical culture, and sports.

The program for exorcising this socially dangerous evil that has been set in the decree of the CPSU Central Committee entitled "On Measures for Overcoming Drunkenness and Alcoholism" (1985) is not a short-term campaign but rather a direction of a unified social policy for our government. Therefore the effectiveness of antialcohol work among sailors is an issue of complexity, consequence, and continuity of the efforts of all services and subdivisions of the fleet, party and Komsomol, union, and social organizations.

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12794

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LACK OF BASIC CHEMICALS FOR DRUG PRODUCTION

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 4, 17 Feb - 2 Mar 87 p 8

[Article: "On Drugs and Deliveries"; first three paragraphs are text of a letter written to NTR: PROBLEMY I RESHENIYA]

[Text] "Recently my father underwent a serious operation, and I ran into the problem of drugs. He needed Salcoseryl [salkoseril]. I run from pharmacy to pharmacy, and I get the same response: that is an imported drug, we do not have it in stock, a comparable Soviet drug is not produced.

After going to the pharmacies and phoning around to physicians I know, I found out that these days several other drugs cannot be bought either, among them some well-known drugs.

What on earth has happened to our drug industry? Can it be that it is not able to produce medicines in sufficient quantities and varieties?"

[signed] S. Nestorova, engineer
[from] Moscow

Our correspondent took your letter, respected comrade Nestorova, to the USSR Ministry of the Medical and Microbiological Industry. As far as the medicine you need goes, our drug industry does not manufacture it, and its importation is limited.

For a whole series of other imported medical drugs, the picture right now is this. We were told that this year the ministry has increased production and has completely met the requests for drugs perfected by the industry in place of many that were formerly imported.

At the same time, a number of drugs are being bought up abroad. Drugs comparable in action (ethmozine [etmozin], ethacizine [etatsizin], papaverine, phenazepam [fenazepam]) are also being produced domestically. Frankly speaking, not enough are being produced, but those in the Ministry of the Medical and Microbiological Industry do not cite some kind of irresolvable difficulties--the volume of production for these drugs is set solely by the USSR Ministry of Health.

Those I spoke with, who are engaged in the manufacture of domestic drugs, believe that the Ministry of Health apparently considers it wiser to increase the importation of medicinal drugs (it grew by a factor of 1.7 in the past five-year plan), spend many millions of rubles a year for them, and at the same time not use the capacity of the Ministry of the Medical and Biological Industry to produce drugs whose manufacture has been perfected. That is not the least of it. Requests for one and the same drug fluctuate unpredictably every year.

Here is the latest example. The Ministry of Health's request for specific medicines for this year is lower than last year's by more than 200 million shipping containers [upakovok]. What, these drugs are no longer needed?

But on to another subject--the difficulties encountered within the drug industry itself. One of that industry's suppliers is the USSR Ministry of the Chemical Industry.

Here is a typical scene. In order for pharmacies to have the necessary quantities of domestic Corvalol and Validol, 100 tons of isovaleric acid are needed. None at all was appropriated for this year. And if you want to purchase Soviet insulin or insulin-group drugs, you will not be able to get them either: the drug industry by and large has been denied the chemically pure (c.p.) phenol needed for their production. These days, crystalline iodine, activated clarifying carbon, and, among many other things, technical-grade bromine are in short supply. It is not surprising that plants in the Ministry of the Medical and Microbiological Industry are running a fever, some of them coming to a standstill several times already this year because of a lack of raw materials.

It looks like such a situation will remain in effect not only in this five-year plan, but also in the coming five-year plan. Today, when the plans for the thirtieth five-year plan are beginning to be made, it is already apparent that there are not yet any guaranties that the drug industry will have all the raw materials that it needs.

And here is yet another pressing problem. The production of medicines requires not only raw materials, but also modern equipment and various monitoring and metering devices. The Ministry of the Medical and Microbiology Industry simply does not have the capabilities of its own to make all this. For the machine-tool ministries, the drug industry's orders are not profitable: the equipment requested is complex and at times unique, and only a few pieces of equipment are needed.

Such, respected comrade Nestorova, is the real picture.

In the current five-year plan, drug production volume will increase by a factor of 1.5. But even such rates of growth for the drug industry--they are, by the way, among the highest in the country--are insufficient. At this point, it is up to the suppliers of the raw materials, to the machine-tool people, to every one of the participants in this important national economy matter.

13227

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PUBLIC HEALTH

OBSOLETE ORGANIZATION OF MEDICAL PRACTICE

Moscow SOVETSKAYA ROSSIYA in Russian 12 Oct 86 p 4

[Article by S. Ivanov, head of the Pediatric Department at the Dubrovskaya Hospital in Leningrad Oblast: "We Will Not Rush the Physician"]

[Text] I read the article by Nikolay Mikhaylovich Amosov in SOVETSKAYA ROSSIYA with emotion and gratitude. It states correctly: On the whole, the organization of medicine is now the same as half a century ago. Such an "organizational" marking time hampers and impedes the rapid and fruitful development of medical science.

How many unnecessary, in my opinion, papers do I write today! How many obsolete norms constrain me and limit my desire to work with full devotion of efforts! Introduce everything that medical statistics needs into the "diary" filled out by any polyclinic physician at the end of the month and eliminate other "forms" and "coupons." Break up sections into units of 500 people per pediatrician and don't lash out at him if he receives fewer people than he is supposed to in a day and spends 20, not 10, minutes on every patient.

Don't I really want to work better and don't you, administrators with stern faces, really believe in me? Why, if I talk to a sick child once again, cheer him up, and don't fill out some line in some record, you immediately declare me a bad worker? After all, the meaning of medicine for me, a pediatrician, lies in spending more time with a child when treating him and in understanding him. Is it good for my patients if I continuously don't have time? I rush to write documents, I don't have time to think about a patient, and I slip into a stereotype--work organization pushes me toward this.

Of course, a great deal depends on the administrator's personality. I see the chief physician as a courageous and talented man with real authority. He is not afraid to break ossified rules and procedures and to search for new ones in keeping with the times. Unfortunately, one will not encounter such administrators often.

The work of chief physicians, with whom I had occasion to deal, often was reduced to correct words accompanied by petty tutelage, harassment, and irritation of physicians and nurses. I remember a case in one of the hospitals, when at a meeting associates unanimously told the chief physician

that they did not respect him. The truth said aloud united people and created the prerequisites for the collective's creative upsurge. Well, what of that? Higher authorities found out about this case and... left everything as it was. Need it be said that such an attitude toward the collective position has far-reaching consequences?

Some practitioners have now developed a distinctive inferiority complex: "We are small people, it is not up to us to decide." I think that our common trouble lies in the fact that they got out of the habit of considering themselves chief figures and have forgotten that no one is more important and needed in medicine than physicians. Let us think: Is this not one of the reasons why there is little order in medicine?

I would like to discuss once again the notorious report on "bed-days." Why does this plan hang over us like the sword of Damocles? The most incomprehensible thing is that we are praised for its fulfillment. For what, actually, are we praised? For the fact that morbidity remains high? What is good in this? After all, "resting" in bed in a hospital is not a guarantee of future health. The person that rested there can appear again in the hospital. However, if he does not appear, if he is cured and our beds are empty, we are abused, berated, and reprimanded.

Or the "level of morbidity." We are required to lower it annually. However, this process cannot be continuous. It seems to me that, instead of the demand to lower morbidity, we should strive to raise the level of health. However, physicians do not know how to raise it. They now direct their efforts toward the patient, not the healthy man. Therefore, the problem of retraining and reorienting physicians, the problem of restructuring medicine--the same restructuring in which the entire country is now engaged--should be put in the forefront.

11439

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PUBLIC HEALTH

READERS' COMMENT ON PUBLIC HEALTH PROBLEMS

Moscow SOVETSKAYA ROSSIYA in Russian 12 Oct 86 p 4

[Readers' letters: "Paragraphs From Letters"]

[Text]

Order for Specialist

I fully agree with Nikolay Mikhaylovich Amosov: Nothing has changed in our medicine for many years. I don't presume to judge the in-depth processes in it, but externally everything looks as it did 20 or 30 years ago. I come to the section physician, he listens to me attentively (or inattentively), and sends me for analyses.

I am fully in favor of the patient being able to choose his physician. It is very difficult to go to the same man for treatment, knowing that he is incompetent as a specialist.

V. Andreyev

Severomorsk,
Murmansk Oblast

I Don't Complain, but Advise

In his interview "I Answer With my Heart" academician Amosov noted that physicians are most of all afraid of complaints and that the level of a collective's work is judged by their number. I fully support Nikolay Mikhaylovich: This is not correct--there are all kinds of complaints. Often some suggestions are adopted in accordance with them. Every patient always has enough complaints, especially if we take into consideration that a great deal has not changed, or has become worse, in public health during past years. I judge from my own case.

It so happens that I have greatly undermined my health at work and for two dozen years have had to be constantly treated in hospitals.

At the very mention of my forthcoming hospitalization I don't feel well. I know that neither the treatment, nor the care, nor the food will correspond to the necessary level. Effective, new preparations are prescribed with the

following essential condition: "Let relatives try to get them. We cannot help." Hospital care also leaves much to be desired--there is an eternal shortage of orderlies and nurses. I don't even mention the food: The same relatives try to solve this problem.

It is necessary to fundamentally change the state of affairs in hospitals; figuratively speaking, to raise the norm to the norm. I think that the time has come to combine the funds of the state budget and of local enterprises, institutions, and organizations for introducing order in hospital financing.

Ye. Devyatisilnyy,
party member since 1955, labor veteran

Moscow Oblast

In the Interests of Everyone

Not long ago my acquaintance categorically refused to undergo corrective physical training, although his broken leg was healing slowly: "Is it really bad to spend an extra month on sick leave? Unfortunately, he is not the only one in his consumer indifference. After all, in our country the status of a "patient" presupposes a lot of privileges, starting with the exemption from heavy field work and payment for sick leave and ending with the priority right to receive passes to sanatoriums and health resorts.

I don't want to cast a shadow on all patients, but, in my opinion, during a preventive medical examination it is necessary to take into consideration the extent to which a person has worked on himself during the year. Either he has done everything to restore his impaired health, or with all his might has ruined it, not giving thought to consequences.

Last year in PRAVDA Professor Panasenکو made a suggestion to introduce a system of material incentives for "not being sick." The AUCCTU secretariat has already made the first step in this direction: The amount of the annually obtained bonus depends on whether during this year a person is sick more or less than last year. This undoubtedly promising innovation should be developed and improved.

In this respect Academician N. M. Amosov's ideas on investigating the level of people's health during a preventive health examination and uncovering "weak links" in their bodies by means of functional tests are close to mine. The idea on checking man's individual work on his health is especially attractive.

Only the personal interest of every member of our society in protecting himself against ailments will be able to solve many insoluble public health problems.

V. Sergeyev,
candidate of medical sciences

Istra

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PUBLIC HEALTH

ESTABLISHMENT OF SPECIALIZED REHABILITATION CENTERS

Moscow SOVETSKAYA ROSSIYA in Russian 12 Oct 86 p 4

[Article by B. Korolev, academician of the USSR Academy of Medical Sciences, Hero of Socialist Labor, Gorkiy: "To Back Charity With Economy"]

[Text] I have known Academician N. M. Amosov for a long time. He defended his candidate and doctoral dissertations in Gorkiy. We often met at various symposiums of cardiac surgeons. We went together abroad--to Austria, Argentina, the United States, and France. During meetings I discussed many things with him and, of course, the state of our medicine and public health organization. Therefore, I read the talk with N. M. Amosov in SOVETSKAYA ROSSIYA with a special feeling--as though he again returned to my thoughts.

It is difficult not to agree with my colleague about a very sad fact: In our country the organization of medicine at times nullifies the aid that we provide to patients. After all, we are obligated to help man so that he does not simply exist, but lives to the full extent to which his age permits. If you wish, the success of our work should be evaluated economically. Yes, public health is an economic category. We must, we are obligated to know how much money we save the state by returning people to normal labor activity.

In order that this problem be solved even more efficiently, every big city should have specialized rehabilitation centers. It is not even necessary to build them anew and to waste additional funds. It is possible to establish them at the base of existing hospitals and sanatoriums. Such a practice exists in our city. A rehabilitation center for infarctions operates in our suburban Zelenyy Gorod Sanatorium. The AUCCTU sanatorium next to it has become a center for rehabilitation in gastroenterology. Probably, this is all. And what about other sanatoriums and hospitals? Many of them can be fully specialized. This could become an entire program for restructuring and organizing public health in such a big city as ours. Unfortunately, our initiative in this direction has always encountered resistance on the part of former oblast and city public health administrators, who very competently have concealed their inactivity and lethargy in thinking with various paragraphs of the ministry's instructions and orders.

Departmental barriers also arise on the path of public health organization. For example, a motor vehicle plant built an excellent hospital outfitted with

modern equipment sometimes even unique for our city. We were able to secure the establishment of a department of our medical institute at its base. For the time being, however, this is all that the plant's managers passed through the departmental barrier. Despite the fact that beds and operating rooms are empty in the hospital, only workers of the motor vehicle plant are treated here. But why should help not be given to those that service them, that is, workers in the service sphere, trade, and transport? I believe that it is also possible to make this hospital specialized, even if for our Avtozavodskiy Rayon.

Of course, the problems that I have touched upon are beyond the scope of purely medical problems. However, is the appeal expressed in N. M. Amosov's talk, "We Should Help the Biggest Possible Number of Suffering People", addressed to physicians alone? I believe that to no lesser extent this is the concern of party and Soviet bodies and economic managers. Without their support and attention it is difficult to imagine our activity today.

11439

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PUBLIC HEALTH

ALCOHOL AND TRAUMA

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 5, May 86, pp 14-15

[Article by L. G. Pozdnukhov, Kazakh Scientific Research Institute of Oncology and Radiology, Alma-Ata]

[Abstract] The drug abuse services in the USSR have the important task of educating the public as to the dangers of alcoholism and the relationship of alcohol intake to trauma. The danger of even one alcoholic drink cannot be overestimated, since loss of coordination is evident with alcohol blood levels of 0.2-0.4 g/liter (corresponding to ingestion of 40-60 g of vodka). The efficiency of workers after a holiday has been seen to diminish by 30% on the first workday due to alcohol intake. Various forms of trauma are a natural consequence of diminished mental and physical faculties, and rigorous measures have to be employed to identify and treat individuals at risk.

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DIAGNOSTIC AND CLINICAL ASPECTS OF CHRONIC NONSPECIFIC PULMONARY DISEASES AND TUBERCULOSIS IN AGRICULTURAL WORKERS

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 5, May 86, pp 27-29

[Article by K. A. Bayarstanova and R. K. Dautbayeva, Chair of Phthisiatry, Karaganda Medical Institute; Karaganda Oblast Antituberculosis Dispensary]

[Abstract] Chronic nonspecific pulmonary diseases in tuberculous patients present a diagnostic and clinical challenge that is often overlooked by uchashtok physicians, with attention accorded solely to tuberculosis. A review of 76 patients in an agricultural setting demonstrated that non-tuberculous manifestations were often misinterpreted as manifestations of the tuberculous process or of its complications. In fact, in many cases such entities operate as an independent nosologic entity arising against a background of the tuberculous process. Physicians in the agricultural

areas must be alerted to such clinically-difficult cases for proper diagnosis and subsequent patient management.

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CLINICAL ASPECTS OF IMPORTED CASES OF RECURRENT TERTIAN MALARIA

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 5, May 86, pp 61-62

[Article by M. S. Srymbetov, L. V. Voyteshonok, K. A. Zhumanbayev and V. I. Medvedev, Chair of Infectious Diseases, Karaganda Medical Institute; City Infectious-disease Clinical Hospital]

[Abstract] Cursory details are presented on the clinical manifestations of tertian malaria in 15 Soviet returnees from assignment in Southeast Asia. The clinical picture in general followed the anticipated pattern for this disease entity, encompassing splenomegaly, paroxysms, chills, hepatomegaly, splenomegaly, anemia, leukopenia and so forth. These factors were accompanied by typical hematologic findings, providing further indications on the basis of which diagnosis the therapy should be instituted. References 2 (Russian).

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CLINICAL MANIFESTATIONS, DISSEMINATION AND REASONS FOR LATE DIAGNOSIS OF LARYNGEAL MALIGNANCIES

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR, SERIYA BIOLOGICHESKIKH NAUK in Russian No 6, Nov-Dec 86, pp 128-132

[Article by A. A. Eyvazov and O. M. Kazhlayev, Azerbaijan Scientific Research Institute of Health Resort and Science Physical Therapy]

[Abstract] A case study analysis was conducted on 25 patients presenting with laryngeal malignancies between 1976 and 1984, ranging in age from 40 to 64 years. In most cases an etiologic factor could not be identified with any degree of certainty. However, all patients were determined to have been smokers for at least 20 years, and 10 were identified as long-term alcoholics. In addition, tuberculosis was present in 28% of the patients. At the time of diagnosis the malignancy had already been present for several months in stage T₃-T₃ of dissemination. Pain and hoarseness were the most common indications of laryngeal pathology, with the relatively late time of diagnosis also being due to a low index of suspicion on the part of physicians. Analysis of various therapeutic modalities showed that best results are obtained with early diagnosis, while in late stages treatment tends to be palliative. References 13: 12 Russian, 1 Western.

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CSO: 1840/830

IMMUNOPREVENTION AND IMMUNOTHERAPY OF EXPERIMENTAL PSEUDOMONAS AERUGINOSA SEPSIS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 4, Apr 86 (manuscript received 30 Apr 85) pp 14-17

[Article by I. A. Grishina, R. P. Terekhova and A. I. Marchuk, Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Outbred rats were employed in a study designed to assess the preventive and therapeutic role of pyoimmunogen II in Pseudomonas aeruginosa infections. Immunization of the rats with pyoimmunogen II with a schedule calling for 0.07, 0.07 and 0.14 mg N at 1 day intervals reduced the mortality figure to 2/40 rats vs. a control rate of 28/40. In addition, treatment of the animals with hyperimmune human plasma (1 ml immediately after infection, and 1 ml/day for 3 days) reduced the mortality figure to 5% in comparison with a control mortality figure of 70%. Antibody response elicited by pyoimmunogen was thus demonstrated to be effective in protecting rats from Ps. aeruginosa sepsis. The data also suggested that for clinical human use, assuming a 70 kg patient, 1.5 liters of hyperimmune plasma should be recommended, to be administered intravenously in 250 ml bolus fractions. References 9: 7 Russian, 2 Western.

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CSO: 1840/613

UDC 616-001.28-06:616.155.348-085.31:546.34]-036.8-07-092.9

EFFECTS OF LITHIUM CARBONATE ON EARLY RECOVERY OF BLOOD CELLS IN MURINE
IRRADIATION EXPERIMENTS

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 28 May 85) pp 25-29

[Article by B. B. Moroz, professor, corresponding member, USSR Academy of
Medical Sciences, Yu. B. Deshevoy, O. A. Tsybanev, G. V. Knyazeva and
T. K. Protserova]

[Abstract] Therapeutic trials were conducted in murine systems to assess
the effectiveness of lithium carbonate (LC) in enhancing the recovery of
blood cells following gamma irradiation. The studies were conducted with
female (CBA x B57Bl)F mice and male Wistar rats subjected to 6 Gy gamma
irradiation, and treated intragastrically with 50 mg/g /day LC for 7 days,
beginning with the 5th postradiation day. Recovery of neutrophils was
accelerated in both species, with the effect somewhat more pronounced in
the rats. Similarly, erythropoiesis was also promoted by LC in the acute
phase of radiation sickness. Lymphopoiesis was immediately stimulated
by LC in the mice, but a beneficial effect was not evident in the rats
until the 9th postradiation day. On a tentative basis, the efficacy of
LC was attributed to stimulation of pluripotential hemopoietic stem cells,
although the exact mechanism of action remains to be defined. References
11: 2 Russian, 9 Western.

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UDC 616-001.28-06:616.155.3-007.1-085.331:[579.922:547.915]-036.8-08-092.9

EFFECTS OF BACTERIAL LIPOPOLYSACCHARIDES ON HEMOPOIESIS FOLLOWING DEPRESSION
BY IONIZING RADIATION

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 31, No 10, Oct 86
(manuscript received 19 Feb 85) pp 30-33

[Article by M. N. Baranov, doctor of biological sciences, L. A. Golubeva,
K. S. Martirosov, professor, and N. V. Petkevich, Military Medical Academy
imeni S. M. Kirov, Leningrad]

[Abstract] Male guinea pigs (300-400 g) were employed in a therapeutic trial designed to test the efficacy of the bacterial lipopolysaccharides prodigiosan and pyrogenal in reversing ionizing radiation-induced depression of hemopoiesis. The animals were exposed to 3.7 Gy gamma irradiation, followed in 5 h by subcutaneous administration of 0.5 mg/kg prodigiosan or 1 mg/kg pyrogenal. The blood picture was monitored for 15 days with enumeration of myelokaryocytes, T cells, B cells, active T cells, and 0 lymphocytes. Ionizing radiation was found to induce pronounced cytopenia, with reversal obtained with both preparations. The survival figure for the untreated control guinea pigs was 25%, while that for the animal group treated with prodigiosan was 71%, and for the pyrogenal group 67%. In differentiation of the therapeutic effects, prodigiosan was seen to be particularly effective in stimulating recovery of the granulocytic series and the activated T cells. Pyrogenal had a more general effect, being equally effective in terms of all the lymphocytic subpopulations. References 7 (Russian).

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UDC 613.81+613.84+614.876:546.42.02.90]-07:612.017.]

COMBINED ACTION OF ⁹⁰STRONTIUM, ALCOHOL AND SMOKING ON SOME IMMUNOLOGICAL
INDICES

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 86 (manuscript received
22 Jan 86) pp 25-27

[Article by V. M. Shubik, N. I. Mashneva and V. M. Kupriyanova, Leningrad
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[Abstract] Data are reported on nonspecific protection (bactericidity of blood serum) and immunity [autoantibodies, circulating immune complexes (CIC)] of animals (white mice) exposed to chronic irradiation with ⁹⁰Sr combined with alcohol intake and cigarette smoke inhalation. It was shown that the combined effect varied with the stages of irradiation. The influence of these factors on immunological indices also differed. Chronic administration of ⁹⁰Sr alone depressed bactericidal action of blood serum and led

to increased formation of complement fixing autoantibodies and CIC. In combination with alcohol and smoke, this effect intensified. The data showed that chronic exposure to these agents, which may be found in many industrial work situations, is very dangerous. References 5 (Russian).

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HEPATITIS B VACCINE PRODUCTION IN AFRICA; PROBLEMS AND PROSPECTS(1)

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 86 pp 591-594
(manuscript received 17 Oct 85) pp 591-594

[Article by A. Nasidi and T.O. Harry, National Institute for Medical Research, Lagos, Nigeria]

[Text] Since the time of the development, production and release of Hepatitis B vaccine, based on the purification and inactivation of the Hepatitis B surface antigen (HBsAg) [5, 11], much has been accomplished in this area. Clinical and field tests have demonstrated the vaccine's immunogenetic potency and efficacy, and it was hoped that the vaccine would protect millions of people not only from Hepatitis B, but possibly from its sequelae, including primary cancer of the liver. This form of liver cancer is known to be the most prevalent of malignant diseases among men living in Southeast Asia and Africa.

The high cost of the vaccine has been the only barrier to its large-scale use and an effective control of this infection. Various approaches are being presently employed in several Southeastern Asian countries to bring the cost of the anti-Hepatitis B vaccine within the reach of the population. Cooperative efforts are being undertaken with companies and institutions of other continents which have the necessary financial resources and scientific technology. In some of those countries the manufacture of a less expensive Hepatitis B vaccine has already started or is being planned.

The present article examines problems related to the anti-Hepatitis B vaccination of the population in several countries of Africa and Southeast Asia.

In view of the present availability of effective immunoprophylaxis in several countries with endemic regions, immunization was selected as the method to be used for the control of Hepatitis B (HB). Many of these countries, particularly in Southeast Asia, have clearly defined their strategy for the effective control of HB through vaccination [2, 7]. That strategy has precisely identified the priority groups slated for vaccination and outlined the means of obtaining the vaccines and reagents required for an immunization program.

The present article discusses some of those programs and suggests a strategy for the effective control of HB in Nigeria and on the African continent as a whole.

Southeast Asia has both industrially advanced (Japan) countries or countries which have recently become industrial (South Korea, Taiwan, etc.) as well as developing countries. Consequently, the manufacture of HB vaccine can be easily set up in view of the already established scientific and technological base in a number of these countries.

There are more than three companies that manufacture HB vaccine in South Korea alone. A similar situation exists in Japan, Taiwan, and Singapore. In Singapore an enterprise has started to manufacture HB vaccine for the subregion in cooperation with a French firm. In its trade relations with other countries, this country supplies their vaccine in exchange for human blood plasma through the mechanism of inter-governmental cooperative agreements.

The strategy developed in Singapore to control HB consists of the following two programs:

1. Sanitation Education Program. The purpose of this program is to provide information on a broad basis to the public and hospital personnel about the mode of HB transmission and related hazards. The public is to be given information about the vertical mode (in pregnancies) and horizontal mode (hospital personnel and residents of the country) of HB transmission.

2. Program of Immunoprophylaxis. This program is aimed at eliminating the antigen carrier factor and immunological protection of the susceptible elements of the population.

The strategy in Taiwan is somewhat different. Here, the principal thrust of HB morbidity control is to be placed on immunization. In order to achieve that goal, it was decided to manufacture HB vaccine, the specific immunoglobulin, and all the test reagents on a country-wide scale. A ten-year vaccination program was begun on July 1, 1984 in which new born infants receive priority immunization. In order to establish whether or not the immunization program has reduced the incidence of primary hepatic carcinoma and other chronic diseases of the liver, the results of the vaccination program will be followed for a period of 30 to 40 years. Thus, the immunization program in Taiwan may be considered to be exhaustive.

In general, the vertical path of HB transmission plays a more significant role in the Southeast Asian countries (>50%) than it does in Africa where, it is believed, only about 12 percent of the diseases are related to this mode of transmission [1, 12]. Extensive scientific research has been undertaken in Southeast Asia and appropriate age groups for immunization have been defined. It follows from the foregoing that an active immunization program can now be outlined and carried out.

HB Vaccination in Africa

HB is endemic in Africa and constitutes a highly endemic disease in several countries of this region. Previously there had been some question as to the need of an HB vaccine for Africa. There was also some debate about rational and practical approaches to the effective utilization of an HB vaccine for the efficient control of this disease in Africa [10, 16].

These remain urgent and practical problems even today, since there are no countries in Africa which have precisely outlined a strategy to control HB through immunization.

Factors impeding the successful implementation of an HB immunization program in Africa include the lack of sufficient financial resources, a clearly defined vaccination strategy, poorly developed programs of sanitary education, a shortage of personnel to implement these programs, and a lack of sufficient studies required for the formulation of a national or regional immunization strategy.

The results of several studies have clearly shown that persons in Africa are infected by HB in the early period of life, and that the morbidity rate for children under one year of age is at least 60 percent [12]. These data would indicate that immunization should be started during the early years, preferably immediately after birth. As in the case of the Asian countries, the vaccination of all new born infants in Africa would be the most suitable method of effective control. However, as experience has shown, an extensive program of immunization that would entail the widespread vaccination of newly born infants is hardly possible since most births occur outside of hospitals. In some regions of the country the vaccination rate of infants is only about 20 percent.

However, the problems encountered in this strategy are concerned with the high cost and large quantities of the vaccine that must be manufactured in order to achieve the established goal. The only realistic approach to this problem is the local manufacture not only of the HB vaccine, but also of the reagents that are essential to vaccine testing and subsequent observations.

The following are various suggested future forms of cooperation for the purpose of making HB vaccines accessible in Africa: 1) cooperation among the continent's scientists or scientific organizations to set up manufacturing enterprises. This would stimulate the active participation of the continent's scientists in a campaign against infectious diseases and guarantee the health of the entire population by the year 2000; 2) the production of HB vaccines under license from highly reputable manufacturers; 3) the modernization of product and equipment quality control for the final packaging and distribution of vaccine suspensions received from manufacturers in other countries; 4) the exchange of starting materials in the form of fractionated or processed HBsAg-positive plasma for vaccine manufacture; 5) the distribution of HB vaccines via non-commercial international organizations at reduced preferential prices.

The selection of any one of the aforementioned options would depend on local conditions which would include the availability of financial resources, human

resources, the public health infrastructure, etc. In view of the current situation in Nigeria, we believe that the first of the aforementioned options would be the most preferable.

We have developed a vaccine at our institute that has passed all the preclinical tests recommended by the WHO with the exception of the safety tests. Some of the scientific associates engaged in this problem decided to test the vaccine on themselves. One of this article's authors (A. Nasidi) and his colleagues who had no anti-HBs as well as an associate in whom these antibodies were detected were immunized by the vaccine. Moreover, the anti-HBs level in the second person vaccinated reached 2,000 units/ml which was indicative of an immune state, and this level in the third person increased to 6,000 units/ml two months after the third vaccination.

Following this test we concluded that our vaccine was suitable for use as an anti-HB agent. Subsequently, we studied the vaccine's stability under tropical conditions and improved its quality in accordance with our requirements. For example, we decided to carry out a supplemental inactivation stage by UV-irradiation, as has been described earlier [4, 14, 15].

These modifications should raise the safety level of the vaccine. In addition, in order to lower the cost of the vaccination, we used $\text{Ca}_3(\text{PO}_4)_2$ in place of $\text{Al}(\text{OH})_3$ which had been previously used in the first experimental vaccine. This prototype vaccine is currently undergoing preclinical tests. The results we have obtained so far are promising. $\text{Ca}_3(\text{PO}_4)_2$ has a number of advantages as an adjuvant. It has a greater adsorptive capacity and is better tolerated, especially in children. This is due to the fact that $\text{Ca}_3(\text{PO}_4)_2$ in the body does not block the formation of specific E class Ig [8, 13, 17], and the fact that the slow release of the vaccine from the depot assures a longer period of immune response stimulation. In addition, the use of this adjuvant lowers the level of possible allergic reactions [3, 6, 19] and allows a higher level of circulating antibodies which in turn makes it possible to reduce the number of injections and extend the intervals between them which eventually lowers the cost of mass immunization.

Significance of HB for Nigeria

In order to convince the government of the need for greater cooperation, we submitted a comprehensive plan for a national anti-HB campaign in Nigeria.

We calculated the amount of vaccine that would be needed for the effective control of HB in our country by means of vaccinating newborn infants. If the vaccine were obtained from foreign manufacturers at today's prices, that expenditure would come to 70 percent of the country's total budget for public health. Consequently, we recommended that the government undertake the local manufacture of HB vaccine in Nigeria.

Thus, the strategy for the control of HB as outlined in the Asian countries may not be acceptable for Africa. The African strategy will require changes and will have to be planned in order to satisfy current conditions on this continent. Since, according to all our available data, not a single African

country can afford to pay for the cost of vaccinating all children under one year of age against HB, the immunization program may have to be adopted in stages.

The HB vaccination program will possibly have to be combined with the extended program of immunization for easier implementation. The following pattern of vaccination would probably be the most suitable for Africa, including Nigeria*(2):

BCG+HB vaccine (1) -- at birth

DTP and polio I + HB (2) -- at two months of age

DTP (2) and polio II + HB (3) -- at three months of age

DTP (3) and polio III + HB (4) -- at four months of age

Measles -- at nine months

Tetanus anatoxin -- two doses at the sixth and seventh month of pregnancy

HB booster dose -- at three years of age

FOOTNOTES

1. Paper given at the International Symposium in September 1985 at the Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences.
2. * Numbers in parentheses represent times immunization is to be repeated.

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MISCELLANEOUS

BRIEFS

INTERFERON SYNTHESIS AT LADYZHINSKIY PLANT--While every drug that helps mankind may be called a miracle, interferon is a miracle of a special kind. Generally employed in the treatment of viral diseases, this drug was earlier manufactured from the blood of donors only. Expert microbiologists at the Ladyzhinskiy Enzyme Preparations Plant managed to synthesize this drug from an available organic medium. This made it possible to significantly reduce the cost of manufacturing the drug, whose curative properties turned out to be much higher. 50 thousand doses were produced last year and twice that number this year. Currently under design is a full-scale plant for the manufacture of interferon, slated to operate at a capacity of 24 million ampules per year. Joining those already operational, the plant will be commissioned in two years. [By M. Odinetz] [Text] [Moscow PRAVDA in Russian 10 Mar 87 p 3]
13126/12955

USSR-GREAT BRITAIN COOPERATION IN AIDS RESEARCH--London--The fact that viruses and bacteria do not discriminate between boundaries is known not only to physicians, but is one which politicians are becoming increasingly aware of as well. International cooperation in this area is not just desirable--it is dictated by the times. The Soviet people are not to blame for the fact that official contacts between English and Russian physicians have been on ice for the last 8 years. These contacts are now being renewed. Great Britain is currently showing great concern about the new threat to human health and life being posed by the AIDS virus. So serious has the situation become that the British government was forced to hammer together an extraordinary plan to combat this horrible viral disease. Physicians here need the experience amassed by their colleagues from other countries. This is why they are particularly interested in the research currently under way at scientific centers in the Soviet Union. The exchange of experiences gathered virologists, current problems in oncology and ophthalmology as well as the provision of first aid in big cities were the topics of the negotiations between British colleagues and an authoritative delegation from Moscow headed by first deputy to the Secretary of Health O. P. Shchepin. "One would have to say that our participation in the joint session involving the collaboration of a Soviet-British working group in the area of medicine and public health was very fruitful. The negotiations were successful and cordial," Soviet delegation head O. P. Shchepin told me. "The negotiations took place in a friendly environment. The fact that prominent representatives of the

medical communities in both countries participated in the exchange of opinions doubtlessly facilitated the discussion of problems. A lot has been achieved in this area both in the USSR and England." The London "Times" made use of the following image in its reports about the contacts between prominent British and Soviet physicians: "Detente in the sphere of medicine". This time, the "Times" is right on target. [By A. Krivopalov] [Text] [Moscow IZVESTIYA in Russian 5 Dec 86 p 4] 13126/12955

SOVIET-ITALIAN COOPERATION IN AIDS RESEARCH--Rome--This was the site of the fifth session of the joint Soviet-Italian working group held on issues in medicine and public health. I asked Italian Deputy Minister of Health G. Nepi to comment on the results of the session. "This meeting", he began, "was very useful. In my opinion, the most important thing that came out of it was the determination of the main directions which the cooperation between scientists of the USSR and Italy are to take as well as new areas of joint research, which will involve the leading medical scientific centers in both countries. We were here guided first and foremost by the problems facing Italian and Soviet experts as well as the medical community throughout the world." Keeping in mind that physicians the world over were interested in the AIDS problem and were applying the achievements of biotechnology to medicine, the working group therefore decided to include them in the plans for joint research. It seems clear to me that the AIDS problem--which, although it has fortunately not spread to the Soviet Union as of yet, has become an alarming one in the United States and several other countries including some in Western Europe--cannot be solved through the efforts of one country alone. While there have been promising developments in a number of countries that can be applied to finding a vaccine to prevent the spread of this disease, it is still too early to talk about the development of drugs which could be used to cure this disease. This is why I believe that the only way to stamp out this evil in as short a period as possible is through the joint efforts of physicians the world over. "The session resulted in something else which I would like to touch upon as well", continued G. Nepi. "We see an opportunity to contribute to the development of comprehensive--including political--cooperation between the USSR and Italy for the cause of international progress and peace by strengthening ties between Soviet and Italian physicians. The results of recent visits to the Soviet Union by Chairman of the Italian Senate A. Fanfari and Italian Secretary of Foreign Affairs G. Andreotti are proof the prospects in this area are good." [By V. Pershin] [Text] [Moscow IZVESTIYA in Russian 17 Mar 87 p 5] 13126/12955

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