JPRS-ULS-92-006
13 FEBRUARY 1992

JPRS Report

Science & Technology

Central Eurasia: Life Sciences

Science & Technology
Central Eurasia: Life Sciences

JPRS-ULS-92-006

CONTENTS

13 February 1992

Biochemistry

Biophysics

Environment

Epidemiology

Genetics

Immunology

Medicine

Microbiology

Pharmacology, Toxicology

Physiology

Public Health

Radiation Biology

Virology

Miscellaneous

Preparation and Cytotoxicity of Anti-CD7/Ricin A-Chain Immunotoxin

927C0141F Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 3, Mar 91 pp 749-753

[Article by A.G. Tonevitskiy, G.V. Yershova, I.I. Agapov, A.Yu. Toptygin, O.V. Korotkova, S.N. Shereshkov, Z.G. Kadagidze and A.Yu. Baryshnikov, All-Union Cardiological and Oncological Scientific Centers, USSR Academy of Medical Sciences, Moscow]

UDC 577.1

[Abstract] An immunotoxin (IT) was developed against CD7-T cells using monoclonal antibodies (IKO87) specific against the CD7 epitope conjugated to the A chain of ricin. The IT was tested in vitro against human Jurkat CD7-T cell line, human RB-3 B cells, and human bone marrow cells based on incorporation of ^{3}H-thymidine or ^{14}C-leucine. Under appropriate conditions of incubation, IT (5 x 10E-9 M) inhibited label incorporation by the T cells (5 x 10E3/ml) by 50 percent, but was 100-fold less effective in the case of the B cells. In addition, bone marrow stem cells were not affected by the IT. Accordingly, the anti-CD7/ricin A-chain IT has been shown to be selectively toxic for CD7 cells and may find application in bone marrow transplantation and other immune pathologies. Figures 3; references 15: 2 Russian, 13 Western.

Enhancement of M-Cholinoreceptor Affinity in Rat Brain by Single Administration of Anticholinergic Benactyzine (Amizil)

927C0141H Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 5, Mar 91 pp 1261-1264

[Article by V.V. Malygin, S.G. Yevdokimenko, O.G. Serebryakova and I.V. Martynov, corresp. member, USSR Acad. Sci., Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka, Moscow Oblast]

UDC 577.25+612.816.7:615.217.34

[Abstract] The anticholinergic benactyzine (Amizil) was used in assessing the impact of psychotropic agents at the molecular level through evaluation of binding kinetics of brain muscarinic receptors. The studies involved a single intraperitoneal administratin of 1.7 to 7.0 mg/kg of beactyzine to 180-220 g male Wistar rats, and assessment of the binding kinetics of brain muscarinic receptors for the antagonist 3-quinuclidinol and agonist oxotremorine. Analysis of the resultant Scatchard plots demonstrated that maximum changes occurred in 1-2 h, consisting of enhanced binding efficiency for the agonist and antagonist. With low doses of benactyzine binding efficiency was enhanced by an increase in the number of receptors, and at high doses by an increase in affinity. These changes were interpreted as reflecting adaptation to, and compensation for, a diminished synaptic inflow due blockage of the muscarinic receptors. Tables 2; references 14: 4 Russian, 10 Western.

Aging and Memory: Putative Brain Peptidase Involvement

927C0141K Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 1, Mar 91 pp 234-237

[Article by N.N. Zolotov, O.A. Kutepova, T.A. Voronina, V.F. Pozdnev, L.D. Smirnov and K.M. Dymayev, corresp. member, USSR Acad. Sci., Scientific Research Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

UDC 615.272.014:577.156.34.042.21.12

[Abstract] An assessment was conducted on age-related changes in the brain, memory functions and effects of mexidol, a Soviet antioxidant, using 3, 12, 18 and 24 month old male Wistar rats. Baseline studies showed that aging was accompanied by enhanced lipid peroxidation and increased concentrations of lipofuscin. Per os administration of mexidol (0.025 percent in drinking water) attenuated age-related lipid peroxidation by > 50 percent while increasing lipofuscin by 60 percent in comparison with control rats. Other age-related changes consisted of diminishing cerebral activities of prolyl endopeptidase, pyroglutamyl aminopeptidase and dipeptidyl aminopeptidase IV initially decreased during the first 12 months, followed by a sharp increase thereafter. Cathepsin B activity, however, continued to diminish. Mexidol treatment reversed these changes in that peptidase activities remained above baseline levels. Other psychotropics, kleregil [sic] (0.1 percent) and meclophenoxate (0.1 percent), further depressed brain peptidases. Correlation analysis revealed a strong positive correlation (r = 0.783-0.990) between peptidase levels and acquisition of the ability to remain on a rotating rod. Additionally, a positive correlation also prevailed between prolyl endopeptidase and acquisition of a passive avoidance response. These findings indicate the significance of brain peptidases in the mechanisms underlying improvement of age-impaired memory by mexidol. Figures 2; tables 1; references 15: 10 Russian, 5 Western.

Covalent Immobilization of Cholinesterases on Polyacrylamide Gels

927C0141R Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 5, Jun 91 pp 1250-1253

[Article by A.K. Andrianov, V.V. Chupov, L.I. Valuyev and N.A. Plate, academician, Moscow State University; Institute of Petrochemical Synthesis imeni A.V. Topchiyev, USSR Academy of Sciences, Moscow]

UDC 547.995.17:541.64

[Abstract] Immobilization of cholinesterases on polyacrylamide gels leads to significant losses of enzymatic activity, suggesting the need for alternative methods of immobilization and perhaps reliance on covalent coupling. Trials with covalent conjugation involved activation of equine serum butyrylcholinesterase and equine erythrocyte acetylcholinesterase by acryloyl chlorides and subsequent polymerization. The testing of the immobilized cholinesterases against substrates, organophosphorus quasisubstrates and nucleophilic reactivators showed retention of 99 to 100 percent of activity. This approach to immobilization, then , overcomes the problem of low activity and should serve to expand the scope of research as well as clinical and industrial applications of immobilized chloinesterases on polyacrylamide gels. Figures 4; tables 1; references 12: 3 Russian, 9 Western.

Impact of Weak Magnetic Fields on Rates of Calmodulin-Dependent Phosphorylation of Soluble Myosin

927C0141D Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 1, Mar 91 pp 227-230

[Article by L.A. Shuvalova, M.V. Ostrovskaya, Ye.A. Sosunov and V.V. Lednev, Institutes of Biochemistry imeni A.N. Bakh, Moscow, and of Biological Physics, Pushchino (Moscow Oblast), USSR Academy of Sciences]

UDC 577.3

[Abstract] A recent theory attributes bioeffects of weak magnetic fields to resonance effect on Ca++ (or other ions) binding to proteins, based in part on the observations that the binding constants may be lowered by an order of magnitude. Consequently, in vitro studies were conducted on the phosphorylation of rabbit myosin by light chain kinase, a mechanism regulated by the Ca-calmodulin complex, as it is affected by a combined (permanent + variable) magnetic field generated by Helmholtz rings providing magnetic inductions of 20.9 μT. Studies with purified and unpurifed kinases showed inhibition maxima at 16.0, 14.0 and 13.0 Hz, with halfwidths of each resonance peak < 1 Hz. This is the first report of the impact of a weak magnetic field—equivalent to geomagnetic field strengths—on Ca-calmodulin-mediated biochemical reactions. The 16 Hz bioactive frequency corresponds to the theoretical parametric resonance frequency of a Ca^{+2} ion, and the other to Ca ions with charges of +1.75 and +1.62. The latter are due to partial overlap of Ca by electron clouds of oxygen atoms of the binding groups on the protein. Putatively, this also implies 3 types of Ca-binding sites on calmodulin and complements spectral studies with similar indications. Figures 2; references 9: 1 Russian, 8 Western.

Effects of Bacterial Polysaccharides on Metals

927C0141O Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 5, Jun 91 pp 1239-1242

[Article by V.M. Bagnyuk, N.K. Balatsenko, L.A. Levina and T.L. Oleynik, Institute of Botany imeni N.G. Kholodnyy, Ukrainian SSR Academy of Sciences, Kiev; State Optical Institute imeni S.I. Vavilov, Leningrad]

UDC 576.8.005:547.458:620.193

[Abstract] Exopolysaccharide ('bactosol') produced by Beijerinckia sp. VKM 1540D was tested for its effects on silver nitrate, pure deoxygenated copper and brass and bronze samples. Ultramicrographic examinations demonstrated that incubation of washed cells with 0.001 percent silver nitrate for 6 h leads to deposition of diffuse and granular metallic silver cell suface. Reduction of silver to the metallic state and its sequestration on cell surface evidently represents a protective mechanism which precludes entrance of highly toxic silver ions into the cells. Incubation of the metal samples with 20 percent bactosol resulted in surface pitting, with the degree of surface destruction greater with unpurified bactosol than with bactosol obtained after ethanol precipitation. The difference was evidently due to the presence of reducing oligosaccharides and organic acids in the unpurified bactosol which enhaced biodegradation of the metals. Figures 2; tables 1; references 9: 4 Russian, 5 Western.

Hydrophobicity of Ion Channels Formed by Amphotericin B

927C0141P Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 5, Jun 91 pp 1242-1245

[Article by Sh.K. Bayramov, M.V. Volkenshteyn, corresp. member. USSR Acad. Sci., I.B. Golovanov and A.Ya. Zilbershteyn, Institute of Theoretical and Experimental Biophysics, USSR Academy of Sciences, Pushchino, Moscow Oblast]

UDC 577.3

[Abstract] Theoretical and experimental approaches were combined in an analysis of the hydrophobicity of ion channels formed by amphotericin B. The essential assumptions were that the channels consists of 2 halfpores, each formed by 8-10 amphotericin B molecules. Furthermore, the disposition of the amphotericin B molecules is presumed to be such that the OH groups on the saturated chain of the lactone ring line the internal cavity, while hydrophobic groups are externalized. Further, the long axis of the amphotericin B molecule is parallel to channel axis. Based on the findings that translocation of inorganic ions through the channels is blocked by organic molecules (amines, alcohols, glycols, sugars, benzene, etc.), as well as facts derived from studies on model channels formed by polyvinyl alcohol simulating the C_7-C_{14} fragment of amphotericin B, the conclusion has been reached that hydrogen bonding between OH groups renders the passage hydrophobic since the OH groups are no longer available for bonding with water molecules. Since amphotericin B lacks OH groups at positions C_6 and C_7, efficiency of the blockers reaches a plateau when their chain length exceeds C_6. The cutoff is due to hydrogen bonds between the C_5 and C_8 OH groups of amphotericin B which are perpendicular to the axis of the channel. Consequently, at C_7 an energy barrier exists for migration of inorganic anions through the ion channels formed by amphotericin B. Figures 2; tables 2; references 7: 3 Russian, 4 Western.

Impact of Save Levels of Ionizing Radiation on Biota

927C0141N Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 1, May 91 pp 248-251

[Article by G.N. Romanova and D.A. Spririn, Experimental Scientific Research Station, "Mayak" Industrial Association, Chelyabinsk]

UDC 574.4/5:539.1.04

[Abstract] Current knowledge was brought to bear on the common assertion that radiation levels that are safe for humans pose no risk to other entities in the biotic spectrum. However, recent advances have shown that in a given ecosystem the wellbeing of the entire system depends on the status of its dominant component. As a result, the fate of the entire ecosystem rests on the radioresistance of the dominant component. Radiometric studies in the areas affected by the nuclear disasters in Southern Urals in 1957 and in Chernobyl in 1986 have shown that primary productivity of the dominant component represents the best criterion of radioresistance. This approach has shown that the maximum dose of radioactive pollution that can be tolerated by biota, including dominant components, is on the order of 0.5 Gy/yr, a figure is 20-fold lower than the overall ecological baseline threshold dose for biota, and some 40-fold lower than that for coniferous forests, the most sensitive of ecosystems. Tables 2; references 10: 9 Russian, 1 Western.

Susceptibility of Large Kyzylkum Gerbils to Strains of Plague

927C0040B Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 2, Feb 91 pp 20-21

[Article by T. B. Khaydarov, V. M. Stepanov, I. L. Martinevskiy, and M. M. Khakimov, Uzbek Anti-Plague Station, Uzbek SSR Ministry of Health]

UDC 616.981.452-036.21+576.851.48(575.1)

[Abstract] The ability of plague microbes (11 strains from different geographical regions) to take root in the Kyzylkum mesocenter was investigated on large gerbils trapped in the Lower Kyzylkumy. These animals were infected with a plague culture and observed three times per day for 5-7 days. The results indicated that strains that are atypical for Kyzylkumy and avirulent to lab animals cannot circulate in this area. In addition, the data demonstrated that the large gerbils are most susceptible to Tien Shan strain A-575 and are least sensitive to I-588 (Gornyy Altay), A-108 (Brazil), A-127 (Congo), A-413 (Vietnam), and A-409 (Kenya) strains.

Effect of Bioactive Substances on Mosquito Susceptibility to Malaria. Part 3. Algae and Fertilizers

927C0145A Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 91 pp 45-48

[Article by L.M. Chunina, N.F. Zakharova, L.A. Ganushkina and V.Ya. Yakubovich, Institute of Medical Parasitology and Tropical Medicine imeni Ye.I. Martsinovskiy, USSR Ministry of Health, Moscow]

UDC 576.895.771:576.893.192.6[:591.67.04:574.632/.64

[Abstract] An analysis was conducted on the impact of various bioactive factors in waters in which mosquitoes are reared on their subsequent susceptibility to malaria parasites. Specifically, larvae of Aedes aegypti were exposed to the algae Anacystis nidulans, Plectonoma boryanu, Synochocystis sp., Chlorella vulgaris culture, chlorella acetone extract, chlorella powder, and 0.1-1.0 g/L ammonium chloride. Subsequent testing of the imagos showed that, to all intents and purposes, their susceptibility to Plasmodium gallinaceum was not affected. In fact, under certain conditions larval exposure to ammonium chloride and Synochocystis sp. enhanced imago susceptibility. These findings were interpreted to demonstrate that the imago-parasite adaptation in this case is of such an advanced nature as to withstand environmental factors that may affect larval development. Practical malaria control will need to rely on effective larvicides, such as phytobacteriomycin. Tables 2; references 15: 10 Russian, 5 Western.

Resistance to Tobacco Mosaic Virus (TMV) of Transgenic Tobacco Plants Producing Interferon-A (INF-A)

927C0141G Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 3, Mar 91 pp 732-734

[Article by S.P. Smirnov, L.V. Krasheninnikova and V.A. Pukhalskiy, Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow]

UDC 575.11

[Abstract] Controversial reports that treatment of tobacco leaves with human INF may render the plants insusceptible to TMV led to assessment of resistance to TMV in transgenic tobacco plants expressing human INF-α. Construction of transgenic Nicotiana tabacum plants, strain Samson and Ternovskiy hybrid, has been described in a previous report [Smirnov et al., Genetika, 26:2111, 1990]. Infection of the recombinant plants expressing the human INF-α gene showed that in all case localized necrotic lesions were formed in response to TMV infection, precluding systemic spread of the virus as seen in control plants. Formation of localized nectrotic lesions is also a feature of tobacco plants bearing the N gene which encodes INF-like products and is responsible for TMV resistance. Further studies are underway to determine the exact mechanism of action of INF-α and its plant congeners in TMV immunity. Figures 1; references 14: 2 Russian, 12 Western.

Therapeutic Efficacy of 2 Normal IgG Intraveneous Products in Pseudomonas Aeruginosa Infections

927C0134C Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 91 pp 54-56

[Article by Ch.L. Vasilev, K.V. Veleva, R.Kh. Tekeliyeva and P.I. Pencheva, Scientific Institute for Infectious and Parasitic Diseases, Bulgarian Medical Academy, Sofia, Bulgaria]

UDC 616.98:579.841.11]-085.373.3-039.71

[Abstract] Immunovenin (60 percent intact IgG molecules, 40 percent fragments) and Immunovenin-Intact (96 percent intact IgG molecules), Bulgarian preparations of normal human IgGs for intravenous use, were assessed for antibody levels against Pseudomonas aeruginosa lipopolysaccharide (LPS) and passive immunotherapy of mice. Enzyme immunoassays showed that the titers against 7 serotypes of Ps. aeruginosa ranged from 1:7016 to 1:24283, with a mean titer of 1:14548 to 1:15605. Trials on 18-20 g ICR mice involved intraperitoenal administration of Immunovenin or Immunovenin-Intact, followed in 2 h by a 5 LD_{50} dose of Ps. aeruginosa. The results showed that doses of 0.01-0.02 ml generally ensured a 10 day 50 percent survival rate, depending on antibody titers. Accordingly, these observations indicate that normal IgG preparations contain sufficient levels of anti-LPS antibodies to be clinically useful against Ps. aeruginosa infections in combination with conventional antibiotic therapy. Tables 2; references 21: 2 Bulgarian, 4 Russian, 15 Western.

$CD4^+$ Cells (T-Inducers/Helpers) in Chernobyl Clean-Up Crews: Counts and Ultrastructure

927C0141Q Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 5, Jun 91 pp 1258-1261

[Article by S.V. Komissarenko, K.P. Zak, B.M. Khomenko, N.P. Karlova, D.I. Lukinov, T.A. Semionova and S.I. Chernyak, Institute of Biochemistry imeni A.V. Palladin, Ukrainian SSR Academy of Sciences, Kiev]

UDC 611.42+612.11:612.014.482:612.017.11

[Abstract] The status of $CD4^+$ lymphocytes was assessed in 20-39 year old male volunteers (Group I) serving on clean-up crews at Chernobyl. Control data were derived from the same group of men 1-2 days before assignment to Chernobyl and data on record for a group of primary male donors in Kiev before April, 1986. The whole body accumulated dose over a 25-30 day work period did not exceed 25 rem. The results showed that cell counts and percentage of $CD4^+$ lymphocytes were not significantly depressed vis-a-vis control values when studied 1 month or 1 year later. However, ultrastructual examinations revealed that at 1 month two $CD4^+$ subpopulations were affected. The group of small $CD4^+$ cells (40-50 percent) with a high nucleus/cytoplasm ratio and cytoplasmic clusters of electron-dense granules was most seriously affected. The changes involved cluster disaggregation, appearance of tubulo-reticular structures, membrane irregularities and degradation, cytoplasmic vacuolization, etc. The tubulo-reticular structures have previously been reported in several immunodeficiency states, including AIDS. The moderate-to-large $CD4^+$ lymphocyte subpopulation (15 percent) with a low nucleus/cytoplasmic ratio presented with 'hand-mirror' cell morphology, extensive vacuolization, eccentric and irregular euchromatic nuclei, occasionally tubulo-reticular formations and parallel tubular structures in association with electron-dense granules, among other changes. These ultrastructual changes were in evidence one year later. Figures 1; references 7: 2 Russian, 5 Western.

Diagnosis of Myocardial Infarction by Monoclonal Antibody-Based Enzyme Immunoassay for Mitochondrial Creatine Phosphate

927C0160A Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 4, Apr 91 pp 30-32

[Article by T.S. Balmukhanov and S.G. Shuratova, Kazakh Scientific Research Institute of Cardiology, Alma-Ata]

UDC 577.15:616-074

[Abstract] Cursory information is presented on the design of an immunoperoxidase-based enzyme immunoassay for mitochondrial creatine phosphokinase (MCPK) intended for diagnosis of myocardial infarction (MI). The assay utilizes anti-MCPK monoclonal antibodies prepared in the conventional manner. The sensitivity of the assay was ca. 1 ng/ml; testing of 63 patient serum samples and 10 control sera showed elevated MCPK levels in the former. MCPK began to rise on the day of the MI, reached maximum activity on the 2nd day, and declined to essentially baseline levels on the 3rd day. A direct correlation was evident between the severity of the MI and rise in MCPK activity. Consequently, enzyme immunoassay of MTCPK is a valuable adjunct in the diagnosis of MI, particularly in cases in which diagnosis by other criteria is dubious. References 3: 2 Russian, 1 Western.

Immunomodulation by Ultrasound and Sinusoidal Currents

927C0151A Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 1, Jan-Feb 91 pp 17-20

[Article by I.A. Novikova and Ye.A. Ulanova, Vitebsk Medical Institute]

UDC 615.837.3+615.844].015.4:612.017.1],036

[Abstract] In vitro and in vivo studies were conducted on immunomodulation by ultrasound (US; Ultrazvuk-T5 device; 880 kHz, 0.05-0.6 W/cm^2; 15 min expo.) or sinusoidal currents (SC; Amplipuls-4 device; 100 Hz; 10 min expo.), using leukocytes of 30 healthy control subjects, 30 patients with rheumatoid arthritis, and nine patients with chronic B lymphocytic leukemia. Impact on the cells and their classification was assessed in terms of rosette formation with appropriate xenogeneic erythrocytes. In vitro studies showed that the effects of US were variable, reflecting individual variablity and dose-effect parameters. The overall impression was that T-suppressor cells and B-cells were not affected in vitro, while T-active/T-total cell ratio was raised. In most cases US had an inhibitory effect on B-cells derived from patients with lymphocytic leukemia. Irradiation of affected joints by SC in patients with rheumatoid arthritis resulted in a 40-70 percent reduction in total peripheral T-cells, leaving the B-cells unaffected. Accordingly, the study indicated that US and SC, under appropriate conditions, have a direct impact on immunocompetent cells when measured by rosette formation. Figures 1; tables 1; references 8: 7 Russian, 1 Western.

Correction of Immunodeficiency by Low-Frequency Ultrasound

927C0151B Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 1, Jan-Feb 91 pp 44-46

[Article by Ye.N. Sologub, L.P. Sizyakina and Ye.P. Moskalenko, Rostov Medical Institute]

UDC 615.837.3.03:[616-092:612.017.1]-008.64

[Abstract] Studies on 12-14 g male CBA mice with secondary immunodeficiency demonstrated that ultrasonication (URSK-7N-18 appratus; 29 kHz; 0.3 μm wave amplitude shift; 60 sec expo.) of the splenic region exerts an immunostimulatory effect over a 28 day period of observation. A single treatment leads to recovery of baseline levels of T-cells, as did two treatments six days apart. However, histologic assessment of lymphoid tissues (spleen, lymph nodes, thymus) demonstrated persistent cellular depletion. Three ultrasonications led to recovery and overshoot of relative and absolute T-cell levels as well as normalization of lymphoid tissue histology, changes that were evident within five days. B-cell status remained refractory to ultrasonication. In addition, secondary immunodeficiency could not be induced in mice following ultrasonication which, in conjunction with other reports, provided further confirmation that ultrasound effects on the immune system are mediated by T-cells. Figures 3; references 5 (Russian).

Correction of Antioxidant Insufficiency by He-Ne Laser in Hypodynamic Rabbits

927C0151C Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY, No 1, Jan-Feb 91 pp 46-48

[Article by V.I. Ruzov, R.Ch. Chernyauskene, S.A. Vilyunas, R.R. Machyulaytis and G.A. Bagdonas, Kaunas Medical Academy; Scientific Research Institute of Cardiovascular Physiology and Pathology imeni Z. Yanushkevichyus]

UDC 615.849.19.03:612.766.1

[Abstract] Confirmatory studies were conducted on 3 kg chinchilla rabbits to test the efficacy of He-Ne lasers (LG-208 apparatus; 632.8 nm wavelength; 2 mW power output; 4 min expo.) in reversing hypodynamia-related activation of lipid peroxidation and depression of antioxidant systems. The results showed that intravenous irraiadation of the blood with laser pulses was the modality most effective in overcoming the adverse effects of 30 day immobilization in a maintenance cage. External irradiation in the hypophyseal projection and intraveneous blood irradiation with a continuous laser emission mode were not as effective. Tables 1; references 25: 21 Russian, 4 Western.

Prospects of Bioregulatory Therapy

927C0154A Moscow KLINICHESKAYA MEDITSINA in Russian Vol 69 No 5, May 91 pp 19-23

[Article by G. M. Yakovlev, V. Kh. Khavinson, V. G. Morozov and V. S. Novikov, Military Medical Academy imeni S. M. Kirov (Chief—Prof G. M. Yakovlev), Leningrad]

UDC 615.35:577.112.5/.6].03

[Text] According to modern ideas, homeostasis is regulated in multicellular systems at different levels, including by neuroendocrine, immunological, cellular and molecular mechanisms [3,5,6,8,11,12,15]. The greatest interest is being shown in the molecular mechanisms of homeostatic regulation, because their revelation will make it possible to study physiological processes more deeply, and to correspondingly develop new approaches to treating diseases in man.

In recent years regulatory peptides contained in different tissues of the body and taking part in intercellular interaction have been attracting increasingly greater attention. The hypothesis has been suggested that these substances carry certain information encoded by means of an amino acid sequence from cell to cell [2]. Regulatory peptides possess a broad spectrum of biological activity, which determines their important significance in coordinating the functions of a multicellular organism.

Besides regulatory peptides, other substances that carry information and apparently act at the intercellular level also exist. These can include growth factors, embryonic inductors, keylons [transliteration] and lymphokines. All of these substances also have the nature of peptides.

The multiplicity of supracellular regulatory mechanisms presupposes the existence of universal mediators, such as cyclic nucleotides, in the transmission of information signals to cells. We know that the cAMP system serves as an intracellular mediator for hormones and a number of

other physiologically active substances interacting with receptors on cell membranes. However, the results of a number of studies are inconsistent with ideas about the role of cyclic nucleotides in transmission of information signals from peptide hormones and growth factors. Thus despite the fact that the role of peptides in integration of the functions of a multicellular organism has not been conclusively established, the available data indicate that some of them participate directly in intercellular information exchange.

We proposed the hypothesis that peptide mediators participate in maintenance of structural and functional homeostasis of cell populations as one of the possible theoretical models supplementing the body's bioregulatory system [16]. Physiologically active substances called cytomedins were initially discovered in brain tissue. Bioregulators which had a pronounced influence on the body's protective functions and on the state of hemopoiesis and the reproductive system in experiments on animals were isolated from the hypothalamic region and epiphysis of the brain by acid extraction followed by gel-chromatography. Factors of similar nature and physicochemical properties were also discovered in other tissues of the organism.

According to research results, cytomedins are peptides with a molecular weight of 1,000-10,000 Da. These substances are able to regulate the functional activity of cell populations serving as the raw material for their acquisition. Cytomedins have now been isolated from tissues of the brain (cortex, corpus callosum, epiphysis, hypothalamus), organs of the immune system (thymus, bone marrow, spleen, lymph nodes and palatine tonsils), the cardiovascular and respiratory systems (heart, blood vessels, lungs and bronchi), the urogenital system (kidneys, prostate, testes and ovaries), and from the retina, the skin, liver and some other tissues of animals and man. According to physicochemical research, cytomedins isolated from organs and tissues differ in the composition of the peptide components, molecular weight and other parameters.

The composition, physicochemical properties and functional activity of cytomedins from lymphoid tissue have been studied the most fully. A great deal of work has been done in experimental research on cytomedins isolated from the thymus, on the basis of which the first Soviet preparation timalin was developed. A highly effective synthetic thymus preparation—timogen—has now been obtained [17]. According to contemporary data polypeptides are the most active of these substances. Considering the important role of these preparations in modern immunology and therapy, we felt it suitable to examine the biological and therapeutic properties of the principal ones—thymosin, thymus humoral factor (THF), thymopoietin, timarin, timalin and timogen. These preparations differ in their physicochemical and some biological properties, and their more or less selective action in relation to different components of the immune system [1,4,9,13,17,25].

Thymosin stimulates antibody formation and promotes differentiation of bone marrow cells into antibody-forming cells. In this connection it is supposed that thymosin activates the helper function of T-lymphocytes in a cooperative immune response to thymus-independent antigens. In experiments, administration of thymosin fraction 3, the least purified, reduces manifestations of the wasting syndrome, increases animal survival, and partially restores the structure of lymphoid tissues, the quantity of circulating lymphocytes and the ability to reject skin grafts. Thymosin fraction 5, which is more highly purified, is capable of intensifying the reaction of thymocytes in mixed culture and activity in the rosette-forming test, and it induces cytotoxicity of lymphocytes and their sensitivity to anti-TL and anti-Thy-1 sera. This drug restores immunological reactions and proliferative processes in lymphoid organs in thymectomized and irradiated mice [23].

The results of clinical research on thymosin against primary immune-deficiency diseases, malignant tumors, autoimmune disorders, acute viral infections, radiation therapy and chemotherapy attested to its regulatory influence upon the T-system of immunity, which manifested itself in most cases as a clinical effect of varying degree of expressiveness [20,21,26].

The action of THF is directed at T-lymphocytes, in which adenylate cyclase activity and the cAMP level increase, causing growth of the ability of the cells to carry out immunological reactions. It was established that THF does not affect mature T-lymphocytes. THF was first used in clinical practice on tumor patients. This factor promotes activation of cellular immunity in children with lymphoproliferative diseases (lymphogranulomatosis, lymphosarcoma, lymphoma) following chemotherapy [24].

Evaluations of the biological activity of *thymopoietins* were initially associated with research on the pathogenesis of myasthenia. It was established that thymopoietins I and II possess the capability for blocking neuromuscular conduction. It was later discovered that regulation of lymphopoiesis is the principal function of thymopoietins. Thymopoietin preparations induce differentiation of T-cells in vitro, increasing expression of Thy-1 and TL antigens on the surface of hemopoietic stem cells, and they intensify the reactivity of lymphocytes to PGA and ConA. Use of thymopoietin TP-5 promotes improvement of the clinical state of patients suffering primary immune deficiency [18], histiocytosis X [22] and herpes infections [23].

Timarin possesses the capability for restoring immunological reactivity and increasing the number of cells in a culture bearing T-lymphocyte receptors [9,13]. The quantity of T-lymphocytes restores to normal in response to timarin in vitro and upon its injection into the organism. In this case the concentration of cAMP in immature cells increases only to the level of differentiated lymphocytes. Mature T-lymphocytes react to timarin by increasing the intracellular concentration of cAMP and proliferative activity. These mechanisms apparently lie at the basis of the immunoregulatory action of thymus factor. It was discovered in a number of studies that administration of timarin normalizes tissue regeneration processes, and regulates the homeostatic system [7]. These data suggest that this thymus preparation has biostimulatory and homeostatic action. Use of timarin also significantly reduces the relative frequency of appearance of neoplasms in experimental animals. The effect of timarin manifests itself most distinctly in suppressing development of spontaneous breast adenocarcinomas: Their frequency decreases by a factor of 2.6. In this case the average and maximum life spans of experimental animals, as well as of mice in which neoplasms had not been revealed, increase significantly. These data permit the supposition that this effect is caused specifically by the preparation's geroprotective action.

The results of our research showed that when they interact with the surface membrane of T-lymphocytes, peptides

contained in timalin activate expression of specific receptors, and thus raise the functional activity of these cells. In the presence of pathological states, timalin promotes restoration of various physiological functions of the body—immunological reactivity, hemopoiesis, hemostasis, neuroendocrine regulation of intracellular biochemical processes, and so on. Timalin is noted to have pronounced hemostatic action in the presence of a low concentration of T-lymphocytes and disturbance of their differentiation. It was discovered with a model of an immune-deficient state elicited by ionizing radiation that administration of timalin to animals initially promotes restoration of the structure and function of the thymus, and then leads to normalization of the corresponding immunological indicators. The clotting properties of blood undergo normalization simultaneously; in a number of cases it has a modulating nature as well. The close interrelationship between the functions of immunity and homeostasis permit the hypothesis that they are responsible for the physiological mechanism of the integral system protecting the organism from endogenous and exogenous disturbance of homeostasis.

Research on endocrine regulation provides the grounds for the conclusion that use of timalin, which has practically no effect on the blood corticotropin concentration, promotes normalization of the cortisol level. Our data and the results of experimental research by other authors [14] permit the suggestion that timalin has a direct inhibitory influence on the glucocorticoid function of the adrenal glands. The increase that occurs in the insulin level in response to timalin provides a possibility for explaining the decrease in the blood glucose concentration of patients following treatment with the thymus preparation.

Use of timalin promotes faster restoration of protective functions in the presence of injuries complicated by infection, it prevents development of infections and tissue destruction, and it has a stimulatory effect on regeneration [17]. Clinical immunological evaluation of the use of timalin in patients with severe mechanical trauma and burns permitted the conclusion that in the first days of the post-traumatic period, administration of the thymus preparation is ineffective and unsuitable. Timalin is indicated on the 5th-10th days after injury, and in the period of septicotoxemia (from the 10th to the 30th days after suffering burns). The patterns revealed in the pharmacodynamic effect of timalin following trauma and burns are interconnected with development of the general adaptation syndrome in the post-traumatic period.

Timalin was noted to be highly effective in cancer patients in combination with radiation therapy. Use of thymus preparations reduces the frequency of postradiation infectious complications, promotes their faster elimination, and prevents suppression of resistance by exposure to ionizing radiation. Consequently use of thymus preparations may be one of the promising directions in preventing immune-deficient states and the complications of radiation therapy [10].

Use of timalin against chronic nonspecific pulmonary diseases promotes normalization of most indicators of cellular immunity and of the organism's nonspecific defense. Their improvement is accompanied as a rule by a decrease or disappearance of inflammatory phenomena in the lungs, coupled with a decrease in treatment time. The clinical immunological effectiveness of timalin in old and senile patients averaged 78 percent.

Use of timalin is observed to have a pronounced clinical effect in patients recovering from a thymectomy: Indicators of cellular immunity and of the organism's nonspecific defenses and the concentration of T-helpers and T-suppressors are restored, and cAMP-dependent processes and the spectrum of lactate dehydrogenase isoenzymes in lymphocytes, as well as many indicators of metabolism, hormonal status and blood clotting normalize, which makes it possible to conclude that cytomedins have a homeostatic action in the body. Clinical immunological remission persists in most patients for 6-8 months. Systematic administration of timalin over an interval of 6-8 months (50-100 mg per treatment course) is required. This will help to maintain the competency and performance of patients recovering from a thymectomy.

Some principles of systemic and intersystemic peptide regulation of cellular homeostasis were studied with the assistance of cytomedins isolated from the thymus and from lymphoid organs. Research on the biological activity of cytomedins of the lymphoid system established that administration of these substances in the presence of various pathological states promotes significant restoration of the functions of the corresponding organs and tissues. Thus, use of preparations obtained from the thymus, spleen and lymph nodes in therapeutic doses in intact animals does not elicit significant changes in blood cell composition and immunological indicators. At the same time the quantity of lymphoid cells in the thymus, spleen and lymph nodes is observed to undergo faster restoration in irradiated animals given cytomedins. It was noted that peptides of the thymus, spleen and lymph nodes exhibit tissue specificity as they act upon certain stages of lymphocyte differentiation.

A decrease in developmental changes in the immune system and in the frequency of development of spontaneous tumors, and an increase in the life span of animals were noted as a result of using thymus preparations in experimental conditions [19]. These important observations lead to conclusions consistent with some principles of the immunological theory of aging of an organism [24]. They may have real practical significance in the development of the "Prolonging Life" specific-purpose integrated program.

The new drug *timogen* is a synthetic peptide from the thymus, glutamyltryptophan ($C_{16}H_{20}N_3O_5$). The immunoactive peptide was isolated by highly effective liquid chromatography out of the natural thymus preparation timalin. Timogen has a stimulatory effect on practically all levels of differentiation of T-lymphocytes (from the stem cell to effectors of cellular immunity), which is expressed in a significant increase in functions of cellular and humoral immunity, and in the organism's nonspecific defense. The preparation intensifies differentiation of lymphoid cells, induces expression of differentiated antigens, normalizes the quantity of T-helpers, T-suppressors and B-cells, and restores the coefficient of differentiation of immunocompetent cells. In its biological activity, timogen surpasses the natural thymus preparation timolin by 10-100 times, and in some cases by 1,000 times.

Timogen is used to treat primary and secondary immune-deficient states in the presence of acute and chronic purulent-inflammatory diseases of the bones and soft tissues, to treat disorders associated with suppression of immunity and hemopoiesis following radiation therapy and chemotherapy, and as a preventive agent in the

presence of acute respiratory viral diseases. According to data obtained at the Military Medical Academy imeni S. M. Kirov, when timogen is included in integrated therapy, the treatment time of patients with acute and chronic purulent-inflammatory diseases decreases by 15-40 percent (in particular, by 25-30 percent in the presence of osteomyelitis, 30-40 percent in the presence of pyoderma, abscesses and phlegmons, by 15-20 percent in the presence of acute inflammatory gynecological diseases), and by 20-50 percent in the presence of acute and chronic viral infections. Treatment time is reduced by 50-60 percent following radiation therapy and chemotherapy of cancer patients, and by 15-20 percent in the postoperative period of surgical patients.

The results of research on the biological activity of peptides isolated from the retina and from epiphysis of the brain are distinguished by considerable novelty. Biological peptides of the retina cause a significant increase in the amplitude of waves of an electroretinogram (administration of peptides obtained from other tissues does not produce such an effect). Epithalamine obtained from the epiphysis has enjoyed clinical use in relation to various diseases involving disturbance of the body's endocrine functions. The preparation raises the sensitivity of the hypothalamus to endogenous regulatory effects, thus promoting restoration of hormonal regulation and growth of the body's resistance to stress factors.

These data indicate a need for further study of the mechanisms of action of cytomedins. According to preliminary data cytomedins are capable of changing the functional activity of the genome at different stages of the cellular cycle. Transmembrane transfer of information molecules into cells at certain stages of development is also hypothesized. Further study of the functional activity and mechanisms of action of cytomedins may apparently be helpful in solving the problem of regulating genetic activity in a multicellular organism.

Determining the role of cytomedins in bioregulation of a multicellular organism is one of the most important problems. It is our impression that any information coming to the organism is controlled by a bioregulatory system that acts to preserve a high degree of stability in gene function. It follows from this that the principal objective of bioregulatory systems is to control genetic homeostasis and the organism's protective functions. In turn, information on changes in the environment induces transformation in the bioregulatory system necessary for preservation of a certain level of cell function. Therefore there are grounds for suggesting that interaction of a genome with information molecules, particularly with cytomedins, is important to cellular homeostasis. Judging from everything, cytomedins perform their functions as mediators in the bioregulatory system, maintaining contact between supercellular mechanisms of neurohumoral regulation and the genome.

Thus cytomedins take part in regulation of cellular homeostasis together with nervous and hormonal effects, as well as other known activators and inhibitors of cell function. These substances can be detected in all cellular structures of the organism. They have polyfunctional action, and they represent an important link in peptide regulation of the organism. Disturbance of peptide regulation, and consequently of the transfer of information molecules between cells, unavoidably leads to pathology accompanied by a decrease in the organism's resistance to injurious factors. Detecting cytomedins in cell populations subjected to involution under stress, exhaustion of the organism and aging has important significance in this connection.

The experience of using cytomedins provides a possibility for developing new drugs and approaches to treating diseases in man. Over 20 new biological preparations have now been created on the basis of cytomedins isolated from cattle organs and tissues under industrial conditions. This opens up possibilities for wide use of peptides in medical practice with the purpose of regulating different functions of the organism in the presence of pathological states. No less important is preventive use of cytomedins as a way to raise the resistance of the body to unfavorable environmental factors, and as a means of phenotypic correction of a genetic predisposition for disease. Drugs of the cytomedin group may be used as agents of biological protection and rehabilitation after ecological and industrial disasters.

A promising direction—bioregulatory therapy—was theoretically substantiated for the first time and is now being practically pursued as a result of work at the Military Medical Academy imeni S. M. Kirov on the problem of isolating and experimentally and clinically studying the new class of polypeptides. Such therapy promotes an increase in the effectiveness of existing methods of treating and preventing various diseases in man.

Bibliography

1. Arion, V. Ya., in "Mediatory immunnoy sistemy" [Mediators of the Immune System], Moscow, 1981, pp 10-50.

2. Ashmarin, I. P., VOPR. MED. KHIMII, No 3, 1984, pp 2-7.

3. Bekhtereva, N. P., "Zdorovyy i bolnoy mozg cheloveka" [The Healthy and Sick Human Brain], Second Edition, Leningrad, 1988.

4. Gembitskiy, Ye. V., KLIN. MED., No 8, 1982, pp 3-8.

5. Gorizontov, P. D., in "Gomeostaz" [Homeostasis], Second Edition, Moscow, 1981, pp 538-573.

6. Komarov, F. I., Korovkin, B. F. and Menshikov, V. V., "Biokhimicheskiye issledovaniya v klinike" [Biochemical Research in the Clinic], Second Edition, Leningrad, 1981.

7. Kuznik, B. I., Vasilyev, N. V. and Tsybikov, N. N., "Immunogenez, gemostaz i nespetsificheskaya rezistentnost organizma" [Immunogenesis, Hemostasis and Nonspecific Resistance of the Organism], Moscow, 1989.

8. Medelyanovskiy, N. N., USPEKHI FIZIOL. NAUK, Vol 13, No 3, 1982, pp 96-126.

9. Morozov, V. G. and Khavinson, V. Kh., DOKL. AN SSSR, Vol 240, No 4, 1978, pp 1004-1007.

10. Napalkov, N. P., Yakovlev, G. M., Anisimov, V. N. et al., VOPR. ONKOL., No 5, 1988, pp 515-521.

11. Petrov, R. V., "Immunologiya" [Immunology], Moscow, 1982.

12. Ugolev, A. M., "Evolyutsiya pishchevareniya i printsipy evolyutsii funktsii: Elementy sovremennogo funktsionalizma" [Evolution of Digestion and the Principles of Functional Evolution: Elements of Modern Functionalism], Leningrad, 1985.

13. Khavinson, V. Kh. and Morozov, V. G., IMMUNOLOGIYA, No 5, 1981, pp 238-31.

14. Khmelnitskiy, O. K., Belyanin, V. L., Grintsevich, I. I. et al., ARKH. PAT., No 3, 1983, pp 18-23.

15. Shidlovskiy, V. A., in "Sovremennyye kontseptsii gomeostaza" [Modern Conceptions of Homeostasis], Moscow, 1982, pp 3-18.

16. Yakovlev, G. M., Morozov, V. G. and Khavinson, V. Kh., VOYEN.-MED. ZHURN., No 6, 1987, pp 37-40.

17. Yakovlev, G. M., Novikov, V. S. and Khavinson, V. Kh., "Rezistentnost, stress, regulyatsiya" [Resistance, Stress, Regulation], Leningrad, 1990.

18. Aluti, F., Fiorilli, M., Quinti, J. et al., LANCET, Vol 1, No 8324, 1983, pp 551-554.

19. Anisimov, V. N., Morosov, V. G. and Khavinson, V. Kh., MECH. AGING. DEVELOP., Vol 19, 1982, pp 245-258.

20. Arenhart-Treichel, J., SCI. NEWS, Vol 117, No 4, 1980, pp 61-62.

21. Bach, J. F., NOUV. PRESSE MED., Vol 8, No 35, 1979, pp 2797-2799.

22. Davies, E. C., Levinsky, R. J., Butler, M. et al., NEW ENGL. J. MED., Vol 309, No 8, 1983, pp 493-494.

23. Djawari, D., Bolla, K. and Haneke, E., DTSCH. MED. WSCHR., Vol 209, No 13, 1984, pp 496-498.

24. Kay, M. B. and Malindan, T., "CRC Handbook of Immunology in Aging," Florida, 1986.

25. Minich, E. and Fefer, A., "Nat. Cancer Inst. Monogr.," Vol 63, 1983, pp 1-252.

26. Pahwa, R., Ikehara, S., Pahwa, S. G. and Good, R.A., THYMUS, Vol 1, No 1-2, 1979, pp 27-58.

Biology of Cholera Vibrios From El-Tor Biovar 01 Serogroup

927C0040A Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 2, Feb 91 pp 16-18

[Article by Sh. I. Ziyayev, S. T. Vallamatov, Ye. Yu. Kocherovskaya, and A. P. Ilyina, Epidemiology, Microbiology, and Infectious Diseases Scientific Research Institute, Uzbek SSR Ministry of Health]

UDC 616.932-038.2

[Abstract] The biological properties of 97 museum strains of El-Tor biovar, 01 serogroup vibrios were investigated from an ecological standpoint with the objective of identifying the virulence of these vibrios in order to develop preventive and anti-epidemic measures. The results demonstrated that of the 197 cultures investigated, 78.5 percent were Ogav serovar, while the remainder were shown to belong to the Inab serovar. Over 85 percent of the strains were typical in colony morphology, and 89.7 percent of the strains agglutinated with "0" cholera serum to a dilution of 1:1600. In addition, investigation of the biological filtrates of the 97 strains in question showed that 93.8 percent were atoxigenic. In conclusion, the results of numerous tests suggest that circulation of the El-Tor biovar cholera vibrios with altered morphological properties in reservoirs may be due to the effect of various chemicals, especially pesticides and fertilizers, that are widely used in agriculture. Bacteriologists involved with the laboratory diagnosis of cholera need to keep in mind that they may encounter atypical variants varying in their differential-diagnostic and other morphological traits. References 6 (Russian).

Carbon Metabolism by Silicate Bacteria

927C0141J Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 6, Apr 91 (manuscript received 09 Sep 88) pp 1491-1493

[Article by M.G. Voronkov, academician, L.K. Yakhontova, Ye.P. Kalyazin, P.I. Andreyev, G.G. Sidyakina, M.N. Semenenko, V.S. Sykhantseva and A.V. Rudnev, Moscow State University; Irkutsk Institute of Organic Chemistry, Siberian Branch, USSR Academy of Sciences; Institute of Mineral Resources, Simferopol]

UDC 577.462

[Abstract] Carbon metabolism was studied in the silicate bacterium Bacillus mucilaginosum cultivated for 10 days at 28°C on organic medium A-27 and mineral medium A-54 both supplemented with ^{14}C-calcium carbonate mixed with fine quartz powder. The resultant findings demonstrated that silicate bacteria can assimilate carbon from the inorganic substrate. However, efficiency of assimilation of carbonate carbon was dependent on the conditions of cultivation and was twice as great on the mineral medium. Accordingly, silicate bacteria can be classified as facultative autotrophs-heterotrophs. Tables 1; references 4 (Russian).

Hydrochlorides of 4,4'-Dibromobenzyl Acid β- and γ-Aminoalkyl Esters and Their Biological Properties

927C0130A Moscow
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 25 No 4, Apr 91 pp 28-31

[Article by O.L. Mndzhoyan, A.A. Gamburyan, L.S. Papoyan, Dzh.A. Gerasimyan, R.M. Srapionyan, L.A. Grigoryan, A.A. Bagdasaryan, D.A. Melkonyan, L.K. Durgaryan, and A.V. Akopyan; Institute of Fine Organic Chemistry imeni A.L. Mndzhoyan, Armenian SSR Academy of Sciences, Yerevan]

UDC 615.213+615.217.24+615.22/547.292.26/.012.1

[Abstract] Pharmacological studies have shown that benzilic acid β-diethylaminoethyl ester (Amizil) exhibits cholinolytic and gangliolytic properties. With the goal of studying changes in Amizil's cholinolytic activity upon inserting two bromine atoms into its acid portion in the 4,4' phenyl group positions and upon changing the amino alkanol chain, 4,4'-dibromobenzyl acid β- and γ-aminoalkyl ester hydrochlorides (IIIa-k) were synthesized. These new compounds were synthesized by reacting 4,4'dibromobenzilic acid with β- or γ-dialkylaminoalkyl chlorides in isopropyl alcohol and converting the esters to their corresponding hydrochlorides. The obtained compounds were tested for cholinolytic, anticonvulsive, anesthetic, and pesticide activity, and their effects on the central nervous system were checked. All the compounds exhibited choline-blocking activity, but their myotropic effects were more pronounced, consistently exceeding those of papaverine. Nine of the compounds inhibited phosphodiesterase activity but to a somewhat lesser degree than papaverine. All the compounds were significantly less toxic than papaverine. The pesticide activity of compounds IIIa-k in controlling "varatosis" of bees was sharply reduced as compared to 4,4'-dibromobenzilic acid isopropyl ester (Neoron). References 14: 9 Russian, 5 Western.

Synthesis and Anticcholinesterase Properties of Phosphorus-Containing Formhydroxamic Acid Halogen Anhydrides

927C0130B Moscow
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 25 No 4, Apr 91 pp 31-33

[Article by V.A. Pavlov, N.V. Aristova, V.V. Moskva, G.F. Makhayeva, V.L. Yankovskaya, and V.V. Malygin; Kazan Chemical-Technological Institute imeni S.M. Kirov; Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka, Moskovskaya Oblast]

UDC 615.217.32:547.298.71].012.1

[Abstract] Hydroxamic acids and their derivatives exhibit a wide spectrum of biological activity. In order to study further the anticholinesterase properties of new formhydroxamic acid halogen anhydrides containing a dialkoxy phosphoryl group, the authors refined their previously developed method for synthesizing (dialkoxy phosphoryl) formhydroxamic acid halogen anhydrides (II). Study of the interaction of bromo- and chloroanhydride derivatives with human erythrocyte acetylcholinesterase (ACE) and horse serum butyrylcholinesterase (BCE) indicated that these compounds irreversibly inhibit both enzymes—the degree of inhibition increased proportionally with the incubation time of the enzyme with the inhibitor. The inhibition constants were on the order of 10^5 for ACE and 10^7 for BCE. These derivatives had a fairly high acute toxicity that correlated with their high anticholinesterase activity. The authors hypothesized that the high anticholinesterase activity of the studied (diisopropoxy phosphoryl)formhydroxamic acid halogen anhydrides was due to the formation of active phosphorylnitrile oxides in aqueous solution since these anhydrides are not, in terms of structure, anticholinesterase agents. References 8: 5 Russian, 3 Western.

Synthesis and Anticholinesterase Activity of *O*-Carbamoylated Alkylchloroform Oximes

927C0130C Moscow
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 25 No 4, Apr 91 pp 33-34

[Article by V.B. Sokolov, Yu.Ya. Ivanov, T.A. Yepishina, and I.V. Martynov; Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka]

UDC 615.355:577.152.311].012.1.07

[Abstract] The class of *O*-substituted alkylchloroform oximes can be considered as new, effective pesticide preparations. In this work, the synthesis and biological activity of eight *O*-carbamoylated alkylchloroform oximes with the general formula $RR^1NC(O)ON=C(Cl)R^2$ were discussed. Biological activity was evaluated according to the compounds' effects on acetylcholinesterase (ACE), butyrylcholinesterase (BCE), and neuro-muscular conductivity and according to acute toxicity in mice. The compounds were found to inhibit both ACE and BCE according to a bimolecular rate constant, k_{II}, that was calculated by a pseudomonomolecular reaction formula. The k_{II} values ranged from 1.1×10^2 to 5.4×10^6 $M^{-1} \times min^{-1}$ for the eight oximes. Acute toxicity in mice ranged from LD_{50} = 32 (25-44) to 565 (500-638) mg/kg when the compounds were given orally. References 7: 5 Russian, 2 Western.

Synthesis and Antiviral Activity of 2-(α-Nitro-β-Aminovinyl)-Hydroquinone and *p*-Benzoquinone Derivatives

927C0130D Moscow
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 25 No 4, Apr 91 pp 35-37

[Article by V.M. Lyubchanskaya, L.M. Alekseyeva, I.S. Nikolayeva, M.G. Ilyina, A.N. Fomina, and V.G. Granik; Central Chemical Synthesis Laboratory, All-Union Scientific Research Chemical-Pharmaceutical Institute imeni Sergo Ordzhonikidze (TsKhLS—VNIKhFI), Moscow]

UDC 615.281.8:[547.565.2+547.567.3

[Abstract] The goals of this work were to synthesize hydroquinone and benzoquinone derivatives containing a β-nitroenamine group as a substitutent and to study their antiviral activity. Eight aminovinyl hydroquinone derivatives (IIa-h) were produced by reacting 3-nitro-5-hydroxy- and 3-nitro-5-hydroxy-6,7-dichlorobenzofuran with primary aliphatic amines. These compounds were then oxidized to their corresponding aminovinyl-*p*-benzoquinones (IIIa-h) with potassium ferrocyanide. Of the 16 compounds, five inhibited Venezuelan equine encephalomyelitis virus (strain 230) reproduction in cell culture at concentrations of 1.25-20 μg/ml and reduced the virus'

infectious titre at concentrations of 2.5-10 g/ml. Dichloroquinone IIId was the most active, supporting previous observations that halogenated quinones have superior antiviral activity. Figures 3; references 7: 4 Russian, 3 Western.

Aminoalkyl Sulfonic Acid Derivatives: Synthesis and Antiviral Activity

927C0130E Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 25 No 4, Apr 91 pp 43-45

[Article by Yu.V. Badeyev, V.D. Korobkova, V.B. Ivanova, O.K. Pozdeyev, G.Kh. Gilmanova, E.S. Batyyeva, and S.V. Andreyev; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan]

UDC 615.281:547.426.5].012.1.07

[Abstract] In this work, the antiviral activity of aminosulfonic acid derivatives was studied *in vitro*—by ability to inhibit reproduction of the influenza A/Leningrad 34/72 (H3N2) virus in surviving fragments of the chicken embryo chorion-allantois envelope—and *in vivo*—by ability to prevent animal deaths in experimental influenza infection conditions. The effect of aminosulfonic acid derivatives on the immune response was studied in conditions of infectious immunopathology. The α-aminoalkyl sulfonic acid derivatives were synthesized by reacting α-aminosulfinic acids with carbonyl compounds; the aminosulfinic acids were produced from sulfurous acid dimethyl ester and secondary amines. The derivatives exhibited high antiviral activity and low toxicity *in vitro* and *in vivo*. Studies showed that the derivatives could inhibit influenza virus reproduction in tissue culture, i.e., they had a direct effect on the virus, they prevented animal deaths in experimental influenza infection conditions, and they intensified the immune response to an injection of thymus-dependent antigen (sheep erythrocytes) in conditions of infectious immunopathology. References 5: 4 Russian, 1 Western.

New Class of Platinum (2+) Antitumor Complexes

927C0130G Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 25 No 4, Apr 91 pp 48-50

[Article by K. I. Yakovlev, A. I. Stetsenko, G. M. Alekseyeva, A. F. Imsyrova, A. L. Konovalova, N. S. Kamaletdinov, and T. Yu. Glazkova; Leningrad Chemical-Pharmaceutical Institute and VONTs [not further identified], USSR Academy of Medical Sciences]

UDC 615.217.34:[615.322:582.572.2].07

[Abstract] In this work, cationic triamine platinum (2+) complexes of the class *cis*-[Pt(NH_3)$_2$LCl]Cl, where L—cytosine, cytidine, isocytosine (2-amino-4-hydroxypyrimidine), 6-fluoroisocytosine (2-amino-4-hydroxy-6-fluoropyrimidine), coffeine (2,6-dioxo-1,3,7-trimethylpurine), and theobromine (2,6-dioxo-1,7-dimethylpurine), were synthesized and tested as potential antitumor agents. The structure of the complexes and the nature of ligand donor atoms were determined by far infrared, ultraviolet, and ^{13}C and ^{1}H NMR spectroscopies. The coffeine and theobromine complexes were fairly active against P-388 leucosis, and cytosine, cytidine, and isocytosine complexes were active against solid tumors and other leucoses. The cytosine complex was the most promising antitumor agent—it was highly active against all seven tumor strains used in the tests, including cervical cancer, Ca-755 adenocarcinoma, and MORS-406 plasmocytoma. The five active complexes were highly soluble in water (>10 percent) and less toxic than *cis*-dichlorodiammine platinum (2+) (DDP), properties that will facilitate their administration and reduce therapeutic doses in tumor treatment. References 6: 2 Russian, 4 Western.

M_2-Cholinolytic Activity of C-nor, *D*-Homosteroid Alkaloids From Plants of the *Petilium* and *Korolkowia* Genera

927C0130H Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 25 No 4, Apr 91 pp 50-53

[Article by Yu.R. Mirzayev, I.T. Plotnikova, R.Shakirov, K. Samikov, and V.V. Kulkova; Institute of Plant Substance Chemistry, Uzbek SSR Academy of Sciences, Tashkent]

UDC 615.217.34:[615.322:582.572.2].07

[Abstract] In this work, convenient methods were developed for studying and evaluating M-cholinolytic properties of C-nor, *D*-homosteroid alkaloids (similar to imperialine) from *Petilium* and *Korolkowia* genus plants. Experiments were conducted in comparison to imperialine and atropine. All the studied compounds were antagonistic to the spasmodic effects of carbacholine on the heart, intestines, and salivary glands, organs where M_2-, M_3-, and M_4-cholinoreceptors are believed to be prevalent. The compounds had a pronounced M-lytic activity on the heart, a lesser effect on the intestines, and the least effect on the salivary glands (activity ratio = 100:10:1), with *Petilium* group alkaloids being significantly more active than *Korolkowia* alkaloids. All the compounds were less active on the heart than atropine, and all but two, acetylimperialine and imperialone, were less active than imperialine. The authors classified the compounds as cardioselective M_2-cholinolytics and found a definite correlation between alkaloid structure and degree of M_2-cholinolytic activity. *Petilium* alkaloids with carbonyl groups at the C(3) and C(6) positions in the presence of tertiary nitrogen (no N=O bonds) were the most active of the new compounds. The difference in *Petilium* vs. *Korolkowia* alkaloid activity was primarily due to a *cis* vs. *trans* joining of the D and E rings. Figures 1; references 13: 9 Russian, 4 Western.

Monoclonal Antibodies Against Insulin That Affect Its Biological Activity

927C0148 Moscow PROBLEMY ENDOKRINOLOGII in Russian Vol 37 No 2, Mar-Apr 91 (manuscript received 27 Apr 90) pp 59-62

[Article by T. G. Mikheyeva, A. S. Novokhatskiy, G. N. Khlyabich, G. V. Kalinin, Ye. P. Ivasko, Ye. Ye. Batrak, and Ye. V. Kochetova; Laboratory of Hormonal Preparation Pharmacology (director—Professor A. S. Novokhatskiy) and Laboratory of Immunobiotechnology (director—Professor G. N. Khlyabich), All-Union Scientific Research Institute for the Technology of Blood Substitutes and Hormonal Preparations, USSR Ministry of the Medical and Microbiological Industry, Moscow]

UDC 615.373.3:[615.357:577.175.722].012.07

[Abstract] In this work, results from experiments on the synthesis, characteristics, and biological activity of monoclonal antibodies (MCA) against human, porcine, and

cattle insulin were presented in order to fill a gap in knowledge about the effect of MCA on the biological activity of insulin *in vivo*. As a result of two independent somatic hybridizations, 335 hybridomas that produced MCA against insulin were synthesized. Twelve hybridomas were cloned by the method of maximum dilutions, and the specific immunoglobulins secreted by them were characterized by solid phase enzyme immunoassay. These 12 MCA types differed in activity toward human, porcine, and cattle insulin, which indicated their specificity to different epitopes on the insulin molecule. Monoclonal antibodies against IN-2 and IN-3 clones reduced the hypoglycemic activity of insulin in *in vivo* experiments, which was manifested as a three-fold lower reduction in blood sugar in rabbits and a longer survival of mice after injecting them with insulin preparations processed with MCA as opposed to injecting them with insulin alone. Figures 1; references 25: 5 Russian, 20 Western.

Effect of High Altitude on Hemostatic Indices in Animals

927C0053A Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 2, Mar-Apr 91 pp 21-23

[Article by A. K. Kadyraliyev, T. Ts. Gurovich, and L. L. Ilyina, Chair of Pathological Physiology, Kirghiz State Medical Institute]

[Abstract] Experiments were performed on rats, rabbits, dogs, and guinea pigs in Frunze and during a 30-day sojourn at Tuya-Ashu Pass (3,200 m above sea level). The authors noted that changes were made in the body to adapt to the high altitude, including hypocoagulation, diminished blood viscosity, and increased fibrinolysis, which improve the blood and oxygen supply to the tissues. At the same time, the danger of hemorrhage was prevented by faster blood coagulation and increased density of the clot, which are balanced by the increase in the level of components of the fibrinolytic system. The results demonstrated that after a 30-day sojourn at high altitude, the animals presented with a decrease in the level of thrombocytes and heparin tolerance and an increase in the general coagulating ability and fibrinolytic activity. The fibrin degradation products found in the blood suggest the development of hyper-hypocoagulation syndrome at an altitude of 3,200 m. Accordingly, these data demonstrate that the hemostasis system condition is very important among animals at high altitudes and must be studied to understand whether high altitude induced changes exert a positive or negative effect on the body when the body is affected by a given pathological process.

Facilitation of Electric Coupling in Snail Respiratory Neurons by Combined Action of Serotonin and Enkephalin

927C0141E Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 3, Mar 91 (manuscript received 15 Nov 90) pp 754-759

[Article by T.L. Dyakonova, Institute of Developmental Biology imeni N.K. Koltsov, USSR Academy of Sciences, Moscow]

UDC 612.822:612.616-003.725

[Abstract] Generation of synchronous membrane potentials by a group of respiratory neurons in the snail nerve center has been shown to control rhythmic opening and closing of the breathing hole. However, synchronous activity has not been demonstrated in isolated preparations, leading to the present demonstration that such activity was restored in vitro by combined application of serotonin and an enkephalin. Neural centers derived from Helix pomatia and H. lucorum snails were pretreated with pronase prior to electrophysiological studies involving application of serotonin and either leu- or met-enkephalin in concentrations of 10E-5 to 5 x 10E-5 M. Application of the serotonin + enhephalin combination restored slow synchronous oscillation in the membrane potential, bursts of activity in the individual silent neurons, and electical coupling among these neurons. No single neuron could be identified as serving a generator function, and preliminary data indicate that electrical facilitation was due to depression of contact resistance. Figures 4; references 12: 3 Russian, 9 Western.

Heat Shock Proteins and Stabilization of Myocardial Nuclear DNA in Immobiliation to Stress and Altitude Hypoxia

927C0141L Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 6, Apr 91 (manuscript received 18 Dec 90) pp 1503-1506

[Article by F.Z. Meyerson, I.Yu. Malyshev and A.V. Zamotrinskiy, Scientific Research Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow]

UDC 616.127-005.8-02:[612.237.2+613.863]

[Abstract] Short-term stress has been demonstrated to enhance resistance of the isolated heart to various adverse factors. In order to analyze these changes in molecular terms, stability of nuclear DNA and heat shock protein (hsp) levels were determined in the hearts of 200-250 g male Wistar rats stressed either by immobilization or pressure chamber hypoxia [Meerson et al., J. Mol. Cell. Cardiol., 21: 299, 1989]. Application of the ssDNA test revealed that in immobilized rats only 8 percent of the nuclear DNA was degraded, while in the hypoxic group degradation reached 43 percent. Concomitant electrophoretic determinations of hsp showed that in the former group high levels of hsp70 (71-72 kD) were induced, while the nucleoplasm of the hypoxic group failed to show hsp accumulation. Consequently, absence of nuclear damage in the immobilized animals was attributed to hsp binding and inactivation of nuclear proteases—induced by ssDNA—which degrade histone H_1 and facilitate nuclease-mediated DNA degradation. Accordingly, two different protective mechanisms are involved. In hypoxic stress enhanced cardiac tolerance of adverse factors relies primarily on improved coronary blood flow and abatement of ischemia, whereas in immobilization the dominant mechanism involves hsp induction. Figures 2; references 15: 6 Russian, 9 Western.

Unilateral Effects of Intracerebral Microinjections of Thymosin on Instrumental Behavior of Monkeys

927C0141S Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 5, Jun 91 (manuscript received 07 May 91) pp 749-751

[Article by S.V. Afanasyev, B.F. Tolkunov and V.A. Fedan, Institute of Evolutionary Physiology and Biochemistry imeni I.M. Sechenov, USSR Academy of Sciences, Leningrad]

UDC 612.821.6:615.78

[Abstract] The detection of thymosin fractions in the hypothalamus, limbic system and neostriatum suggests a neurotropic function for this immune factor. Accordingly, neostriatal microinjection studies were performed on two 4-6 year old pig-tailed macaques (Macaca nemestrina; 15-20 kg) to assess the effects on conditioned food procuring. Injection of 100 vg of thymosin into the right or left neostriatum diminished the time for feed box opening after the conditioned stimulus by 25-30 percent ($p < 0.01$) when the right extremity was used, while a dose of 300-400 vg increased the latent time by 24-40 percent ($p < 0.05$). Left extremity usage displayed similar but insignifcant (7-9 percent) trends. In all cases thymosin effects became apparent after 15-20 min and persisted for 3-5 h. Injection of 300 vg of thymosin into the posterior thalamic nucleus

affected only the time interval between opening and closing of the feed box, increasing it by 70-80 percent ($p > 0.001$) in the case of the contralateral extremity. These observation indicate that structures other than the hypothalamo-hypophyseal axis are affected by thymosin and expand our understanding of the physiological spectrum of action of thymic hormones. Figures 1; references 8: 6 Russian, 2 Western.

Structure of Two Myelopeptides Affecting Pain Threshold

927C0141T Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 319 No 3, Jul 91 (manuscript received 22 Apr 91) pp 755-757

[Article by L.A. Fonina, S.A. Guryanov, I.V. Nazimov, O.G. Yanovskiy, L.A. Zakharova, A.A. Mikhaylova and R.V. Petrov, academician, Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow]

UDC 576.8.097

[Abstract] A mixture of two hexapeptides identified in porcine bone marrow was tested for their impact on pain threshold in (CBA x C57Bl)F_1 mice, using the hot plate technique. Intraperitoneal administration of 100 pM of the peptides showed that latent time for an escape response in low-threshold mice was increased from 19.1 to 23.1 sec ($p < 0.1$), and in high-threshold mice reduced from 29.2 to 19.6 sec ($p < 0.05$). Nociception was not affected in mice with intermediate threshold (22.0 sec) following peptide injection (22.6 sec; $p > 0.05$). Retesting of the latter animals in 2 h showed a hypalgic effect in the control (30.1 sec) but not the in peptide-treated cohort (22.0 sec). The mechanisms of action underlying the effects of mixture of these peptides—Leu-Val-Val-Tyr-Pro-Trp (I) and Phe-Leu-Gly-Phe-Pro-Thr (II)—will have to await their isolation. However, peptide I corresponds to the N-terminus of the α-chain and peptide II to the N-terminus of the β-chain of porcine hemoglobin. Consequently, the physiological role of these peptides may be important in cases of pathologic red cell destruction or natural degradation such as occurs in the reticuloendothelial system. Figures 1; tables 1; references 14: 9 Russian, 5 Western.

Use of Traditional Vietnamese Medicine Methods in Belorussia

927C0006C Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 4, Apr 91 (manuscript received 14 Sep 90) pp 43-44

[Article by Zyong Trong Khiyeu and G. Ye. Lemesheva, Traditional Medicine Institute, Hanoi, Ninth Clinical Hospital, Minsk, Scientific Production Agrocommercial Cooperative Firm "Novoye Pole"]

UDC 614.2(476):61(597)

[Abstract] In April 1990 a group of Vietnamese specialists from the Institute of Traditional Medicine began working in Belorussia in their first experience of cooperation with foreign physicians on a contractual basis. These specialists trained in Hanoi for 6 years, learning both traditional Vietnamese and conventional European methods of disease prevention, diagnosis, and treatment. The advantages of traditional Eastern medicine include painless treatment and lack of side effects. In addition, Vietnamese medicine is often effective where conventional European treatment has failed. Vietnamese medical treatment includes classical acupuncture, electroacupuncture, auricular reflex therapy, cauterization, point massage, manual therapy, point massage with pharmaceuticals, and phytotherapy. These specialists treated 141 patients aged 2-76 years in rural clinics. Treatment courses were 10 days long. The results demonstrated that 81 percent of those treated noted significant improvement or complete relief from symptoms. Accordingly, these findings suggest that traditional Vietnamese treatment methods can be very successful in the management of chronic diseases. Tables 1; references 1 (Russian).

Basic Directions in Activities of the Republic's Ministry of Health Under the Conditions of a Transition to a Market Economy

927C0022A Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 91 pp 1-7

[Article by A. A. Amanbayev, Kazakh SSR Ministry of Health]

UDC 614.2(574)(354.53)

[Text] The state of affairs in the republic's public health remains complex. It is determined in many ways by the socioeconomic environment, the sanitary and hygienic conditions of the life and work of the people, and the principle of this sector's "residual" financing. The recently published program of the Kazakh SSR government for transition to a market economy foresees the following: "...In the sphere of public health, market relations should be of limited nature, and the state will assume the main part of the burden of supporting development of public health." The program emphasizes that the government will pursue a firm course of withdrawal from the infamous "residual" principle. This diametrically new approach to solving the problems of the republic's public health contains significantly greater possibilities for the sector's further development. At the same time we need to determine right now the paths of the most sensible use of allocated assets, and of acquisition of additional allotments for public health.

A number of measures have already been drawn up in this plan. There are many large medical units and polyclinics in the republic that directly service industrial, transportation, construction and other enterprises. Transfer of such institutions to the balance and under the maintenance of the enterprises has now begun. Rural outpatient clinics, rural section hospitals and paramedic-obstetric stations should also be transferred to the balance and under the maintenance of the large kolkhozes and sovkhozes. This will free certain assets for public health. At the same time the enterprises and kolkhozes have better possibilities for improving the material and equipment base of the therapeutic and preventive institutions transferred to them.

It is also time to implement measures for the sensible use of the bed pool. The mean annual bed occupancy rate is decreasing everywhere. In 1987 it was 319 days, in 1988 it was 313, and in 1989 it was 300. At the same time certain groups of patients are not being provided sufficient hospital care. Obviously many things remain unclear in matters of epidemiology and in the distribution and the real structure of morbidity in oblast medical institutions. This is associated with the quality of therapeutic and diagnostic work, with the quality of analysis and recording of illnesses, and ultimately with the qualifications of medical personnel. Thus in order to identify the uses of the bed pool precisely, we need to reach a qualitatively new level in the work of all units. In addition we need to reorient the bed pool on the new forms of organization of therapeutic and preventive care—ones such as hospitals for convalescence and rehabilitation of patients, and nursing homes.

Today, 600 day hospitals are functioning in the republic, and around 100 are providing home care. Such forms of health care organization have justified themselves, and they need to be developed. We also need night hospitals. It would be suitable to create collective and brigade forms of services and family outpatient clinics, and we must organize leasing relations. Few contracts have been signed thus far with industrial enterprises and other organizations on providing supplemental health care to workers and their families. As of today, such contracts have been signed for a total of only around 3.5 million rubles. However, this is extremely little for the scale of our republic.

Organization of medical cooperatives should also receive further development. There are presently 114 of them in the republic, but the activities of these associations do not embrace many forms of health care. The volume of services rendered by cooperative workers in 1989 was R3.5 million (7.5 percent of the total volume of paid services rendered to the public). And all cost-accounting departments and polyclinics provide paid services for a total of R50 million. It should be noted that the directors of oblast health departments are not prepared today for the transition to a market economy. In the meantime the recently published draft "Basic Principles of USSR and Union Republic Legislation on Public Health Financing" compel us to plan the basic stages of the sector's transition to market relations right now. Such a transition must be based on the principle of universal accessibility of therapeutic and preventive care. This draft foresees that budget allocations and the assets of enterprises allotted to finance the health insurance of their workers must become the sources of public health financing. They make up 50-55 percent of the total insurance fund. For working citizens, the assets of the enterprises, institutions and organizations in which they work are the source of health care financing. These assets make up 45-50 percent of the fund. Insurance deductions for mandatory health insurance of workers are established in accordance with the law "On Taxes of

Enterprises, Associations and Organizations" (Article 3, Paragraph 1). In the case of enterprises operating at a loss, payments for health insurance will be made out of the assets of the ministries, departments and other higher organizations to which they are subordinated, or out of the assets of the local soviets. Mandatory health insurance for nonworking citizens residing in a city rayon is to be provided through contracts between the executive committee of the rayon or city soviet of people's deputies and an insurance institution; insurance premiums are to be paid to this institution subsequently. As far as working citizens are concerned, they will be insured by means of a contract signed with an insurance institution by enterprises, institutions and organizations in regard to health insurance for their workers (the insurance premiums will be transferred to them). This principle will be observed irrespective of the presence of a departmental therapeutic and preventive base in the enterprise, institution or organization. A self-employed citizen will independently sign contracts for mandatory insurance with an institution of this profile, and the insurance premiums will be transferred to it. Health insurance mandatorily foresees the same premium for all citizens (based on the standards for health care outlays per resident). Every insured citizen will receive a document listing the forms of health care and medical services in correspondence with quality standards.

Health care funds created in administrative regions, oblasts and union republics and mandatory health insurance funds will become the basis for the entire financing system in the country. Such funds will acquire independence. They will not be subordinated to any other organization. They will have at their disposal their own fund-forming sources, and they will follow their own financing rules. Health insurance funds will be formed and used by self-managing, specialized insurance institutions. A general assembly of representatives from administrative and public health organs and from enterprises, organizations, medical institutions and local soviets will become the supreme organ of such institutions. Note that health insurance is called upon to protect the interests of the users of the insurance. When a public health institution violates treatment quality standards, it must pay compensation to the insured person or his family in accordance with the law.

The new principles of management in a market economy will require sensible use of all available assets. The outpatient-polyclinic level will become the foundation of medical and public health care.

Territorial therapeutic and pediatric sections have been consistently undergoing size reduction in recent years. As a result the section therapeutic physician now services not 2,280 persons, as in 1980, but 1,800, while the section pediatrician services 796 children.

Section, rayon and city hospitals, inpatient rehabilitation centers, hospitals for chronic patients, nursing homes and boarding hotels must be included in the system of primary medical and public health care. Prevention must become the main direction in their activity.

Personnel training should be treated as a key problem in the republic. Unfortunately, it is not being solved as it should. Today, medical specialists are being trained in six VUZes and 34 secondary special schools. Each year 4,100 persons are admitted to the first-year program in VUZes, and 12,000 are admitted to secondary schools. Annual graduation totals over 3,000 specialists with a higher education and around 11,000 with a secondary one. And although our country has no equals in the world in regard to the availability of medical workers, the quality of specialist training leaves something to be desired.

In 1991 the budget of medical institutions will be established with the help of assets contributed by state orders and assets obtained from local soviets, industrial enterprises and kolkhozes (from specialist training). We should make an effort in this case to ensure that the requirements on the quality of the training of future doctors are at the highest level. With this purpose we need to develop and introduce a system of monitoring and evaluating the quality of medical instruction in every VUZ, faculty and department. We need to analyze the paths by which VUZes will make their transition to independence. This is a very important step, and it is probably the only possibility for qualitatively improving the material and equipment base of the VUZes, and for raising their scientific potential. We must be prepared that under the conditions of a market economy, competitive relations between institutes will put them in their respective places without any certification.

Scientific research institute collectives also await a serious trial— ensuring financial stability and profitability. The level of most scientific research is presently low. Science has not had a positive influence on the state of maternal and infant mortality, infectious morbidity and occupational pathology for many years. The reason: The mechanism taking the form of a scientific approach to solving the main problems is not working.

It is being said that our public health system has lost its preventive orientation. But this is not at all so. To be more accurate, we have not been able to reach a new level of preventive objectives. We are forced to follow the principle of reacting to new problems and solving them, while the strategy that should attain priority would be to foresee the new problems, to anticipate them. Unfortunately science is not working in this key. This is associated in many ways with the level of personnel training. The government of the republic has supported and continues to support development of science, making it its goal to create the necessary theoretical, scientific, technical and personnel potential. However, the state cannot endlessly compensate for the bankruptcy of science. The time has come to make the activities of scientific research institutions profitable (something that has been a characteristic of foreign institutions for a long time). As far as our scientific research institutes and medical VUZes are concerned, directions of scientific research such as clinical genetics, endocrinology, virology, allergology, occupational pathology and others have not yet been developed. Problems concerning the epidemiology of many noninfectious diseases remain unstudied. Special attention must be devoted to fundamental research.

Improvement of science and practice requires sufficient material, equipment and medicinal support. And yet, our demand for medical equipment is 52 percent satisfied. With the exception of two or three items, for practical purposes all equipment, furniture and motor transportation must be imported from the union republics. The per-bed availability of medical equipment is R1,000 at the moment, while the demand is twice greater. In 1989 the republic's industrial enterprises manufactured equipment worth R2,250,000, and in 1990 they manufactured R10 million worth. But even this is only a fifteenth of our

demand. The task for today is to begin producing complex medical equipment at Kazakhstan's enterprises. A number of oblasts are purchasing apparatus with hard currency, but far from all are capable of doing so. If we are to provide the sector with medical equipment, we must seek new approaches. Principal among them is that of creating our own medical industry. The republic's scientific, technical, raw material and industrial potential makes this a fully realistic and fulfillable goal.

A similar situation exists with medicinal support. The demand of Kazakhstan's citizens for drugs is 72 percent satisfied today. The drug shortage may grow worse in the next few years. This means that this problem also needs to be solved by developing our own pharmaceutical production. Considering the technological difficulties of creating chemical preparations, and their side effects, it would make better sense today to organize operations producing drugs of animal and plant origin. Such enterprises can be created on the basis of close contacts with other departments, with scientists of the republic's Academy of Sciences, and with representatives from other republics and countries. Efforts to cultivate medicinal plants were initiated in 1990 in a number of oblasts. There are plans for increasing production of such raw materials to 500 tons dry weight in the next few years; nor is this anywhere near the limit. To add to this, the raw material must be ecologically clean.

Under the conditions of a market economy the financial status of the pharmaceutical system must be reliable, and this can be achieved only if state orders for medicines continue to be placed, if the pharmaceutical service is provided hard currency and loans on priority, and if tax benefits are introduced. In addition to this, we need to reform retail prices on medicines by establishing firm surcharges to wholesale prices. We also need to develop new methods of planning the sales volume of medical resources and articles.

The training of specialists in clinical pharmacology, and primarily of ones with a secondary pharmaceutical education, requires special attention. For this, we need to establish advanced training courses in medical schools and in the Farmatsiya Association, and to organize traveling pharmaceutist advanced training courses. It would be suitable to open pharmacies in oblast centers to serve as training bases.

The solution of these and other problems associated with improving the public health system is ultimately directed at positively influencing the health of the people. In the meantime the incidence of tuberculosis and intestinal infections remains high in the republic, and the level of maternal and infant mortality is considerable. Nor are many other problems being solved effectively. For example child morbidity and mortality are the product of poor prevention of infectious diseases, and the quality of medical care leaves something to be desired. However, the system of measures for timely diagnosis and treatment of infectious and inflammatory diseases in women and in adolescent girls has not been fully developed. Prevention of miscarriages is being managed poorly. According to the results for 1989, maternal mortality was 74.6 (282 women), as compared to 60.4 (237) in 1988. In the first 10 months of the past year we lost 222 women. Hemorrhaging remains foremost among the main causes of mortality (36.4 percent). This is evidence of a very low level of the obstetric service.

The republic's public health system lacks a scientifically, methodologically and organizationally developed system of prevention and reduction of infant and maternal mortality. Contacts betwem workers at the practical level and specialists of scientific research institutions are weak. Even in the oblasts that possess medical institutes, there is absolutely no evidence of their influence on reducing morbidity in the population. Oblast health department directors and practical public health workers exhibit no eagerness in hosting specialists conducting research and studying the demographic situation locally. Scientists offer few specific recommendations. Their proposals are unacceptable under local conditions. In turn, directors of oblast health departments make an insufficient effort to analyze the situation in their oblasts and rayons in detail at therapeutic-preventive institutions, and they do not pose specific problems to specialists.

Serious shortcomings in planned preventive care persist, owing to which the epidemiological situation in the oblasts remains unsatisfactory in relation to certain nosological units. For example brucellosis morbidity was 10.7 per 100,000 residents in 1989, as compared to a union indicator of 1.8. In the first half of last year, 796 cases of illness were recorded, which is 1.5 percent more than in the corresponding period of 1989. Alma-Ata, Dzhambul, Chimkent, Semipalatinsk, Kokchetav and Tselinograd oblasts remain the most unfavorable in this regard. Given this state of affairs, not more than 85 percent of all residents with disease risk factors are subjected to clinical examination. Seventy-six percent are tested by serological methods. Given such examination and prevention indicators, it would hardly be possible to rectify the situation in the immediate future. Raw material processing enterprises and farms are not complying with brucellosis control measures. The level of affliction of farm animals by brucellosis reaches 1.3-1.4 percent. Still, the oblasts are raising no alarms concerning the fact that the State Agroindustrial Committee is failing to fulfill the Council of Ministers decree "On Further Improvement of Measures to Control Brucellosis and Tuberculosis Morbidity Among Agricultural Animals."

The situation is just as complex in regard to tuberculosis. Guryev Oblast, where morbidity is 1.5-2 times higher than in the republic on the average, is especially unfavorable. The situation remains alarming in Kzyl-Orda and Ural oblasts. Poor personal conditions, climate and unbalanced nutrition have great significance to the persistence of such high tuberculosis mobility in the indicated regions. At the same time we are also forced to talk about incomplete and untimely implementation of preventive and epidemic control measures. For example because of a low volume of specific examinations (68.5 percent), incomplete records on tuberculosis and violation of immunization schedules, over a quarter of a million persons have not undergone the tuberculin test.

It is from these positions that we must consider the high incidence of intestinal infections, especially in Kzyl-Orda, Chimkent, Guryev and North Kazakhstan oblasts. Failure of preventive vaccination measures and weak organization of surveillance over immunization progress are creating an unstable situation in regard to the incidence of diphtheria, whooping cough, poliomyelitis and measles. The hepatitis situation in the republic remains as serious as before. Thus, its incidence in Uralsk Oblast is twice higher than the republic average, and it is 1.8 times higher in Kzyl-Orda, 1.7 times higher in Chimkent and 1.5 times higher in

Aktyubinsk Oblast. In this case the increase in the number of cases of serum hepatitis infections is a direct indication of the grossest violations of disinfection and sterilization rules. Such violations must become an object of the most serious discussion.

The epidemic process in natural plague foci has become active in a number of the republic's rayons in recent times. The cases of illness that have occurred exposed serious shortcomings of organizational and purely clinical nature. All of this raises the issue of intensifying surveillance over the epidemiological situation in such rayons, and of adopting immediate preventive measures oriented on early diagnosis, treatment and prompt isolation of patients and of persons who come in contact with them. Intensive release of cholera vibrio into the environment was noted in a number of the country's regions in 1990, including in our republic. In this connection we need to sharply stiffen requirements on epidemiological surveillance, turning priority attention to training and retraining medical workers in regard to the problems of especially dangerous infections. Discussing infectious morbidity, first of all we need to carefully study the epidemiological situation in the Lake Aral region. Many problems of infectious pathology in this region have not yet been identified, and consequently no preparations have been made to solve them.

The transition to working under the conditions of a market economy raises the question as to what forms of administration and what structure of public health organs would correspond to the greatest degree to the new economic conditions. This questions was discussed at a conference of oblast public health department directors on New Year's Eve. Various points of view were stated. For example A. K. Kulmakhanov, director of the Chimkent Oblast Health Department, proposed reorganizing oblast health departments into oblast territorial medical associations. This proposal was supported in principle by Ye. K. Argymbayev, director of the Alma-Ata Oblast Health Department. A. K. Akhmetov, director of the Ural Oblast Health Department, feels it suitable to create economically independent oblast and rayon territorial medical associations. Taldy-Kurgan Oblast Health Department Director U. N. Nurgazinov proposed reorganizing the oblast hospital into an oblast diagnostic center, and rural section hospitals into rural outpatient clinics, but to retain the specialized therapeutic and preventive institutions. The conference participants exchanged opinions and adopted a number of practical measures for the sector's transition to a market economy. Various factors need to be considered in the search for new, progressive forms of health care organization—the oblast's socioeconomic potential, the demographic situation, climate, and other conditions. As was emphasized in a decision of the USSR Supreme Soviet Public Health Committee, the program for reinforcing the health of the people must be based on a deep analysis of today's realities. Defining the main goals, the state program for preventing disease and forming a healthy way of life of the USSR population in the period to the year 2000 states the priority tasks:

- implementing a broad spectrum of socioeconomic measures to preserve and improve health by introducing healthful living habits to the USSR population;
- reducing the negative (natural and anthropogenic) effects upon the population's health;
- radically improving the system for medical prevention of diseases and their complications, and for rehabilitation of persons in poor health.

It is my hope that health workers of the Kazakh SSR will make a worthy contribution to practical implementation of the state program for preventing disease and forming a healthy way of life. After all, even if just one of the main goals of the program—increasing the life span of Soviet people of working age by 2 years—were fulfilled by only half, the economic impact from implementing the program would be more than R500 million, which is equivalent to approximately the annual national income of our country. Such a high goal is worth the great effort.

Stage-by-Stage Introduction of New Wage Terms

927C0022B Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 91 pp 19-21

[Article by S. N. Arystanova and N. D. Pogorelova, Kazakh SSR Ministry of Health]

UDC 614.25.331.2

[Text] Public health is one of the largest sectors of the social sphere. In our republic around 500,000 persons work in it, including 58,600 physicians and 173,000 secondary medical personnel.

Stage-by-stage introduction of new wage terms foreseen by CPSU Central Committee, USSR Council of Ministers and AUCCTU Decree No 1240 dated 16 October 1986, "On Increasing the Wages of Public Health and Social Welfare Workers," was completed on 1 September 1990. As a result of this decree's implementation, the average wages of medical workers increased in 1990 in comparison with 1986 by 23-52 rubles, or by 13-29 percent.

In addition to a raise in salaries, the new wage terms foresee wide application of allowances and extra payments that intensify the stimulatory role of wages. They include allowances for the time of continuous work in certain institutions, subunits and positions, in an amount of 10-40 percent. In public health, they have been introduced for physicians of section hospitals and outpatient clinics in rural areas, section therapists and pediatricians of territorial city polyclinic sections, directors of shop section departments, mobile first aid and urgent care station and department brigades, public health aviation stations and planning and emergency consultative assistance departments.

Introduction of the above allowances somewhat reduced the acuity of the problem of retaining personnel in the most difficult work areas: Allowances for the difficulty and stressfulness of work, for performing especially important work and for employing the accomplishments of science and technology and progressive procedures and methods in labor are foreseen in an amount of up to 50 percent of the salary for physicians, pharmaceutists and other medical and pharmaceutical workers, specialists, and blue and white collar workers. Wage fund savings and additional allocations in an amount of up to 1 percent of the planned wage fund, approved by cost estimate, are used to pay these allowances.

Much attention is also being attached to development of the brigade form of labor organization and wages. As of

this moment 3,814 brigades have been organized in the republic's public health institutions.

According to the USSR State Committee for Labor and Wages and AUCCTU Decree No 229/9-44 dated 11 June 1990, the amount of extra earnings paid to one worker of a brigade out of collective earnings with regard for the evaluation of his personal contribution is not limited by minimum or maximum amounts, while the amount of extra earnings received by an executive may not exceed, together with bonuses, 12 months' pay, calculated on an annual basis.

For house calls during off-duty hours, in the evening and at night, physicians and secondary medical personnel of public health institutions are awarded extra pay (irrespective of the type of institutions and their locations) in an amount of 50 percent of the salary for the actual time of duty. Such duty is performed within the limits of the monthly working time norm.

Extra pay for night-time work is paid within the limits of the monthly work time norm in an amount of 35 percent of the salary for every hour of night-time work, and in accordance with a list approved in the institution—in an amount of 50 percent of the hourly wage rate.

The scale of combining occupations (positions) and of imposing additional duties changed both within the institution as a whole and with respect to individual categories of workers with introduction of the new wage terms. In particular, extra pay for combined occupations (positions), for expansion of service zones or enlargement of the volume of work done, including in positions and occupations pertaining to different categories of workers, is established without restrictions by a list of combinable occupations (positions) and without restrictions on the amount of such extra pay. The extra pay of specialists, including medical and pharmaceutical workers and blue collar workers, for fulfilling responsibilities of a temporary absent worker in addition to their principal work cannot exceed the wages (wage rate) of the principal and additional position of the absent worker. The existing procedure of paying wages to physicians, secondary and junior medical personnel, pharmaceutists and laborers for substituting for temporarily absent workers (beyond normal work time) are retained in this case. Extra pay in an amount of 30 percent of the salary is established for split shift work. The list is approved in the institution.

Executives have the right to establish monthly salaries in an amount of up to 250 rubles in place of wage rates for highly skilled workers employed in especially important and critical work.

With introduction of the new wage terms, the system for increasing the salaries of persons employed in dangerous and especially difficult conditions was changed: Rather than using a percentage of wages, the increase is established at absolute amounts of from R11 to R40 per month irrespective of the wage level determined by time in service, but with regard for the category of the personnel, the position and the degree of danger and difficulty of the work.

The fact is that increases in wages for work in especially difficult conditions have a dual function—compensatory and stimulatory. If the increase were to perform only a compensatory function, then it would be justified to fix its amount in absolute terms, identical for workers of different qualifications, since the risk to health and the difficulty of the work would be the same for them. However, inasmuch as the extra pay also serves to stimulate labor (to attract and secure personnel in the corresponding jobs), we must also reckon with the different "sensitivity thresholds" to the amount of the extra pay among workers receiving different wages.

Institutions, subdivisions and positions are divided into two groups in relation to the amounts of the raises:

the first group—R35, R25 and R20 (higher for physicians, lower for secondary and junior medical personnel);

the second group—R22, R15 and R11;

the third group (here the wages are increased in relation to two or more schedules)—R40, R30 and R20. For example the extra pay received by a physician-roentgenologist at a tuberculosis or infection hospital will be R40 per month, in a hospital of general profile it would be R22, and for an X-ray technician it would be R30 and R15 correspondingly.

The bonus system is presently in the initial stage of its development. The entire savings of the wage fund and an additional wage fund (up to 2 percent of the planned fund, approved by cost estimate) may be used to pay bonuses. Workers are paid bonuses (of up to four-tenths of wages calculated on a monthly basis) on the basis of quarterly and monthly work results; in this case an evaluation is made of the quality of the therapeutic process (accuracy of clinical diagnosis, the time and completeness of examination and treatment, cases of infections contracted within the hospital, the state and quality of services to patients and care for them, presence of justified complaints).

At the same time, wide use of allowances and extra pay does not promote intensive development of public health in all places and at all times, as we would wish, and consequently it has only an indirect influence on the effectiveness of the work of medical workers and on the pace of the sector's transition to a qualitatively new step in its development. Unfortunately, the new wage terms have not yet become a lever by which to increase the interest of medical workers in constantly introducing the accomplishments of scientific and technical progress and upgrading the quality of medical services. Today, wages in many of the republic's public health institutions are still independent of work results. This is why we need to continue to devote the greatest attention to improving the wage mechanism, making wages dependent on the concrete contribution of each specialist to the end results of the work.

Improvement of the Public Health System Under the Conditions of the New Economic Mechanism

927C0022C Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 91 pp 21-23

[Article by A. K. Kulmakhanov, Chimkent Oblast Health Administration]

UDC 614.2(574.54)

[Text] Our oblast is one of the regions characterized by a high birth rate and a high level of natural population increase. Of the 1,870,000 persons inhabiting the oblast, over 70 percent reside in rural areas. And this, as we know, creates certain difficulties in organizing effective therapeutic and preventive care to the residents of remote

settlements, all the more so if we consider that for many years our oblast has had some of the lowest indicators in the republic in regard to availability of medical personnel, the material and equipment base of public health institutions and the rate of fixed capital (53 rubles) and budget allocations (R60) per resident.

All of these circumstances compel us to constantly seek new, more progressive forms of organizing health care for the population, and to make an effort to upgrade the qualifications of medical workers with the assistance of highly professional specialists of Alma-Ata, Tashkent, Moscow, Kharkov and Omsk. As a result of such efforts, resuscitation departments intended primarily for intensive therapy and resuscitation care for children and women have been opened in practically all central rayon hospitals over the last 2 years. We have begun organizing such departments at obstetric and children's hospitals. All of this naturally reflected upon the qualitative indicators of the health of the people, and primarily of infants. In 1989, infant mortality was reduced by 17 percent, and in the first 10 months of last year it was reduced by 8.7 percent in comparison with the same preceding period, while maternal mortality decreased by 28.4 percent.

Still, we feel that we should not stop here. The residual principle, upon which state public health is based today, cannot produce greater results. This is why the oblast administration is purposefully preparing executives of the oblast's therapeutic institutions for work under the conditions of the new economic mechanism, for which an oblast headquarters has been established. On its initiative, the chief physicians of all rayon, city and oblast institutions underwent courses of training organized by the department of social hygiene and public health organization of the Alma-Ata Institute for the Advanced Training of Physicians. Moreover we invited this department's associates to our administration, and conducted a two-week seminar for all economists and chief accountants of the institutions.

As a result of the administration's reorganization, 300 physicians and over 1,000 secondary and junior medical personnel are working in accordance with the brigade contract principle in the oblast's therapeutic institutions. In just 10 months of 1990, R600,000 were received for providing supplemental health care on the basis of contracts signed with enterprises, organizations, kolkhozes and sovkhozes; paid services totaling over R3,700,000 were rendered to the population, 13 medical cooperatives and one cost-accounting polyclinic are functioning, 72 day hospitals with a capacity of 762 beds were deployed, and over 18,120 patients were treated.

Efforts to introduce the "Family Doctor" system are continuing. Eight family doctors and four nurses have been trained, three "family outpatient clinics" are functioning in Chimkent, and the first four departments of the oblast diagnostic center have become operational. A diagnostic van was equipped for Polyclinic No 2 of the medical unit of the Fosfor Production Association, and mobile X-ray and fluorographic facilities have become widespread.

Stage-by-stage introduction of cost accounting permitted us to abolish the Chimkent City Health Department as an intermediate administrative unit in late 1989, and to create a city regional medical association under the medical unit of the Fosfor Production Association. The period that has gone by since the time of the reorganization opened up the prospects for employing new management principles and economic methods of managing the sector, and it allowed city therapeutic and preventive institutions to gain greater independence in sensible organization of their labor.

In response to our proposal and with the consent of the republic's Ministry of Health, in that same year an oblast administration was organized out of the oblast health department; it was reinforced somewhat in quantitative respects by reducing the staff of the city health department.

Today, under the conditions of the society's increasingly greater democracy, in a time when local public health institutions have acquired greater independence in approving their staffs and in spending budget allocations irrespective of expense items, the administrative staff of the oblast administration is clearly acquiring the characteristics of an intermediate, residual unit of the obsolete command administrative system. Moreover the staff of the oblast public health administration (24 persons) is still weak in terms of available resources. A paradoxical situation has arisen where the administrative functions exist but the executors—physical persons—are absent. As a result the administration's staff busies itself primarily with collecting operational information and adopting simple decisions. Surveillance over fulfillment of these decisions also remains low and ineffective.

In turn, the existing status of the oblast hospital compels it to deal primarily with the current affairs of its own therapeutic institution, while support to the rayons is practically formal in nature, and ineffective. Possessing huge material and manpower resources, the oblast hospital is currently working as an ordinary multiprofile therapeutic institution, and it has been unable to become either the organizational or the methodological center for development of oblast public health.

In this connection, under the conditions of the public health system's transition to the new forms of work associated with introduction of a modern economic mechanism, at the threshold of introduction of health insurance, and in the search for sensible approaches to managing the public service, we came to the conclusion that we need to organize an administrative agency that is more closely in tune with practical public health. In our opinion an oblast territorial medical association can become such an agency. The new structural unit would absorb the staff of the present oblast public health system and the administration of the oblast hospital. Inasmuch as all of the principal forces (including the institution of chief specialists, rayon curators and the department of organizational and methodological planning) are in the oblast hospital, it will become possible in the new association to solve all current problems of both methodological and consultative assistance and coordination of the activities of oblast therapeutic and preventive institutions without introducing additional administrative units and creating redundancy in the work.

Thus with the abolition of the oblast public health system and unification of its staff with that of the oblast hospital, all of its functional responsibilities foreseen by the statute "On the Oblast Public Health Department" are transferred in their entirety to the oblast territorial medical association. This agency will be headed by a general director together with the appropriate deputies, one of whom would be the chief physician of the oblast hospital.

The chief of the oblast public health administration presently has four deputies, and the chief physician of the oblast hospital has eight, while after unification only six of them will remain.

We realize that the version we suggest for the transition to the new form of public health administration at the oblast level is not undebatable. Therefore we would wish that our decisions would not be rejected off-handedly simply because they do not fit within the standard framework, and instead that they would be attentively examined by higher agencies, so that our associates in other regions of the republic would be able to state their opinions on this matter, and offer useful advice. But one way or another, now that we are at the threshold of a market economy, we must make some realistic steps right now to keep our public health from being crushed in the vise of inflation.

State of Public Health in Mayskiy Rayon, Pavlodar Oblast

927C0022D Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 91 pp 26-27

[Article by Ye. A. Beysembayev, M. I. Valivach, N. Ye. Molchanov and O. P. Ogorodnikova, Pavlodar Physician Advanced Training Faculty of the Semipalatinsk Medical Institute, Pavlodar Clinical Immunological Center, and Pavlodar Oblast Hospital]

UDC 612.017.1.014.482

[Text] The unfavorable tuberculosis situation among residents of Mayskiy Rayon, the high frequency of anemia among children, and the rayon's proximity to a nuclear test range permit the supposition that immunological disorders are highly widespread among persons residing in this region.

A traveling consultative polyclinic staffed by specialists of different profiles was organized with the purpose of examining the population of Mayskiy Rayon. We analyzed data from comprehensive examinations that made use of ultrasonic, instrumental, endoscopic and laboratory methods. Moreover the immune status of 69 children from 1 to 7 years old and of 70 adults from 20 to 50 years old was examined without any preliminary selection.

A verographin-polyglucin density gradient (density 1.077) was used to isolate mononuclear cells from peripheral blood. The cells were washed and resuspended in medium 199, after which the rosette-forming reaction was carried out with ram erythrocytes. The percentage of rosette-forming cells was determined beneath a microscope in a compressed drop. The concentration of G, A and M immunoglobulins was estimated by radial immunodiffusion, while the IgE concentration was investigated immunoenzymatically. Circulating immune complexes were determined by polyethylene glycol procedure. Activity of the complement system was investigated in a micromodification on the basis of 100 percent hemolysis. The average titers of the activity of the complement system in healthy people fit within 1:4-1:16 by this procedure, without any noticeable age-related features. The blast transformation reaction of lymphocytes was conducted using PHA, in accordance with instructions coming with the preparation.

The research revealed an extremely unfavorable situation in the rayon. An average of up to six nosological forms of chronic illness were discovered per resident. Anemia is suffered by 61 +/- 5 percent of children from 1 to 7 years old. Also of interest is the elevated concentration of leukocytes in the examined group—9,070 +/- 760 cells per cubic millimeter, while among Pavlodar's residents the leukocyte count was within 6,470 +/- 180 cells per cubic millimeter. In this case leukocytosis above 8,000 cells per cubic millimeter was noted among 46 +/- 3 percent of the subjects, to include 9 +/- 3 percent with a leftward bacillonuclear shift. Substitution of the customary leukopenia by leukocytosis in the absence of significant changes in the infectious morbidity of the region allows us to interpret the data as a "recoil-ricochet" phenomenon associated with regenerative hypercompensation of hemopoiesis as a result of the cessation of underground nuclear tests in the Semipalatinsk test range.

Eosinophilia without a significant increase in the IgE level was revealed in 22 +/- 4 percent of the examined children, which permits the supposition that parasitic invasions are widespread. However, the causes of the elevated eosinophil concentration in blood may be different as well. For example a combination of neutrophilesis with eosinophilia may be induced by high production of leukoprotein B_4, which is highly reactive in relation to neutrophils and eosinophils, and capable of inducing suppressors [1].

A significant frequency of elevation of erythrocyte sedimentation rates to over 20 mm/hr among examined children (18 +/- 4 percent) requires revelation of latent inflammatory processes, and it may possibly be a reaction to an increase in the concentration of circulating immune complexes.

Circulating immune complexes were detected in 10 percent of examined children and in 6 percent of adults. High IgG concentrations were recorded in 13 percent of the children (above 10 gm/liter) and in 4 percent of adults (above 16 gm/liter). In children, the IgG concentration was within 7.3 +/- 0.37 gm/liter, that of IgA was within 0.42 +/- 0.04 gm/liter, and that of IgM was within 0.72 +/- 0.05 gm/liter. The concentrations in adults were within 9.07 +/- 2.57 gm/liter for IgG, 0.99 +/- 0.08 gm/liter for IgA and 0.82 +/- 0.06 gm/liter for IgM. The concentration of immunoglobulins of all three classes was 3.0 gm/liter or less in three children out of the 69 examined (4 +/- 2 percent) and in one adult out of 70 examined (1 +/- 1 percent). These data suggest a high frequency of panhypoimmunoglobulinemia among children and adults residing in Mayskiy Rayon. An IgG concentration below 5 gm/liter was found in 21 children (30 +/- 6 percent) and in 10 adults (14 +/- 4 percent), which is a predisposition to higher infectious morbidity and immune complex pathology. The IgA concentration was below 0.3 gm/liter in 32 children (46 +/- 6 percent) and below 0.5 gm/liter in three adults (4 +/- 2 percent), which may promote a higher frequency of affliction of mucous membranes in residents of Mayskiy Rayon. The IgM concentration was below 0.3 gm/liter in nine children (9 +/- 3 percent) and in three adults (4 +/- 2 percent). Our data indicate a high frequency of humoral immune deficiencies among residents of Mayskiy Rayon, a large part of it being of a naturally acquired nature.

Complement activity of blood serum was sharply reduced in 22 percent of the examined children and 13 percent of examined adults, which may aggravate existing humoral immunological insufficiency and promote development of immune complex pathology.

The average concentration of rosette-forming cells was significantly reduced in children (32 +/- 1.4 percent) and in adults (36 +/- 1.4 percent) in comparison with control indicators (43 +/- 0.4 percent). In addition to quantitative changes in the indicators of cellular immunity, the functional activity of lymphocytes was also reduced according to the lymphocyte blast transformation reaction using PHA. The lymphocyte transformation indicators for residents of Mayskiy Rayon were significantly lower (38 +/- 2.2 percent, as opposed to 48.5 +/- 1.3 percent in the control group of urbanites residing in Pavlodar). A decrease in cellularly mediated defensive reactions is known to elicit reduced resistance to viral infections, oncological diseases and so on.

These data were additionally refined by examining the population in rayons even farther away from the nuclear test area, and by conducting examinations in the course of therapy. The large number of variants of immunological insufficiency in the population of Mayskiy Rayon is evidence of the diversity of causes bringing them on. However, data published in the oblast press stating that certain craters in the test area emit up to 2,000 microroentgens per hour, coupled with evidence of grazing of animals on contaminated farmland and of hay cutting in contaminated areas, doubtlessly indicate that the test area is making a contribution to the extremely unsatisfactory health of the population of Mayskiy Rayon.

Bibliography

1. Mayanskiy, A. N. and Mayanskiy, D. N., "Ocherki o neytrofile i makrofage" [Notes on the Neutrophil and the Macrophage], Novosibirsk, Nauka, 1989, p 83.

Mortality Trends of the Population of Krasnoyarsk Kray Due to Oncological Diseases

927C0144A Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 5, May 91 pp 21-26

[Article by V. F. Mazharov, B. E. Gornyy and I. V. Tikhonova, Institute of Complex Problems of Hygiene and Occupational Diseases, Siberian Department, USSR Academy of Medical Sciences]

UDC 616-006.6-036.88(571.51)

[Text] Soviet and foreign literature on the oncological mortality of the population and modern trends in its dynamics contains ambiguous information on this indicator in different countries of the world. For example according to [9], stable growth of the incidence of malignant neoplasms in the population as a whole in the last two decades and stabilization of oncological mortality among persons of working age in 1984-1988 were noted in the USSR. In Poland, mortality due to malignant neoplasms increased from 89 to 181.8 per 100,000 people between 1960 and 1986 [8]. At the same time a yearly 2 percent decrease in mortality due to all types of cancer among white residents 35-44 years old was recorded in the USA in 1968-1983. No such decline occurred in older age groups, although mortality due to all diseases did drop in certain age groups [15].

According to the Krasnoyarsk Kray Statistical Administration, mortality due to all oncological diseases, calculated for the years of the all- union census, increased significantly by 1989 (Table 1).

Table 1. Dynamics of Mortality of the Krasnoyarsk Kray Population Due to Oncological Diseases in 1959-1989 (per 100,000 People)

Territory	Sex	1959	1970	1979	1989
Urban	M	107.7 +/- 4.1	119.1 +/- 3.7	139.8 +/- 3.6	178.1 +/- 3.8
	F	112.2 +/- 4.1	107.4 +/- 3.4	106.4 +/- 3.0	141.4 +/- 3.2
	Both	110.1 +/- 2.9	113.0 +/- 2.5	123.3 +/- 2.4	159.0 +/- 2.5
Rural	M	104.5 +/- 4.1	127.4 +/- 4.8	159.7 +/- 5.8	192.2 +/- 6.2
	F	97.5 +/- 3.7	96.9 +/- 4.1	110.7 +/- 4.7	120.1 +/- 5.0
	Both	100.7 +/- 2.8	111.5 +/- 3.1	134.4 +/- 3.7	156.3 +/- 4.0
Kray	M	106.1 +/- 2.9	122.3 +/- 2.9	146.0 +/- 3.1	182.1 +/- 3.2
	F	104.6 +/- 2.7	103.4 +/- 2.6	108.9 +/- 2.6	135.8 +/- 2.7
	Both	105.4 +/- 2.0	112.4 +/- 2.0	126.7 +/- 2.0	158.3 +/- 2.1

A number of authors associate the revealed trend with catastrophic worsening of the ecological situation in many industrial cities, where the industrial load of untreated wastes on man is rising dramatically in connection with excessive concentration of large industrial facilities utilizing obsolete and ecologically dangerous production processes in their production cycles [3-8]. As we know, many of them have a direct or indirect carcinogenic effect [6].

As we know, oncopathology is developing under the influence of factors such as our way of life, the nature and quality of our food, and harmful habits (smoking, alcohol). According to some authors [12,14,16] the proportion of the latter is especially high in the overall structure of factors responsible for oncological diseases.

We agree fully with these conceptions, which were persuasively confirmed by our own research aimed at ecological certification of both individual industrial enterprises and the territory of the Kansk-Achinsk fuel and energy complex.

Paradoxical as this may seem, oncological morbidity and its growth in general or rough indicators may also be the result of successes in preventing and reducing the incidence of other major diseases (infections, cardiovascular diseases, accidents and injuries, and so on), which are accompanied by an increase in the life span of people and consequent growth of the proportion of people beyond working age in the overall population structure.

This proportion has already attained 13-14 percent in the USSR, and in the immediate future it will increase to 17-20 percent [11]. The author emphasizes the fact that the population's aging will create serious economic problems for public health in connection with growth of geriatric pathology. In Krasnoyarsk Kray, because of significant migration of elderly people from the northern rayons out of the kray the proportion of persons beyond working age is smaller on the average than in the USSR, being 10.96 percent (Table 2). At the same time it reaches 19-20 percent of the total population in certain administrative territories, especially in the southern part of the kray.

Table 2. Proportion of Persons (%) Beyond Working Age in the Krasnoyarsk Kray Population in 1959-1989

Territory	Sex	1959	1970	1979	1989
Urban	M	4.0	4.8	5.4	6.9
	F	7.6	10.2	11.4	13.4
Rural	M	6.5	7.0	8.1	9.3
	F	10.3	13.4	16.6	19.0
Kray	M	5.3	5.6	6.2	7.8
	F	7.0	11.4	13.0	14.9

Table 3. Oncological Morbidity (per 100,000 People) on Territories With Different Proportions of Persons Beyond Working Age (M +/- m)

Proportion of Elderly Persons, %	Morbidity	
	Rural	Urban
Up to 5	-	623.2 +/- 22.6
5-9.9	258.5 +/- 23.8	798.3 +/- 20.8
10-14.9	370.1 +/- 35.0	783.9 +/- 36.2
15-19.9	497.7 +/- 33.4	-

Doubtlessly, such change in the demographic structure of the population of any territory unavoidably causes change in both morbidity and mortality. In the last two decades researchers have noted universal manifestation of a moderate tendency for overall mortality to grow in countries of Eastern Europe primarily as a result of demographic factors associated with the population's aging [8].

Table 3 gives morbidity data for the population of Krasnoyarsk Kray in 1988 in relation to all forms of oncological diseases registered by the kray's therapeutic institutions.

In contrast to morbidity, mortality basically reflects the age-related features of the population [2], as well as the volume, quality and promptness of qualified medical care. Therefore it can serve as a yardstick for the level of development it has attained in any given territory [10,12]. Even with growth of oncopathological morbidity, adequate development of the oncological service makes it possible not only to stablize oncological mortality but also reduce it. There are sufficient grounds for suggesting that efforts to improve diagnosis, to reveal early stages of disease and to expand the arsenal of therapeutic measures, in combination with taking the most conservative approaches in radical operations, would have to be rewarded by positive trends in the dynamics of this indicator. However, data from the kray administration of the State Statistical Committee, shown in Table 1, do not offer any optimism on this account, because the method used to estimate mortality did not account for the influence of differences in the population's age composition in different years. This approach is unacceptable because it gives incorrect results due to leveling of fluctuations in the indicators in different years and in different age groups [2,17,18].

Because the demographic structure of the Krasnoyarsk Kray population changed in the last 30 years, it would be proper only to compare oncological mortalities between age groups and sexes. Dependable comparisons of overall oncological mortality indicators would be possible only after they are standardized in relation to the ages of the compared groups. The results of calculating age-related indicators for different years, obtained by the all-union census, are presented below. In this case data on deaths during the census year from reporting Form 5 of the State Statistical Administration and the State Statistical Committee were used for the calculations (tables 4, 5). The age groups were formed in a somewhat unusual manner in an attempt to draw a comparison on the basis of all four postwar censuses. These groups are related to the age structure adopted for recording deaths on Form 5 in 1959.

Table 4. Age-Related Mortality of the Male Population of Krasnoyarsk Kray per 100,000 People (M +/- m)

Age, Years	a—Urban, b—Rural	1959	1970	1979	1989	Student's t-Test (1959-1989)
0-14	a	9.0 +/- 2.2	3.4 +/- 1.2	10.2 +/- 2.0	7.4 +/- 1.5	0.8
	b	7.9 +/- 1.8	4.7 +/- 1.6	5.5 +/- 2.1	9.6 +/- 2.7	0.5
15-19	a	4.8 +/- 2.8	12.9 +/- 3.6	4.9 +/- 2.2	8.4 +/- 3.0	0.88
	b	15.2 +/- 5.7	8.4 +/- 3.8	12.3 +/- 5.0	14.5 +/- 6.5	0.08
20-24	a	10.8 +/- 3.4	4.3 +/- 2.1	8.9 +/- 2.7	3.3 +/- 1.9	1.93
	b	15.2 +/- 5.1	8.7 +/- 5.0	8.7 +/- 4.4	15.8 +/- 7.0	0.07
25-29	a	17.1 +/- 4.7	16.5 +/- 4.8	11.9 +/- 3.1	13.5 +/- 3.3	0.63
	b	17.0 +/- 5.4	18.7 +/- 8.4	23.4 +/- 7.4	11.0 +/- 4.9	0.82
30-39	a	43.1 +/- 6.5	29.7 +/- 1.3	30.7 +/- 4.3	32.4 +/- 3.6	1.44
	b	32.2 +/- 6.2	43.4 +/- 7.0	39.3 +/- 8.8	39.7 +/- 6.6	0.83
40-49	a	179.5 +/- 17.4	145.2 +/- 11.8	147.5 +/- 9.8	172.0 +/-10.9	0.37
	b	143.6 +/- 16.8	145.4 +/- 14.7	174.8 +/- 15.5	151.3 +/- 17.8	0.31
50-59	a	477.8 +/- 37.4	522.8 +/- 31.5	508.7 +/- 25.1	525.0 +/- 20.4	1.10
	b	458.4 +/- 35.9	458.9 +/- 36.1	492.8 +/- 32.2	532.9 +/- 29.8	1.60
60 and older	a	1266.6 +/- 69.8	1247.6 +/- 53.7	1301.6 +/- 47.4	1384.0 +/- 39.7	1.46
	b	839.6 +/- 45.6	983.6 +/- 50.6	918.1 +/- 48.9	1066.3 +/- 47.8	3.43

Note: Paired values for urban (upper) and rural areas (lower) are given here and in tables 5-7.

Table 5. Age-Related Mortality of the Female Population of Krasnoyarsk Kray per 100,000 People (M +/- m)

Age, Years	a—Urban, b—Rural	1959	1970	1979	1989	Student's t-Test (1959-1989)
0-14	a	5.2 +/- 1.7	1.8 +/- 0.9	4.8 +/- 1.4	8.3 +/- 1.6	1.33
	b	8.2 +/- 1.9	8.4 +/- 1.5	5.4 +/- 1.8	4.6 +/- 1.9	1.34
15-19	a	7.4 +/- 3.7	3.0 +/- 1.7	3.7 +/- 1.8	2.1 +/- 1.5	1.33
	b	4.7 +/- 3.3	2.1 +/- 2.1	5.6 +/- 1.4	-	-
20-24	a	9.0 +/- 3.4	11.3 +/- 3.6	4.1 +/- 1.8	10.0 +/- 3.3	0.21
	b	9.2 +/- 4.1	6.9 +/- 4.9	10.1 +/- 5.0	11.6 +/- 6.7	0.31
25-29	a	13.6 +/- 4.5	12.2 +/- 4.3	8.4 +/- 2.7	8.3 +/- 2.6	1.02
	b	17.6 +/- 5.6	8.3 +/- 5.9	16.3 +/- 6.6	16.1 +/- 6.6	0.17
30-39	a	40.1 +/- 5.9	30.6 +/- 4.3	31.9 +/- 4.5	39.8 +/- 4.0	0.04
	b	377.5 +/- 6.0	38.1 +/- 6.8	42.9 +/- 9.6	42.4 +/- 7.6	0.51
40-49	a	158.7 +/- 14.7	115.9 +/- 9.6	84.8 +/- 7.3	114.1 +/- 8.7	2.61
	b	135.0 +/- 13.2	123.3 +/- 12.1	91.9 +/- 11.4	121.7 +/- 17.0	0.62
50-59	a	344.2 +/- 25.1	279.7 +/- 18.5	244.6 +/- 14.5	240.4 +/- 12.8	3.68
	b	229.5 +/- 19.0	237.2 +/- 20.1	203.6 +/- 16.9	221.4 +/- 19.0	0.30
60 and older	a	722.7 +/- 49.9	586.0 +/- 24.6	569.7 +/- 20.7	685.7 +/- 19.2	0.69
	b	499.2 +/- 26.2	359.6 +/- 21.3	371.6 +/- 21.0	379.2 +/- 20.2	3.63

As we can see from tables 4 and 5, the general tendency for mortality indicators to increase with age, as described by Gomperts-Meykkhem [transliteration] functions, are also typical of mortality due to oncological diseases. Stable growth of mortality begins with men 20-24 years old and with women 15-19 years old, which is fully consistent with the data in [15] on the "initial" instability of mortality among the former.

Analysis of mortality in the age groups from 0 to 49 years did not reveal persistent sex and social differences, or any dynamic changes in them in the different census years. Even in the 50-59 and 60 and older groups the increase in male mortality is not statistically significant ($p > 0.05$), except in the case of rural inhabitants over 60 years old. On the other hand a tendency for this indicator to decrease in all groups is noted among women.

Thus analysis of mortality in relation to age made it possible to reveal ambiguities in mortality dynamics, caused on one hand by the biological aspects of age and sex differences and the tendency for the population to age, and on the other hand by socioeconomic changes in the society.

All of this permits us to standardize mortality indicators both in relation to entire groups and separately for persons of working age using a commonly accepted method, and to compare them with overall indicators (tables 6-8). It was noted that while intensive growth of mortality relative to the 1959 level was typical of general indicators, this growth was significantly more moderate in the case of standardized indicators. Among women, however, it assumes the reverse direction, and it decreases both on the whole and in the working age group.

Table 6. Standardized Mortality of the Male Population of Krasnoyarsk Kray Due to Oncopathology in 1959-1989

Age Group	1959	1970	1979	1989
All	178.9	172.8	177.9	188.6
	127.3	137.7	139.4	152.1
Including persons of working age	105.5	100.8	98.9	105.7
	105.6	107.1	117.5	118.4

Table 7. Standardized Mortality of the Female Population of Krasnoyarsk Kray Due to Oncopathology in 1959-1989

Age Group	1959	1970	1979	1989
All	144.1	114.6	105.6	124.3
	120.5	98.4	94.2	100.6
Including persons of working age	94.7	74.4	62.2	70.8
	85.8	83.2	73.0	82.1

Table 8. Rate of Growth (+, -) of Mortality of the Krasnoyarsk Kray Population Due to Oncopathology, % (1959—100%)

Territory	Sex	Age Group	1970	1979	1989
Urban	M	All	+10.6/-3.4	+29.8/-0.6	+65.4/+5.4
		Persons of working age	+6.3/-4.5	+20.8/- 6.3	+53.8/+0.2
	F	All	-4.3/-20.5	-5.2/-26.7	+26.0/-13.7
		Persons of working age	-15.1/-21.4	-15.9/-34.3	- 10.4/-25.2
Rural	M	All	+21.9/+8.2	+52.8/+9.5	+83.9/+19.5
		Persons of working age	+15.3/+1.4	+50.6/+11.3	+65.1/+12.1
	F	All	-0.6/-18.3	+13.5/-21.8	+23.2/-16.5
		Persons of working age	+12.0/-3.0	+5.7/- 14.9	+12.7/-4.3

Note: Numerator—"total" indicator (commonly accepted calculation method); denominator—age-standardized indicator

A confirmation of this can be found also by dispersion analysis, carried out in relation to two groups of factors—age and place of residence (urban and rural). It was revealed as a result that the age group of factors associated with formation of the mortality indicator is credited with more than 90 percent of the sum of the accounted factors.

Thus the complex demographic and socioeconomic processes occurring in the kray, which go a long way to determine the causal structure of the population's overall morbidity and the intensity of its indicators, require caution in evaluating general mortality (particularly due to oncological diseases). Analysis of age and sex differences in oncological mortality reveals completely opposite tendencies in the yearly dynamics of the indicators. Consequently general mortality indicators can be evaluated only after age standardization.

Bibliography

1. Begun, A. V., Lebedev, A. D. and Shkolnikov, V. M., in "Mediko- geograficheskiye issledovaniya gorodskikh i selskikh geosistem" [Medical and Geographical Research on Urban and Rural Geosystems], Moscow, 1984, pp 91-100.

2. Grabovskaya, T. V., Mishchenko, A. N. and Morozyuk, M. M., SOV. ZDRAVOOKHR., No 6, 1989, pp 16-20.

3. Mazharov, V. F., Gelfgat, Ye. L., Sharova, A. N. et al., "KATEK: Atmosfernyye zagryazneniya i zdorovye naseleniya: Ekspress-byul." [Kansk-Achinsk Fuel and Energy Complex: Atmospheric Pollution and the Health of the Population: Express Bulletin], Novosibirsk, 1990.

4. Mazharov, V. F., Gornyy, B. E. and Tikhonova, I. V., "Vliyaniye vybrosov Krasnoyarskogo zavoda meditsinskikh preparatov na zdorovye naseleniya: Ekspress-byul." [Influence of Discharges From the Krasnoyarsk Medical Preparations Plant on the Health of the Population: Express Bulletin], Novosibirsk, 1989.

5. Mazharov, V. F., Tikhonova, I. V. and Gornyy, B. E., "Vliyaniye vybrosov Krasnoyarskogo alyuminiyevogo zavoda na zdorovye naseleniya: Ekspress-byul." [Influence of Discharges From the Krasnoyarsk Aluminum Plant on the Health of the Population: Express Bulletin], Novosibirsk, 1989.

6. Maksimova, L. V., Raykh, Ye. L., Saravatskaya, L. I. et al., in "Okruzhayushchaya sreda i zdorovye cheloveka" [The Environment and Human Health], Moscow, 1979, p 214.

7. Mazharov, V. F., Gelfgat, Ye. L., Sharova, A. N. et al., "Nekotoryye pokazateli zdorovya naseleniya, prozhivayushchego v zone deystviya vybrosov Krasnoyarskogo kombaynovogo zavoda: Ekspress-byul." [Some Indicators of the Health of the Population Living Within Range of Discharges From the Krasnoyarsk Combine Plant: Express Bulletin], Novosibirsk, 1990.

8. Pogorelov, Ya. D., MED. REF. ZHURN., Vol 16, No 3, 1989, p 7.

9. "Sotsialnoye razvitiye SSSR" [Social Development of the USSR], Moscow, 1990, pp 265, 272.

10. Tolmachev, V. A., in "Zdorovye cheloveka v Sibiri" [Human Health in Siberia], Novosibirsk, 1989, Part 1, p 35.

11. Shchepin, O. P., SOV. ZDRAVOOKHR., No 5, 1988, pp 3-6.

12. Andre, Ulrich, GSE; MANSCH-UMWELT, Vol 5, 1988, pp 41-46.

13. Brzesinsky, Z. J., WLD. HLTH STATIST. QUART., Vol 39, No 4, 1986, pp 365-378.

14. Butrum, R. R., Clifford, C. K. and Lanza, E., AMER. J. NUTR., Vol 48, No 3, Suppl., 1988, pp 888-895.

15. Davis, D. L. and Schwartz, J., LANCET, Vol 1, No 8586, 1988, pp 633- 635.

16. Ernster, V. L., CANCER (PHILAD.), Vol 62, No 8, Suppl., 1988, pp 1702-1712.

17. Kotesovec, F. et al., CSL. HYG., Vol 33, No 4, 1988, pp 193-201.

18. Radkovsky, J., CSL. ZDRAV., Vol 33, No 4, 1985, pp 161-170.

Development of Rural Clinical Examination and Treatment Under the Conditions of Restructuring of Soviet Public Health

927C0144B Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian
No 5, May 91 pp 50-53

[Article by D. V. Tintyuk, Odessa Medical Institute]

UDC 614.2:008(47+57)

[Text] Upgrading the quality and effectiveness of medical care, creating a well organized mobile health care system, reinforcing the preventive orientation of public health and improving clinical examination and treatment of the population are paramount among the complex and diverse problems of the society's economic and social development. In turn, development of clinical examination and treatment of the population requires serious restructuring of all agencies of the public health system.

This problem is especially acute in rural areas. This is associated with the fact that the material and technical base of public health institutions has fallen significantly behind in rural areas, indicators characterizing the way of life and health of rural inhabitants have worsened, and the ecological situation has deteriorated as a consequence of intensive, irrational use of pesticides in agricultural production. This situation is explained by the fact that conservative work methods have been at the basis of the work of medical institutions and specialized physicians in recent years, and public health selected the extensive path of development.

The fact that the material and technical base of rural areas has fallen behind production development by a period of many years (in view of understatement of the need for "social rear services") had an effect on the quality and effectiveness of medical care to the population. The availability of physicians to rural residents of the Moldovan Republic is twice lower than in urban areas, and the proportion of the public subjected to clinical treatment and examination is 4.5 times lower. Overall morbidity remains high, including that associated with chronic illnesses, diseases involving temporary incapacitation, disability and general and infant mortality.

In this connection development of the scientific principles of improving clinical treatment and examination of the population and the methodological basis of this work is acquiring great significance in this connection. While a high assessment is given to the results of research on this complex, multifaceted problem (G. Z. Demchenkova, A. A. Balmasov, G. F. Yemelyanova, V. A. Minyayev, G. A. Novgorodtsev, B. D. Petrakov, I. V. Polyakov, A. F. Serenko, N. A. Testemitsanu etc.), it should be noted that more work must be done on the problem of clinical examination and treatment of the population in different rural regions, with regard for the features and possibilities of public health, and on the basis of an integrated systems approach to studying interaction of the social, hygienic, demographic, economic, ecological and other factors affecting the health of rural laborers.

A comprehensive research program of this sort makes it possible to obtain information at the junction of different areas of scientific knowledge on the factors slowing down development of public health, and to reveal the trends and prospects of increasing the quality and effectiveness of health care—that is, to systematically examine all of the

general and particular aspects typical of development of clinical examination and treatment in rural areas in a densely populated region of the country. Restructuring of rural public health and determination of its preventive orientation must be based on a deep study of the way of life and health of rural inhabitants, and on an assessment of their functional state and adaptive possibilities in a time when the signs of disease are absent, on activating the medical efforts of therapeutic and preventive institutions, and on creating scientifically grounded, effective programs of dispensary observation for different population groups.

Confirmation of a healthy way of life is viewed today as one of the priority directions of restructuring Soviet public health. The problem of developing a healthy way of life remains paramount in rural areas as well. This is confirmed by the established fact that over half of rural inhabitants smoke, 62.5 percent consume alcoholic beverages, and only 7.2 percent of respondents gave a strongly positive assessment to their possibilities for engaging in physical education and sports. The assessment given by rural inhabitants to the elements of socially productive situations opens up wide possibilities for developing effective preventive and recovery measures directed at improving health.

Because not enough has been done on the integrated problem of human adaptation and the associated problem of protecting and strengthening the health of rural laborers, it is of primary importance to study the adaptive mechanisms of disease prevention, to determine the role of adaptation in preserving and strengthening the health of the rural population, and to subject it to clinical treatment and examination.

The ability of the rural laborer's body to adapt itself to the environment through its own functional possibilities and reserves is relatively low. The overall indicator of social and job-related adaptation is up to +0.40 for most of the studied agricultural occupations. Adaptation is higher among white collar workers (+0.65) and machine operators (+0.49), and much lower among livestock workers (+0.29) and tobacco growers (+0.23). The assessments made of the relationship of rural residents to the elements of social and production situations permit us to divide rural inhabitants into four adaptation groups: the 1st—people with stable functional organic possibilities; the 2d—persons experiencing functional stress; the 3d—people with low functional possibilities; 4th—people with impaired functional organic possibilities. These four adaptation groups characterize the physical, social and mental well-being of the human body, and they may be used to evaluate health during clinical examination and treatment of the rural population. Revealing the degree of adaptation may be treated as the first and most important stage of dispensary observation of health.

Unfavorable social, production and hygienic factors have a negative influence on the health of rural inhabitants. This reveals itself especially clearly when we analyze rural morbidity on the basis of the frequency with which health care is sought and on the basis of data from thorough medical examinations on the backdrop of the region's unsatisfactory ecological situation. The overall morbidity of the rural population is 2,488.34 per 1,000 persons. According to data from thorough medical examinations, morbidity is 4.1 times higher than that revealed by the frequency of doctor visits. Significant morbidity differences were established in regions making intensive and minimum use of pesticides.

The unsatisfactory ecological situation and the many years of influence of an entire complex of negative factors upon the human body caused its adaptive possibilities to decline, as a consequence of which the forecasts of the health of the rural population, and especially children, are low. In this connection one of the priority objectives of the public, the farms and the medical institutions in the period of restructuring of public health is to protect the rural laborer from harmful environmental factors.

Assessments of the way of life of the rural population should also be used in determining the effectiveness of dispensary observation of the rural population, and the level of medical activity. The following can be distinguished as criteria by which to assess medical activity: the level of development of public health; the medical and social activity of physicians, and the medical and social activity of rural inhabitants. It has been established that the coefficient of medical activity of the rural population is higher than that of physicians—correspondingly 0.45 and 0.22. The number of visits for preventive treatment per rural inhabitant per year is only 0.8, while the rate regarding dispensary observation is 0.4. Consequently one of the objective needs of the present stage of public health development is to orient physicians and the rural population on disease prevention, on formation of a healthy way of life, and on improving the quality of medical services. This requires deep development of adequate and effective methods of evaluating the activities of public health institutions and of individual physicians in a situation where medical assistance to the rural population is organized on the basis of cost-accounting principles.

However, in order to justify the optimum forms and methods of clinical examination and treatment of rural inhabitants, it would be important to determine the status of health care and the basic trends in upgrading its quality. The results show that only 30.0 percent of rural inhabitants are satisfied with the regularity of dispensary observation. Dissatisfaction in the work organization and quality of medical care rendered by section hospitals is expressed by 68.7 percent of rural inhabitants, 56.6 percent are dissatisfied with first aid, 52.5 percent are dissatisfied with rural outpatient treatment, 35.0 percent are dissatisfied with children's hospitals (departments), and 32.0 percent are dissatisfied with maternity hospitals (departments). Among the main causes of dissatisfaction, the first is the waiting lines for a doctor, the second is poor organization of the work of medical institutions in preventive treatment and dispensary observation, and the third is the impersonal attitude of medical personnel toward their work and patients. Around 74.5 percent of interviewed section physicians of a rural medical section are dissatisfied with the VUZ training they received in clinical examination and treatment, 80.4 percent are dissatisfied with their residency training, 62.7 percent are dissatisfied with their internship, and 62.5 percent are dissatisfied with the knowledge they acquired in their advanced training. These results made it possible to determine the main components of the quality of medical services, and to develop a system for training physicians in the problems of prevention and dispensary observation.

The basic directions of development of dispensary observation in rural areas of the country's densely populated

regions were developed on the basis of the patterns revealed in the health of rural inhabitants, their way of life, their morbidity and the quality of health care.

With regard for the regional features of Moldova, the health of rural laborers should be kept under observation in rural outpatient clinics of a new type located near the home. The rural medical section is the first and primary stage in the organization and conduct of preventive inspections and clinical observation of the population. Such an orientation is confirmed by the results of an expert assessment of the stages of dispensary observation of the rural population: 72.5 percent of rural inhabitants should receive such care in outpatient clinics, 19.1 percent should do so in central rayon polyclinics, and 8.4 percent should receive it in republic polyclinics and dispensaries.

In order to upgrade the quality of preventive examinations and dispensary observation in rural outpatient clinics, it would be suitable to establish offices for preliminary examinations and centralized accounting and control of dispensary observation. This would relieve the physician of excessive paperwork, outpatient clinics would be used to the maximum for preventive and recovery measures and for laboratory diagnostic analysis, visitors could be distributed properly, efforts to shape a healthy way of life of the rural population could be carried out, an account of all efforts in dispensary observation could be maintained, and so on.

An integrated data bank pertaining to inhabitants of an experimental rural medical section was developed as a means of controlling dispensary observation. The data bank provides a possibility for using information for the following purposes: planning and controlling dispensary observation and preventive examinations; analyzing the influence of a complex of social and production factors; keeping health under dynamic observation; analyzing the quality and effectiveness of health care; obtaining reference materials necessary to the work of medical personnel.

The end results of the activities of medical institutions aimed at clinical examination and treatment of the rural population should be evaluated in three aspects—medical, social and economic.

The main indicators of the medical effectiveness of dispensary observation divide into two groups—those characterizing health positively, and those characterizing it negatively. Positive indicators include the health index, movement of patients under dispensary observation through the different health groups, the medical and social activity of the physician and rural inhabitants, and satisfaction of the rural population with health care quality; negative indicators include the incidence of chronic diseases, morbidity involving temporary incapacitation, the level and dynamics of disability, and overall and infant mortality.

The social criteria by which effectiveness is assessed are the average life span, way of life, degree of social and work adaptation, the degree to which the ability to work is maintained, and so on.

Economic criteria by which dispensary observation is assessed include morbidity associated with temporary incapacitation, the level of disabilities, overall mortality and average life span.

An analysis of the activities of therapeutic and preventive institutions made it possible to reveal the main factors hindering fundamental restructuring of public health and development of dispensary observation of the rural population. The most significant among them are: the ineffectiveness of existing forms of organization of health care and dispensary observation of the rural population; low interest of the directors of organizations in rural areas and of kolkhozes and sovkhozes in improving the health of the population; absence of criteria by which to assess the work of the physician, and absence of ways to materially stimulate his activity on the basis of the end results of health care for rural inhabitants; absence of quick diagnostic methods and of medical apparatus in medical institutions by which to carry out the needed volume of examinations at the home; poor equipment availability in medical institutions; an irresponsible attitude of rural inhabitants toward their way of life and health.

Developing a package of measures by which to protect the health of the rural population is the most important social problem in public health. In order to develop clinical examination and treatment, we must fundamentally restructure the activity of all medical institutions, develop a responsible attitude in the rural population toward its health and the health of surrounding individuals, and make sensible use of resources in public health. Growth of the social value of human life and of the sociopolitical significance of public health is the principal factor responsible for greater attention to the problems of public health, viewed in its organic unity with the way of life.

Kazakhstan's Microbiological Service

927C0196B Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 8, Aug 91 pp 7-9

[Article by A.L. Kotova, A.A. Kurmangaliyeva and V.Ye. Kim, Alma- Ata Medical Institute]

[Text] The microbiological service of the republic's epidemiological stations is one of the most important structural subdivisions of public health organs responsible for long-term preventive laboratory surveillance of the epidemic situation and for fast response to its changes.

No matter how the work of this service might transform with time, the goal of its activity remains constant—actively ensuring the epidemiological safety of the population by revealing objective evidence of infection and of epidemic danger.

There are 294 bacteriological and 13 virological laboratories operating within the system of the republic's epidemiological service. The problems of their organizational and methodological support and the state of their material and equipment base have been discussed on several occasions at different levels. To permit an objective assessment of the status of the service, a laboratory certification system was created. Its results revealed that not all laboratories satisfy the requirements imposed on them.

The material and equipment base of many of them cannot be recognized to be satisfactory: Only 15 percent are housed in standard quarters or ones that are close to standard, and 10 percent of the laboratories are housed in dilapidated buildings. A significant proportion of them servicing rural rayons do not have running water, hot water supply, sewage disposal and central heating, the standards of locating different organizational entities are not being met, and so on. Equipment, even the most

necessary, is often old, and it is in short supply. Orders for glassware and chemical reagents are 20-30 percent filled, and vivariums are poor or altogether absent. All of this reflects upon the quality and effectiveness of microbiological research.

There are unfortunately shortcomings of other sorts as well: violations in the management of accounting and reporting documents; misrepresentation of analyses, and conduct of analyses outside the profile of the epidemiological service; violations in sampling materials for analysis and delivering them to the laboratory; deviations in analytical procedures; absence of a toxicogenic strain of diphtheria microbe; improper determination of the need for bacterial preparations; failure to observe the rules of workplace sanitation, safety and so on.

At the same time we should not fail to mention the positive changes that have occurred recently. For example beginning in 1985 virological laboratories were established in the republic under the oblast epidemiological stations of Guryev, Kustanay, Pavlodar, Dzhezkazgan, Taldy-Kurgan and Kzyl-Orda oblasts. In 1988-1989 the laboratories of oblast and city epidemiological stations in Dzhambul, Pavlodar and Semipalatinsk were awarded the status of centralized laboratories.

Today the republic's microbiological laboratories employ 619 physicians, which is 90 percent of the requirement. In this case only 11 percent of the positions are occupied by biologists and veterinarians. Aktyubinsk, Kustanay, Karaganda and Chimkent oblasts are rather favorable in this regard. At the same time, a shortage of physicians can be felt and personnel turnover is noticeable in North Kazakhstan, Kzyl-Orda, Taldy-Kurgan and Kokchetav oblasts and in Alma-Ata. These phenomena are especially pronounced in Taldy-Kurgan and Kzyl-Orda oblasts. The causes of such a situation are rooted in poor housing and working conditions (especially in rural rayons). Cases of negligent resolution of personnel issues and unjustified transfer of physicians occur.

The corps of physician-bacteriologists and virologists contains 8 percent in the top qualification category and 10 percent in the first category. There are many opportunities for raising one's qualifications, including through scientific research. Unfortunately, the excessive load in the laboratories is an obstacle to this, depriving even experienced bacteriologists, who tend to involve themselves in scientific research, of the possibility for engaging in it seriously. Fortunately most physicians are able to combine their practical work with teaching in schools.

Even so, serious attention is being devoted in our republic to advanced training of physicians. The laboratory council under the Main Epidemiological Administration of the Kazakh SSR Ministry of Health has drawn up a personnel training program (seminars, traveling courses, work stations). In three years, five seminars on procedures associated with viral infections and on the methods of public health and virological research were conducted under the sponsorship of the Republic Epidemiological Service, and 27 virologists underwent training. Moreover 42 republic and traveling seminars were organized with the participation of leading specialists on different issues of bacteriological and serological research. The training was conducted at facilities of the epidemiological service itself. Advanced training is provided to bacteriologists of departments of especially dangerous infections regularly through facilities of the republic epidemiological service, the Central Asian Plague Control Institute and central bases outside Kazakhstan (Rostov-on-Don, Stavropol and elsewhere).

Seminars on medical bacteriology and virology for specialists of departmental laboratories have recommended themselves positively.

In order to evaluate the intensity and effectiveness of the work of microbiological laboratories, the laboratory council under the State Epidemiological Administration of the Kazakh SSR Ministry of Health approved several indicators in 1986, including the work norm of a physician-bacteriologist in city epidemiological stations, equal to 30,000 laboratory units annually, and a norm of 24,000 in rural epidemiological stations; it also approved a tentative figure for the number of different types of analyses carried out per 100,000 population.

The present level of research presupposes the use of new, informative methods making it possible to significantly widen the diagnostic value of analyses. However, the range of the research has not been updated since 1976. In the meantime new disease agents were discovered in recent years, methods of microbiological research were updated, new quick methods came into being, and so on. This is why in 1990 a group of experienced physicians of the republic, Pavlodar and North Kazakhstan epidemiological stations drew up the "List of Basic Documents Currently in Effect and Regulating the Work of Bacteriological Laboratories of Epidemiological Stations," approved by the laboratory council and the Kazakh SSR Ministry of Health. It includes 53 methodological instructions and 38 all-union state standards defining the nature of the work done by laboratories to reveal intestinal and airborne infections; microbiological analysis of water and foodstuffs; bacteriological monitoring of therapeutic and preventive institutions and pharmacies; analysis of clinical materials, and so on.

The purpose of indicators by which to assess the effectiveness and intensity of the work of laboratories, and of regulating the range of research by means of the "List...," is to standardize analyses. In association with this, these analyses must be intensified, and new methods must be mastered and introduced.

The results of activities of microbiological laboratories of Kazakhstan's epidemiological service in the last 3 years show that the number of analyses being carried out does not provide an indication of their effectiveness. The incidence of acute intestinal infections remains high from one year to the next; however, their etiological identification has not undergone any serious changes over a number of years. And although bacteriological confirmation of dysentery has improved somewhat in the republic as a whole, there are oblasts (East Kazakhstan, Semipalatinsk, Tselinograd) in which this indicator has dropped. Identification of other acute intestinal infections also remains stably low, especially in Kzyl-Orda and Chimkent oblasts.

The percent isolation of diphtheria agent and of meningococcus in examinations of healthy individuals was as follows in the republic over a period of three years:

- 1988: bacteriological analyses—13,302, bacteriological confirmations—0.02 percent;
- diphtheria, 1989: bacteriological analyses—131,388, bacteriological confirmations—0.03 percent;

- 1990: bacteriological analyses—123,992, bacteriological confirmations—0.01 percent;
- 1988: bacteriological analyses—2,152, bacteriological confirmations— 7.8 percent;
- meningococcus, 1989: bacteriological analyses—1,867, bacteriological confirmations—7.2 percent;
- 1990: bacteriological analyses—1,579, bacteriological confirmations— 5.6 percent

In order to raise the effectiveness of identifying infectious diseases, many new methods were introduced; in particular, the Zonne-Fleksner antibody erythrocytic dysentery diagnosticum (developed by the Kazakh SSR KIEMIB [Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases]) was used in the passive hemagglutination reaction; the latter was employed in the diagnosis of Coxsackie B infection, rotavirus infection, hepatitis A etc. The method of identifying poliomyelitis and Coxsackie B virus strains was modified, making it possible to accelerate determination of the species of the agent three to four times. A procedure for early diagnosis of measles was introduced. The analysis is completed in 2-3 days, rather than two weeks. Since 1987 all laboratories have been using transport medium developed by the KIEMIB, and since 1988 they have been using a medium developed by the Central Asian Plague Control Institute (SANIPChI), which makes it possible to increase the number of persons examined by more than a time and a half, and to raise bacteriological confirmation of a brucellosis diagnosis to 24.5-38.3 percent. The KIEMIB has proposed a number of diagnosticums.

A new medium (SANIPChI) by which to isolate tularemia agent was tested. A "dry drop" method using the blood of rodents and ticks to test for rickettsiosis by the passive hemagglutination and complement fixation reactions was introduced into practice.

Thus the microbiological laboratories of the republic's epidemiological service are working with a sufficient load, they are expanding the list of methods and range of objects of research, they are introducing new methods, and they are raising their effectiveness: All of this is directed at improving the activity of the epidemiological service, and consequently the indicators of the health of the population and the environment.

The objectives of the republic's laboratory service include expanding its network further, improving the material and equipment base, strengthening interaction with operational subdivisions of the epidemiological service, continually upgrading the qualifications of specialists, developing and introducing new research methods and progressive forms of activity, improving existing methods, and carrying out practically highly meaningful scientific research.

Blood Transfusion in Therapeutic and Preventive Institutions

927C0196C Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 8, Aug 91 pp 10-12

[Article by S.B. Bekirov, S.N. Khosid, N.I. Petrikovets and L.N. Nedorezova, Kazakh Republic Blood Transfusion Station, and Blood Transfusion Department of the Emergency Health Care Hospital, Alma-Ata]

UDC 615.38.008.81

[Text] Transfusion therapy is used in therapeutic and preventive institutions as a basic method of treating seriously ill patients, and it occupies one of the leading places in integrated therapy of many surgical diseases and shock of various etiology, in intensive therapy and reanimation, in obstetrics and gynecology, in hematology, and in pediatric medicine.

Given the fundamental transformations occurring in the country's public health system, which have the purpose of protecting the health of the population at the level of the accomplishments of modern science, much also depends on the blood service, and particularly on clinical transfusion science. In light of this, the need has arisen for reexamining organization of blood transfusion in therapeutic institutions, and finding new ways of solving the problems of rapidly introducing blood components and preparations into therapeutic practice, which will require better organization of the work of the blood service in therapeutic and preventive institutions.

In Alma-Ata, such a service is represented by two blood transfusion departments working under the city clinical emergency health care hospital and the Central City Clinical Hospital, and by corresponding offices in all other therapeutic and preventive institutions. This area of work in the latter is supervised by physicians responsible for the hospital and its departments and appointed by order of the chief physician. Because they still must carry out their primary responsibilities, they work primarily on the basis of public support.

Determining the status of the physician serving as transfusion specialist in a therapeutic and preventive institution, who in addition to obtaining and distributing transfusion media could deal with the problems of clinical transfusion science (solving procedural problems, training physicians and secondary medical workers, providing consultation and so on), is a problem that should have been addressed long ago, one requiring immediate solution. We believe that it can be solved by having a transfusion specialist, released from all other work, working at 1.0-0.5 times the pay rate. This has become possible owing to the certain financial independence of chief physicians of therapeutic and preventive institutions.

The list of transfusion media supplied to Alma-Ata's therapeutic network contains up to 30 names: whole donated blood, its components, preparations and blood substitutes. Introduction of quick-frozen and antistaphylococcal plasma and antistaphylococcal, antitetanus and antirhesus immunoglobulin made it possible to improve specialized care to patients and women in childbirth.

The principles of application of transfusion therapy in relation to different diseases are constantly improving. But its effectiveness depends on one hand on the transfusion competency of clinical physicians, and on the other hand on the possibilities of the blood service. A knowledge of the problems of clinical transfusion science must be acquired and improved at medical institutes and institutes for the advanced training of physicians, as well as the blood service.

Analysis of cases of posttransfusional complications in the republic provides the grounds for suggesting that physicians are inadequately trained in this area. Not all of them have mastered the skills of preventing and treating such

complications, or know their clinical pattern. As a consequence complications are not diagnosed promptly, as a result of which therapeutic measures are implemented late, and often incorrectly.

The time has come to raise use of transfusion media in the therapeutic network to a qualitatively new level by developing and approving clear indications for transfusion of blood, its components, preparations and blood substitutes, to introduce unified requirements on the tactics of transfusion therapy, and to draw up optimized programs of its application. We need to update the standards on expenditure of donated blood, its components, preparations and blood substitutes per specialized hospital bed per year. In this case it would be suitable to base the standards on the need for introducing particular components of therapy and limiting the use of whole blood.

Because different transfusion media are widely employed in clinical practice, physicians must provide a total guarantee of the safety of their transfusion. In this connection we feel it necessary to recall the following provisions of currently effective orders and instructions. When a patient or an expectant mother is admitted for surgery, childbirth or blood transfusion, the treating physician or the physician ordered to carry out the blood transfusion is obligated to determine the patient's blood group with two series of standard hemagglutinating sera, and to write the blood group down on the front page of the disease history, in the upper right corner, indicating the date of the analysis and documenting the note with his own signature. Blood must be forwarded to the laboratory to determine the rhesus group. After a written response is received from the laboratory, the analysis result must be written down on the front page of the disease history (in the upper right corner), documenting this notation with the physician's signature and the date of the analysis.

In emergency situations, during hours when the laboratory is closed, the physician must determine the rhesus group by a quick method; the result must then be verified later on in the laboratory.

During transfusion of blood and its components, physicians are obligated:

- to determine the indications for transfusion and to exclude contraindications, making the appropriate notation in the disease history;
- to clarify the transfusion and obstetric history;
- to select the transfusion medium (blood, erythrocytes, plasma etc.);
- to transfuse blood and its components of the same blood type and rhesus group;
- to macroscopically inspect the fitness of the blood container for transfusion;
- to strictly observe the aseptic and antiseptic rules;
- to store blood and its components in a refrigerator at a temperature from +4 to -8°C, to check the storage conditions twice a day, and to make a note of each inspection in the appropriate log;
- to recheck the patient's blood group with two series of standard sera, and to compare the results with the blood group written down in the disease history;
- to determine the recipient's rhesus group if the analysis had not been made previously;
- to transfuse blood and its components from one container only to one patient;
- to determine the blood group of donated blood in a container with two series of standard sera of the ABO system;
- fresh blood serum obtained from the patient immediately prior to a subsequent blood transfusion must be used when running compatibility tests. To avoid mistakes, the last name and initials of the patient, his blood group and the date the sample was taken must be written immediately on the test tube;
- to run a test for group compatibility using the ABO system;
- to run a test on rhesus compatibility;
- to conduct a biological test, entailing three administrations of 10-15 ml of blood (erythrocytes, plasma) in a continuous flow, with an interval of 3 minutes between administrations. Absence of a reaction in the patient gives the physician the right to continue with the transfusion;
- to keep the patient under observation;
- to log transfusion of blood and its components and all tests and their results in the disease history (reporting form 005/u);
- when a reaction to transfusion of blood or its components occurs, the nature of the reaction must be described in detail in the disease history;
- to store partially used but still-sealed containers of transfusion medium and the test tube of the patient's blood taken prior to transfusion in a refrigerator at a temperature from +4 to -8°C for 48 hours;
- if a blood transfusion requires the use of several containers from the same donor, compatibility tests must be run with blood from each container.

Problems concerned with organizing blood transfusion in therapeutic and preventive institutions must be solved by specialists of the blood service jointly with workers of the health department and chief specialists of specialized services.

Software Supporting the Peacetime Disaster Plan of the Kazakh SSR Public Health System

927C0196D Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 8, Aug 91 pp 12-13

[Article by S.S. Tazhibayeva, N.A. Melnikova, R.A. Narmanbetova and T.I. Veprentsova, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases]

UDC 614.8

[Text] The southern and southeastern territories of Kazakhstan are earthquake regions. Major earthquakes have occurred here recently according to a historical yardstick: Vernenskiy (1887) with a magnitude of 7.3 points; Chilikskiy (1889)—M = 8.4, and Keminskiy (1911)—M = 8.2. Their intensity reached 9 and 11 points on the Richter scale.

Growth of seismic activity has been observed in these rayons in recent years. With regard for this, the republic's Ministry of Health and other departments are drawing up measures to reduce losses due to possible earthquakes and to improve the organization of health care to the population in disaster relief efforts in compliance with a decree of the Kazakh SSR Council of Ministers.

These measures include creating a subsystem for the automated control system of the Kazakh SSR Ministry of Health titled "Rendering Health Care to the Population in Peacetime Disasters." In the future the principal elements of this subsystem will be included in the "RASU- Kazakhstan," which is being written by the republic's civil defense staff for the case of extraordinary circumstances in peace and in war. The software is run on an IBM PC/XT/AT personal computer.

One of the main parts of this subsystem is the comprehensive program "Preparation of the Republic's Public Health System for Medical Support to the Population in the Event of Earthquakes and During Relief Efforts," currently being written. It is being created on the basis of a retrospective analysis of available materials on earthquakes that have occurred in the republic, in the USSR and in other countries. Indicators describing the actual readiness of public health and simulation models of possible variants of medical situations associated with earthquakes with intensities from 7 to 10 points are being considered as well.

Predicted Population Losses in an Earthquake in Alma-Ata (Time of Year—Winter, Time of Day—Night)

Earthquake Intensity (Points)	Predicted Total Losses (Thousands)	Predicted Public Health Losses (Thousands)	Predicted Irretrievable Losses (Thousands)
7	17,355	11,991	5,364
8	242,006	134,772	107,234
9	393,415	104,200	289,214
10	619,410	74,691	544,719

Preparation of this program is associated with carrying out a number of tasks that will make it possible to obtain the raw data necessary to plan health care to the population in earthquakes and during disaster relief efforts. We have thus far developed three subsystems: "Population Losses in an Earthquake," "Losses of Medical Personnel in an Earthquake," "Survival and Fitness of Medical Institutions for Use After an Earthquake."

In the course of this work we are forming a data base that includes a reference data array which we will use for calculations and modeling. Losses are calculated on the basis of a formula we developed. As a test example, we calculated possible population losses in an earthquake in Alma-Ata (see table) and in Alma-Ata Oblast.

Peripheral Blood Indexes as Function of Radionuclide Level in Children's Bodies

927C0006A Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 4, Apr 91 (manuscript received 01 Nov 90) pp 8-11

[Article by I. P. Danilov and A. I. Nemets, Belorussian Radiation Medicine Scientific Research Institute]

UDC 616.18:546.36

[Abstract] Peripheral blood analyses were performed for children aged 7-15 years in Krasnopolskiy Rayon in 1988 and again in 1990 to determine the cesium-137 radionuclide levels in their bodies. Cesium-137 is quickly absorbed by the blood and uniformly distributed throughout the body. Its half-life ranges from 20 to 50 days in children. The maximum acceptable dose, 0.14 roentgen equivalent man/year for children (0.3 μCi) was exceeded in 14.8 percent of children in 1988, but by 1990 this figure dropped to 8.2 percent, while the average radionuclide level decreased from 0.222 to 0.150 μCi for this period. At the same time, however, the percentage of children with radionuclide contents between 0.10 and 0.30 μCi increased by 60 percent, suggesting that hygienic standards set in the wake of Chernobyl still need to be observed. The results of analysis demonstrated that the leukocyte count was lower in children with greater than 1 μCi, as compared to the control group, while the rest of the indices were comparable. For those children with radionuclide levels close to the maximum dose acceptable, further improvement is needed in social, hygiene, and sanitation measures. Also recommended is continued observation for signs of possible remote sequelae. Tables 4; references 3: 2 Russian, 1 Western.

Condition of Lens in Inhabitants of Radionuclide Polluted Areas

927C0006B Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 4, Apr 91 (manuscript received 09 Oct 90) pp 11-12

[Article by A. S. Madekin, Chair of Eye Diseases, Grodnensk Medical Institute]

UDC 617.741)004.1)036.4:612.014.482

[Abstract] The effect of low doses of radiation on the lens structure was investigated in 114 residents of Bragin and Braginskiy Rayon, areas with a cesium density of up to 43 Ci/km^2 as a result of the accident at Chernobyl. These individuals ranged in age from 1 to 82 years and had come to the polyclinic with complaints of diminishing visual acuity. Cataracts to various degrees were found in 107 of those investigated. Analysis of the data revealed that cataracts in those under 21 years of age were confined to the posterior capsule and posterior cortex, and there was uneven cloudiness in the nucleus of the lens. Investigation of the frequency of the cataracts as a function of the dose of radiation exposure indicated that even very low doses can cause cataracts. In conclusion, the development of preventive and therapeutic methods for initial radiation cataracts is needed. Tables 1; references 2 (Russian).

Organelle Self-Assembly as Determinant of Radiosusceptibility of Cultured Cells

927C0141C Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 1, Mar 91 (manuscript received 10 Dec 90) pp 231-233

[Article by B.V. Sorochinskiy, V.V. Shmigovskaya, Ye.M. Strikhar and D.M. Grodzinskiy, academician, Ukr. SSR Acad. Sci., Institute of Cell Biology and Genetic Engineering, Ukrainian SSR Academy of Sciences, Kiev]

UDC 577.346:576.36

[Abstract] An analysis was conducted on the impact, if any, of chemical agents affecting cellular self-assembly processes on radiosusceptibility. The results showed that introduction of 10E-7 to 10E-6 M colchicine, phalloidin or taxol before or after irradiation exerted variable effects on transformed murine fibroblastoid L cells, strain 929, subjected to 7.5 Gy gamma irradiation (equivalent to LD_{50}) from a Cs-137 source. Colchicine, which favors disassembly of microtubules, was seen to increase radiosensitivity, whereas taxol and phalloidin, which promote self-assembly, were observed to increase radioresistance. These findings provide yet additional confirmation for the significance of self-assembly processes in radiobiology. Tables 1; references 8: 6 Russian, 2 Western.

Neurologic Status of Chernobyl Clean-Up Workers

927C0149A Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 36 No 5, May 91 (manuscript received 19 Apr 90) pp 17-19

UDC 616.8-02:614.876]-07

[Article by F.S. Torubarov, M.K. Nikolayev, P.V. Chesalin and E.N. Shakirova, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] Neurological assessment was conducted on 113 patients with acute radiation sickness as a result of working in damage control at the Chernobyl Nuclear Power Plant in Ukraine. The individuals presented with stages I-IV radiation injuries due to whole-body 0.8 to 16 Gy Γ-B irradiation; 96.5 percent of the subjects were males, with 70.2 percent in the 20-40 years age bracket. Stage IV radiation injuries were diagnosed in 20 cases, 15 of whom died within 14-20 days, with one patient surviving for 4 years. In 6 (30 percent) of these patients the primary neurological symptom complex was indicative of radiation encephalopathy, occuring without a lag phase in cases receiving > 10 Gy. Autopsies revealed widespread CNS edema, swelling and hemorrhagic foci. Encephalopathic complications in stages I-III were interpreted as manifestations of radiation toxicology, while recovery was characterized as complicated by systemic and angiopathic neurasthenic manifestations. Tables 3; references 11 (Russian).

Clinical Confirmation of Karyometric Lymphocyte Correlates of Low-Level Radiation Exposure

927C0149B Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 36 No 5, May 91 (manuscript received 20 Jul 90) pp 21-23

UDC 616.155.32-02:615.849.1]-07

[Article by E.Ye. Ogandzhanyan, A.S. Pogosyan, D.G. Saakyan, A.A. Ogandzhanyan, S.G. Ambartsumyan and

A.M. Dallakyan, Scientific Research Institute of Medical Radiology, Armenian SSR Ministry of Health, Yerevan]

[Abstract] Karyometric studies on peripheral blood lymphocytes were performed on Armenian workers engaged in Chernobyl decontamination in order to assess this method as indicator of low-dose radiation exposure. Control data were derived from pre-Chernobyl studies on 202 of the men. This approach showed that radiation-induced changes were evident in 188 (63.9 percent) of the 294 subjects involved in the effort which entailed a cumulative 25 rem dose over a period of time lasting from 2 days to 2 years (1-4 months average). The changes were evident 1-33 months after exposure and basically consisted of an increase in the percentage of large lymphocytes and a concomitant reduction in small and intermediate cells to statistically significant degrees ($p < 0.001$). The large lymphocytes was also significantly increased in size. Total counts were not affected. Cytogenetic studies on 19 subjects also revealed an increase in chromosomal abnormalities (4.1 percent) in 14 men, significantly greater than the control value (1.23 percent; $p < 0.001$). In 13 (68.4 percent) of the 19 men concordance was obtained between the karyometric and cytogenetic results. These findings indicate that lymphocyte karyometry is a valuable adjunct in monitoring exposure to low-dose ionizing radiation. Tables 2; references 6: 5 Russian, 1 Western.

Mitigation of Internal Cesium Irradiation by Ferric Ferrocyanide (Prussian Blue)

927C0149C Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 36 No 5, May 91 (manuscript received 28 May 90) pp 23-27

UDC 614.876.546.36]-074

[Article by V.N. Korzun, All-Union Scientific Center of Radiation Medicine, USSR Academy of Medical Sciences, Kiev]

[Abstract] Clinical and animal trials were conducted with Prussian blue as a means of mitigating radiation from internalized Cs-137. Trials on 16 adults in the Chernobyl area with whole body Cs-137 levels of 2-8 μCi showed that administration of Prussian blue (1 g q. 24 h) increased fecal and urinary elimination of Cs-137 4- to 5.3-fold from baseline elimination of 0.05 percent per day of the body load. As a food supplement Prussian blue was somewhat more effective than as an aqueous suspension. Studies on 80 12-14 year old children in the Rivne oblast, Ukraine—an area contaminated by the Chernobyl fallout—with mean Cs-137 body loads of 2 μCi (0.8-6 μCi) demonstated that Prussian blue food supplement (1 g q. 24 h) enhanced fecal elimination of Cs-137 from 0.11 percent to 1.96 percent, while total elimination (urine + fecal) increased from 0.7 to 2.62 percent per day of the body load. Finally, per os administration of 20 mg/day of Prussian blue to outbred rats was was shown to reduce absorption of Cs-137 by 90-93 percent. These studies provided further confirmation for the efficacy of Prussian blue in controlling absorption and promoting elimination of Cs-137, one of the more serious radionuclide health hazards posed by the Chernobyl accident. The available Prussian blue food supplements have met required Ukrainian and Soviet gustatory standards. Efforts are underway to secure wider clinical utilization of Prussian blue in controlling the health hazard posed by Cs-137. Figures 3; tables 4; references 12: 4 Russian, 8 Western.

Structural and Dynamic Features of Reactive Psychoses in Victims of Chernobyl Nuclear Accident

927C0158A Kiev VRACHEBNOYE DELO in Russian No 8, Aug 91 (manuscript received 31 Jan 91) pp 83-86

UDC 616.89-02:614.876

[Article by A.A. Revenok, Department of Affective Pathology, Ukrainian Branch, All-Union Scientific Research Institute of General and Forensic Psychiatry imeni V.P. Serbskiy, Kiev]

[Abstract] Monitoring of 148 subjects at the Kiev City Psychiatric Hospital between 1986 and 1990 for Chernobyl-related reactive psychosis, either residents in the vicinity at the time of the accident in April, 1986, or subjects involved in subsequent damage control, yielded 11 positive cases. The average age of the patients was 47.5 year, with an onset 2 to 4 months after the accident, i.e., at a time of maximum stress resulting from 3 day to 2 month exposure to ionizing radiation. In 9 of the patients the clinical manifestation was in the form of psychogenic paranoia and in 2 depressive changes were noted.

Outcome of Studies on Chemical Disease in Chernovtsi Children

927C0158B Kiev VRACHEBNOYE DELO in Russian No 8, Aug 91 (manuscript received 15 Jan 91) pp 88-91

UDC 616-053.3:613.6:(477.85)

[Article by D.D. Zerbino, L.N. Reznik, professor, and I.D. Babak, Chairs of Pathologic Anatomy and of Skin and Venereal Diseases, Lvov Medical Institute; Lvov Oblast Children's Hospital]

[Abstract] Hair analysis was conducted on 55 children (up to 14 years old) in the Chernovtsi region to further ascertain the nature of the Chernovtsi syndrome and compare the findings with those obtained in Lvov on children with thallium poisoning. Clinical manifestations incuded neurological involvement as well as mucosal lesions (92 percent), alopecia (88 percent), eosinopenia, lymphocytosis and left shift of the leukocyte formula (77 percent), respiratory distress (63 percent), delirium (22 percent) and cutaneous lesions (12 percent). The studies revealed high hair concentrations of various metals and morphological abnormalities consistent with metal poisoning. However, preponderance of the data implicated thallium as the key toxic factor in the Chernovsti syndrome. Figures 2; references 4 (Russian).

Cellular Immunity in HIV-1 Infections

927C0134A Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 91 (manuscript received 27 Feb 90) pp 23-25

[Article by M.Z. Saidov, B.V. Pinegin, A.M. Borisova, S.M. Andreyev, M.V. Sidorova and R.M. Khaitov, Institute of Immunology, USSR Academy of Sciences, Moscow]

UDC 616-082:612.017.1.064]-022.7:578.828.6

[Abstract] A fragment of the gp120 HIV-1 protein was employed in tests on sensitization in 5 patients with AIDS-related complex (ARC). The tests were desiged to measure inhibition of peripheral leukocyte adhesion to plastic surfaces and inhibition of capillary tube chemotaxis by the gp120 fragment (N-Cys-Tre-His-Gly-Ile-Arg-Pro-Val-Val-Ser-Tre-Gln-Leu-Leu-Asn-Gly-Ser-Leu-Ala-Glu-OH) conjugated to gelatin. The results showed in concentrations of ca. 10E-6 M gp120 inhibited adhesion and chemotaxis in patients with ARC. Inhibition was attributed to the presence of specific surface receptor for the gp120 epitope on T cells induced in the patients by the interaction of HIV-1 with CD-4 cells. Accordingly, the tests in question may be used in monitoring cellular sensitization in HIV-1 infections. Tables 2; references 12: 2 Russian, 10 Western.

Serum Inhibitory Factors in Aids-Related Complex (ARC)

927C0134B Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 91 (manuscript received 15 Jan 90) pp 26-27

[Article by B.V. Pinegin, M.Z. Saidov, O.F. Yeremina, A.M. Borisova and R.M. Khaitov, Institute of Immunology, USSR Ministry of Health, Moscow]

UDC 616-092:612.017.064]-022.755.78.828.6]-092:612.124.017.1.064

[Abstract] The observations that sera from AIDS patients inhibit certain immune reactions led to analysis of sera derived from 8 male and female patients with ARC and 5 HIV-positive individuals for inhibition of E-rosette formation and leukocyte chemotaxis. The results showed that 7 of the 8 ARC cases (17-58 years old) possessed serum factor(s) inhibiting reaction of T cells with sheep erythrocytes, as did the sera of 3 of the HIV-positive individuals. In addition, testing of 5 ARC sera showed that 4 inhibited chemotaxis, 3 of which were also inhibitory of E-rosette formation. Treatment of the ARC patients with plasmapheresis and/or travolol (synthetic D-penicillamine analog) led to recovery of E-rosette formation and in some cases actually enhanced it. Laboratory workups excluded involvement of C-reactive protein, suggesting that the inhibitory factors are related to HIV proteins. Tables 1; references 8: 1 Russian, 7 Western.

Enzyme Immunoassay for Coxiella Burnetii Antigens

927C0134D Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 91 (manuscript received 22 Nov 88; in final form 17 May 90) pp 56-60

[Article by Ye.N. Gorbachev, N.K. Tokarevich, V.N. Verbov, N.A. Kartseva, A.I. Artyukhov and A.B. Dayter, Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur, Leningrad]

UDC 616.98:579.881.13]-078.333

[Abstract] Technical details are presented on the preparation of Coxiella burnetii antigens, induction of hyperimmune antisera in rabbits, isolation of IgG, and preparation of IgG-horseradish peroxidase conjugates for use in ELISA for C. burnetii antigens. As routinely performed the assay had a sensitivity of 5-100 ng/ml for phase 1 and 2 antigens and the soluble lipopolysaccharide antigen. This level of sensitivity is 10- to 100-fold greater than that commonly seen with complement fixation. However, sensitivity was strongly influenced by the polystyrene planchettes used for adsorption, with best sensitivity and reproducibility (6.8 percent) obtained with Dynatech planchettes. There was no cross-reaction with heterologous antigens, nor with tissue antigens. Figures 6; references 11: 4 Russian, 7 Western.

ELISA for Monkeypox Virus

927C0134E Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 91 (manuscript received 03 Aug 89; in final form 25 May 90) pp 60-63

[Article by S.S. Marennikova, O.A. Zhukova, F.G. Nagiyeva, E.M. Shelukhina and G.R. Matsevich, Scientific Research Institute of Viral Prreparations, USSR Academy of Medical Sciences, Moscow]

UDC 579.821.5.083.24

[Abstract] A monoclonal antibody-based ELISA was developed for the identification and assay of monkeypox virus, using monoclonal antibodies derived from culture fluid and ascites and relying on rabbit anti-vaccinia Ig adsorbed to plastic planchettes. The results showed that ascitic fluids yielded several fold higher titers of monoclonal IgM and IgG antibodies (1:24,000 to 1:7,000,000) than culture fluids (1:729 to 1:2200); use of the former greatly enhanced ELISA sensitivity. Studies in Zaire demonstrated that the system was specific for monkeypox virus and allowed for its identification in skin lesions of human patients and experimentally infected monkeys. In all cases the results were confirmed by culture on chick embryo chorioallantoic membranes and Vero cell culture. Lyophilized monoclonal antibody-horseradish peroxidase conjugates retained full activity for 4°C for at least the 18 month period of observation. Tables 3; references 9: 4 Russian, 5 Western.

O-Alkyl-O-Methylchloroformiminophenylphosphonate Inhibitors of Neurotoxic Chicken Brain Esterase

927C0141A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 314 No 4, Oct 91 (manuscript received 11 Jan 91) pp 1009-1012

[Article by G.F. Makhayeva, I.V. Kononova, V.V. Malygin, Yu.E. Lyashenko, V.B. Sokolov and I.V. Martynov, corresp. member, USSR Acad. Sci., Institute of Physiologically Active substances, USSR Academy of Sciences, Chernogolovka, Moscow Oblast]

UDC 547.26.118:577.152.311:541:697+519.327.5

[Abstract] A series of o-alkyl-o-methylchloroformiminophenylphosphonates were tested for their selective inhibition of neurotoxic esterase (NE), inhibition of which triggers a cascade of biochemical processes leading to axonal degeneration. The in vitro studies were performed on NE derived from chicken brains, relying on phenyl valerate as the substrate. Comparison of pI_{50} values for NE, i.e., inhibitor concentrations giving 50 percent inhibition, showed that pI_{50} increased progressively from the CH_3 congener to the C_5H_{11} congener. The reverse was true in case of acetylcholinesterase (ACE) inhibition, leading to an increase in the ACE/NE pI_{50} ratio from 0.4 to 123.8. Accordingly, this class of inhibitors represents novel agents acting selectively on NE that may be used in studies on delayed neural degeneration in poisoning with organophosphorus compounds. Figures 1; tables 2; references 15: 3 Russian, 12 Western.

Naloxone Effects on Brain Development and Behavior of Drosophila Melanogaster

927C0141B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 316 No 4, Feb 91 (manuscript received 28 Jun 90) pp 988-991

[Article by L.I. Korochkin, L.G. Romanova, N.G. Kamyshev and G.P. Smirnova, Institutes of Developmental Biology, Moscow, and of Physiology imeni I.P. Pavlov, Leningrad, USSR Academy of Sciences; Moscow State University imeni M.V. Lomonosov]

UDC 557.2

[Abstract] Paucity of knowledge about the opioid system in insects resulted in an analysis of the effects of naloxone injection to Drosophila melanogaster wild-type Canton-S on motor activity, sexual behavior and phototaxis. At different stages of development the flies were injected with 50 μg/g. Injection of imagos resulted in statistically significant enhancement of individual motor activity, but not of group activity. Assessment of imagos injected with naloxone in the prepupal stage showed no difference in mating behavior or phototaxis. Histologic assessment failed to reveal any discernible changes in the nervous system of naloxone-treated and untreated flies, suggesting that whatever effect were noted were due to changes in neurotransmitter concentrations. Tables 2; references 7 (Western).

Antiviral Activity and Therapeutic Efficacy of Lipophilic Monoclonal Antibodies (LMA) Against Herpes Simplex Virus (HSV)

927C0141I Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 317 No 6, Apr 91 (manuscript received 24 Dec 90) pp 1487-1489

[Article by A.G. Kolomiyets, V.I. Votyakov, full member, USSR Acad. Med. Sci., G.V. Vladyko, A.V. Ovcharenko, A.V. Kabanov, N.S. Melik-Nubarov, N.Yu. Yaskovets, I.V. Malakhova, V.F. Yeremin, A.G. Moroz and N.D. Kolomiyets, Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk; All-Union Scientific Research Center for Molecular Diagnostics and Therapeutics, Moscow]

UDC 616.523-097

[Abstract] Stearic acid conjugated IgG monoclonal antibodies directed against the gD glycoprotein of HSV type 1 were screened for antiviral activity in vitro and tested for therapeutic efficay in vivo. Tissue culture studies demonstrated that LMA limited replication of HSV in primary chick embryo fibroblasts and neutralized HSV, whereas native monoclonal antibodies failed to prevent replication and were inefficient in neutralization. In addition, studies on outbred 6-7 g mice showed that intraperitoneal administration of LMA was 2.2- to 2.9-fold more effective than native antibodies in reducing mortality in herpetic meningoencephalitis and 1.8- to 3.6-fold more effective in generalized herpes. Both antibody preparations prolonged the prodromal phase by 3-8 days. These observations confirm the general impression that antibodies against any HSV glycoprotein provide specific immunity. In addition, rendering such antibodies lipophilic enhances their transition across the blood-brain barrier and therapeutic efficacy. particularly in CNS involvement. Figures 1; tables 1.

Similarities of Calcium and Muscarinic Receptor Blockers

927C0141M Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 318 No 1, May 91 (manuscript received 08 Jan 91) pp 221-223

[Article by V.Ye. Degtyar, G.I. Poda, R.N. Skryma and A.I. Luyk, Institute of Bioorganic Chemistry and Petrochemistry, Ukrainian SSR Academy of Sciences, Kiev]

UDC 612.829:557.1

[Abstract] In view of the fact that many calcium blockers have also been shown to block muscarinic receptors (MR), a series of anticholinergics have been assessed for calcium blocking activity. Studies on isolated neurons of the garden snail Helix pomatia showed that the m-cholinoreceptor antagonists benactyzine, atropine and glipin [sic] blocked current-gated calcium channels. Maximum effects were noted in 20-120 sec, followed by a slow recovery over 2-5 min. The EC_{50} values were on the order of magnitude with those of the calcium blockers verapamil and nifedipine, i.e. 10E-5 to 10E-3 M. Structure-activity analysis of these compounds revealed that they possess common pharmacophoric elements in the form of donor-acceptor centers. The latter are represented by a triagonal orientation of a carbonyl and an ester or hydroxyl oxygen atoms, and a tertiary nitrogen atom with effective charges in the -0.20 to -0.35 range. Figures 2; references 14: 7 Russian, 7 Western.

NTIS
ATTN PROCESS 103

5285 PORT ROYAL RD
SPRINGFIELD VA 22161

Foreign Broadcast Information Service (FBIS) and Joint Publications Research Service (JPRS) publications contain political, military, economic, environmental, and sociological news, commentary, and other information, as well as scientific and technical data and reports. All information has been obtained from foreign radio and television broadcasts, news agency transmissions, newspapers, books, and periodicals. Items generally are processed from the first or best available sources. It should not be inferred that they have been disseminated only in the medium, in the language, or to the area indicated. Items from foreign language sources are translated; those from English-language sources are transcribed. Except for excluding certain diacritics, FBIS renders personal names and place-names in accordance with the romanization systems approved for U.S. Government publications by the U.S. Board of Geographic Names.

Headlines, editorial reports, and material enclosed in brackets [ ] are supplied by FBIS/JPRS. Processing indicators such as [Text] or [Excerpts] in the first line of each item indicate how the information was processed from the original. Unfamiliar names rendered phonetically are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear from the original source but have been supplied as appropriate to the context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by the source. Passages in boldface or italics are as published.

SUBSCRIPTION/PROCUREMENT INFORMATION

The FBIS DAILY REPORT contains current news and information and is published Monday through Friday in eight volumes: China, East Europe, Central Eurasia, East Asia, Near East & South Asia, Sub-Saharan Africa, Latin America, and West Europe. Supplements to the DAILY REPORTs may also be available periodically and will be distributed to regular DAILY REPORT subscribers. JPRS publications, which include approximately 50 regional, worldwide, and topical reports, generally contain less time-sensitive information and are published periodically.

Current DAILY REPORTs and JPRS publications are listed in *Government Reports Announcements* issued semimonthly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 and the *Monthly Catalog of U.S. Government Publications* issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The public may subscribe to either hardcover or microfiche versions of the DAILY REPORTs and JPRS publications through NTIS at the above address or by calling (703) 487-4630. Subscription rates will be provided by NTIS upon request. Subscriptions are available outside the United States from NTIS or appointed foreign dealers. New subscribers should expect a 30-day delay in receipt of the first issue.

U.S. Government offices may obtain subscriptions to the DAILY REPORTs or JPRS publications (hardcover or microfiche) at no charge through their sponsoring organizations. For additional information or assistance, call FBIS, (202) 338-6735,or write to P.O. Box 2604, Washington, D.C. 20013. Department of Defense consumers are required to submit requests through appropriate command validation channels to DIA, RTS-2C, Washington, D.C. 20301. (Telephone: (202) 373-3771, Autovon: 243-3771.)

Back issues or single copies of the DAILY REPORTs and JPRS publications are not available. Both the DAILY REPORTs and the JPRS publications are on file for public reference at the Library of Congress and at many Federal Depository Libraries. Reference copies may also be seen at many public and university libraries throughout the United States.