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# Science & Technology

*USSR: Life Sciences*

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# Science & Technology

## USSR: Life Sciences

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### CONTENTS

29 March 1990

#### Aerospace Medicine

- Changes Produced by Space Flight Factors in Striated Muscle Ultrastructure  
*[O. M. Poznyakov, L. L. Babakova, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY, Vol 106 No 12, Dec 88]* ..... 1
- Spectral Analysis of Vestibular Nystagmus  
*[A. V. Telezhnikov, V. G. Bazarov, et al.; FIZIOLOGICHESKIY ZHURNAL, Vol 35 No 2, Mar-Apr 89]* ..... 1
- Effect of Helium and Argon on Oxygen Uptake by Lymphocytes  
*[T. N. Govorukha, A. I. Nazarenko, et al.; FIZIOLOGICHESKIY ZHURNAL, Vol 35 No 2, Mar-Apr 89]* ..... 1

#### Agricultural Science

- Influence of Trichotheccin on Pathogenesis in Wheat Infested with Stem Rust  
*[T. P. Yurina, A. M. Umnov, et al.; FIZIOLOGIYA RASTENIY, Vol 36 No 3, May-Jun 89]* ..... 2
- Zhaleyka Buckwheat  
*[T. A. Anokhina, Ye. D. Gorina, et al.; SELEKTSIYA I SEMENOVODSTVO, No 1, Jan-Feb 89]* ..... 2
- Skakun Oats  
*[Ye. V. Lyzlov, Ye. A. Vasilyeva-Pchelina; SELEKTSIYA I SEMENOVODSTVO, No 1, Jan-Feb 89]* ..... 2
- Bug Oats *[N. G. Bystrenko, S. I. Grib, et al.; SELEKTSIYA I SEMENOVODSTVO, No 1, Jan-Feb 89]* ..... 2
- Substitution of Cytoplasm in Varieties of Barley and Effect on Selection  
*[F. N. Batur, O. G. Davydenko, et al.; DOKLADY AKADEMII NAUK BSSR, Vol 33 No 7, July 89]* .... 2
- Changing Levels of Abscisic Acid and RDPKO Activity in Different Varieties of Triticum Aestivum L. in Water Stress  
*[Ye. V. Maydebura, I. I. Chernyadyev, et al.; DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI, No 6, Jun 89]* ..... 3

#### Biochemistry

- Electrostimulated Uptake of DNA by Liposomes  
*[L. V. Chernomordik, A. V. Sokolov, et al.; BIOLOGICHESKIYE MEMBRANY, Vol 6 No 2, Feb 89]* .. 4
- Central Asian Cobra (Naja Naja Oxiana) Venom Factor That Inactivates the Human Complement C4 Component  
*[L. V. Kozlov, B. B. Shoybonov; MOLEKULYARNAYA BIOLOGIYA, Vol 23 No 2, Mar-Apr 89]* ..... 4
- Biosynthesis of <sup>14</sup>C-macrocylic Trichotheccenes  
*[A. M. Zaychenko, T. I. Tugay, et al.; MIKROBIOLOGICHESKIY ZHURNAL, Vol 51 No 2, Mar-Apr 89]* ... 4
- Staphylococcal Enterotoxin E: Isolation, Purification, and Analysis  
*[M. L. Beylbayeva, Yu. V. Yezepchuk, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 4, Apr 89]* ..... 4
- Site-Specific Restriction Endonuclease Btcl from Bacillus Thuringiensis v. Canadensis  
*[A. I. Kuzin, M. I. Boleznin, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 4, Apr 89]* ..... 5
- Modification of RTX-III Neurotoxin from Sea Anemone (Radianthus Macroductylus) with Acetic Anhydride  
*[V. M. Makhnyr, E. P. Kozlovskaya; BIOORGANICHESKAYA KHIMIYA, Vol 15 No 4, Apr 89]* ..... 5
- Effects of Cholera Toxin and Cholera Toxin B-Subunit on Intracellular Concentrations of Free Calcium Ions *[Ye. I. Astashkin, A. M. Surin, et al.; BIOLOGICHESKIYE MEMBRANY, Vol 6 No 4, Apr 89]* .. 5
- Antioxidant Activity of Synthetic Ionophore Di-Sec-Butyl-Dibenzo-18-Crown-6 (DBBC)  
*[M. V. Zamarayeva, S. N. Klyuyev, et al.; BIOLOGICHESKIYE MEMBRANY, Vol 6 No 4, Apr 89]* .... 6
- Determination of Staphylococcus Toxin in Blood with Immobilized Antibodies on Polyamide Carrier  
*[Kh. K. Sultanov, M. M. Rakhimov, et al.; MEDITSINSKIY ZHURNAL UZBEKISTANA, No 2, Feb 89]* ..... 6

### Biophysics

- Ca<sup>2+</sup>-Dependent Capture of Small Negatively Charged Liposomes by Larger Monolamellar Liposomes of Phosphatidylcholine  
[V. G. Budker, Ye. V. Kiseleva, et al.; *DOKLADY AKADEMII NAUK SSSR*, Vol 305 No 6, Apr 89] ..... 7
- Vibronic Spectra of Bacteriorhodopsin and its Intermediate Forms in Photochemical Cycle  
[N. V. Karneyeva, S. P. Balashov, et al.; *BIOLOGICHESKIYE MEMBRANY*, Vol 6 No 3, Mar 89] ..... 7
- Effect of Hyperbaric Oxygenation of Animals and Humans on State of Mitochondria in Their Tissue (Based on EPR Study Data)  
[Ye. N. Burgova, A] F] Vanin, et al.; *IZVESTIYA AKADEMII NAUK SSSR; SERIYA BIOLOGICHESKAYA*, No 2, Mar-Apr 89] ..... 7

### Biotechnology

- Soviet-Swedish Enterprise [S. Turanov; *MEDITSINSKAYA GAZETA*, 11 Jun 89] ..... 9
- New Vector for Temperature-Controlled Expression of Cloned Genes. Synthesis in Escherichia coli Cells of Polypeptide Carrying Antigen Determinants of Human Immunodeficiency Virus  
[Ye. V. Barsov, M. I. Bukrinskiy; *BIOTEKHNOLOGIYA*, Vol 5 No 1, Jan-Feb 89] ..... 9
- Cloning of Beta-Glucuronidase Gene As Carrot Extensin Gene Promoter  
[A. L. Gartel, O. S. Melik-Sarkisov, et al.; *DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA*, No 3, Mar 89] ..... 9
- Design of Escherichia coli Strains Producing K88 Antigen  
[Ye. I. Popov, T. A. Svetoch; et al.; *BIOTEKHNOLOGIYA*, Vol 5 No 1, Jan-Feb 89] ..... 9
- Synthesis Regulation of Total Cell Proteins and Monoclonal Antibodies in Hybridoma Culture  
[O. S. Morenkov, Yu. A. Mantzsygin, et al.; *TSITOLOGIYA*, Vol 31 No 3, Mar 89] ..... 10
- Transformation of Solanum Laciniatum Cells by Various Ti- and Ri-Plasmids of Agrobacterium  
[G. D. Sadykova, N. S. Zakharchenko, et al.; *VESTNIK AKADEMII NAUK KAZAKHSKOY SSR*, No 6, Jun 89] ..... 10
- Cloning and Potential Applications of Human  $\alpha_1$ -Antitrypsin (AT) Gene  
[N. S. Neznanov, I. V. Makarova, et al.; *BIOPOLIMERY I KLETKA*, Vol 5 No 2, Mar-Apr 89] ..... 10
- Expression of Cloned Human Erythropoietin (Epo) Gene in CHO Cell  
[I. A. Kramerova, M. G. Zelenin, et al.; *BIOPOLIMERY I KLETKA*, Vol 5 No 2, Mar-Apr 89] ..... 11
- Expression of Escherichia coli  $\beta$ -Galactosidase in Mouse Hepatocytes  
[I. Ye. Kostetskiy, S. P. Shpilevaya; et al.; *BIOPOLIMERY I KLETKA*, Vol 5 No 2, Mar-Apr 89] ..... 11
- Expression of Exogenous Human Insulin Gene in Cultured Mammalian Fibroblasts  
[L. N. Neborachko, L. L. Lukash, et al.; *BIOPOLIMERY I KLETKA*, Vol 5 No 2, Mar-Apr 89] ..... 11
- Practical Application of Genetically Unstable Plasmid-Containing Producer Cells  
[K. Tomson, P. Liyk, et al.; *IZVESTIYA AKADEMII NAUK ESTONSKOY SSR: BIOLOGIYA*, Vol 38 No 1, 89] ..... 11

### Epidemiology

- Alopecia Reported in Estonia, RSFSR, Ukraine  
[V. Korchagina; *MEDITSINSKAYA GAZETA*, 13 Aug 89] ..... 12
- Prevalance of Premorbid Forms and Chronic Nonspecific Pulmonary Diseases Based on Data from a Special Study of Three Administrative Regions of Leningrad  
[I. G. Tsyura, V. I. Tyshetskiy, et al.; *VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR*, No 2, Feb 89] ..... 14
- Search for Statistical Correlations Between Plague Infectivity Indices and Fleas in Small Mammals  
[L. A. Burdelov, I. Zh. Zhubanazarov, et al.; *PARAZITOLOGIYA*, Vol 23 No 2, Mar-Apr 89] ..... 14
- Comparative Analysis of Ischemic Heart Disease Among 40- to 54-Year-Old Urban Males in Various Cities of the USSR: Cooperative Epidemiologic Survey  
[V. V. Konstantinov, G. S. Zhukovskiy, et al.; *TERAPEVTICHESKIY ARKHIV*, Vol 61 No 3, 89] ..... 14

### Genetics

- Cloning of Gene Responsible for Regulation of Nitrogen Fixation in Phototrophic Bacterium Rhodobacter Sphaeroides  
[S. V. Shestakov, M. M. Babykin, et al.; *DOKLADY AKADEMII NAUK SSSR*, Vol 305 No 4, Apr 89] .. 15

Production of Transgenic Pigs Containing and Expressing Surface Antigen Gene of Human Hepatitis Virus	
[I. M. Vasilyev, T. V. Vasilyeva, et al.; DOKLADY AKADEMII NAUK SSSR, Vol 306 No 1, May 89]	15
$\alpha$ -Hemolysin Determinant: Cloning and Tn1000 Insertional Mutations	
[D. A. Yelizbarashvili, S. K. Baumukhanova, et al.; GENETIKA, Vol 25 No 2, Feb 89]	15
Cloning of Pseudomonas putida Naphthalene Initial-Stage Oxidation Genes in Escherichia coli	
[A. M. Boronin, T. V. Tsoy, et al.; GENETIKA, Vol 25 No 2, Feb 89]	16
Restriction of Bi-Replicon Shuttle Escherichia Coli-Streptomyces Plasmids in Streptomyces Lividans 66 Strain	
[A. V. Orekhov, I. V. Strokina, et al.; GENETIKA, Vol 25 No 4, Apr 89]	16

### Immunology

Immunomodulating Action of Myelopeptides in Hypoxic Hypoxia in Animals	
[D. V. Sarybayeva, L. A. Zakharova, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY, Vol 106 No 12, Dec 88]	17
Localization of Protein Ligand-Receptor Sites	
[R. V. Petrov, M. A. Novikov, et al.; DOKLADY AKADEMII NAUK SSSR, Vol 305 No 6, Apr 89]	17
Effects of Myelopid on Early Immunosuppression in Stress	
[Ye. A. Kirilina, L. A. Zakharova, et al.; IMMUNOLOGIYA, No 1, Jan-Feb 89]	17
Experimental Study of Immunomodulating Action of Glucosaminyl-muramyl-dipeptide (GMDP). Influence of GMDP on Macrophage Component in Immune Response, Activation of T- and B-Lymphocytes, and Their Cooperative Interaction.	
[V. M. Manko, V. Yu. Skvortsov, et al.; IMMUNOLOGIYA, No 2, Mar-Apr 89]	18
Detection of Tularemia Agent in Patients by Immunofluorescent Antibody Technique	
[Ye. V. Ananova, L. S. Kamennova, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII, No 4, Apr 89]	18
Indirect Leukocytolysis Test (ILT) in Tularemia	
[N. A. Sukhanov, L. V. Merinova, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII, No 4, Apr 89]	18

### Industrial Medicine

Effects on the Body of Combined Exposure to Industrial Chemicals and Ionizing Radiation	
[V. V. Kustov; GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA, No 2, Feb 89]	19
Dose-Time-Effect Equation for One-Time Administration of Xenobiotic	
[V. N. Pavlov; GIGIYENA I SANITARIYA, No 2, Feb 89]	19
Quantitative and Qualitative Factors in Combined Effects of Carbofuran (Furadan), High Temperatures, UV Irradiation, and Low Humidity in Acute Experiments	
[D. I. Sapegin, T. A. Dzhayloyev; GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA, No 3, Mar 89]	19

### Laser Bioeffects

CO <sub>2</sub> Laser Surgery for Purulent Pulmonary Lesions	
[Ye. I. Brekhov, L. N. Sidarenko, et al.; GRUDNAYA KHIRURGIYA, No 2, Mar-Apr 89]	20
Influence of Laser Radiation Absorption by Blood Hemoglobin on the Damage Threshold of Pathologic Tissue During Laser Angioplasty	
[A. N. Bekeshko, A. A. Belyayev, et al.; MEDITSINSKAYA TEKHNIKA, No 1, Jan-Feb 89]	20
Effects of Helium-Neon Laser and Ionic Strength on E-Rosette Formation	
[R. M. Laptava, B. S. Balmukhanov, et al.; IMMUNOLOGIYA, No 1, Jan-Feb 89]	20
Treatment of Skin Melanoma with Laser Pulses	
[K. G. Moskalik, R. I. Vagner, et al.; SOVETSKAYA MEDITSINA, No 2, 89]	20
Raman Scattering Laser Spectroscopy for Studying Vitreous Bodies	
[M. N. Azhigaliyeva, V. G. Uldanov, et al.; VESTNIK OFTALMOLOGII, Vol 105 No 2, Jan-Feb 89]	21

### Medicine

Hemosorption in Combined Therapy of Advanced Acute Pneumonia and Infectious Lung Destruction	
[Yu. N. Levashev, V. A. Boinov, et al.; GRUDNAYA KHIRURGIYA, No 2, Mar-Apr 89]	22
Osmotic Activity of Loosely Crosslinked Arcylic Copolymers	
[K. V. Alekseyeva, O. L. Bondarenko; FARMATSIYA, Vol 38 No 1, Jan-Feb 89]	22
Cryogenic Treatment of Trigeminal Neuralgia	
[L. Boyko; MEDITSINSKAYA GAZETA, 19 May 89]	22

Fulminant Kaposi's Sarcoma with Visceral Lesions [A. Sh. Kyshtobayeva, V. A. Trishkin, et al.; VOPROSY ONKOLOGII, No 2, 1989] .....	22
Pathomorphological Changes in the Ganglia of the Solar Plexus in Burns [I. M. Isayev, L. I. Muzykant, et al.; ARKHIV PATOLOGII, Vol 51 No 2, 1989] .....	23
Histologic Diagnosis of African Histoplasmosis: First Case Reported in USSR [V. L. Bykov; ARKHIV PATOLOGII, Vol 51 No 2, 1989] .....	23
<b>Microbiology</b>	
Immunofluorescent Express Method for Determining Antibiotic Sensitivity of Brucella [Ye. A. Gubina, M. M. Zheludkov, et al.; ANTIBIOTIKI I KHIMIOTERAPIYA, Vol 34 No 2, Feb 89] ..	24
Bacterial Corrosion of Concrete [G. I. Karavayko, T. V. Zherebyatyeva; DOKLADY AKADEMII NAUK SSSR, Vol 306 No 2, May 88] ..	24
Immunochemical Characteristics and Serological Properties of Lipopolysaccharides Extracted from Various Species of Brucella by Various Extraction Methods [V. Ye. Malikov, Ye. A. Dranovskaya, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 3, Mar 89] .....	24
Dynamics of Anthrax Toxin in the Body [Ye. P. Golubinskiy, E. Ye. Tafelshteyn, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 3, Mar 89] .....	24
Detecting Antibodies Against R. prowazekii With Three Serological Tests [A. V. Kuznetsova, V. A. Yablonskaya, et al.; LABORATORNOYE DELO, No 2, 1989] .....	25
<b>Military Medicine</b>	
Methods of Physical Sanitation [V. Shapovalov; MEDITSINSKAYA GAZETA, 24 May 89] .....	26
Sanitary, Hygienic, and Antiepidemic Measures Among Troops Sent to Disaster Areas [I. S. Konyshv, I. M. Khomenko, et al.; VOYENNO-MEDITSINSKIY ZHURNAL, No 2, Feb 89] .....	26
<b>Molecular Biology</b>	
Cloning and Comparative Analysis of Two Structurally Distant $\delta$ -Endotoxin Genes of Bacillus Thuringiensis var. Galleriae and var. Kurstaki [A. L. Osterman, A. I. Karasin, et al.; MOLEKULYARNAYA BIOLOGIYA, Vol 23 No 2, Mar-Apr 89] ..	27
Complementary Site-Addressed Modification of Plasmid DNA [V. V. Vlasov, S. A. Gaydamakov, et al.; MOLEKULYARNAYA BIOLOGIYA, Vol 23 No 2, Mar-Apr 89] .....	27
Expression of Synthetic Human Angiogenin Gene in E. coli as Fused $\beta$ -Galactosidase/Angiogenin Protein [S. P. Kovalenko, I. A. Lisnyak, et al.; BIOORGANICHESKAYA KHIMIYA, Vol 15 No 4, Apr 89] .....	27
Recombinant Plasmids Bearing Genes of Hybrid Proteins with Antigenic Determinant of Foot-And-Mouth Disease Virus (FMDV) [Ye. A. Chernenkaya, A. I. Gurevich, et al.; BIOORGANICHESKAYA KHIMIYA, Vol 15 No 4, Apr 89] .....	27
<b>Nonionizing Radiation Effects</b>	
Invasive Properties of Pathogenic Escherichia Infecting Experimental Animals with Varying Immune Status [L. V. Grigoryeva, L. F. Yerusalimskaya, et al.; MIKROBIOLOGICHESKIY ZHURNAL, Vol 51 No 1, Jan-Feb 89] .....	29
Effects of Thermogenic-Intensity Microwaves on Quantitative Histologic Changes in Central and Intermediate Segments of Visual Analyzer [S. V. Logvinov; RADIOBIOLOGIYA, Vol 29 No 2, Mar-Apr 89] .....	29
Immune and Hormonal Effects of Local Microwave Radiation of Varying Intensity [S. B. Pershin, I. D. Frenkel, et al.; VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY, No 1, Jan-Feb 89] .....	29
Pulsed Decimeter Wave Therapy in Medical Rehabilitation of Patients With Chronic Nonspecific Pulmonary Disease [A. I. Krupennikov; VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY, No 1, Jan-Feb 89] .....	30

**Pharmacology, Toxicology**

- The Dynamics of Immunobiological Effects Following Transcerebral Microwave Exposure  
[S. B. Pershin, I. D. Frenkel, et al.; *VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY*, No 3, May-Jun 89] ..... 31
- Siberian Herbs Used to Treat Cancer, Psoriasis, Liver Damage  
[Arkady Semenov; *ADVANCES OF SCIENCE AND TECHNOLOGY*, No 15, 30 May 89] ..... 31
- Comparative Study of the Action of Dalargin and Obsidan on the Course of Experimental Acute Myocardial Infarction  
[V. S. Pavlenko, V. V. Khlystov, et al.; *PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA*, No 6, Nov-Dec 88] ..... 31
- Growth-Stimulating Effect of Baliz-2 Preparation on Sympathetic Ganglia in Culture  
[M. V. Kozlova, I. P. Sidorenko, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY*, Vol 106 No 12, Dec 88] ..... 32
- Quantitative Analysis of Vietnamese Cobra Venom in Pharmaceutical Ointments  
[I. A. Muravyev, Khoàng Ngok Khung; *FARMATSIYA*, Vol 38 No 1, Jan-Feb 89] ..... 32
- Use of Dalargin Electrophoresis to Adjust Mental State in State I and II Hypertension  
[V. A. Yezhov, A. G. Buyavykh; *ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA*, Vol 89 No 2, Feb 89] ..... 32

### Changes Produced by Space Flight Factors in Striated Muscle Ultrastructure

18400402d Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 106 No 12, Dec 88 (manuscript  
submitted 24 Dec 87) pp 746-749

[Article by O. M. Poznyakov, L. L. Babakova, and M. S. Demorzi, Scientific Research Institute of General Pathology and Pathological Physiology, USSR Academy of Medical Sciences, Moscow]

[Abstract] Space flight is known to produce functional disturbances in the muscular system, with changes in the system's structural organization and metabolism serving as the basis for the disturbances. The nature and the degree of the changes in the muscles vary, depending on the functional purpose of the muscle. It was for that reason that the authors chose to examine the structural response of various types of muscle in their study of the effects of a seven-day flight on the body. Ultrastructural analysis centered on portions of the soleus, gastrocnemius, and diaphragm muscles of six rats who had spent seven days aboard the Kosmos-1667 biosatellite and seven vivarium control rats. All the rats were Wistar SPF. After sacrifice, the muscles were prefixed in a 4% formaldehyde solution buffered to pH 7.4, and then they were postfixed in a 1% solution of OsO<sub>4</sub>. Destructive atrophic changes were found in the muscles from the biosatellite animals, with the soleus muscles exhibiting the most extensive alteration, owing to the fact that weightlessness removes all load from them. This heightens hypoxia, as evidenced by the condition of microvessels. A damaging factor for the muscles is also the structural reconfiguring of their synaptic apparatus. The lower level of neuromuscular interaction leads to a disturbance of trophic influences and the development in muscle fibers of denervation changes. The functional features of the other groups of muscles explained the lesser extent of the changes seen in them. Figures 1, references 6: 4 Russian, 2 Western.

UDC 617.761-009.24-02:616.282-008.1.073.97

### Spectral Analysis of Vestibular Nystagmus

18400533a Kiev FIZIOLOGICHESKIY ZHURNAL  
in Russian Vol 35, No 2, Mar-Apr 89 (manuscript  
received 3 Dec 87) pp 18-23

[Article by A. V. Telezhnikov, V. G. Bazarov, L. A. Savchuk, I. A. Belyakova, B. G. Kaduk, M. V. Kulikova, A. A. Tarasov, and V. L. Tsygankov; Institute of Otolaryngology imeni A. I. Kolomiychenko, Ukrainian SSR Ministry of Health, Kiev]

[Abstract] The purpose of this work was to study the frequency characteristics of nystagmograms obtained by rotary stimulation and to clarify the information content of changes in the spectrum for determining various cochleovestibular pathologic processes. For analyzing electro-nystagmograms (ENG), a model was used which assumed that the time series observed during rotation and at the

moment of culmination after a rotation were the sum of the periodic trend  $f(t)$  and a random component  $u(t)$ . The spectral power intensity, which determined the time series distribution of particular ENG components according to their frequencies, was evaluated by using periodograms calculated by the fast Fourier transform method. Spectral analysis of ENG's consisted of two steps: recording the initial signal from the electroencephalograph (EEGP 4-02) output onto a recorder (TEAC R-81) and inputting the signal, recorded in analog form, into an EC-1022 computer. Based on the results of ENG spectral analysis, frequency characteristics were determined—in particular, the first, third, and fifth harmonics. In the case of Meniere's disease, the third harmonic did not register when either the right or left labyrinth was stimulated. Patients with neuritides of auditory nerves formed four categories in which either the third or fifth harmonic failed to register. The authors proposed that the third harmonic reflects the state of the peripheral area of the vestibular analyzer, while the fifth reflects the central area. Figures 1; references 9 (Russian).

UDC 612.42.94:612.26.546.291+546.293

### Effect of Helium and Argon on Oxygen Uptake by Lymphocytes

18400533b Kiev FIZIOLOGICHESKIY ZHURNAL  
in Russian Vol 35 No 2, Mar-Apr 89 (manuscript  
received 27 Jan 88) pp 93-95

[Article by T. N. Govorukha, A. I. Nazarenko, L. N. Pinchuk, and G. V. Pinchuk; Institute of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Results of investigations involving the effect of inert gases on the oxygen metabolism of tissues are few and rather contradictory. In a number of works, the stimulating effect of helium and other inert gases on the intensity of tissue respiration is noted, while in several, this effect is not observed. In particular, the effect of inert gases has been insufficiently studied at the cellular level. Mammalian cells have not been researched in this respect. In this work, the effect of the inert gases helium and argon on O<sub>2</sub> uptake by white rat lymphocytes was studied. The obtained results showed that oxygen demand by a suspension of lymphocytes in an air medium was 1.8 μl x 20 min<sup>-1</sup> x 10<sup>-8</sup> cells, on average. In a normoxic helium-oxygen atmosphere, the lymphocytes' oxygen consumption definitely increased (P < 0.001). The presence of argon in the normoxic gas medium had practically no effect on the intensity of O<sub>2</sub> uptake by the lymphocyte suspension. It was determined that O<sub>2</sub> consumption increased almost two-fold when helium was substituted for nitrogen in the respiration medium and that this indicator did not change when argon was substituted for nitrogen. This can be explained by structural properties of the lymphocytes' cell membrane, such as the high dynamism and flow of its elements, which are probably due to the large protein content in the membrane. Figures 1; references 14: 9 Russian, 5 Western.

UDC 581.2

**Influence of Trichothecin on Pathogenesis in Wheat Infested with Stem Rust**

18400513 Moscow *FIZIOLOGIYA RASTENIY* in Russian Vol 36 No 3, May-Jun 89 (Manuscript received 14 Dec 87; after revision 9 Nov 88) pp 581-587

[Article by T. P. Yurina, A. M. Umnov, V. A. Karavayev, M. K. Solntsev, Department of Biology, Moscow State University imeni M. V. Lomonosov, Moscow]

[Abstract] A study was made to determine reactions facilitating suppression of the development of the stem rust pathogen in host plant tissues after treatment by the antifungal antibiotic trichothecin. All studies were performed on *Triticum aestivum* L. The influence of trichothecin was determined by counting the number of pustules on one leaf on the seventh day after infestation. Trichothecin caused significant restructuring in the host plant metabolism, increasing the biosynthesis of protein, increasing the activity of oxidative enzymes, increasing the content of phenols and the oxidation activity of an aqueous extract from the leaves and roots, as well as photosynthetic activity. Figures 3; References 18: 13 Russian, 5 Western.

UDC 633.12:631.526.32

**Zhaleyka Buckwheat**

18400521C Moscow *SELEKTSIYA I SEMENOVODSTVO* in Russian No 1, Jan-Feb 89 pp 28-29

[Article by T. A. Anokhina, Ye. D. Gorina, and I. V. Prokhorchik, Belorussian Scientific Research Institute of Agriculture]

[Abstract] Zheleyka, a variety of buckwheat which is insensitive to planting time, has been developed at the Belorussian Scientific Research Institute of Agriculture by a combination of complex hybridization and periodic selection of seeds on the basis of overall combinational capability. The new variety is a member of the vulgare subspecies, alata variety, an early Northern ecological group. It combines uniform blossoming with strong development of plants, reaching heights of 85-110 cm, depending on planting time and weather conditions. It is relatively resistant to lodging and branches well. Yields have reached 3.2 t/ha in tests.

UDC 633.13:631.526.32

**Skakun Oats**

18400521D Moscow *SELEKTSIYA I SEMENOVODSTVO* in Russian No 1, Jan-Feb 89 pp 30-32

[Article by Ye. V. Lyzlov, head of Oats Selection Laboratory, Podmoskovye Scientific-Production Association, and Ye. A. Vasilyeva-Pchelina, State Commission for Testing of Agricultural Varieties, USSR State Agricultural Commission]

[Abstract] A new variety of oats has been developed that combines good yield and resistance to unfavorable environmental factors with great ecological plasticity. The new variety, called Skakun, was created by selecting pairs for crossing based on the ecological-geographical considerations and extensive ecological testing of the selection materials under a variety of soil and climate conditions. Due to its great ecological plasticity, the new variety achieves stable high grain yields under a broad variety of natural conditions: up to 6.2 t/ha in tests. It has better-than-average lodging resistance and is suitable for intensive cultivation. It is resistant to powdery mildew and brown rust and yields grain of good quality.

**Bug Oats**

18400521E Moscow *SELEKTSIYA I SEMENOVODSTVO* in Russian No 1, Jan-Feb 89 pp 32-33

[Article by senior research associate N. G. Bystrenko, candidate of agricultural sciences S. I. Grib, research associate S. P. Khaletskiy, and junior research associate M. S. Kadyrova, Belorussian Scientific Research Institute of Agriculture]

[Abstract] The new variety of oats called Bug was developed by massive selection from a hybrid population of MGH 61645 X Grundy obtained in an exchange from Poland (Stshelze Selection Station). It has been regionalized in the Belorussian SSR and Kirovograd Oblast since 1986, the region expanding in 1987-1989 to include Chernigov, Kiev, Zhitomir, Rovno, Volyn, Lvov, Ivano-Frankovsk, Cherkassa, Ternopol, Poltava, Kalinin and Kaliningrad Oblasts, the Lithuanian SSR and Latvian SSR and the Kabardino-Balkar ASSR. The new variety is a member of the species *Avena sativa*, variety aurea, a Western European agroecotype. Plant heights reach 95-110 cm, it is a medripening variety with a vegetation period of 105-115 days in Belorussia, distinguished by its high yield—10.2 t/ha in tests. Yield is quite good in dry years. It has good resistance to lodging and typical diseases.

UDC 575.13:575.224

**Substitution of Cytoplasm in Varieties of Barley and Effect on Selection**

18400584 Minsk *DOKLADY AKADEMII NAUK BSSR* in Russian Vol 33 No 7 July 89 (manuscript received 2 Dec 88) pp 657-659

[Article by F. N. Baturo, O. G. Davydenko, M. A. Kadyrov, B. Yu. Anoshenko, Institute of Genetics and Cytology, Belorussian Academy of Sciences]

[Abstract] Although cytoplasmic genes have been proven to have an effect on the productivity of plants, such effects are difficult to use in selection, because processes such as photosynthesis or pollen fertility may be blocked in mutants and the introduction of foreign cytoplasm has a negative influence on many characteristics valuable in



selection. This article studies the effect of barley cytoplasm on many economically valuable characteristics using six specimens from the Western Selection Center, each of which was saturated with the pollen of five other varieties, creating an almost complete series of substituted lines. The data showed that intraspecific cytoplasmic variability is a powerful supplementary source of general genotype variability. References 7: 2 Russian, 5 Western.

UDC 581.192.7:633.11

**Changing Levels of Abscisic Acid and RDPCO Activity in Different Varieties of Triticum Aestivum L. in Water Stress**

18400591A Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 6, Jun 89 (manuscript received 4 Apr 88) pp 65-68

[Article by Ye. V. Maydebura, I. I. Chernyadyev, I. V. Kosakovskaya, Central Republic Botanical Garden,

UkSSR Academy of Sciences, Kiev; Institute of Biochemistry, USSR Academy of Sciences, Moscow]

[Abstract] The researchers here studied the effect of water stress on the activity of D-ribulose-1,5-diphosphate carboxylase-oxygenase (RDPCO), which is important in photosynthesis and photorespiration, and on the rate of formation of the phytohormone of stress of free endogenous abscisic acid in varieties of winter wheat *Triticum aestivum* L. that differ in their degree of resistance. Under stress, the length and weight of the plant above the ground decrease, while root weight increases. Water stress slightly affects the carboxylase activity of RDPCO. The most hardy variety of wheat, Mironovskaya 808, accumulated the largest quantities of phytohormone, indicating a correlation between the plant's tolerance and its ability to rapidly synthesize abscisic acid in stress conditions. The phytohormone may be used as an indicator to determine the hardiness of a variety of wheat.

UDC 577.352.2:577.113:577.115.7

**Electrostimulated Uptake of DNA by Liposomes***18400530c Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 6 No 2, Feb 89 (manuscript received 28 Jul 88) pp 212-217*

[Article by L. V. Chernomordik, A. V. Sokolov, and V. G. Budker; Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow; Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Electrostimulated uptake of donor DNA into cells is a new method for obtaining genetic transforms and for studying short-term expression of certain genes. A simple model system was used for studying the mechanism of electrically induced uptake of DNA by cells. An electrically induced, highly effective uptake of high-polymer DNA into monolayered liposomes approximately 0.5  $\mu\text{m}$  in diameter was developed. When the DNA entered the liposome, it was separated from the rest of the liposome by an additional membrane, i.e., it was located in an endosome-like vesicle. This indicates that the DNA did not enter through pores in the liposome membrane. Short-term (0.1-1 ms) exposure of the liposome suspension to a strong electric field (12.5 V/cm) in the presence of high-polymer DNA led to an uptake of nucleic acids by the liposomes. This uptake became more effective when bivalent cations ( $\text{Mg}^{2+}$  and  $\text{Ca}^{2+}$ ) were added to the medium in a 5 mM concentration, achieving 0.6 and 1.5  $\mu\text{g}$  DNA/ $\mu\text{mole}$  of lipid in the cases of T7 phage DNA and pBR322 plasmid, respectively. During electro-induced uptake of DNA by ethidium bromide (EtB)-containing liposomes, it was established that approximately 50% of the EtB moved out into the external solution and that DNA moved into the liposomes, but no DNA-EtB complexes formed inside the liposomes. The EtB and DNA inside the liposomes were separated by the endosome-like vesicle surrounding the DNA. Figures 4; references 20: 6 Russian, 14 Western.

UDC 577.112:612.124.017

**Central Asian Cobra (*Naja Naja Oxiana*) Venom Factor That Inactivates the Human Complement C4 Component***18400569A Moscow MOLEKULYARNAYA BIOLOGIYA In Russian Vol 23 No 2, Mar-Apr 89 (manuscript received 17 Feb 88) pp 372-378*

[Article by L. V. Kozlov and B. B. Shoybonov, Institute of Applied Molecular Biology, USSR Ministry of Health, Moscow]

[Abstract] Detailed kinetic studies were conducted on the inactivation of the C4 component of human complement by a factor derived from the venom of the Central Asian cobra (*Naja naja oxiana*). The factor (CFA-Ib)—a 60 kD glycoprotein with six sialic acid residues per

molecule and an N-terminal threonine—bound C4 with a  $K_i$  of 0.27  $\mu\text{M}$  and exhibited first order inactivation kinetics with a rate constant of 0.75  $\text{min}^{-1}$  at 37°C. The mechanism of inactivation presumably involved conformational changes in C4 leading to hydrolysis of the thioester bond. CFA-Ib also appears to act on the membrane bound fragment C4b to prevent the binding of the latter and the C2 component and the formation of C3 convertase. It appears that CFA-Ib may find practical applications in blocking the classical complement cascade. Figures 4; references 11: 5 Russian, 6 Western.

UDC 582.288-11:577.19

**Biosynthesis of  $^{14}\text{C}$ -macrocytic Trichothecenes***18400597B Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 2, Mar-Apr 89 (manuscript received 17 Sep 88) pp 71-74*

[Article by A. M. Zaychenko, T. I. Tugay, V. V. Shlyakhovoy, Institute of Microbiology and Virology, Ukrainian Academy of Sciences, Kiev; Institute of Biochemistry, Ukrainian Academy of Sciences, Kiev]

[Abstract] Macrocytic trichothecenes (MCTC) are formed during growth of fungi on natural hard substrates, particularly those containing cellulose, and on liquid media in the laboratory. Labelled MCTC are important for the solution of problems related to their distribution in the animal organism, their transport into the cell, and subcellular location, metabolism, and mechanism of action. The authors synthesized ( $^{14}\text{C}$ )-MCTC with the fungus *Dendrodochium toxicum* 5800, which forms a complex of trichothecenes—represented primarily by verrucarins A, rhoridin A, and rhoridin H. When glucose and acetate were used as precursors, the yields of alcohol-soluble fraction containing MCTC were almost identical when the glucose and acetate were introduced simultaneously with the inoculum. A similar introduction of  $^{14}\text{C}$ -mevalonate inhibited the yield of the fraction, whereas its introduction at the end of the logarithmic growth phase increased the yield almost sixfold. A similar effect has been noted by other researchers when acetate is introduced at the end of the growth phase, but it was for other mycotoxins. Radioactivity was highest when the precursor used was ( $^{14}\text{C}$ )-acetate introduced after 48 hours of cultivation. References 16: 1 Russian, 15 Western.

UDC 615.372:[579.861.2:615.919].012

**Staphylococcal Enterotoxin E: Isolation, Purification, and Analysis***18400593C Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGII in Russian No 4, Apr 89 (manuscript received 19 May 88) pp 32-36*

[Article by M. L. Beylbayeva, Yu. V. Yezepchuk and B. A. Ramazanova, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Kazakh

SSR Ministry of Health, Alam-Ata; Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted to devise a relatively simple, rapid, and efficient method for the isolation of staphylococcal enterotoxin E. The method that was finally employed yielded a preparation purified 133.5-fold in a yield of 48%, with a minimum enterotoxic (vomiting, diarrhea) dose of 5µg/kg on intravenous administration to 2-2.5 kg cats. The procedure started with precipitation of the toxin from the culture fluid with 70% ammonium sulfate, followed by a series of steps including chromatography on DEAE-cellulose and gel fractionation on Sephacryl S-200 columns. The MW of the preparation of toxin E obtained by the present method was 32 kD. Ouchterlony tests showed that it was antigenically identical to commercial preparations (Serva, FRG). Figures 5; references 8 (Western).

UDC 578.81:578.5].08

#### Site-Specific Restriction Endonuclease BtcI from *Bacillus Thuringiensis v. Canadensis*

18400593D Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGII in Russian No 4, Apr 89 (manuscript received 26 Feb 88; in revised form 23 Jun 88) pp 36-39

[Article by A. I. Kuzin, M. I. Boleznin, V. V. Smolyaninov and R. R. Azizbekyan, All-Union Scientific Research Institute of Applied Microbiology, Obolensk, Moscow Oblast; All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] Plating studies with phage Tp4 on *B. thuringiensis v. canadensis* and *B. thuringiensis v. galleriae* showed that on the former strain the efficiency was 10<sup>7</sup>-fold lower than on the latter. However, once grown in *B. thuringiensis v. canadensis*, the phage could be propagated without restriction. Studies on the mechanisms responsible for the difference led to the identification of a restriction endonuclease in *B. thuringiensis v. canadensis* designated as BtcI. A preparation of BtcI was obtained with activity of 30,000 U in a yield of 25%. BtcI required Mg<sup>2+</sup> for optimum activity and acted on the 5'...GATC...3' site on double stranded DNA, a recognition site identical to that of SauA3. The presence of the BtcI system in *B. thuringiensis v. canadensis* is presumably responsible for the high phage resistance of this strain. Cloning of the BtcI in *B. thuringiensis* strains used for the production of the protein toxin used for biological insect control could presumably yield improved industrial varieties. Figures 1; references 13: 6 Russian, 7 Western.

UDC 577.112.4

#### Modification of RTX-III Neurotoxin from Sea Anemone (*Radianthus Macrodactylus*) with Acetic Anhydride

18400602A Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 15 No 4, Apr 89 (manuscript received 4 Oct 88) pp 465-470

[Article by V. M. Makhnyr and E. P. Kozlovskaya, Pacific Institute of Bioorganic Chemistry, Far Eastern Department, USSR Academy of Sciences, Vladivostok]

[Abstract] An analysis was conducted on the biological effects of acetylation of neurotoxin RTX-III, the most toxic sea anemone toxin for mice. RTX-III is a 48 amino acid polypeptide containing six amino groups: an α-amino group on Gly<sup>1</sup> and five ε-amino groups on Lys moieties at positions 4, 32, 46, 47, and 48. Acetylation of the N-terminal amino group of RTX-III with acetic anhydride led to a 12-fold reduction in the LD<sub>50</sub> for mice in comparison with the native toxin. Acetylation of Lys-4 and two of the three C-terminal Lys residues reduced toxicity twofold. A 30- to 35-fold reduction in toxicity was attained when two amino groups were acetylated, providing that one of them was the N-terminal group. CD studies demonstrated that modification of the Lys-4 residue and of the C-terminal Lys residues altered the secondary structure of RTX-III. These observations indicate that the N-terminal amino group is involved in receptor binding, while Lys-4 and the C-terminal Lys residues appear to stabilize the active conformation of RTX-III. Figures 4; references 14: 3 Russian, 11 Western.

UDC 577.352.465:591.145.2:543.426

#### Effects of Cholera Toxin and Cholera Toxin B-Subunit on Intracellular Concentrations of Free Calcium Ions

18400603A Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 6 No 4, Apr 89 (manuscript received 18 Sep 87; after revision 6 October 88) pp 395-403

[Article by Ye. I. Astashkin, A. M. Surin, A. S. Gukovskaya, I. S. Nikolayeva and A. V. Lazarev, All-Union Scientific Research Institute of Biotechnology, USSR Ministry of Medical and Microbiological Industry, Moscow]

[Abstract] An analysis was conducted on the effects of cholera toxin (CT) and its B-subunit (CTB) on the concentration of intracellular free calcium (ICa) in thymic lymphocytes of Wistar rats, splenocytes of BALB mice, and P-388 macrophage culture. The methodology relied on measurement of fluorescence intensity of the indicator quin-2 (8-amino-2[2-amino-5-methylphenoxy)methyl]-6-methoxyquinoline-N,N,N',N'-tetraacetate). Addition of CT or CTB resulted in a marked increase in the intensity of quin-2 fluorescence

within 1-2 min. Analysis of data obtained in the presence of  $MnCl_2$  and EGTA and with preincubation with the ganglioside  $G_{M1}$ , and comparison with the results obtained with and without dialysis of CTB, demonstrated that the increase in fluorescence was not due to an increase in  $ICa$ . Rather, the increase in fluorescence was due to complex formation between extracellular Ca and quin-2 for the following reasons: commercial preparations of CT and CTB contain sufficient trace concentrations of EDTA to cause dissociation of quin-2-transition metal complexes, leading to transition metal chelation by EDTA and freeing quin-2 to react with extracellular Ca. Thus, contrary to earlier reports [Dixon, S.J., et al., J. CELL BIOL., 105:1153, 1987], CTB does not increase the permeability of the cytoplasmic membrane to Ca ions. Since  $ICa$  is one of the key trigger factors for cell division, it appears that CTB exerts a similar effect by an as yet unidentified mechanism. Figures 5; references 25: 4 Russian, 21 Western.

UDC 577.352.465:577.182.423

#### **Antioxidant Activity of Synthetic Ionophore Di-Sec-Butyl-Dibenzo-18-Crown-6 (DBBC)**

18400603B Moscow *BIOLOGICHESKIYE MEMBRANY* in Russian Vol 6 No 4, Apr 89 (manuscript received 8 Jan 88) pp 420-423

[Article by M. V. Zamarayeva, S. N. Klyuyev, A. I. Gagelgans, A. I. Marzoyev, A. K. Tashmukhamedova and B. A. Tashmukhamedov, Soil Biology Faculty, Tashkent State University imeni V. I. Lenin]

[Abstract] An assessment was conducted on the putative antioxidant properties of DBBC vis-a-vis nonenzymatic lipid peroxidation of liposome and sarcoplasmic reticulum derived from rabbit skeletal muscles. Determinations of malonic dialdehyde accumulation and chemiluminescence measurements demonstrated that DBBC

inhibited nonenzymatic lipid peroxidation in concentrations of 1-50  $\mu M$  and was comparable to the inhibitory activity of the classical inhibitor ionol (4-methyl-2,6-di-*tert*-butylphenol). The possible mechanism of action may have involved the function of DBBC as an active oxygen trap. In addition, it also appears that in the case of the sarcoplasmic reticulum inhibition of lipid peroxidation served to stabilize the membrane, as indicated by elevation of  $Ca^{2+}/ATP$  ratio. Figures 2; references 12: 9 Russian, 3 Western.

#### **Determination of Staphylococcus Toxin in Blood with Immobilized Antibodies on Polyamide Carrier**

18402086 Tashkent *MEDITSINSKIY ZHURNAL UZBEKISTANA* in Russian No 2, Feb 89 (Manuscript received 3 Nov 87) pp 54-58

[Article by Kh. K. Sultanov, M. M. Rakhimov, A. K. Rakhmatullayev, D. S. Shamsiyev, Central Asian Medical Pediatric Institute; Tashkent State University imeni V. I. Lenin]

[Abstract] An attempt was made to develop a method for identifying the staphylococcus toxin in blood on the basis of the use of immobilized biospecific heterogeneous antibodies on a polyamide carrier in a phospholipase reaction. The method was proven to be highly specific in tests on 83 pediatric staphylococcus pneumonia patients, with negative results in patients with pneumonia of nonstaphylococcus etiology and healthy persons. Staphylococcus pneumonia was diagnosed by the method in 244 patients in which it was not diagnosed by existing bacteriologic and serologic methods. The method can be used to monitor the effectiveness of treatment. The method is sensitive, simple, reproducible and does not require expensive equipment. Figures 4; References 5: 4 Russian, 1 Western.

UDC 577.352.4

**Ca<sup>2+</sup>-Dependent Capture of Small Negatively Charged Liposomes by Larger Monolamellar Liposomes of Phosphatidylcholine**

18400456a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 305 No 6, Apr 89 (manuscript received 19 Aug 88) pp 1495-1498

[Article by V. G. Budker, Ye. V. Kiseleva, M. V. Serebryakova, and A. V. Sokolov, Novosibirsk Institute of Bioorganic Chemistry, Siberian Division of USSR Academy of Sciences]

[Abstract] In presence of bivalent cations, polynucleotides are adsorbed on model phospholipid membranes or on lipid fragments of natural membranes. Adsorption of polynucleotide on large monolamellar liposomes of phosphatidylcholine (PC) and its mixture with cholesterol leads to a capture of a portion of the polynucleotide molecule in the internal volume of liposome by a mechanism resembling cellular endocytosis. At the adsorption site, membrane invaginations are formed which, upon closing, form endosome-like vesicles separating from the membrane into the internal liposome volume. It can be assumed that other negatively charged "particles" are similarly translocated through the phospholipid membrane. To test this assumption, the interaction of small, negatively charged liposomes from a mixture PC-dicetylphosphate with large monolamellar liposomes from a mixture of dipalmitoylphosphatidylcholine-cholesterol was studied. It was shown that the nucleic acids, as well as the fragments with a fixed polyanionic surface may be captured by liposomes in presence of bivalent cations by a mechanism resembling adsorption endocytosis. It may be assumed that the presence of multiple, uniformly distributed binding sites on the particle, regardless of its nature, is sufficient for the translocation of the particle through the phospholipid membrane. Figures 2; references 6: 2 Russian, 4 Western.

UDC 577.344:577.354.24

**Vibronic Spectra of Bacteriorhodopsin and its Intermediate Forms in Photochemical Cycle**

18400531 Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 6 No 3, Mar 89 (manuscript received 5 Aug 88) pp 290-300

[Article by N. V. Karneyeva, S. P. Balashov and F. F. Litvin, Biological Faculty, Moscow State University imeni M. V. Lomonosov]

[Abstract] The purple membrane of Halobacterium halobium was subjected to low-temperature absorption spectroscopy to assess the vibronic transitions of 13-cis- and trans-bacteriorhodopsin (BR) and its intermediate bacteriorhodopsin forms—K(P600), L(P500), and M(P419)—encountered in the photochemical cycle. The study led to the identification of a number of vibronic

bands differing in position, halfwidth, and intensities. For example, the major band of trans-BR in a light-adapted water-glycerol suspension at 90 K consists of 8 components at a minimum: 632 nm, 620 nm, 606 nm, 580 nm (major), 550 nm, 510 nm, 470 nm, and 448 nm. Analysis of the positions of the bands, intervals, halfwidths, and relative intensities indicated that the electronic transitions correspond to valency vibrations of conjugated C=C bonds. Consequently, the structures of trans-BR, 13-cis-BR, and the K, L, and M intermediates are largely due to  $\pi-\pi^*$  transitions of a highly resolved (<sup>1</sup>Bu<sup>+</sup>) state. In the short wavelength bands the interband intervals were 1370 cm<sup>-1</sup>, on the average. In the longer wavelength region the intervals between the most intense band and two adjacent bands decreased to 990 cm<sup>-1</sup> in the case of the L intermediate, to 925 cm<sup>-1</sup> in the case of 13-cis-BR, and to 850 cm<sup>-1</sup> for trans-BR. These differences were attributed to greater delocalization of the  $\pi$  electrons on the protonated chromophores (L, trans-BR, BR570) in comparison with the deprotonated M form. The vibronic bands of the primary photoproduct, K(P600), were 2.5-3 times wider than those of trans-BR, indicating greater internal mobility of P600 in comparison with the other forms. In addition, differences in the vibronic structure of 13-cis-BR and L(P550) spectra indicate different conformations for these two forms. Figures 10; references 23: 7 Russian, 14 Western.

UDC 577.3

**Effect of Hyperbaric Oxygenation of Animals and Humans on State of Mitochondria in Their Tissue (Based on EPR Study Data)**

18402081a Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 89 (manuscript received 25 Feb 87) pp 191-197

[Article by Ye. N. Burgova, A. F. Vanin, Ye. A. Demurov and I. V. Proshina, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Hyperbaric oxygenation (HBO) is used increasingly to treat diseases that lead to tissue ischemia on the assumption that availability of excess oxygen should help to overcome the ischemia. Yet, the possibility of the toxic effect of oxygen cannot be excluded. The goal of this work was to investigate the effect of HBO in detail, concentrating on the changes in the functional state of mitochondria in the tissue of subjects exposed to HBO. A ratio of differential intensities of EPR signals of the semiquinone-type free radicals and of iron-sulfur proteins recorded at liquid nitrogen temperature was used (R index). Experiments were done on mice, rats and rabbits. Also placenta from pregnant women undergoing abortions for medical reasons were studied. Exposure of normal mouse and rabbit tissue to close to toxic doses of HBO resulted in an increased R index, indicating a shift in the mitochondrial redox state towards the oxidation. This was not observed in the

ischemic tissue (experimentally induced myocardial infarcts) where additional oxygen simply counteracted tissue hypoxia. Women with pathological pregnancies

treated with HBO showed a decreased R index in their placental mitochondria. Figures 2; references 14: 9 Russian, 5 Western.

**Soviet-Swedish Enterprise**

18402161b Moscow MEDITSINSKAYA GAZETA  
in Russian 11 Jun 89 p 4

[Article by C. Turanov, TASS correspondent, under the rubric "Facets of Cooperation": "'Technoferm Inzhiniring' Makes Guarantees"]

[Text] The joint Soviet-Swedish enterprise known as Technoferm Inzhiniring will produce equipment that uses ecologically clean technologies to effect the complex processing of plant biomass, for the purpose of producing products for food, for fodder, and for medical and chemical use. The agreement on the creation of the enterprise was signed in Moscow by representatives of the USSR Ministry of Medical and Microbiological Industry and of the Swedish firm Sunds Defibrator.

The enterprise, which is to be set up at the Manturovo Biochemical Plant in Kostroma Oblast, guarantees all interested firms—be they domestic or foreign—door-to-door delivery and servicing of automatic units. The new equipment will be manufactured with Soviet technology, with machine tools supplied by Swedish side.

UDC 579.252.5.001.66

**New Vector for Temperature-Controlled Expression of Cloned Genes. Synthesis in Escherichia coli Cells of Polypeptide Carrying Antigen Determinants of Human Immunodeficiency Virus**

18400516A Moscow BIOTEKHNOLOGIYA in Russian  
Vol 5 No 1, Jan-Feb 89 (Manuscript received  
20 Mar 87) pp 4-8

[Article by Ye. V. Barsov and M. I. Bukrinskiy, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, Moscow]

[Abstract] The purpose of this work was to design, based on the plasmid pUC 18, a vector containing a temperature-sensitive mutant of the lac i<sup>ts</sup> repressor gene. The use of this vector for expression of the HIV env gene combines the advantages of pUC 18 with reliability of repression during cloning and simple induction. Temperature-regulated expression of the polypeptides encoded by the HIV env gene was achieved in E. coli cells. Figures 2; References 12: 6 Russian, 6 Western.

UDC 631.523.11

**Cloning of Beta-Glucuronidase Gene As Carrot Extensin Gene Promoter**

18400524 Moscow DOKLADY VSESOYUZNOY  
ORDENA LENINA I ORDENA TRUDOVOGO  
KRASNOGO ZNAMENI AKADEMII  
SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I.  
LENINA in Russian No 3, Mar 89 (Manuscript received  
27 Jul 88) pp 7-9

[Article by A. L. Gartel, O. S. Melik-Sarkisov, G. K. Gazaryan, All-Union Scientific Research Institute of Agricultural Biotechnology; Institute of Molecular Genetics, USSR Academy of Sciences]

[Abstract] The study of the strength of promoters of various plant genes is very important for the creation of transgenic plants with high levels of expression of the transferred genes. One of the most widely used gene markers is the  $\beta$ -glucuronidase gene of E. coli. The plasmid pBIN can substitute the  $\beta$ -glucuronidase gene as a promoter by means of a polylinker. After transfer of this plasmid into Agrobacterium tumefaciens and inoculation of the plants, the transgenic plants can be selected on the basis of canamycin resistance, while the  $\beta$ -glucuronidase gene expression level indicates the strength of the promoter. Carrot extensin is the major component of the cell wall, an oxyproline-rich glycoprotein. The expression of extensin is increased after injury or attack by pathogens, indicating its significance in the defensive strategy of the plant. Figures 3; References 7 (Western).

UDC 576.851.48

**Design of Escherichia coli Strains Producing K88 Antigen**

18400516B Moscow BIOTEKHNOLOGIYA in Russian  
Vol 5 No 1, Jan-Feb 89 (Manuscript received  
24 Jul 86) pp 9-14

[Article by Ye. I. Popov, T. A. Svetoch, V. M. Pavlov, V. T. Shitov, S. P. Torskiy, and K. I. Volkovoy, All-Union Scientific Research Institute of Applied Microbiology, Obolensk, Moscow Oblast]

[Abstract] The adhesion factors of enterotoxigenic escherichia causing diarrhea in humans (CFA/1, CFA/2) and young farm animals (K88, K99, P98 and F41) have been studied in recent years, with the K88 antigen—the main immunogen in piglet colibacteriosis—of especial interest to veterinary medicine. This article suggests a method for the production of strains of E. coli K12 containing natural K88 plasmid and for the construction

of recombinant DNA with K88 genes. The Hind III fragment containing the structural genes of K88 was cloned from pPM1 plasmid on pBR322 vector, shortened from 7.7 MD to 4.3 MD and tested for expression of K88 antigen, which was found to depend on orientation of the Hind III fragment. Experiments with rabbits and white mice demonstrated strong immunogenic properties. Figures 3; References 18: 3 Russian, 15 Western.

UDC 577.217:57.083.3

### Synthesis Regulation of Total Cell Proteins and Monoclonal Antibodies in Hybridoma Culture

18400560 Moscow *TSITOLOGIYA in Russian*  
Vol 31 No 3, Mar 89 (manuscript received  
28 Oct 87) pp 324-335

[Article by O. S. Morenkov, Yu. A. Mantsygin and E. I. Lezhnev, Institute of Biological Physics, USSR Academy of Sciences, Pushchino]

[Abstract] The goal of this work was to investigate the effect of fetal bovine serum (FBS) on the metabolism of total cell proteins and monoclonal antibodies (McAb), as well as the mechanism of regulation of total protein synthesis during the growth of hybridoma culture with changing concentration of FBS in the medium. Decreasing the concentration of FBS from 10% to 1% lowered the rate of synthesis of the proteins, whereas the rate of the degradation and secretion did not change; specific production rate of McAb per cell was not affected by changes in FBS concentration. When FBS was completely removed from the medium, the rate of synthesis of the cellular protein dropped twofold, while that of the McAb dropped by 5-10% only. This was related to slower initiation of the translation, slower elongation of the polypeptide chain, and slower termination of the translation. The decrease in protein synthesis in the stationary phase of the cell growth was the result of a 15-25% drop in the ribosome content per cell, a twofold decrease in the ribosome content involved in mRNA translation and a decrease in mRNA translation by 5-15%. During the cell growth process, their content of poly(A)<sup>+</sup>RNA decreased, while the nontranslated poly(A)<sup>+</sup>RNA increased. At least some of the free ribosomes and the nontranslatable poly(A)<sup>+</sup>RNA were found to be functional, because they could be involved in translation by the action of cycloheximide. This shows that, during the growth of ribosomal cells, the decrease in the portion of ribosomes participating in protein synthesis is due to the decreased rate of translation initiation. Figures 7; references 22: 4 Russian, 18 Western.

### Transformation of *Solanum laciniatum* Cells by Various Ti- and Ri-Plasmids of *Agrobacterium*

18400585 Alma-Ata *VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian* No 6, Jun 89 pp 42-47

[Article by G. D. Sadykova, N. S. Zakharchenko, Sh. K. Murumbayeva, A. U. Akhanov, Ya. I. Buryanov]

[Abstract] The use of medicinal plant tissue cultures as sources of biologically active compounds is a promising area of biotechnology, though the yield of active compounds is much lower than in normal plants. This article studies the tropical plant *Solanum laciniatum*, a source of steroid alkaloids used in the pharmaceutical industry as raw material for producing steroid hormonal drugs. The literature contains information on callus formation and regeneration of *S. laciniatum*, but no information on the genetic transformation of its cells. The purpose of the work reported here was to study the relationship between differentiation of transformed *S. laciniatum* cells and the functionality of genes for synthesizing phytohormones into T-DNA of Ti- and Ri-plasmids. *Agrobacterium tumefaciens* and *A. rhizogenes* were grown in LB culture fluid at 28°C for 48 hours. After the *S. laciniatum* tissue culture was prepared in a Murashige-Scoog medium, it was co-cultivated with the agrobacteria in a culture fluid without hormones for 48 hours, in the dark, with constant mixing. The calluses were then sown on a hormone-free medium that contained carbenicillin and sephataxime. The sterile shoots were inoculated with the freshly grown culture of agrobacteria. Leaf disks were co-cultivated with the agrobacteria for two days and were then transferred to the hormone-free medium. Calluses transformed by the plasmids tested had all the properties of tumor cells. The transformed cells synthesized octopine. Figures 4, references 12: 2 Russian, 10 Western.

UDC 612.349.7.018

### Cloning and Potential Applications of Human $\alpha_1$ -Antitrypsin (AT) Gene

18400601A Moscow *BIOPOLIMERY I KLETKA in Russian* Vol 5 No 2, Mar-Apr 89 (manuscript received 10 Dec 87) pp 43-47

[Article by N. S. Neznanov, I. V. Makarova, I. A. Kramerova and K. G. Gazaryan, Institute of Molecular Genetics, USSR Academy of Sciences, Moscow; Institute of Biomedical Technology, USSR Ministry of Health, Moscow]

[Abstract] Cloning studies were conducted with the human AT gene using a cDNA copy of the mRNA for the protein. The largest of the cDNA molecules was 1.2 kb long and shown to lack the terminal 5'-end 345 bp. Hybridization studies demonstrated that the cloned cDNA molecule did not code for the Z variant of AT. At position 130 it contained the CTA codon rather than CTC which is normally present; however, the difference was insignificant since both codons encode Leu. Determination of the regulatory sequence responsible for expression in hepatocytes showed it to be identical to that previously described by others. The hypothesis was advanced that cloning the AT gene in retrovirus may be an approach for the introduction of the AT gene into hepatocytes and macrophages (bone marrow cells) for possible gene therapy of hepatic cirrhosis and pulmonary emphysema. Figures 2; references 11 (Western).



UDC 612.349.7.018

**Expression of Cloned Human Erythropoietin (Epo) Gene in CHO Cell**

18400601B Moscow BIOPOLIMERY I KLETKA in Russian Vol 5 No 2, Mar-Apr 89 (manuscript received 10 Dec 87) pp 47-51

[Article by I. A. Kramerova, M. G. Zelenin, M. M. Vorontsova, S. L. Kolobkov and T. Ye. Monakova, Scientific Research Institute of Biomedical Technology, USSR Ministry of Health, Moscow]

[Abstract] Previous isolation of the Epo gene from a human genome phage library was followed up by the recloning of the gene in plasmid vector pSV2gpt. In the resultant pSEpo plasmid the Epo gene was under the control of the early genes of virus SV40. Subsequent transfection of Chinese hamster cells (CHO<sup>t</sup>) showed that the Epo gene was expressed in the CHO cells, yielding erythropoietin in concentrations of 0.5-1.5 U/ml. These findings suggest that the plasmid pSEep may be useful in experiments on the introduction of the Epo gene into fibroblasts obtained from patients with erythropoietin deficiencies. Hypothetically, reintroduction of such transfected fibroblasts into a patient may be an approach to gene therapy for such conditions. Figures 1; references 25: 1 Russian, 24 Western.

UDC 577.212:577.352.27

**Expression of Escherichia coli  $\beta$ -Galactosidase in Mouse Hepatocytes**

18400601C Moscow BIOPOLIMERY I KLETKA in Russian Vol 5 No 2, Mar-Apr 89 (manuscript received 9 Sep 88) pp 51-58

[Article by I. Ye. Kostetskiy, S. P. Shpilevaya, L. I. Likhacheva, L. G. Zharova, D. M. Irodov, V. S. Kirillova and V. A. Kordyum, Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Trials were conducted on the expression of a bacterial gene in a mammalian system, using a system in which a liposomally enclosed recombinant plasmid was injected directly into mouse hepatic tissue. The gene in question, E. coli lacZ gene encoding  $\beta$ -galactosidase (GS), was borne by plasmid pGA193. Two-month-old BALB/c received direct intrahepatic injections of the liposomal preparation containing 10  $\mu$ g of plasmid DNA. Immunofluorescent antibody studies demonstrated production of GS in 24 h in 20-25% of the cells. The time factor suggests that production of GS was due to function of the free plasmid since the time appeared to be insufficient for integration of the plasmid into the genome. Figures 4; references 21: 5 Russian, 16 Western.

UDC 577.21:579.25.5

**Expression of Exogenous Human Insulin Gene in Cultured Mammalian Fibroblasts**

18400601D Moscow BIOPOLIMERY I KLETKA in Russian Vol 5 No 2, Mar-Apr 89 (manuscript received 10 Nov 87) pp 58-61

[Article by L. N. Neborachko, L. L. Lukash, B. M. Troyanovskiy, I. S. Varzanova, T. I. Buzhiyevskaya and V. A. Kordyum, Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Studies were conducted on the expression of the human insulin gene in human and heterologous mammalian fibroblasts. The approach involved the use of a recombinant plasmid, pBR322, bearing the human insulin gene with a promoter but lacking the regulatory segment determining tissue specificity. Transfection of human pulmonary fibroblasts and mouse C3H10T1/2 fibroblasts led to a similar pattern of proinsulin/insulin synthesis as determined by ELISA based on monoclonal antibodies against proinsulin/insulin. Production of proinsulin/insulin rose to above baseline levels between days 3 and 10 (approx. 150+ ng/ml), and diminished rapidly thereafter. In that timeframe tissues culture levels of glucose fell by 100-400 mg%. Figures 1; references 18: 1 Russian, 17 Western.

UDC 577.31

**Practical Application of Genetically Unstable Plasmid-Containing Producer Cells**

18402069A Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR: BIOLOGIYA in Russian Vol 38 No 1, 89 (Manuscript received 3 Jul 87) pp 1-8

[Article by Katrin Tomson, Peeter Liyk, Rayvo Vilu, Institute of Chemical and Biological Physics, Estonian Academy of Sciences; Tartu State University]

[Abstract] When plasmid-containing producers are cultivated by biotechnology methods, there is a rapid loss of plasmid-bonding syntheses. This article studies the selection of a vector and recipient cell to achieve the maximum production for each specific process. Equations are derived describing the change in the distribution of plasmids in the cell during the growth of cells under both nonselective and selective conditions. The ratio of plasmid-containing cells to plasmid-free cells determined by the probability of elimination of plasmid DNA and is independent of flow rate. The model assumes that the plasmids reproduce once per cell cycle and are randomly divided among daughter cells. Various mechanisms are discussed for the instability of the plasmid DNA. Figures 2; References 4 (Western).

**Alopecia Reported in Estonia, RSFSR, Ukraine**

18402159 Moscow *MEDITSINSKAYA GAZETA*  
in Russian 13 Aug 89 pp 2

[Article by V. Korchagina, *MEDITSINSKAYA GAZETA* correspondent, ESSR under the "Acute Situation" rubric: "Trouble of Sillamyae"; first two paragraphs are *MEDITSINSKAYA GAZETA* introduction]

[Text] *This small seaside city in northeastern Estonia "gained renown" this spring. Right after the inhabitants of Chernovtsy, cases of alopecia were identified among children. Reports flashed by in the press: a commission of the USSR Ministry of Health is working in Sillamyae, and they are discussing the causes.*

**And in the meantime, the number of those afflicted or, to be more precise, the number of cases detected is growing. And not only in Sillamyae. And like the circles in the water, problems and more problems have begun to expand, unfolding one after the other.**

**Try to analyze things**

The northeastern region of Estonia is termed an ecological disaster zone. The water, air, and soil here are in a state of crisis. Manmade lunar landscapes in the vicinities of industrial enterprises are typical in these places. So too are the alarming statistics reflecting the state of the population's health. And now another sign of trouble.

It could have gone unnoticed. Especially since, as the oldtimers confirm, cases of alopecia in children are not all that rare in these parts. It has happened before. It simply did not receive the proper attention. No special accounting was made. Now try to analyze the situation.

"Perhaps it would not have been considered important this time either," honestly admits T. Arisov, head of the pediatric polyclinic, "if there had been no history of it in Chernovtsy. When a change in the hair cover of 6-year-old Anton was detected during the screening examinations that were performed on children at the No. 13 Pediatric Center, the first thought was 'Is history not repeating itself with our children?' The new examinations only intensified the alarm—several other children were diagnosed as having alopecia."

The chronicle of these data, which is reflected in numerous reports, is reminiscent of a combat summaries: every examination produced new names and addresses of those affected. There were 24 by the beginning of March. Most were children from the same pediatric center (No. 13), and they lived in the same microregion. Just a coincidence? Or maybe it's precisely in this microregion that the key to unravelling the causes for the children's hair loss must be sought? The USSR and Estonian Ministry of Health commissions working in Sillamyae have focused their attention on the following fact: almost all of those affected had recently suffered an acute respiratory illness or chickenpox. The in-depth research conducted at the clinic of the Pediatric

Institute of the USSR Academy of Medical Sciences (to which 17 children from Sillamyae were sent) discovered that many of the children had a whole bouquet of somatic illnesses, disturbances in the function of their digestive organs and endocrine glands, and deviations in the cellular makeup of their blood. Laboratory analyses showed elevated contents of lead, cadmium, zinc, magnesium, and other such elements in their blood, urine, hair, and nails.

"In a word, the entire periodic table contained in industrial emissions," comments V. Romanov, head physician of the Sillamyae Sanitary Epidemiologic Station.

And still, they soon had to give up the attempt to localize the source of the illness. Despite every effort to investigate the air and water and foodstuffs and the soil, they couldn't find a thing that could point to a cause of the hair loss. Then something else became clear. The health of all of the city's children was threatened. By the end of March, cases of hair loss had been recorded not in one, but in all preschool institutions and schools in Sillamyae. The diagnosis of focal and diffuse alopecia was made in 47 children. Hair thinning was noted in yet another 14.

Those figures have now increased many times over. Almost 200 children are now registered by the polyclinic, and there are adults.

**Forcing the genie back into the bottle**

Here is a summary. For half a year they have been looking for an answer to the following question in Sillamyae: Why are the children losing their hair? The country's biggest institutes and specialists have become involved in the research. About 40 versions have been developed during the search for a cause. But not a single one can provide a clear answer to the main question to date.

Have we hit a dead end? Must the medical people resign themselves to their powerlessness, as in the case of the children from Chernovtsy?

"We do not think so. Today we know more than you think. We can state the following with a great deal of probability: It is not an infection, not food poisoning, not an injury resulting from thallium. We are most likely dealing with the effects of a complex of toxic environmental factors—dozens of chemical compounds, elevated radiation levels. The research must be continued." Such is the opinion of Ya. Uybu, Estonia's chief state health physician and the republic's deputy minister of health.

There is special talk of radiation. We will now hear from A. Novokhatskiy, head of the No. 17 Medical and Sanitary Unit: "We have no doubt that the source of the illness must be searched for outside of Sillamyae. The facts push us to this conclusion. Cases of alopecia have been recorded in other cities in the region. During the screening examinations alone that were jointly conducted this spring by our physicians, Moscow specialists,

and the commission members working among us, the diagnosis of alopecia was established in 23 of the 27 children examined in Narva; the same number were diagnosed from a total of 161 children seen in Kokhtla-Yarva, and six were diagnosed of 48 seen in Tartu. The Estonian Ministry of Health was informed of these data. It was decided that there was a need to conduct a comprehensive examination of the health status of the children in the northeastern region. A plan for joint actions was developed, and the time frames and executors were agreed upon. It would seem that finally, having combined forces, we would be able to move ahead in understanding this most complex situation. The first thing that had to be done was compile a map of the prevalence of the illness and to deduce some sort of pattern."

But then the incomprehensible began to happen. The first thing the republic specialists did was to cast doubt on the results that had already been obtained: "The local physicians," they said, "tend toward hyperdiagnosis." But they did not rush to gather their own data.

The physicians waited for more than two months for even the slightest bit of information from them.

True, they were able to learn of some of their conclusions through the newspaper. Doctor Uybu gave SOVETSKAYA ESTONIYA an interview. Of course, Sillamyae physicians were unable to find the answers to any of the questions that were of interest to them. The Ministry of Health was asked again. The response was silence. Such is the situation.

I was much luckier. In Tallin I saw a report on the results of the republic commission's work (with which, by the way, Doctor Novokhatskiy still hasn't seen). It contains interesting figures—the number of cases of alopecia discovered in children from different cities of the regions. When they are compared, it is easy to see that the highest morbidity is in Sillamyae (8.2 percent of those examined).

The physicians of the Medical and Sanitary Unit No. 17 do not believe these data. According to their estimates, everything is the opposite. The morbidity in Sillamyae is at least half that in neighboring Kokhtla-Yarva and Narva. It is simply that the examinations there were performed by various specialists who were still inexperienced. The main principle—to do the examinations with the same eyes and the same hands—was not observed.

"Like a genie in a bottle, they are trying to lock the alopecia in Sillamyae," say local physicians bitterly.

"They are protecting their own department's interests," they retort at the Ministry of Health.

No, the business between the departmental medicine and the local health care organs is not going well. Mutual insults and grudges are accumulating. And the situation and the children are suffering.

#### But do we want to know the truth?

This is precisely how the problem now stands in Sillamyae.

"My opinion is that in the republic they are not very interested in finding the real reason for the illness," believes Yu. Tolmachev, first secretary of the party gorkom. "Some people like to play with people's feelings, heating up their emotions. The local press is intensely exaggerating the radiation version. We believe that there is no basis for this. We are presenting the facts. They prefer 'not to listen.'" So what kind of truth do we need? What lies in somebody's concept of things, or the real truth that is based on facts?"

Passions are brewing around Sillamyae. Rather recently, MEDITSINSKAYA GAZETA wrote about the events in Chernovtsy: "There can be no calm until we know where the trouble has come from. And where is the guarantee that, given the country's current ecological situation, it will not be repeated somewhere else?"

It already has been repeated—in Estonia. The children are again ill. The commissions are working. Measures are being taken. And the result is the same—zero.

It nevertheless seems to us that we are dealing with disconnected facts—something on the order of "isolated shortcomings" and therefore not very frightening. But when you look a little more carefully, there they are—the new addresses of trouble: alopecia in Kemerova, in the Donbass, in Mariupol. Reports have come out in the newspapers. What happened there? How did they happen there? If only we knew.... But in Sillamyae, there is no information whatsoever in that regard. Everyone is fighting alone. We already know how productive the methods are. In the medical and sanitary unit they showed me mountains of papers covered with writing, tables, and diagrams—the fruits of unsuccessful attempts to discover any kind of pattern at all. A multitude of analyses, biological samples, measurement results—they should at least be compared them with those obtained in Chernovtsy and other regions. Alas, the local physicians don't have the opportunity to do that. They are forced to take the word of those who were there, who say that the cases are not similar. In the Estonian children the alopecia is occurring in a mild form, without the clinical manifestations that were noted in the children of Chernovtsy.

The searches must be continued. Who can argue with that? But how can the searches be conducted if rapid information exchange doesn't exist on a countrywide scale or even within a republic, if efforts aren't combined?

And while they are still working out relations, the children continue to fall ill. Every week physicians are recording cases of children with a diagnosis of alopecia. Despite all preventive measures, the process is continuing.

But are we really supposed to just wait for everything to work out by itself?

UDC 616.24-036.12-036.2:31(470.23-25)

**Prevalance of Premorbid Forms and Chronic Nonspecific Pulmonary Diseases Based on Data from a Special Study of Three Administrative Regions of Leningrad**

18400519 Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 2, Feb 89 (Manuscript received 16 May 88) pp 38-42

[Article by I. G. Tsyura, V. I. Tyshetskiy, P. P. Gorbenko, and I. I. Zhernosekov, All-Union Scientific Research Institute of Pulmonology, USSR Ministry of Health, Leningrad]

[Abstract] The primary medical documentation of 1,766 children and young people and 13,553 adult residents of three administrative regions of Leningrad was studied, and 12,975 persons from this group who had not sought medical assistance for chronic nonspecific pulmonary disease were examined in their apartments. It was found that 15.7% of the total group of over 15,000 residents had premorbid pulmonary conditions, 11.8% had chronic nonspecific pulmonary disease. The data were used to calculate the expected frequency of chronic nonspecific pulmonary disease in babies born in Leningrad in 1988 and remaining in the city for 70 years or more. The expected frequency is 12.4% for boys, 6.4% for girls, with disease arising most frequently during active labor.

UDC 576.895.775+851.45+599

**Search for Statistical Correlations Between Plague Infectivity Indices and Fleas in Small Mammals**

18402080A Leningrad PARAZITOLOGIYA in Russian Vol 23 No 2, Mar-Apr 89 (manuscript received 19 Apr 88) pp 98-103

[Article by L. A. Burdelov, I. Zh. Zhubanazarov, N. F. Rudenchik and U. A. Koshenov, Central Asian Scientific Research Antiplague Institute; Aral Sea Antiplague Station]

[Abstract] A study was conducted on the statistical correlations between infectivity with the plague bacillus and infestation with fleas in the case of 30 species of small mammals captured in various areas of the Aral Sea region. The analysis was based on  $1.2 \times 10^6$  fleas collected from over 300,000 mammals. Determinations of the correlation coefficients and comparison of the experimental data with that previously published demonstrated positive correlations for timeframes spanning a decade or more (1964-1980; 1971-1980). This study represents the first statistical demonstration of the importance of plague transmission by fleas in the maintenance of an endemic zoonosis. In addition, the study confirmed the fact that a large number of small mammals serve as host animals in plague. References 10 (Russian).

UDC 616.127-005.4-055.1-036.22(47+57)

**Comparative Analysis of Ischemic Heart Disease Among 40- to 54-Year-Old Urban Males in Various Cities of the USSR: Cooperative Epidemiologic Survey**

18402100 Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 61 No 3, 89 (manuscript received 10 Mar 87) pp 101-105

[Article by V. V. Konstantinov, G. S. Zhukovskiy, R. G. Oganov, A. D. Deyev, T. A. Varlamov, O. S. Konstantinova, A. V. Kapustina, Yu. V. Zyryanov, I. P. Smirnova, O. I. Volozh, S. B. Domarkene, A. A. Elgarov, N. N. Burkadze, A. F. Zeynalov, Ye. A. Beloborodova, T. S. Meymanaliyev, S. A. Balakhmetova, A. A. Akanov, N. A. Serova, V. V. Gafarov, V. P. Alekseyev, Z. P. Popova, R. T. Umarov, and G. I. Burlutskiy, Scientific Research Institute of Preventive Cardiology, All-Union Cardiology Scientific Center, USSR Academy of Medical Sciences; Ukrainian Scientific Research Institute of Cardiology imeni N. D. Strazhesko; Scientific Research Institute of Cardiology, Estonian Ministry of Health; Institute of Physiology and Pathology of the Cardiovascular System at the Kaunas Medical Institute; Institute of Therapy, Siberian Department, USSR Academy of Medical Sciences; Medical Faculty, Kabardino-Balkar University; Scientific Research Institute of Clinical and Experimental Cardiology imeni Academician M. Tsinamgvrvishvili, Georgia; Scientific Research Institute of Cardiology, Uzbek Ministry of Health; Kazakh Scientific Research Institute of Cardiology, Kazakh Ministry of Health; Kirghiz Scientific Research Institute of Cardiology, Kirghiz Ministry of Health; Azerbaijan Institute of Postgraduate Medicine imeni A. A. Aliyev, USSR Ministry of Health; Scientific Research Laboratory of Polar Medicine, Siberian Department, USSR Academy of Medical Sciences; Laboratory of Morphofunctional Studies of Man, Scientific Research Institute of Medical Problems of the North, Siberian Department, USSR Academy of Medical Sciences, and the Medical Faculty, Yakutsk University]

[Abstract] A multicenter study was conducted to evaluate the morbidity pattern of ischemic heart disease (IHD) among 40- to 54-year-old males in 13 Soviet cities as part of the "Regional IHD Epidemiology and Atherosclerosis in the USSR" program. The study encompassed 1,005-1,617 men in each city (Moscow, Kiev, Tallin, Kaunas, Nalchik, Tbilisi, Baku, Tashkent, Alma-Ata, Frunze, Norilsk, Yakutsk, Novosibirsk). The results showed that the incidence of IHD was 1.5-fold higher in the 50-54 age bracket than in the 40-49 bracket, and that IHD was present in 7.4-12.3% of the urban males in the target age span, depending on the diagnostic criteria. The highest incidence of IHD was recorded in Baku, Moscow, Kiev and Tbilisi, with somewhat lower figures for the Siberian region. The lowest incidence of IHD was recorded in Frunze, Tashkent, Alma-Ata, and Nalchik. These findings confirmed previous epidemiological studies concerned with IHD. References 23: 15 Russian, 8 Western.

UDC 579.251.5:579.255

**Cloning of Gene Responsible for Regulation of Nitrogen Fixation in Phototrophic Bacterium *Rhodobacter Sphaeroides***

18400454a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 305 No 4, Apr 89 (manuscript received 8 Aug 88) pp 984-986

[Article by USSR Academy of Sciences Corresponding Member S. V. Shestakov, M. M. Babykin, M. V. Bibikova, O. R. Bondarenko, and V. V. Zinchenko, Moscow State University imeni M. V. Lomonosov]

[Abstract] Insertion of regulatory plasmid-vector-cloned *nif*- and *ntr*-genes of *Klebsiella pneumoniae* into bacteria of various taxonomic groups is widely used in studies of nitrogen fixation mechanisms. However, this approach could not be used in purple bacteria because *nif*-genes of *K. pneumoniae* are not expressed in them. Purple bacteria *nif*-genes may be identified by phenotypic complementation of *Nif*-mutants with recombinant plasmids isolated from the purple bacteria genome bank. The present paper describes the cloning of a new regulator gene *nifR5* from purple bacterium *R. sphaeroides*. Vector systems constructed on the basis of *IncP*- and *IncQ*- plasmids were used, capable of carrying out direct selection of recombinant plasmids and transmitting them to various gram-negative microorganisms. Recombinant plasmids containing *nif*-gene were selected by means of the complement test, using cells of three *Nif*-mutants (*Nif8*, *Nif15*, and *Nif78*). These mutants were not capable of fixing molecular nitrogen or using aminoacids as the only source of nitrogen. Complement clones of these three *Nif*-mutants contained identical recombinant p114 plasmid with a 13.8 bp insertion of *R. sphaeroides* DNA. Insertion of this p114 plasmid into *Nif* cell mutants reestablished the *Ntr*<sup>+</sup> and *Nif* phenotypes, showing that p114 contains a novel gene participating in regulation of nitrogen metabolism (*nifR5*) which showed no homology with other known regulator genes. Possibly, *nifR5* of *R. sphaeroides* is functionally analogous to the cloned *E. coli* gene which reestablishes *Nif*<sup>+</sup> phenotype in a series of *Nif* mutants. Figure 1; references 9: 2 Russian, 7 Western.

UDC 577.21

**Production of Transgenic Pigs Containing and Expressing Surface Antigen Gene of Human Hepatitis Virus**

18400457a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 306 No 1, May 89 (manuscript received 9 Dec 88) pp 206-209

[Article by I. M. Vasilyev, T. V. Vasilyeva, G. P. Georgiyev, M. A. Grashchuk, G. N. Yenikolopov, B. A.

Kuzin, A. A. Kushch, O. V. Masalova, T. V. Michurina, A. A. Nekrasov, T. M. Nikonova, M. S. Slezinger, USSR Academy of Sciences Corresponding Member, N. G. Khrushchov, I. Ya. Shikhov, and All Union Academy of Agricultural Sciences Member L. K. Ernst, Institute of Molecular Biology imeni V. A. Engelhardt, USSR Academy of Sciences; All-Union Academy of Agricultural Sciences imeni V. I. Lenin, Moscow]

[Abstract] One of the applications for the use of transgenic farm animals may be the production of proteins and peptides valuable in medical and veterinary practice. The well-studied surface antigen of human hepatitis virus (HBsAg) was selected for this purpose, and an attempt was made to insert the recombinant construction containing this gene into fertilized oviducts of farm animals. The present paper reports on production of transgenic pigs containing HBsAg gene and secreting the antigen into the serum. The recombinants were obtained by standard methods. After injection of the genetic material, the next generation was obtained with transgenic individuals (the efficiency was 7.8%). It was shown that the introduced genetic material was integrated in pig chromosomes. Thus, the possibility of using transgenic pigs to produce biologically active material was demonstrated. Figure 1; references 13: 2 Russian, 11 Western.

UDC 575.133:579.252.5

**$\alpha$ -Hemolysin Determinant: Cloning and Tn1000 Insertional Mutations**

18400508a Moscow GENETIKA in Russian Vol 25 No 2, Feb 89 (manuscript received 26 Mar 88; in revised form 2 Jun 88) pp 207-213

[Article by D. A. Yelizbarashvili, S. K. Baumukhanova, I. A. Yegorov and V. A. Tarasov, Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] *E. coli* HB101 cells were employed for the amplification of cloned  $\alpha$ -hemolysin ( $\alpha$ -HL) derived from the donor plasmid pHly195, using plasmid pBR322 as the vector and restriction endonuclease HindIII for DNA incisions. The recombinant plasmid, pEE121, represented a pBR322 plasmid with an inserted 7.4 kb fragment bearing the  $\alpha$ -HL determinant. Restriction maps of pEE121 obtained with restriction enzymes HindIII, EcoRI, BamHI, and SalI showed that the genetic determinant under study did not differ significantly either in size or in position from well-studied  $\alpha$ -HL determinants. Insertional mutagenesis with Tn1000 led to isolation of 23 clones with the Hly<sup>-</sup> phenotype. The fact that the MW of the plasmid

DNA in the different clones varied from clone to clone indicated that each mutation occurred independently and that Tn1000 was inserted at different sites in the 7.4 kb  $\alpha$ -HL fragment. Figures 4; references 14: 2 Russian, 12 Western.

UDC 575:579.841.11:579.842.11

**Cloning of *Pseudomonas putida* Naphthalene Initial-Stage Oxidation Genes in *Escherichia coli***

18400508b Moscow GENETIKA in Russian  
Vol 25 No 2, Feb 89 (manuscript received  
29 Mar 88) pp 226-237

[Article by A. M. Boronin, T. V. Tsoy, I. A. Kosheleva, M. U. Arinbasarov, V. M. Adanin, S. A. Selifonov and A. G. Kozlovskiy, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] Data are presented on studies undertaken to clone plasmid-borne genes of *Pseudomonas putida* in *Escherichia coli*, selecting genes that are responsible for the initial stages of naphthalene catabolism. The vector pBR322 was used to clone an EcoRI-A fragment of D-plasmid pBS286 in *E. coli* HB101, a fragment encompassing the nah DNA sequence responsible for naphthalene dioxygenase. The resultant recombinant plasmid pBS958 was found to be unstable. However, using vector pUC19 and transformation of *E. coli* JM109 yielded a recombinant plasmid pBS959 incorporating a 6.15 kb pBS286 DNA fragment prepared with Sau3A endonuclease. pBS959 was found to be relatively stable and encoded the entire nahA locus. Expression of nahA was evident in the fact that both transformed *E. coli* HB101 and *E. coli* JM109 cells acquire the ability to synthesize indigo. The fact that enzyme activity was not elevated by addition of a lactose operon inducer into the nutrient medium was taken as proof that expression of the nah gene was controlled by its own promoter. In addition, restriction mapping and hybridization studies suggested that nahB may also have been cloned into pBS959. Figures 5; references 24: 5 Russian, 19 Western.

UDC 575:579.842.11

**Restriction of Bi-Replicon Shuttle *Escherichia coli*-*Streptomyces* Plasmids in *Streptomyces lividans* 66 Strain**

18400596B Moscow GENETIKA in Russian  
Vol 25 No 4, Apr 89 (manuscript received 25 Mar 88; in  
final form 31 May 88) pp 614-625

[Article by A. V. Orekhov, I. V. Strokina, A. R. Furs, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] *S. lividans* 66 is the chief recipient strain for molecular cloning in streptomycetes. A good many genes of other species of *Streptomyces*, as well as genes from other organisms, have been cloned in plasmid and phage vectors in that strain. Use of the bi-replicon shuttle *E. coli*/*Streptomyces* plasmids, however, has produced different results, with bi-replicon plasmids pSLP120 and pSLP125—obtained on the basis of the actinomycete plasmid pSLP111 and *E. coli* plasmids pACYC177 and pACYC184—found to be ineffective in transforming protoplasts of *S. lividans* 66. Restructuring of the plasmid DNA has been noted. Transformation efficiency increases dramatically with the use of plasmid DNA extracted from *S. lividans* 66. Cloning efficiency is reduced tenfold when a 1 kp Sau3A fragment from the DNA of plasmid pACYC184 is inserted into the actinomycete vector pSLP111. With quantitative data about the efficiency of transforming *S. lividans* 66 protoplasts using the DNA of bi-replicon shuttle plasmids generally sparse in the literature, the researchers here set out to build bi-replicon shuttle *E. coli*-*Streptomyces* plasmids in *E. coli*, establish restriction of plasmid DNA extracted from *E. coli*, and determine the degree of restriction in the transformation of the plasmid DNA in *S. lividans* 66. They used pBR322 *E. coli* plasmid DNA and the pVG2 *Streptomyces* plasmid to produce bi-replicon plasmids pVG6 and pVG7. When the researchers managed to produce *S. lividans* 66 clones that were transformed by shuttle plasmids, the DNA extracted from such plasmids was 10- to 1,000-fold more efficient in transforming strain 66 than was DNA of the same plasmids produced from *E. coli*. Earlier data obtained by the researchers show that there is a modifying component in *S. lividans* 66 that keeps the DNA from being cleaved by restrictases Scg21 and Sgr201, which are related to EcoRII. They propose that the restriction component of the restriction/modification system of *S. lividans* 66 is a restriction endonuclease whose specificity overlaps that of the restrictase Scg21.

UDC 612.419.017.1.06:612.273.2

### **Immunomodulating Action of Myelopeptides in Hypoxic Hypoxia in Animals**

18400402b Moscow *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian* Vol 106 No 12, Dec 88 (manuscript submitted 17 Aug 87) pp 691-692

[Article by D. V. Sarybayeva, L. A. Zakharova, A. M. Vasilenko, A. A. Mikhaylova, B. T. Tulebekov, Institute of Immunology, USSR Ministry of Health; Institute of High-Altitude Physiology and Experimental Pathology, KiSSR Academy of Sciences]

[Abstract] Myelopeptides—immunoregulatory peptides produced by intact bone marrow cells—are capable of stimulating antibodies in various forms of immune deficiency. Previous research has enabled researchers to suggest that such peptides participate in the evolution of immune-deficient states caused by stress. The authors studied the effect of hypoxic stress on the natural production of myelopeptides and evaluated their immunocorrecting effect with that type of stress factor. Hybrid F<sub>1</sub>(CBA X C57BL) male and female mice were twice immunized with a 5% suspension of ram erythrocytes and were taken to the equivalent of 7,000 meters in an altitude chamber over a three-day period. Studies of myelopeptide production indicated that 24 hours in the altitude chamber reduced production 2- to 3-fold. The deficiency remained the second and third days of hypoxic stress. Animals kept in the altitude chamber for three days exhibited an immune response diminished by an average of 47%. The results of the studies confirm the hypothesis that myelopeptides have a stress-protective function. One of the causes of the diminished immune response in hypoxic hypoxia may be assumed to be suppression natural myelopeptide production. The artificial restoration of their levels in the body via exogenous administration prevents the development of an immune-deficient state caused by hypoxia. Figures 2, references 7: 6 Russian, 1 Western.

UDC 577.3

### **Localization of Protein Ligand-Receptor Sites**

18400456b Moscow *DOKLADY AKADEMII NAUK SSSR in Russian* Vol 305 No 6, Apr 89 (manuscript received 22 Jun 88) pp 1506-1508

[Article by Academician R. V. Petrov, M. A. Novikov, D. Ye. Tsvetkov, S. M. Andreyev, L. A. Fomina, and I. V. Krasilnikov, Institute of Immunology, Moscow]

[Abstract] In recent years, researchers have worked to develop novel vaccines based on synthetic polypeptide

fragments of viral antigens. Because the selection of antigenic determinants is based on semiempirical and statistical analysis of antigen structure, such vaccines are seldom protective. One promising approach is based on the investigation of the molecular mechanisms of the interaction of virus and cells in the body and on the development of reagents blocking various steps of the process. For many viruses, the initial phase of cell infection is a specific binding of the virus-envelope protein ligand to the receptor protein of the target-cell membrane. Targeted blocking of the fragments of complement interaction with ligand receptor sites (LRS) can stop, or prevent the development of, infection. To detect interacting protein sites and their receptors, a computer program was written in which two matrixes were used to calculate LRS based on a search for sequence homology between "complementary" and "anticomplementary" amino acids. Results of the calculations of the ligand-receptor sites of proteins of the envelopes of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) were reported: gp 120, CD4, and HSA, pre-S HBsAg. Various fragments from the hypothetical sites, which in the past were localized experimentally, now were obtained from theoretical calculations. References 15: 1 Russian, 14 Western.

UDC 615.275.4.015.46:612.017.1.064:613.863

### **Effects of Myelopid on Early Immunosuppression in Stress**

18400541c Moscow *IMMUNOLOGIYA in Russian* No 1, Jan-Feb 89 (manuscript received 9 Feb 88) pp 41-43

[Article by Ye. A. Kirilina, L. A. Zakharova, A. M. Vasilenko and A. A. Mikhaylova, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Therapeutic trials were conducted with myelopid, a novel immunostimulant isolated from bone marrow, in a swimming stress model involving (CBA x C57BL/6)F<sub>1</sub> mice. The data showed that the antibody response against sheep erythrocytes in immunized mice subjected to a swimming regimen (60 min/day for 1-4 days), in terms of enumeration of antibody-forming splenic cells, was reduced by about 50% in comparison with control animals that were not forced to swim. Intravenous administration of myelopid (100 µg/mouse) before or after stress or at the height of the immune response had beneficial effects on the immune response. Administration before the stress test resulted in an immune response that exceeded the control number of splenic antibody-forming cells, and resulted in marked enhancement in the other situations. Basically analogous observations applied to studies conducted on antibody-forming cells in lymph nodes. These findings demonstrated that myelopid possesses both therapeutic and prophylactic characteristics vis-s-vis humoral immunity. References 15: 12 Russian, 3 Western.

UDC 615.276.4.015.46:612.112.94.017.1

**Experimental Study of Immunomodulating Action of Glucosaminyl-muramyl-dipeptide (GMDP). Influence of GMDP on Macrophage Component in Immune Response, Activation of T- and B-Lymphocytes, and Their Cooperative Interaction.**

18400586 Moscow *IMMUNOLOGIYA* in Russian  
No 2, Mar-Apr 89 (manuscript received  
25 Feb 88) pp 23-26

[Article by V. M. Manko, V. Yu. Skvortsov, T. B. Masternak, A. S. Ivanova, M. I. Gubarev, T. V. Anfalova, A. S. Larin, N. I. Lutsan, Ye. I. Osipova, Ye. V. Zabanova, T. M. Andronova, and V. T. Ivanov, Institute of Immunology, USSR Ministry of Health; Institute of Bioorganic Chemistry imeni M. N. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] This article represents a continuation of earlier work studying the immunomodulating activity of GMDP, a humoral-response stimulator without mitostatic or lymphotoxic properties or significant influence on the cell immune reaction. Results are presented from a study of the influence of GMDP on specific components of immune response. The researchers conclude that the preparation has no mitogenic properties, is not a polyclonal B-cell activator, and does not enhance the cooperative interaction of T- and B-lymphocytes. It does enhance the phagocytic activity of macrophages in vivo. GMDP increases the migration of macrophages in immune animals, but has no effect on migration in intact mice in vitro. GMDP stimulates T- and B-lymphocyte proliferation under the influence of mitogens, the stimulating effect being much stronger on B-cells than on T-lymphocytes. References 20: 7 Russian, 13 Western

UDC 616.98:579.843.94]-078.73:543.426

**Detection of Tularemia Agent in Patients by Immunofluorescent Antibody Technique**

18400605B Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII* in Russian  
No 4, Apr 89 (manuscript received 27 Dec 87) pp 46-49

[Article by Ye. V. Ananova, L. S. Kamennova, I. S. Meshcheryakova and R. A. Savelyeva, Scientific

Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Two case studies are presented in which living and dead *Francisella tularensis* cells were demonstrated in buboes by conventional immunofluorescent antibody technique. This method was found to be a highly reliable diagnostic tool yielding results in 1.5-2 h. Subsequently, confirmatory serologies were obtained in both patients with standard agglutination and passive hemagglutination tests. The ease, simplicity, and speed that this microscopic technique offers in the diagnosis of tularemia should make this technique a valuable adjunct in the clinical laboratory. Figures 1; references 10: 7 Russian, 3 Western.

UDC 616.98:579.841]-07:616.155.3-091.818-056.43

**Indirect Leukocytolysis Test (ILT) in Tularemia**

18400605D Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOLOGII* in Russian  
No 4, Apr 89 (manuscript received  
11 May 88) pp 103-104

[Article by N. A. Sukhanov, L. V. Merinova, Yu. V. Mironchuk, L. M. Mikhaylov and A. I. Platonov, Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] Trials were conducted with the application of ILT to analysis of sera derived from 25 subjects that had been immunized against tularemia, since such sera had previously been shown to react positively in the direct leukocytolysis test. In each case the sera tested positive in ILT, with the percentage of lysed cells varying from 21% to 57%. Confirmatory results were obtained with sera obtained from immunized guinea pigs, horses, and infected rabbits. In the latter situation a positive ILT was obtained within three days of infection. Studies with sera from control human subjects showed that in the majority (20) the results were negative, and in five individuals 6-12% of the leukocytes were lysed, findings that fell within the normal error range. These findings demonstrated that ILT possesses adequate specificity for use in assessing tularemia sensitization in humans and animals.



UDC 613.648+613.632]-07

**Effects on the Body of Combined Exposure to Industrial Chemicals and Ionizing Radiation**

18400512 Moscow GIGIYENA TRUDA I  
PROFESSIONALNYYE ZABOLEVANIYA in Russian  
No 2, Feb 89 (Manuscript received 14 Jul 87) pp 35-39

[Article by V. V. Kustov, Institute of Biophysics, USSR Health Ministry, Moscow]

[Abstract] Preliminary exposure to certain industrial poisons has been shown to modify the biological effect of ionizing radiation. Carbon monoxide, aniline, nitrogen dioxide, freon, metallic mercury and lead vapors have been found to increase radiation resistance, while other substances decrease radiation resistance: methylketone peroxide, formaldehyde, chloroacetophenone, mercury chloride and higher concentrations of mercury vapor. The type of combined action is determined primarily by the relationship of reactions forming radioresistance to reactions decreasing it. These factors must be considered in hygienic standardization of the content of industrial chemicals and the maximum permissible level of ionizing radiation when both factors are present. References 43: 37 Russian, 6 Western.

UDC 613.632-07+615.9.015.12.015.3.07]519.24

**Dose-Time-Effect Equation for One-Time Administration of Xenobiotic**

18400518A Moscow GIGIYENA I SANITARIYA in Russian  
No 2, Feb 89 (Manuscript received 3 Mar 88) pp 7-8

[Article by V. N. Pavlov, Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow]

[Abstract] An equation is derived for the dose-time-effect variation assuming a single compartment (one-part model). The variation of effect with dose is described by an exponential curve with a limit. The variation in effect as a function of dose differs basically from the variation as a function of time. References 6 (Russian).

UDC 613.632.4:615.285.7]-074]-092.9

**Quantitative and Qualitative Factors in Combined Effects of Carbofuran (Furadan), High Temperatures, UV Irradiation, and Low Humidity in Acute Experiments**

18400539 Moscow GIGIYENA TRUDA I  
PROFESSIONALNYYE ZABOLEVANIYA in Russian  
No 3, Mar 89 (manuscript received 5 Aug 83) pp 44-45

[Article by D. I. Sapegin and T. A. Dzhayloyev, Crimean Medical Institute, Simferopol]

[Abstract] The combined effects of carbofuran, high temperatures, UV light, and low humidity were assessed on 150 outbred rats. The animals were treated with carbofuran doses ranging from 0.06 to 4.85 mg/kg (LD<sub>50</sub> values from 1/162 to 1/2) either at 20-22°C and 40-60% humidity (Group I) or at 35°C, 7506 μW/cm<sup>2</sup> UV light, and 20-30% humidity (Group II). A dose-response effect was obtained in terms of toxic manifestations (exophthalmos, hypersalivation, tremor, convulsions, inspiration dyspnea, etc.). The minimum dose of carbofuran required for toxic manifestations was 0.18 mg/kg in Group I animals, and 0.06 mg/kg in Group II. Additional studies demonstrated that 89.0% of the adverse effects on the animals were due to carbofuran, 8.8% were due to the physical factors, and 2.2% were due to synergistic effects. These observations demonstrated that environmental conditions have a significant effect of the physiological sequelae of carbofuran on the mammalian organism. References 10 (Russian).

UDC 616.24-002.3-089:615.849.19.03

**CO<sub>2</sub> Laser Surgery for Purulent Pulmonary Lesions***18400506a Moscow GRUDNAYA KHIRURGIYA in Russian No 2, Mar-Apr 89 (manuscript received 19 Aug 87) pp 48-51*

[Article by Ye. I. Brekhov, L. N. Sidarenko and A. Yu. Sadov, Central Scientific Research Laboratory, 4th Main Administration, USSR Ministry of Health, Moscow; Medical Institute and No 6 Municipal Hospital, Kalinin]

[Abstract] Cursory details are presented on performing carbon dioxide laser surgery on 58 patients with purulent pulmonary lesions, with the laser modality selected to take advantage of its hemostatic and bacteriostatic properties. Surgical access was generally gained by anterior thoracotomy and layer-by-layer resection with a focused 25 W CO<sub>2</sub> laser beam in conjunction with compression by a special elastic clamp. Laser surgery was confirmed to be organ-sparing with a mean intraoperative blood loss of 373.3 ml, which was 1.5-fold less than the average blood loss in conventional surgery. The volume of postoperative exudate was some 25% lower than with conventional surgery, allowing the removal of drains in 2-5 days. Complications were noted in 7 patients (12.0%), of whom two were operated on because of gangrenous pulmonary abscesses complicated by hemorrhages and who did not survive. In the remaining five patients residual cavities developed that were treated successfully with additional drainage. References 8 (Russian).

UDC 615.47:615.849.19].03:616.13/.14-089.844

**Influence of Laser Radiation Absorption by Blood Hemoglobin on the Damage Threshold of Pathologic Tissue During Laser Angioplasty***18400514a Moscow MEDITSINSKAYA TEKHNIKA in Russian No 1, Jan-Feb 89 (manuscript received 21 Dec 87) pp 33-36*

[Article by A. N. Bekeshko, A. A. Belyayev, G. N. Zmiyevskoy, N. V. Rubinskiy, S. E. Ragimov, N. A. Ryzhov, and V. S. Stefanyuk; All-Union Scientific Research Institute for Medical Instrument Making, Moscow]

[Abstract] The absorption of laser radiation by blood during laser angioplasty leads to a decrease in power intensity on the target and to a corresponding need for increased power intensity at the light guide output. The purpose of this work was to establish the required values for raising the power intensity at the light guide output above the calculated threshold for various distances between the end of the light guide and the irradiated surface and for various light guide parameters. The optimum radiation divergence and range of distances between the irradiated surface and the end of the light guide, within which it was possible to destroy atherosclerotic formations, were determined. For laser angioplasty, it was best to use light guide systems with an output N.A. of no more than 0.2. For the ion-argon laser

( $\lambda=0.488-0.514 \mu\text{m}$ ), the range of operating distances was restricted to about 1 mm and was determined primarily by radiation absorption by hemoglobin. Increasing the power produced virtually no change in this value. For the Nd:YAG solid-state laser ( $\lambda=1.064 \mu\text{m}$ ), the range of operating distances was restricted to 1.5-2 mm and was determined primarily by beam divergence at the output of the light guide system. Figures 2; references 10: 5 Russian, 5 Western.

UDC 615.849.19.015.4:612.112.94].07

**Effects of Helium-Neon Laser and Ionic Strength on E-Rosette Formation***18400541b Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 89 (manuscript received 22 Sep 87) pp 34-36*

[Article by R. M. Lapteva, B. S. Balmukhanov and S. A. Baisheva, Kazakh Scientific Research Institute of Oncology and Radiology, Kazakh SSR Ministry of Health, Alma-Ata]

[Abstract] The effects of ionic strength on electrophoretic mobility of human lymphocytes and E-rosette formation were determined in order to assess the mechanism of action of helium-neon laser radiation in enhancing rosette formation. The use of lymphocytes derived from 11 donors demonstrated that when the concentration of NaCl was increased from 87 to 155 mM under constant pH the electrophoretic mobility of the lymphocytes decreased. The decrease in mobility reflected a reduction in the zeta potential of the cell surface, a change accompanied by a significant increase in E-rosette formation from about 10 to about 70%. Laser action was shown to diminish electrophoretic mobility to an even greater degree, again diminishing electrostatic repulsion between the human lymphocytes and the sheep erythrocytes. These findings substantiate the view that helium-neon laser action serves to lower the zeta potential on the target cells, thereby promoting E-rosette formation. Figures 1; references 10: 9 Russian, 1 Western.

UDC 616.5-008.81.04-085.849.19-036.8

**Treatment of Skin Melanoma with Laser Pulses***18402055B Moscow SOVETSKAYA MEDITSINA in Russian No 2, 89 (manuscript received 26 May 87) pp 94-97*

[Article by K. G. Moskalik, R. I. Vagner and A. P. Kozlov, Scientific Research of Oncology imeni N. N. Petrov, USSR Ministry of Health, Leningrad]

[Abstract] Therapeutic trials were conducted on 170 male and female patients with stage I cutaneous melanoma to determine the efficacy of neodymium laser treatment. The patients ranged in age from 7 to 82 years, with 41.7% of the lesions located on the face. Treatment was performed with neodymium laser pulses delivered from a Pulsar-1000 instrument (1060 nm, 1 msec pulses, 200-500 J/cm<sup>2</sup> per impulse). The energy parameters were selected to ensure that a lesion was destroyed during one

treatment session with an average of 15-25 pulses. The coagulation necrosis led to the development of a black scab that became detached in 10-20 days. Followup studies for one to 13 years showed that the five-year survival figure was 80%, versus reported figures of 50-70% for surgical management. The five-year survival was 100% for patients with a lesion less than 1 cm in diameter. In addition, the five-year survival was higher for women (83.3%) than for men (72.7%). Other factors predisposing to a favorable prognosis included a facial location of the lesion, relative flatness of the lesion, and spindle-type cellular organization. Figures 1; references 8: 2 Russian, 6 Western.

UDC 617.747-073.584:52.626

### **Raman Scattering Laser Spectroscopy for Studying Vitreous Bodies**

*18402076b Moscow VESTNIK OFTALMOLOGII in Russian Vol 105, No 2, Jan-Feb 89 (manuscript received 2 Aug 88) pp 24-26*

[Article by M. N. Azhigaliyeva, V. G. Uldanov and V. Zh. Ushanov, Kazakh Scientific Research Institute of Eye Diseases, Institute of Chemical Sciences, KazSSR Academy of Sciences, Alma-Ata]

[Abstract] Raman scattering laser spectroscopy (RS) was used to examine cadaver eyes in an attempt to show the adaptability of this method to noninvasive in situ examination of the vitreous body. Scientists abroad have shown that RS can be used in both the in vivo and in vitro studies of protein molecules. The RS spectra provide information on the molecular composition of a study object and on the spatial orientation of its molecules. The experimental conditions were: spectrum excitation with 488 and 514 nm lines of the argon laser "Spectra Physics", 200 mW power, spectral slit width  $5 \text{ cm}^{-1}$ , scanning rate 100 or  $50 \text{ cm}^{-1}/\text{min}$ . The strongest lines of the protein structure were noticed at  $1240 \text{ cm}^{-1}$ ,  $1650 \text{ cm}^{-1}$  and  $2940 \text{ cm}^{-1}$ . Examination of the cadaver eyes revealed  $\alpha$ -helix and antiparallel  $\beta$ -structures in the polypeptide chain. Figures 2; reference 1 (Western).

UDC 616.24-002.1-036.17-085.38.015.2:615.246.2

**Hemosorption in Combined Therapy of Advanced Acute Pneumonia and Infectious Lung Destruction***18400506b Moscow GRUDNAYA KHIRURGIYA in Russian No 2, Mar-Apr 89 (manuscript received 4 Nov 87) pp 51-55*

[Article by Yu. N. Levashev, V. A. Voinov, B. V. Medvenskiy, I. V. Pokhodzey, S. V. Orlov and O. A. Sukhovskaya, All-Union Scientific Research Institute of Pulmonology, USSR Ministry of Health, Leningrad]

[Abstract] Hemosorption was employed in the management of 60 patients with advanced acute pneumonia and infectious pulmonary destruction to determine whether the inclusion of this modality would improve the outcome in situations where mortality often approaches 90%. In 76% of the cases the pathogens were identified as gram negatives, anaerobes, or a combination of the two. Marked toxemia, elevation of "intermediate molecules" to more than 450-500 U, and marked depression of cellular immunity and phagocytosis served as indicators for the use of hemosorption. The latter was carried using AT-196, Unirol, or an analogous apparatus and SKN or SUGS series absorbents. The blood flow was adjusted to 100-150 ml/min with the total volume of perfused blood equal to 3-5 circulating blood volumes. The patients were treated by hemosorption one to five times depending on the need, with patients in respiratory distress treated with membrane oxygenation for 12-24 h. Eleven (18.3%) of the patients with irreversible pulmonary changes at the time of hemosorption died. Intensive preoperative measures and hemosorption after surgery reduced the overall rate of complications to 27.2%. Positive prognostic signs immediately after hemosorption consisted of an increase in serum IgA levels as well as in the phagocytic activity of monocytes, and reduction in the "intermediate molecules." Later changes indicating a favorable outcome consisted of elevation of IgG concentrations and an increase in the phagocytic activity of neutrophils. Signs of poor prognosis immediately after hemosorption included depression of neutrophil phagocytic activity, decrease in serum IgA, an increase in IgM levels, and activation of monocyte phagocytic activity. References 12: 1 Czech, 10 Russian, 1 Western.

UDC 615.454.1[615.451.3547.831.9541.64].07

**Osmotic Activity of Loosely Crosslinked Acrylic Copolymers***18400532a Moscow FARMATSIYA in Russian Vol 38 No 1, Jan-Feb 89 (manuscript received 25 Feb 87) pp 22-25*

[Article by K. V. Alekseyeva and O. L. Bondarenko, All-Union Scientific Research Institute of Pharmacy, Moscow]

[Abstract] Determinations were made of the osmotic activities of loosely crosslinked copolymers of acrylic

acid with allyl pentaerythritol ether, compounded with polyethylene oxide as the osmotically active agent. The purpose of the study was to identify polymeric gels suitable for use as exudate-absorbing ointments for the management of infected wounds and burns. Ointments consisting of 1.5-2.5% of the copolymer and 40% polyethylene oxide-400 showed water absorption in the range of 424-560% by weight. The osmotic activity was not affected by pH in the 4.0-8.0 interval, which corresponds to the pH of wound surfaces, suggesting that the gel may have clinical applications. Figures 1; references 6 (Russian).

**Cryogenic Treatment of Trigeminal Neuralgia***18402048 Moscow MEDITSINSKAYA GAZETA in Russian 19 May 89 p 3*

[Article by L. Boyko, in Kharkov: "Treating With Cold"]

[Abstract] Doctor of Medical Sciences V. I. Sipityy and Candidate of Medical Sciences M. F. Posokhov, neurosurgeons at Kharkov Medical Institute, have received an authors' certificate for their development of a technique in the treatment of trigeminal neuralgia. The technique uses a special neurosurgical cryoinstrument with a probe which gives the physician access to the sensory root of the trigeminal nerve. Unfortunately, the new instrument is only in use in Kharkov; series production has not yet been started, although the invention could be used in otolaryngology, ophthalmology and other branches of medicine where delicate surgical interventions of the highest precision are performed.

UDC 616-006.3.04-031.14

**Fulminant Kaposi's Sarcoma with Visceral Lesions***18402054 Leningrad VOPROSY ONKOLOGII in Russian No 2, 89 (manuscript received 26 Apr 88) pp 229-232*

[Article by A. Sh. Kyshtobayeva, V. A. Trishkin, Ye. A. Chekharina and G. Ya. Yakovlev, Order of the Red Banner of Labor Scientific Research Institute of Oncology imeni Prof. N. N. Petrov, USSR Ministry of Health, Leningrad]

[Abstract] A case study is presented of a 52-year-old physicist who was first seen at the institute on 06/30/86 because of extreme weakness, rapidly enlarging nodular lesions in leg muscles, loss of appetite, nausea, vomiting, hiccoughs, weight loss, pain in the lower extremities, and a temperature of 38-39°C. The patient's illness began in April 1986, when he first developed edema of the lower extremities diagnosed as thrombophlebitis, in conjunction with dyspepsia. The subsequent course of the patient was stormy. Kaposi's sarcoma was diagnosed on the basis of muscle biopsy studies. Despite intense combination chemotherapy the patient died on 07/04/86. The cause of death was advanced intoxication and acute cardiac insufficiency due to metastasis to the

heart. The autopsy revealed extensive invasion of the visceral organs by the tumor. Invasion of the peritoneal cavity and the formation of a cyst in the lesser omentum was evidently responsible for the incessant hiccoughs and occasional vomiting. In addition, despite failure to identify an immunosuppressive factor, the thymus and lymph nodes were completely atrophied. This case was unusual in view of the extensive involvement of the internal organs, skeletal and cardiac musculature, and the rapid clinical deterioration. Evidently, the key pathogenetic mechanism underlying this form of fulminant Kaposi's sarcoma was the complete absence of an immune counterbalance. Figures 3; references 7: 3 Russian, 4 Western.

UDC 617-001.17-06:616.839.31-091.8

#### **Pathomorphological Changes in the Ganglia of the Solar Plexus in Burns**

*18402056a Moscow ARKHIV PATOLOGII in Russian Vol 51, No 2 89 (manuscript received 23 Feb 88) pp 47-54*

[Article by I. M. Isayev, L. I. Muzykant, V. P. Tumanov, R. P. Gasanov, Chair of Pathologic Anatomy, Azerbaijan Medical Institute imeni N. Narimanov, Baku; Department of Pathologic Anatomy, Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] A histopathologic study was conducted on the solar plexus 64 subjects who died 3.5 hours to 3 months after sustaining burns covering from less than 10% to more than 90% of the body surface. Marked hyperemia, acute ganglionitis, swelling, and granular dystrophy characterized the solar plexi of subjects who died while in shock (within 3.5-24 h). In the toxemic phase (days 6-7) leukocytic thrombogenesis was evident, as well as hypertrophy (80-100  $\mu$ ) of a majority of the neurons in the solar plexus; binucleate neurons were observed, and the dendrites

showed hyperplasia and thickening. The changes seen in the solar plexi of patients who succumbed in the early stages of sepsis (10-15 days) consisted of irregular hyperemia of the ganglionic blood vessels, fatty degeneration of the neurons, and granular dystrophy of the hypertrophic neurons. In late septicemia and cachexia dystrophic changes predominated with extensive necrosis. These changes in the solar plexus were implicated in the erosive gastric changes and gastric atrophy. Figures 3; references 22: 18 Russian, 4 Western.

UDC 616-006.44-036.1-076.5

#### **Histologic Diagnosis of African Histoplasmosis: First Case Reported in USSR**

*18402056b Moscow ARKHIV PATOLOGII in Russian Vol 51, No 2 89 (manuscript received 11 Mar 88) pp 75-77*

[Article by V. L. Bykov, Scientific Research Division of Profound Mycoses and Clinic and the Chair of Pathologic Anatomy, State Institute of Postgraduate Medicine imeni S. M. Kirov, Leningrad]

[Abstract] A case study is presented of a 20-year-old African from Guinea-Bissau student who resided continuously in the USSR for 4 years and who was diagnosed with the first case of African histoplasmosis in the Soviet Union. The patient was first seen in July, 1987, with a skin condition after diagnosis of a perimaxillary abscess in January 1987. The histologic picture was characterized by infiltrates of irregular giant cells (100  $\mu$ ), macrophages, plasma cells, neutrophils, and lymphocytes. The giant cells contained a large number of the etiopathogenic agent *Histoplasma duboisii* (5-15  $\mu$ ). These observations confirmed the utility of histopathology in the diagnosis of African histoplasmosis, a diagnostic approach that may prove significant in view of the expansion of cultural, scientific, and economic links between the USSR and Africa. Figures 2; references 9: 1 Russian, 8 Western.

UDC 579.841.93.04:615.33].083.3

**Immunofluorescent Express Method for Determining Antibiotic Sensitivity of Brucella***18400511 Moscow ANTIBIOTIKI I KHIMioterapiya in Russian Vol 34 No 2, Feb 89 (Manuscript received 3 Jun 87) pp 109-112*

[Article by Ye. A. Gubina, M. M. Zheludkov, S. I. Dyakov, I. K. Lebedeva, T. A. Tolmacheva, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow; Military-Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] The purpose of this work was to develop procedures for an immunofluorescent express method of determining the sensitivity of brucella to antibiotics. The express determination of sensitivity was performed by a method involving the following stages: filling of plastic panels with a compact nutrient medium with or without the antibiotic, inoculation of the material, incubation in a thermostat at 37 °C, preparation of imprint specimens, staining with a fluorescing antibody preparation, and luminescent microscopic analysis of the stained imprints. The method provides an answer to the question of sensitivity in 24 hours. It is possible to use the method for rapid determination of antibiotic sensitivity of brucella in practice. The sensitivity of brucella to tetracycline, doxycycline and rifampicin was confirmed. References 3 (Russian).

UDC 576.8

**Bacterial Corrosion of Concrete***18400522B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 306 No 2, May 88 (Manuscript received 3 Aug 88) pp 477-481*

[Article by G. I. Karavayko, T. V. Zherebyatyeva, Institute of Microbiology, USSR Academy of Sciences, Moscow; Central Scientific Research Laboratory of Construction and Construction Materials, Lipetsk]

[Abstract] A study is made of the propagation of microorganisms involved in the process of corrosion of concrete and the mechanism of their action on concrete. The work was performed on mechanical-draft, drip-type cooling towers of a circulating water system that were made of concrete containing sulfate-resistant portland cement and portland cement containing 0.2% lignosulfonates to increase frost resistance and decrease permeability to water. Heterotrophic bacteria utilize organic substances contained in the concrete (the lignosulfonates). Then, as the concrete breaks down, sulfate-reducing and thionic bacteria appear, forming H<sub>2</sub>S, which is oxidized under aerobic conditions to SO<sub>4</sub><sup>2-</sup>. The bacteria liberate mineral and organic acids as well as lipids. Both aerobic and anaerobic bacteria participate in the corrosion. Attempts to control corrosion must consider the entire community of microorganisms involved in the process. Figure 1; References 15: 10 Russian, 5 Western.

UDC 616.98:579.841.93]-078.73

**Immunochemical Characteristics and Serological Properties of Lipopolysaccharides Extracted from Various Species of Brucella by Various Extraction Methods***18400574a Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 89 (manuscript received 2 Dec 87) pp 22-27*

[Article by V. Ye. Malikov, Ye. A. Dranovskaya and V. V. Vysotskiy, Scientific Research Institute of Epidemiology and Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] A comparative analysis was conducted on the immunochemical, serological, and ultrastructural aspects of species-specific Brucella lipopolysaccharides (LPS) extracted by different methods. The methods employed consisted of trichloroacetic acid extraction (Boivin method), mild alkaline hydrolysis, and boiling water-phenol extraction, using highly virulent B. melitensis 565, virulent B. abortus 99, and avirulent vaccine strain B. abortus 19-BA. Following extraction the LPS preparations were purified by reprecipitation with ethanol and gel chromatography on Sephadex G-100, G-200, and Sepharose 4B columns. The method of extraction and the bacterium from which the LPS was derived were shown to affect the results of serological and immunochemical studies. In addition, the ultrastructural appearance of LPS prepared by the various methods differed. Highest titers in passive hemagglutination reactions were obtained with polyvalent rabbit antiserum and LPS extracted by mild alkaline hydrolysis, with the highest titers seen with B. melitensis 565 and the lowest with B. abortus 19-BA. In addition, lipid A isolated from B. melitensis 565 LPS extracted by the boiling water-phenol method was also shown to be serologically active. However, reports that lipid A may react nonspecifically in serologic tests suggest that results obtained with component be treated with caution. Figures 5; references 19: 5 Russian, 4 Western.

UDC 615.919:852.13].015.4.07

**Dynamics of Anthrax Toxin in the Body***18400574b Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 89 (manuscript received 16 Dec 87) pp 98-100*

[Article by Ye. P. Golubinskiy, E. Ye. Tafelshteyn, V. S. Kolesnik, I. I. Osipenko, A. M. Kondratyeva, M. P. Rudnik, G. I. Borsuk and V. A. Bashkova, Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] Fisher-344 rats (150-180 g) were used to assess the pharmacokinetics of various culture filtrates of Bacillus anthracis following intravenous administration. Enzyme immunoassays on plasma and tissue levels of the anthrax toxin following administration of the filtrate (0.2-1.0 mg protein), in conjunction with mortality statistics and histopathologic changes, demonstrated that

retention of the toxin in the blood stream was a key factor in mortality. The toxin underwent relatively rapid extravasation in animals injected with nonlethal filtrates and was detected largely in splenic macrophages and, to a lesser extent, as granular deposits in splenic sinuses. Subsequent rapid disappearance of the toxin from the spleen was indicative of its complete elimination/metabolism from the body. Moderate toxicity was accompanied by longer retention in the blood stream as indicated by plasma immunoassays, while in animals that succumbed the toxin remained in the plasma with minimal levels detected in the macrophages. The data indicate that the outcome of anthrax in the Fisher-344 rats was predicated on pathogenetic mechanisms affecting permeability of the microcirculatory system and on macrophage activity. Figures 3; references 9: 4 Russian, 5 Western.

UDC 616.98:579.881.1]-07:616.153.96-097-078.73

#### **Detecting Antibodies Against *R. prowazekii* With Three Serological Tests**

18402059 Moscow LABORATORNOYE DELO in Russian No 2, 89 (manuscript received 21 Dec 87) pp 58-61

[Article by A. V. Kuznetsova, V. A. Yablonskaya, I. V. Tarasevich, A. I. Komarova and A. Yu. Talibov, Scientific

Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A comparative evaluation was conducted with three serological methods for the detection of antibodies against *R. prowazekii*, using complement fixation (CF), indirect immunofluorescence (II), and indirect solid-phase immunoassay (ISIA). ISIA was modified by the introduction of 4% polyethyleneglycol (PEG, 6000 mw). Introduction of PEG into the buffer reduced the incubation time to 2 h (from 4 h) and facilitated incubation at room temperature rather than 37°C. ISIA analysis of sera obtained from patients with Brill's disease yielded 100% positive results with titers ranging from 1:500 to 1:512,000. The sera were also positive in CF and II tests, but with titers ranging from 1:500 to 1:5120. Examination of 510 sera obtained from healthy donors and patients with various somatic disorders yielded negative results with CF and II, but 14 (2.7%) were identified as positive by ISIA in relatively low titers (1:500 to 1:1000). The latter results were interpreted to reflect past infections with *R. prowazekii* and the high sensitivity of ISIA. Nevertheless, these findings may also indicate that the specificity of ISIA requires further investigation. Figures 2; references 15: 4 Russian, 11 Western.

**Methods of Physical Sanitation**

18402097b Moscow *MEDITSINSKAYA GAZETA* in  
*Russian* 24 May 89 p 3

[Article by V. Shapovalov, colonel of the medical service, lecturer at the chair of traumatology, Military Medical Academy imeni Kirov: "Methods of Physical Sanitation"]

[Text] Successful treatment of severe, open fractures (including gunshot fractures) of the long tubular bones, especially those which are complicated by suppurative infection, is essentially possible only with a comprehensive approach.

The implementation of modern methods of physical sanitation has proven to be justified, including hyperbaric oxygenation, laser therapy, and electric stimulation of bone repair.

On the whole, use of supplementary methods of physical sanitation has led to a reduction in the term of hospitalization of the patients by an average of 26 bed-days. The long-term results, in patients followed-up for up to 8 years, showed that the rate of relapse was 5.4 percent in the patients who underwent physical methods of sanitation, which is almost a third of the rate in patients not receiving such treatment.

A qualitatively new phase in the treatment of fractures of the long tubular bones and their sequelae involves the adoption of electric stimulation of bone repair into the clinical practice of the leading countries in the world, including the Soviet Union.

This therapy is done with the Soviet-made electric stimulators of the BES-3M and ESO-80 series, implanted electrodes, conductor-guides, and monitoring-and-measuring apparatus.

The comparative findings from the treatment of more than 1,200 patients have shown that combining electrical stimulation of bone repair with techniques of internal and external osteosynthesis in the case of fractures of the lower leg increased the number of good and excellent outcomes and shortened the average time of knitting of the fractures by a factor of 1.2-1.9.

UDC 356.33:614.4(479.25)

**Sanitary, Hygienic, and Antiepidemic Measures Among Troops Sent to Disaster Areas**

18400566A Moscow *VOYENNO-MEDITSINSKIY ZHURNAL* in *Russian* No 2, Feb 89 pp 11-13

[Article by Col. of the Medical Corps I. S. Konyshov, Lt. Col. of the Medical Corps I. M. Khomenko, and Lt. Col. of the Medical Corps V. I. Shishmintsev]

[Abstract] An analysis was conducted on the measures taken by the military under the disaster conditions prevalent in Armenia following the 1988 earthquake. The actual performance at that time demonstrated that sanitary and hygienic oversight over military personnel dispatched to a natural disaster area should be divided into three basic stages. The first stage consists of efforts directed at water treatment and disinfection, removal of debris, and billeting of troops. The second stage deals with ensuring adequate and proper food provisions for the troops, proper sanitary facilities, disposal of victims of the earthquake, vaccination, rat control, phage treatment for the control of typhoid fever, and other general measures aimed at securing elementary sanitary control over the area. The third stage emphasizes the availability of safe drinking water and adequate food and clothing with regard to the ambient conditions. There is need for careful monitoring of drug supplies and disinfectants and for close cooperation and coordination of efforts with local health authorities and other health departments.



UDC 577.212

**Cloning and Comparative Analysis of Two Structurally Distant  $\delta$ -Endotoxin Genes of *Bacillus Thuringiensis* var. *Galleriae* and var. *Kurstaki***

18400569C Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 23 No 2, Mar-Apr 89 (manuscript received 13 Mar 88) pp 463-472

[Article by A. L. Osterman, A. I. Karasin, O. P. Zagnitko, S. V. Kaluger, G. G. Chestukhina, M. Yu. Fonshteyn, N. K. Yankovskiy and V. M. Stepanov, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] A phasmid  $\lambda$ SL5 vector has been employed in the construction of total DNA libraries of *B. thuringiensis* var. *kurstaki* (strain *Dipel*) and var. *galleriae* (strain 11-16), with isolation of recombinant phasmid clones bearing the  $\delta$ -endotoxin genes based on enzyme immunoscreening. Restriction mapping and nucleotide sequence analyses led to the identification of one phasmid ( $\lambda$ OC2) bearing the complete structural  $\delta$ -endotoxin gene of the *kurstaki* variant, identical to one previously described. In addition, two phasmids ( $\lambda$ C10 and  $\lambda$ C11) were identified which bore the complete structural gene of the  $\delta$ -endotoxin of the *galleriae* variant. Expression of the *kurstaki* and *galleriae* genes in *E. coli* yielded products displaying differences in the spectrum of biological activities of these two toxins typical of the differences seen with the *B. thuringiensis* var. *kurstaki* and var. *galleriae* preparations. Further differences between the two endotoxins were confirmed by Western-blot analysis, while Southern blot hybridizations on the respective DNA preparations revealed only limited homology. Figures 3; references 17: 3 Russian, 14 Western.

UDC 579.252.5

**Complementary Site-Addressed Modification of Plasmid DNA**

18400569D Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 23 No 2, Mar-Apr 89 (manuscript received 7 May 88) pp 556-561

[Article by V. V. Vlasov, S. A. Gaydamakov, A. A. Nikonova and A. S. Levina, Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences; Institute of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk]

[Abstract] Studies were conducted on the feasibility of chemical modification of plasmids p160 and p163, bearing 570 bp fragments of mouse immunoglobulin (Ig) gene, by previously described 5'-alkylated oligonucleotides (AO) complementary to the Ig gene. The DNA analysis demonstrated that, in distinction to relaxed DNA, supercoiled DNA ( $\sigma = 0.1$ ) binds the AO reagents and as a result undergoes site-specific chemical modification. The efficiency of site-targeted modification was

directly related to superhelicity, reaching a maximum of 1-2% at  $\sigma = -0.12$  with the different alkylating reagents. The AO reagents were also effective in site-targeted modification of the Id (circular, covalently closed, denatured) form of the plasmid DNA. Figures 4; references 12: 5 Russian, 7 Western.

UDC 577.214.622

**Expression of Synthetic Human Angiogenin Gene in *E. coli* as Fused  $\beta$ -Galactosidase/Angiogenin Protein**

18400602B Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 15 No 4, Apr 89 (manuscript received 17 Jun 88) pp 492-498

[Article by S. P. Kovalenko, I. A. Lisnyak, and N. I. Mertvetsov, Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences; Institute of Therapy, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk; Institute of Oncological Problems, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Genetic engineering studies were conducted on the cloning of human angiogenin gene into a single translation frame with  $\beta$ -galactosidase gene in recombinant plasmid pUR290. Subsequent transformation of *E. coli* with pUR290 and induction with isopropyl- $\beta$ -D-galactoside resulted in the synthesis of a fused  $\beta$ -galactosidase/angiogenin protein. Testing on chick embryo chorioallantoic membranes demonstrated that the fused protein possessed angiogenic activity. Mild acid hydrolysis of the hybrid protein led to the appearance of  $\beta$ -galactosidase peptides and angiogenin. The latter differed from native angiogenin by replacement of the N-terminal Glu-Asp-Asn tripeptide sequence by a Pro residue. Figures 4; references 15: 2 Russian, 13 Western.

UDC 547.963.320.57;577.214.622

**Recombinant Plasmids Bearing Genes of Hybrid Proteins with Antigenic Determinant of Foot-And-Mouth Disease Virus (FMDV)**

18400602D Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 15 No 4, Apr 89 (manuscript received 15 Sep 88) pp 508-513

[Article by Ye. A. Chernenkaya, A. O. Gurevich and V. G. Korobko, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] Technical details are presented on the construction of a series of recombinant plasmids, designated pFMD, bearing chimeric genes encoding fused proteins consisting of *E. coli*  $\beta$ -galactosidase or of human leukocytic interferon (LIF;  $\alpha 2$ ) and monomeric or pentameric sequences of the antigenic determinant (ADO) of FMDV serotype O1. Transformation of competent *E. coli* with the recombinant plasmids led to synthesis of LIF-ADO and GAL-ADO fused proteins. Detailed studies with the

latter system showed that the GAL-ADO protein accounted for 30-35% of the total cell protein, or 100 mg/L culture after purification. Solid phase enzyme immunoassays demonstrated that GAL-ADO protein

reacted with antibodies against FMDV as well as with antibodies directed against the 136-148 sequence of the major FMDV surface antigen. Figures 3; references 26: 6 Russian, 20 Western.

UDC 616-092

**Invasive Properties of Pathogenic Escherichia Infecting Experimental Animals with Varying Immune Status**

18400509C Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 1, Jan-Feb 89 (Manuscript received 16 Sep 87) pp 92-95

[Article by L. V. Grigoryeva, L. F. Yerusalimskaya, G. I. Vinogradov, V. G. Kolesnikov, Kiev Scientific Research Institute of General and Communal Hygiene; Kiev Scientific Research Institute of Epidemiology and Infectious Diseases]

[Abstract] Nonionizing microwave radiation may stimulate or suppress the immune system. At 50  $\mu\text{W}/\text{cm}^2$  or more, experiments have shown depression of cellular and humoral immunity, nonspecific immunity and allergic reactions in guinea pigs and white rats. This article studies the manifestation of invasive properties of pathogenic escherichia placed in the ophthalmic conjunctiva of healthy and microwave-irradiated guinea pigs. The results indicate that preliminary irradiation with microwaves increases the sensitivity of the animals to invasion by the 334 strains of pathogenic escherichia involved in the study. The percentage of positive reactions increased, frequently resulting in generalization of the process and death of the animals. The animals were exposed to 500  $\mu\text{W}/\text{cm}^2$  radiation at 2375 MHz, 20 sessions of seven hours each. References 8: 7 Russian, 1 Western.

UDC 577.391.577.44

**Effects of Thermogenic-Intensity Microwaves on Quantitative Histologic Changes in Central and Intermediate Segments of Visual Analyzer**

18400604E Moscow RADIOBIOLOGIYA in Russian Vol 29 No 2, Mar-Apr 89 (manuscript received 21 Mar 88) pp 247-250

[Article by S. V. Logvinov, Tomsk State Medical Institute, RSFSR Ministry of Health]

[Abstract] An analysis was conducted on the visual cortex and the lateral geniculate bodies of guinea pigs to determine the histological sequelae of exposure to low-intensity decimeter waves (12.6 cm, 2.375 MHz, 60  $\text{mW}/\text{cm}^2$ ). The purpose of the study was to define changes in the glia and the glioneural complex in the central and intermediate regions of the visual analyzer. The histologic findings demonstrated variable responsiveness of the neuroglia at the different levels of the visual analyzer. The more pronounced reactivity and capacity for recovery was shown by the glioneural interactions in the lateral geniculate bodies. The histologic manifestations were less pronounced in the visual cortex. Evidently, the observed differences are due to differences in the glioneural complex of the lateral geniculate

bodies and the visual cortex. The major factors responsible for the difference appear to be the much higher glioneural index and higher percentage of free glia in the lateral geniculate bodies than in the visual cortex. References 15: 14 Russian, 1 Western.

UDC 615.849.112.015.4:612.017/.018].07

**Immune and Hormonal Effects of Local Microwave Radiation of Varying Intensity**

18402072B Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 1, Jan-Feb 89 (Manuscript received 12 Jul 88) pp 16-21

[Article by S. B. Pershin, I. D. Frenkel, A. I. Galenchik, Ye. G. Korovkina, All-Union Science Center of Medical Rehabilitation and Physical Therapy, USSR Ministry of Health; Scientific Research Institute of Physical Methods of Rehabilitation and Treatment, Moscow]

[Abstract] A study is made of the production of immunohormonal effects when areas of various endocrine glands are exposed to microwaves of various "thermal" intensities. Studies were performed on 77 rabbits exposed to microwaves at 120, 240 and 480  $\text{mW}/\text{cm}^2$  for 6 minutes each day in a course of 10 procedures, in the area of the thyroid, adrenal glands and higher autonomic centers (hypothalamus and hypophysis). The studies showed that the immune and hormonal changes that were produced at 120 and 240  $\text{mW}/\text{cm}^2$  were complex, and immune stimulation was observed when the thyroid gland was exposed to the microwaves. Immune depression resulted when the adrenal glands were irradiated and when the irradiation was transscleral. The microwave irradiation at 240  $\text{mW}/\text{cm}^2$  resulted in damage to tissue in the form of edema in 56% of the animals and in the form of edema with necrosis at sites where the skin came in contact with the irradiation device. Irradiation at 120  $\text{mW}/\text{cm}^2$  produced no damage. Boosting the power to 480  $\text{mW}/\text{cm}^2$  produced edema and necrosis in the animals, 25% of whom died from the radiation. The body's resistance to microwave-induced damage apparently depends on the type of animal and the condition of the circulatory system and the system for cooling the organs. The researchers conclude that immunostimulation is best achieved by exposure of the endocrine glands to 120  $\text{mW}/\text{cm}^2$ . References 5: 3 Russian, 2 Western.

UDC 616.24-036.12-036.868:615.846/-036.8-07

**Pulsed Decimeter Wave Therapy in Medical Rehabilitation of Patients With Chronic Nonspecific Pulmonary Disease**

*18402072C Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 1, Jan-Feb 89 (Manuscript received 15 Aug 88) pp 39-43*

[Article by A. I. Krupennikov, All-Union Science Center of Medical Rehabilitation and Physical Therapy, Moscow]

[Abstract] For the first time in Soviet practice, pulsed decimeter wave therapy is used on patients with chronic nonspecific pulmonary disease. Clinical studies were performed with 93 patients with chronic obstructive and nonobstructive bronchitis who suffered slight aggravation or incomplete remission. The new form of therapy is found to be effective on these patients and can be successfully used in the medical rehabilitation stage. The pulsed therapy can be used on patients with significant disorders of hemodynamics involving pulmonary circulation, with pulmonary insufficiency stage III, and with cardiac insufficiency stage IIB with bronchiectases and a tendency toward hemoptysis. References 10: 6 Russian, 4 Western.

UDC 615.849.112.015.46.07

**The Dynamics of Immunobiological Effects Following Transcerebral Microwave Exposure**

18402148A Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 3 May-Jun 89 (manuscript received 30 Sep 88) pp 12-15

[Article by S. B. Pershin, I. D. Frenkel, A. S. Bobkova, Ye. V. Gontar, A. I. Galenchik, V. M. Bogolyubov, All-Union Scientific Center for Medical Rehabilitation and Physical Therapy, USSR Ministry of Health, Moscow]

[Abstract] The dynamics of immunobiological effects following transcerebral exposure to a decimeter-range electromagnetic field are studied. Male rabbits were exposed to microwave radiation six minutes a day, for ten days, and sacrificed at various times following microwave exposure. The quantities of hemolysin-forming cells and splenocytes were determined, as were some hormone levels. Transcerebral microwave exposure stimulated glucocorticoid function and processes in the lymphoid tissue, thus increasing the total number of splenocytes and content of oxycorticosteroids. Transcerebral microwave exposure can alter functional activity in the endocrine system, because of the hypothalamus and hypophysis acting on the endocrine glands. Immune suppression occurs, possibly due to a lower prostaglandin level. References 1 (Western).

**Siberian Herbs Used to Treat Cancer, Psoriasis, Liver Damage**

18400650 Moscow ADVANCES OF SCIENCE AND TECHNOLOGY in English No 15, 30 May 89 pp 1-2

[Article by Arkady Semenov, Doctor of Chemistry]

[Text] The combination of the modern methods of treatment with traditional medicine produces the most promising results in treating many diseases. We have made sure of this after having studied for many years the experience of herb healers. For example, psoriasis, a skin disease, normally responds to treatment very badly, but the Siberian healers have a medicine which gives 65 per cent of the patients a chance of a complete cure. We are developing a preparation on its basis which will be even more effective. The medicine does not have hormonal effects. True, the course of treatment is quite long: from six months to two years, but on the other hand it does not involve hospitalization which most such patients normally need. According to the available data, this medicine is unique in the world. The plant from which it is extracted grows only in the unique climatic conditions of Siberia, and on a limited territory, too.

Here is another example. Most contraceptives have hormonal effects. The medicine for this purpose which we suggest does not have such effects. Besides, it is cheap because it is extracted from a plant which is wide-spread

in the world. It takes only half a gram of the pure substance for the desired effect.

We are completing the development of a preparation which in terms of its restorative effect on a damaged liver excels all the drugs existing in the world. Its tentative name is Salsocollin. It is based on a well-known plant called saltwort. It can be cultivated on plantations where it produces good harvests. That is why our medicine is considerably cheaper than other similar preparations.

There have been seemingly impossible cases in medicine when patients were completely cured by herbs. Nikolai Simbirtsev who once worked at our institute believed, for example, that cancer could be cured on the diamond-cut-diamond principle. In his experiments he administered tumorous plant tissues to animals with malignant tumours and eventually scored a certain success. When his medicine was administered even to hopeless patients there were some promising results.

We have gathered enough experiment materials which indicate that a certain group of patients with the fourth phase of cancer (up to 20 per cent) can be saved. It is known that traditional medicine is helpless in such cases. The mechanism of the curative effect is actually well-known: the preparation acts as an immunostimulator. The drug restores the activity of the immune system when it breaks down for reasons which are still to be ascertained and stops recognizing cancer cells.

The work on this drug continues. By the way, it may prove effective against AIDS, too. This is because it stimulates the growth of T-lymphocytes which get quite scarce in the case of that disease. I don't want to rush with optimistic forecasts, for the hypothesis needs to be thoroughly tested, and this takes time. To speed up the development of the preparation, we are prepared to cooperate on mutually beneficial terms (maybe, even set up a joint venture) with foreign companies concerned.

The science department of the Novosti Press Agency is prepared to help those wishing to contact the Siberian developers of these and other unique preparations.

UDC 66.127-005.8-036.11-092.9-085.31:  
[547.95:547.943]-036.8-07

**Comparative Study of the Action of Dalargin and Obsidan on the Course of Experimental Acute Myocardial Infarction**

18400401a Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 6, Nov-Dec 88 (manuscript submitted 20 Mar 87) pp 13-15

[Article by V. S. Pavlenko, V. V. Khlystov, A. F. Usynin, and V. D. Slepshkin, Department of Pathology, Scientific Research Institute of Cardiology, Tomsk Science Center, USSR Academy of Medical Sciences]

[Abstract] In evaluating approaches that attempt to limit the size of the necrosis in acute myocardial infarction, one must consider the problems associated with the therapeutic use of obsidan. A number of authors suggest using  $\beta$ -adrenergic blockers that reduce the load on the myocardium by lowering the frequency of contractions and the contracting capacity of the myocardium. The metabolism in the periinfarct region is also thereby improved. The authors here studied the use of one of the representatives of the opioid peptides—the synthetic leu-enkephalin, dalargin—to affect the dynamics of the development of acute myocardial infarction induced in 100 male rats. The rats were separated into five groups, one of which was injected with 50 mkg/kg body weight dalargin an hour after coronary occlusion, another of which received 200 mkg/kg nalaxone 30 minutes before the dalargin, and a third of which was injected with 50 mkg/kg obsidan an hour after the occlusion. Infarct size was determined, as were serum levels of lactate dehydrogenase and its isoenzyme. Obsidan was found to have a limited effect in terms of restricting the area of damage and was judged to be more effective when used in a preventive capacity, before catecholamine damage to the myocardium. A greater antiischemic effect with dalargin is associated with its ability not only to suppress the peripheral effects of catecholamines, but also to lessen the aftermath of such effects. In the early stages of the infarction, dalargin, interacting with the opiate receptors, reduces serum enzyme activity and, like obsidan, reduces the peripheral effects of catecholamines. Unlike obsidan, it later prevents the expansion of the focus of the ischemic damage to the myocardium. References 4: 2 Russian, 2 western.

UDC 615.275.015.4:616.834-003.9-092.4

#### Growth-Stimulating Effect of Baliz-2 Preparation on Sympathetic Ganglia in Culture

18400402c Moscow *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* in Russian Vol 106 No 12, Dec 88 (manuscript submitted 25 Aug 87) pp 720-722

[Article by M. V. Kozlova, I. P. Sidorenko, A. Ya. Shurygin, and V. U. Kalenchuk, Department of Cellular Biology, USSR Academy of Medical Sciences, Moscow; Department of Biologically Active Substances, Scientific Research Institute of Physical and Organic Chemistry, Kuban State University, Krasnodar]

[Abstract] Baliz-2, a product of microbiological synthesis that has a marked stimulating effect on retarded reparative processes, is used in medical practice as an antibacterial agent, a wound-healing agent, and a burn-treatment preparation. The first stage of an analysis of its effect on reparative processes in nerve tissue should be a study of its effect on the development and growth of peripheral ganglia in culture. The researchers here performed studies of 124 explants of sympathetic ganglia from newborn Wistar rats. The ganglia were cultivated

for 4-7 days, and Baliz-2 was used in concentrations of 0.01, 0.001, and 0.0001%. The growth dynamics of the control ganglia *in vitro* were typical. The addition of the Baliz-2, however, resulted in increased density of neurite-glia fasciculi as well as in a larger area of region of growth. The concentrations of 0.001 and 0.0001% were found to produce the largest increase in region of growth. The increase in density of neurite-glia fasciculi was greater than that of control by a factor of 1.5-1.7. Figures 2, references 14: 6 Russian, 8 Western.

UDC 615.919:598.126]:615.454.1.07

#### Quantitative Analysis of Vietnamese Cobra Venom in Pharmaceutical Ointments

18400532b Moscow *FARMATSIYA* in Russian Vol 38 No 1, Jan-Feb 89 (manuscript received 12 Feb 88) pp 27-29

[Article by I. A. Muravyev and Khong Ngok Khung, Pyatigorsk Pharmaceutical Institute]

[Abstract] A method has been devised for the analysis of the concentration of Vietnamese cobra venom in medicinal ointments, based on the presence of phospholipase A in the venom. The visual determination of the endpoint yielded an analytical method with a sensitivity of 0.40  $\mu\text{g/ml}$  for the venom, when using egg yolk substrate in phosphate buffer, pH 7.4. References 5 (Russian).

UDC 616.89-02:616.12-008.331.1]-085.31: [547.95:547.943]-036.8-07

#### Use of Dalargin Electrophoresis to Adjust Mental State in State I and II Hypertension

18400543a Moscow *ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA* in Russian Vol 89 No 2, Feb 89 (manuscript received 9 Sep 87) pp 66-69

[Article by V. A. Yezhov and A. G. Buyavykh, Chair of Physiotherapy and Health Resort Therapy, Faculty of Postgraduate Medicine, Crimean Medical Institute, Yalta]

[Abstract] Endonasal dalargin electrophoresis was assessed for its efficacy in alleviating emotional disorders evident in patients with stage I and II hypertension. The patients were represented by 80 men and women, 30 to 59 years old, of whom 46 (57.5%) presented with anxiety, 26 (32.5%) with neurasthenia, 6 (7%) with hypochondria, and 2 (2.5%) with signs of hysteria and emotional lability. Endonasal administration of 1 mg dalargin using a 2-3 mA current for 15-20 min per day for a total of 10-12 treatments was shown to improve mental functions and emotional stability. Sensorimotor reactions improved without significant alterations in accuracy or productivity of performance. Additional benefits of dalargin treatment consisted of diminished anxiety and improvements in memory. References 12 (Russian).