JPRS-ULS-87-006
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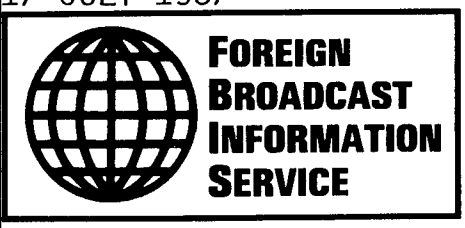

JPRS Report

Science & Technology

USSR: Life Sciences

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17 JULY 1987

SCIENCE & TECHNOLOGY

USSR: LIFE SCIENCES

CONTENTS

BIOCHEMISTRY

MICROBIOLOGY

PUBLIC HEALTH

MISCELLANEOUS

UDC 577.175.142:582.285.12

CYTOKININ ACTIVITY OF MYCELIA EXTRACTS AND CULTURE FLUID OF DIPLOID AND HAPLOID STRAINS OF CORN SMUT FUNGUS USTILAGO ZEAE (DC.) Ung

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 6, Nov-Dec 86 (manuscript received 4 Apr 85) pp 783-789

[Article by L. V. Kuznetsov, I. F. Khozina, I. V. Sokolovskaya and A. N. Polin, Moscow State University]

[Abstract] Cytokinins cause hypertrophy and hyperplasia of cells in plant tissue cultures, increase cell attracting capacity, induce nutrient substance influx, prevent disorganization of chloroplasts, decrease apical dominance and induce the development of axillary buds. Cytokinins participate in the formation of pathological neoplasms on plant leaves. The symptoms of a number of diseases can be imitated by exposure to exogenous cytokinins. A number of pathogens cause an increase in cytokinin content of infected tissues, either by production of cytokinins by the parasite or by its stimulus of biosynthesis or inhibition of degradation of host cell hormones. This article attempts to determine whether haploid strains of the fungus Ustilago zeae (DC) Ung and the diploid strains obtained from them are capable of formation in the mycelium and liberation, into the environment, of substances with cytokinin activity, and whether there are differences between strains in terms of this capability. The results showed that the diploid and haploid strains, differing in capability of inducing gall formation, form cytokinins in the mycelium and liberate them into the environment. Haploid strains, however, are not capable of causing the formation of galls, but suppress the growth and development of the host plant. Determination of quantitative differences between strains in their capability of formation of substances with cytokinin activity is of significant interest in connection with the study of the mechanisms of gall formation, since the induction of pathologic neoplasms in plants is frequently related to hormonal balance disorders. Figures 4; references 13: 5 Russian, 8 Western.

6508/9716
CSO: 1840/552

UDC 575.127

SOMATIC HYBRIDIZATION OF LYCOPERSICON ESCULENTUM AND L. PERUVIANUM V. DENTATUM

Kiev BIOPOLIMERY I KLETKA in Russian Vol 2, No 3, May-Jun 86 (manuscript received 1 Nov 85) pp 136-140

[Article by N.M. Piven, O.K. Makhorina, I.K. Komarnitskiy, N.N. Cherep and L.R. Shlumukov, Institute of Botany imeni N.G. Kholodnyy, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Protoplastic fusion technology was employed to create somatic hybrids of Lycopersicon esculentum and L. peruvianum v. dentatum, representing two incompatible species under normal breeding conditions. Chromosomal analyses and determinations of multimolecular protein forms (peroxidase, esterase, RuBPCase) and restrictase analysis of chloroplast DNA provided molecular confirmation for the novel hybrids. In most of the resultant plants the morphology of the leaves and the color and morphology of flowers was intermediate between the two species. The cloroplast DNA in the hybrids was found to be identical to the Peruvian species. Further studies shall be undertaken to assess the fertility of the hybrids with a view toward incorporating them into tomato breeding programs. Figures 5; references 14: 4 Russian, 10 Western.

12172/9716
CSO: 1840/435

UDC 632.938

COMPARATIVE FIELD STABILITY OF SELECTED POTATO VARIETIES TO VIRUSES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 3, May-Jun 86 (manuscript received 27 Feb 85) pp 61-63

[Article by L.K. Zherebchuk, V.A. Vyshnevskiy and Z.M. Olevinskaya, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev; Polessie Experimental Station, Malin]

[Abstract] Trials were conducted with six varieties of potatoes, widely cultivated in the Ukraine, to test their susceptibility to common potato viruses. The three-year study (1982-1984) demonstrated that, of the varieties tested (Zhitomyryanka, Polesskiy rozovyy, Irshanka, Ikar, Lepta, Radomyshlskiy) against a battery of viruses (X, Y, S, F, M, leaf twist), the Irshanka variety was resistant to all except the potato S. virus. In the Kiev Oblast the average 3-year harvest for Irshanka tubers was 344 quintals/ hectare. The high yields and the insusceptibility to viruses indicate the utility of Irshanka in potato breeding programs. References 2 (Russian).

12172/9716
CSO: 1840/530

UDC 632.38

EFFECTS OF PRESOWING TREATMENT OF SUGAR BEET SEEDS WITH IMANINE ON VIRAL DISEASES AND PRODUCTIVITY

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 12 Apr 85) pp 65-69

[Article by A.D. Bobyr and A.A. Barkalova, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] The effects of imanine pretreatment of sugar beet seeds prior to sowing were evaluated on the basis of crop yields and incidence of viral (mosaic and yellow) diseases. Trials with several varieties (Belotserkovskiy polyhbybrid, Belotserkovskiy monospermous, Yaltushkiy monospermous 30, Verkhnyachskiy 101) demonstrated that under the conditions employed (0.01-0.1 % imanine for 6-48 h) the rate of seed germination and sprouting improved by 50%, with a concomitant reduction in viral disease incidence of 50%. In general, the improvements in harvest obtained with imanine seed pretreatment were statistically significant and ranged from a gain of 20 to 60 quintals/ha. References 6 (Russian).

12172/9716
CSO: 1840/532

UDC 582.542.1-133.12:631.461.5

CULTURE AGE AS FACTOR IN AGGLUTINATION OF AZOSPIRILLUM BRASILENSE 7 BY WHEAT LECTIN

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 3, May-Jun 86 (manuscript received 23 Apr 84) pp 396-399

[Article by N.N. Semak, V.Yu. Matveyev, V.I. Panasenko and V.V. Kotusov, Institute of Plant and Microbial Biochemistry and Physiology, USSR Academy of Sciences, Saratov]

[Abstract] A spectroturbidimetric study was conducted on culture age as a factor in the agglutination of Azospirillum brasilense 7 by wheat lectin. Measurements made at 450-620 nm demonstrated that two agglutination maxima were observed in relation to the growth curve on meat-peptone broth. The first sharp increase in agglutinability occurred at the beginning of the exponential phase of growth at ca. 4 h, and the second peak at the onset of the stationary phase at ca. 8 h. These two growth phases are obviously represented by cells with the highest concentration of lectin-specific sites or receptors. Figures 2; references 17: 7 Russian, 10 Western.

12172/9716
CSO: 1840/549

UDC 547.463; 576.311.347

UNCOUPLING AND INHIBITION OF OXIDATIVE PHOSPHORYLATION IN MITOCHONDRIA BY OLIGOMERS OF 15-KETO-PGB_1 (PGB_x)

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR: KHIMIYA in English Vol 35, No 4, Oct-Dec 86 (manuscript received 14 Feb 86) pp 265-268

[Article by I. Martin, N. Samel and U. Lille, Institute of Chemistry, EsSSR Academy of Sciences]

[Text] The polymeric prostaglandin PGB_x, with a molecular weight range of 2200-2500 (6-7 monomeric units), synthesized from 15-keto-PGB_1, was able to maintain oxidative phosphorylation during hypotonic degradation in aged mitochondria isolated from rat liver [1]. It stimulates the release of Ca^{2+} from fragmented sarcoplasmic riticulum and heart mitochondria. Ionophore activity of PGB_x is almost two orders of magnitude greater than that of other prostaglandins [2]. It was found that PGB_x in vivo facilitates and significantly increases the survival of monkeys after myocardial infarction with ventricular fibrillation [3], as well as the survival of the heart of the hypoxic mouse [4]. Also, rabbits treated with PGB_x showed improved recoveries from the effects of experimentally induced cerebral ischemia [5].

Association between the increase in cytosolic Ca^{2+} level and tissue damage in ischemic myocardium does exist, because mitochondria are avid accumulators of Ca^{2+} [6] and when overloaded with Ca^{2+}, they rephosphorylate ADP at a relative slow rate [1]. At the same time, the energy in the form of ATP is required for the maintenance of intracellular homeostasis with respect to Ca^{2+} and hence for the maintenance of a low cytosolic Ca^{2+} [7]. After taking into account the effects of PGB_x in vivo and in vitro we hope that PGB_x will interact with mitochondria, thereby preventing the latter from becoming overloaded with Ca^{2+}. The beneficial effect of PGB_x showed in vitro with aged mitochondria (3-5 days at 0°C), but failed with fresh mitochondria [8]. Therefore the examination of the effects of PGB_x on the energetic parameters of oxidative phosphorylation of Ca^{2+}-loaded and nonloaded mitochondria is of great interest.

Methods

PGB_x was synthesized by the Michael reaction catalyzed by alkali via 15-keto-PGB_1 starting with biosynthetic PGE_1. Oligomers were separated, and the molecular weights were determined by gel chromatography [9]. Fractionated oligomers with mean molecular weights of 1336, 2400, 3040 and 3370 were stored at -20°C in ethanol. We termed those fractions as Fractions I, II, III and IV, respectively.

Mitochondria were isolated from rat liver by differential centrifugation and stored at 0°C for 2 hours prior to polarographic analysis. The effects of the oligomers of 15-keto-PGB_1 on oxidative phosphorylation of Ca^{2+}-loaded and nonloaded rat liver mitochondria were studied polarographically by using a Clark oxygen electrode (produced at Moscow State University), polarographic analyzer PA2 (Laboratorni Pristroje, Praha), and Recorder 2210 (LKB). The specific activities of oligomers (A_3) and (A_4) were defined as changes in the mitochondrial respiration rate in State 3 and State 4 respectively, caused by the increase of oligomer concentration in the incubation medium by 1 μM, and was dimensioned as (ngatoms O/mg·min)/μM. Chemicals: HEPES, EGTA, potassium malate, potassium glutamate, magnesium acetate were products of Sigma, BSA, TRIS and sucrose were purchased at Serva, $CaCl_2$, KH_2PO_4 and EDTA were products of "PeaXHM", and ADP was from Reanal. Abbreviations: PG - prostaglandin, ADP - adenosine-5′-diphosphate, ATP - adenosine-5′-triphosphate, HEPES - N-(2-hydroxyethyl) piperazine-N′-2-ethanesulfonic acid, EGTA - ethylene glycol bis (2-aminoethylether)-N,N-tetra-acetic acid, EDTA - ethylene diaminetetra-acetic acid, TRIS - tris(hydroxymethyl)aminomethane, BSA - bovine serum albumin, RCI - respiratory control index.

Experimental

Isolation of rat liver mitochondria was performed in a cold room at +2°C. The female Wistar rats (200-250g) were decapitated, their livers excised as rapidly as possible and washed with ice-cold 0.3 M of sucrose solution. The livers were cut with scissors on a Petri dish and washed carefully with the same solution. The chopped livers were homogenized (glass barrel, Teflon pestle) in a medium that contained 0.3 M of sucrose, 0.2 mM of EDTA and 10 mM of TRIS·HCI pH 7.4. The nuclei were sedimented at 700 X g during 10 min, and mitochondria at 8000 X g during 20 min. The mitochondrial pellet was washed twice with a homogenization medium that consisted of 1 mg/ml of BSA and was homogenized with a pipette in the same solution. The centrifugation, washing and homogenization procedures were repeated at 5300 X g and 4400 X g for 10 min. After rehomogenization of the final mitochondrial pellet, the content of protein was measured by the Biuret method [10] with BSA used as a standard.

Polarographic analysis of oxidative phosphorylation. The standard incubation medium contained 250 mM sucrose, 20 mM HEPES buffer pH 7.4, 4 mM potassium glutamate, 2 mM potassium malate, 3 mM magnesium acetate, 4 mM KH_2PO_4, 0.3 mM EGTA, and 1 mg of mitochondrial protein in a final volume of 1.0 ml at 28°C. Additions were made with microsyringes through a small opening in the cell: 150 μM of $CaCl_2$ for the loading of mitochondria, 0.6-15 μM of oligomers

and 120 μM of ADP for the initiating oxidative phosphorylation. We also determined the oxygen uptake and respiratory control index (RCI) which was defined as the ratio between the respiratory rate during the active state of respiration and the respiratory rate after the phosphorylation of ADP. The mean values of A_3 and A_4 for metabolic states 3 and 4 were obtained with the help of five measurements in the oligomer concentration range of 0.6-15 μM.

Results

The RCI values in the range of 5-6 and respiration of 72 ngatoms O/mg·min in the steady State 3 were determined 1 hour after the isolation of mitochondria. Addition of oligomers to the incubation medium led to the uncoupling and inhibition of oxidative phosphorylation. For example, a decrease of respiration to the level of 32.4 ngatoms O/mg·min and respiratory control index 1.4 was caused by an addition of 5.85 nmoles of Fraction II per 1 mg of protein. The increases and decreases of mitochondrial respiration are illustrated in Fig. 1. It was unexpected that affecting ability of 15-keto-PGB_1 oligomers appears periodically, because the bell-shaped activity curve of PGB_x with a maximum at 2500 Dalton is known [1]. Mitochondria loaded with 150 μM Ca^{2+} showed respiration of 36 ngatoms O/mg·min in the active state and RCI 2.5 1 hour after isolation. Activities A_3 and A_4 for the Ca^{2+}-loaded mitochondria are shown in Figs 2 and 3. The A_4 values for Ca^{2+}-loaded mitochondria are approx. two times greater than for nonloaded mitochondria, and Fraction III (M_w3040) differs from the others by its lowest A_4 value.

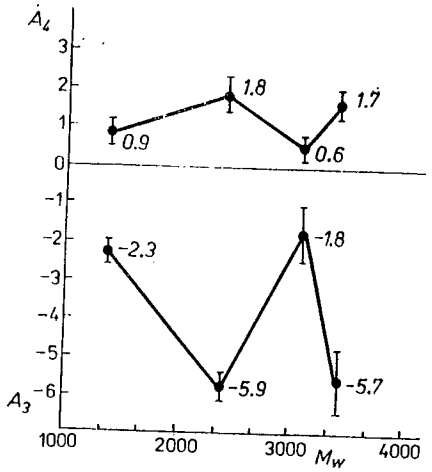

Fig. 1. Influence of 15-keto-PGB_1 oligomers on mitochondrial respiration in the state of phosphorylation (State 3) and at rest (State 4). Corresponding activities of oligomers in both states are A_3 and A_4. For definition and dimensions see Methods.

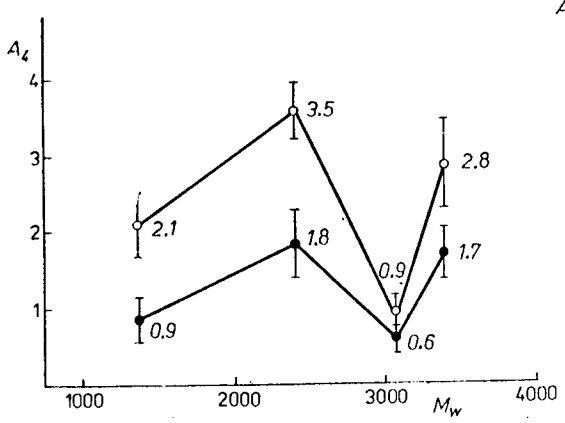

Fig. 2. Activities of oligomers on mitochondrial respiration for Ca^{2+}-loaded (–○ – ○–) and intact (–● – ●–) mitochondria in State 4 (A_4)

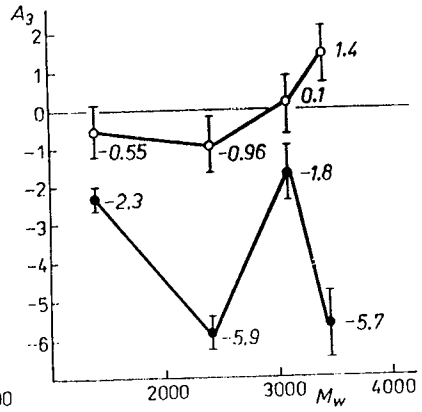

Fig. 3. Activities of oligomers on mitochondrial respiration for Ca^{2+}-loaded (–○ – ○ –) and intact (– ● – ● –) mitochondria in State 3 (A_3).

In the active state, the intramitochondrial Ca^{2+} prevents the inhibition of phosphorylation by oligomers. Furthermore, an increase of the concentration of Fraction IV (M_w3370) by 1 μm stimulates respiration by 1.36 mgatoms O/mg·min (Fig. 3).

Discussion

The beneficial effect of PGB_x serving to protect oxidative phosphorylation during hypotonic degradation was revealed in aged (4 days at 0°C) mitochondria. An addition of PGB_x also prevents the Ca^{2+}-inhibition of phosphorylation of two-day-old mitochondria [1]. On the contrary, the inhibition of respiration in State 3 and stimulation in State 4 of two-hour-old mitochondria by PGB_x were observed during the present study. By our results, the oligometric derivatives of 15-keto-PGB_1 act like inhibitors and uncouplers of oxidative phosphorylation. It is surprising that oligomers with a mean molecular weight of 2400 are able to protect oxidative phosphorylation in aged mitochondria, but at the same time they inhibit and uncouple oxidative phosphorylation in intact mitochondria. Loading mitochondria with Ca^{2+} does not change the mechanism of action of oligomers in State 4 because the shapes of activity curves are similar (Fig. 2). But in the state of phosphorylation (State 3), the Ca^{2+}-loaded mitochondria were affected by oligomers only to an inconsiderable extent and the curve shape differed from that obtained with nonloaded mitochondria.

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CSO: 1840/553

UDC 578.842.1.04

INFLUENCE OF PHYSICAL AND CHEMICAL FACTORS ON THE MOSQUITO IRIDOVIRUS AEDES CANTANS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 2, Mar-Apr 86 (manuscript received 15 Feb 84) pp 55-58

[Article by L.P. Buchatskiy, G.S. Litvinov, L.M. Podrezova and Ye. A. Bunich-Remizova, Kiev State University]

[Abstract] A study was made of the influence of ultraviolet radiation and a constant magnetic field of varying intensity, and also of ether and chloroform, on an iridovirus of mosquitos. The infectious titer of the virus was significantly decreased after UV irradiation, 15 minutes of irradiation at 19 Lx being significant to inactivate the virus completely. A magnetic field with an induction of 0.01 Tl decreased the infectious titer of the virus only slightly, whereas an induction of 1 Tl decreases the infectious titer significantly. Ether had no effect on the iridovirus, but chloroform decreased the infectious titer without causing full inactivation. Figures 2, references 15: 9 Russian, 6 Western.

6508/9716
CSO: 1840/528

UDC 577.175.829'17.05:615.212.7

STRUCTURAL-FUNCTIONAL INTERRELATIONSHIPS OF SHORT ENKEPHALIN ANALOGUES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 12, No 7, Jul 86 (manuscript received 3 Jan 85; after revision 9 Jul 85) pp 869-897

[Article by G.F. Rozental and G.I. Chipens, Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga]

[Abstract] A systematic discussion is presented of the structural and functional relationship at the level of known analogues of N-terminal tetra- and shorter enkephalin peptides. The affinity of enkephalin tetrapeptides for the nerve cell opiate receptor is examined in relationship to their analgesic activity. The combination of properties of the active section

of the molecule supporting the interaction of enkephalins with the μ-subclass of opiate receptors is said to result from the limited N-terminal sector of the peptide molecule. A critical analysis of the relationship between affinity and structure of some 180 enkephalin analogues confirm this suggestion. References 117: 3 Russian, 114 Western.

6508/9716
CSO: 1840/442

UDC 577.113.6:542.95

FULLY AUTOMATIC SYNTHESIS OF OLIGODEOXYRIBONUCLEOTIDES BY THE AMIDOPHOSPHITE METHOD ON THE "VIKTORIA-4M" SYNTHESIZER

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 12, No 7, Jul 86 (manuscript received 21 Jan 86) pp 988-991

[Article by S.M. Gryaznov, V.K. Potanov, V.G. Memelev, A.A. Elov, A.A. Purmal and Z.A. Shabarova, Chemistry Faculty, Moscow State University imeni M.V. Lomonosov; Interfaculty Problem Scientific Research Laboratory of Molecular Biology and Bioorganic Chemistry imeni A.N. Belozerskiy, Moscow]

[Abstract] Results are presented from the use of the "Viktoria-4M" synthesizer for rapid synthesis of long (up to 29 element) oligodeoxyribonucleotides by the phosphite method in fully automatic mode. The initial monomers used were 5'-O-monomethoxytrityl-N-benzoyl-3'-(N, N-diisopropylamido) methyl phosphites, selected due to their high stability under long-term storage and rapid rate of formation of the internucleotide bond. Twelve 10-29-element oligonucleotides were synthesized, intended for various molecular biological studies. Their nucleotide sequences are listed. The mean degree of conversion in each stage was 94-96%; yields, as substance isolated after ion exchange and reverse-phase chromotography, were 85-92%. Figures 3; references 7: 2 Russian, 5 Western.

6508/9716
CSO: 1840/442

UDC 547.993.02:595.443.8-114.5.088

STRUCTURE AND FUNCTION OF ARGIOPIN: ION CHANNEL BLOCKER FROM SPIDER ARGIOPE LOBATA VENOM

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 12, No 8, Aug 86 (manuscript received 10 Mar 86) pp 1121-1124

[Article by Ye.V. Grishin, T.M. Volkova, A.S. Arsenev, O.S. Reshetova, V.V. Onopriyenko, L.G. Magazanik*, S.M. Antonov* and I.M. Fedorova*, Institute of Bioorganic Chemistry imeni M.M. Shemyakin (Moscow) and of *Evolutionary Physiology and Biochemistry imeni I.M. Sechenov (Leningrad), USSR Academy of Sciences]

[Abstract] Structural and functional studies were conducted on argiopin, a toxin isolated from the venom of the spider Argiope lobata, particularly with respect to glutamate-dependent neurotransmission. In the case of glutamatergic synapses of blowfly larva, the dissociation constant (K_D) for the argiopin-receptor complex was calculated at 6.7×10^{-7}M. By comparison, the K_D for the reaction of argiopin with cholinergic postsynaptic membrane of the frog muscle was much greater, at 2.4×10^{-5} M. Argiopin, therefore, reacts primarily with ion channels activated by glutamate, demonstrating thereby selective inhibition of neuromuscular transmission in insects. A combination of chromatographic and spectroscopic studies resulted in the determination of a MW of 636 for argiopin, a molecular consisting of six well-defined structural fragments containing a 2,4-dihydroxyphenylacetic residue and a polyamine. Figures 1; references 8: 2 Russian, 6 Western.

12172/9716
CSO: 1840/443

UDC 577.113.6:542.95

AUTOMATIC AND SEMIAUTOMATIC SYNTHESIS OF POLYDEOXYNUCLEOTIDES BY DIISOPROPYLPHOSPHAMIDITE METHOD

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 12, No 8, Aug 86 (manuscript received 3 Jan 86) pp 1132-1134

[Article by V.P. Kumarev, T.I. Kolocheva, I.P. Motovilova, G.A. Potemkin* and Yu.G. Sredin*, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk; *Central Technical Construction Bureau of Specialized Electronics and Analytical Instrument Manufacturing, Novosibirsk]

[Abstract] Cursory details are presented on the functional steps in the Soviet Gen-1 (semiautomatic) and Gen-1M (automatic) polynucleotide synthesizers using the diisopropylphosphamidite method. These instruments were used in the synthesis of approximately 100 oligonucleotides containing from 8 to 48 monomeric units. The carriers used in the syntheses consisted of CPG 350-1400, Silipor 015-075, and silochromes S3 and S80, with the nucleosides

protected with N,N-diisopropylphosphamidites synthesized by the method of Barone et al. [Barone, AD, et al., Nucl. Acids. Res., 12(10): 4051-4060, 1984]. Figures 1; references 10: 4 Russian, 6 Western.

12172/9716
CSO: 1840/443

UDC 576.094.2.087.4:543.545

ANALYTICAL FREE-FLOW ELECTROPHORESIS OF CELLS AND PROTEINS

Kiev BIOPOLIMERY I KLETKA in Russian Vol 12, No 5, Sep-Oct 86 (manuscript received 21 Oct 85) pp 251-256

[Article by I.S. Gabuyev, A.L. Mazanov, V.N. Brezgunov, I.N. Prelova and A.S. Koleznev, All-Union Scientific Research Institute of Applied Microbiology of the Main Microbiological Industry of the USSR Council of Ministers, Obolensk, Moscow Oblast]

[Abstract] A schematic and an operational description are provided for a free-flow electrophoretic apparatus suitable for separation of both cells and proteins. The instrument incorporates an optical scanner and a minicomputer for pattern analysis, providing an analytical readout. Trial runs were conducted with E. coli, sheep erythrocytes, bovine serum albumin, and horse hemoglobin. The mobility data were in excellent agreement with those obtained by more conventional electrophoretic techniques, but offered the added advantage of requiring only 5-10 min for an analysis. In addition, free-flow electrophoresis was remarkable for a relatively low error rate of 3%. Figures 7; references 9: 7 Russian, 2 Western.

12172/9716
CSO: 1840/437

UDC 577.112:612.124.017

BINDING INHIBITION AND ACTIVATION OF FIRST HUMAN COMPLEMENT COMPONENT: EFFECTS OF SYNTHETIC PEPTIDES, IMMUNOGLOBULIN FRAGMENTS AND SELECTED PROTEINS

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 17 Oct 85) pp 707-718

[Article by L.V. Kozlov, M.N. Sizoy, A.A. Zinchenko and A.V. Levkovskiy, Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted on the binding of human C1q to sensitized SRBC as it is affected by various analogs simulating the putative complement-binding site on IgG: Trp^{277}-Tyr^{278} and Thr^{289}-Lys-Pro-Arg^{292}. Inhibition was greatest with Boc-Trp-Tyr (K_i = 2.86 x 10^{-4} M), followed by tuftsin (K_i = 6 x 10^{-4} M). The D,D-dipeptides that were tested were ineffective

as inhibitors. The insoluble Z-Trp-Tyr-OMe peptide induced classical pathway-activation of complement, while the synthetic octapeptide Boc-Glu-Val-Asp-Leu-Leu-Lys-Asp-Gly-OMe--which is the 36-43 region of beta$_2$-microglobulin--inhibited Clq binding with a $K_i = 4.7 \times 10^{-4}$ M. Furthermore, certain amino acid sequences in Clq are homologous to the active site on pepsin. This fact, as well as the tendency of Clq and pepsin to bind hydrophobic amino acids, suggest considerable structural similarity between these two proteins. The binding data provided further confirmation for the involvement of Trp^{277}, Tyr^{278}, Lys^{322}, Lys^{290} and Glu^{318} in the C_H2 domain of IgG in a three-dimensional binding site for Clq. In addition, both lactalbumin and lysozyme possess homologous sequences to Trp^{277}-Tyr^{278} of IgG and inhibit binding of Clq to SRBC with a K_i = 1.5 and 3 M, respectively. Figures 2; tables 3; references 42: 7 Russian, 35 Western.

12172/9716
CSO: 1840/505

UDC 577.152.1

EFFECTS OF HEME LIGANDS CO AND CYANIDE ON BACTERIAL LUCIFERASE ACTIVITY

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 16 Jul 85) pp 782-787

[Article by V.S. Danilov and Yu.A. Malkov, Biology Faculty, Moscow State University imeni M.V. Lomonosov]

[Abstract] To further define the functional mechanisms of bacterial luminescence and luciferase action, luciferase preparations from Photobacterium fischeri and Beneckea harveyi were analyzed for their responsiveness to CO and KCN. In view of the high affinity for O_2 exhibited by the luciferases, special controls were established to assess oxygen effects on enzymatic activity. The kinetic data demonstrated that the heme-reacting ligands--CO and KCN--inhibited the bacterial luciferases, providing evidence that bacterial luminescence involves a carbon monoxide-binding hemoprotein. Figures 5; references 21: 5 Russian, 16 Western.

12172/9716
CSO: 1840/505

UDC 577.1:576.858

DETERGENT SOLUBILIZATION OF VIRAL ENVELOPE GLYCOPROTEINS

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 22 Jul 85) pp 808-815

[Article by V.E. Berezin, V.M. Zaydes, A.F. Artamonov, Ye.S. Isayeva and V.M. Zhdanov, Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow; Institutes of Microbiology and Virology and of Chemical Sciences, Kazakh SSR Academy of Sciences, Alma-Ata]

[Abstract] Trials were conducted with a number of ionic and nonionic detergents to determine their utility in solubilizing viral envelope glycoproteins. The data showed that nonionic detergents triton X-100, octyl-beta-D-glucopyranoside and MESK (a new Soviet nonionic detergent) provided optimal conditions for solubilization and recovery. MESK offered special advantages in terms of procedure and the fact that the glucoproteins were obtained in 90% yields. This approach was applied successfully to influenza, parainfluenza, VEE, rabies and herpes viruses, yielding glycoproteins that retained their structural, antigenic and hemagglutinating activities. Figures 3; references 42: 4 Russian, 38 Western.

12172/9716
CSO: 1840/505

UDC 576.8.095

EFFECTS OF CATIONS ON SERINE PROTEINASE PRODUCTION BY BACILLUS SUBTILIS

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 5 Aug 85) pp 830-833

[Article by V.V. Artemov, Ye.L. Barskiy, V.A. Melikhovskiy, A.V. Nazarenko and V.D. Samuilov, All-Union Scientific Research Institute of Biotechnology; Biology Faculty, Moscow State University imeni M.V. Lomonosov]

[Abstract] In order to assess the importance of surface charge on production of serine proteinase by Bacillus subtilis, the effects of mono- and bivalent cations on the process were evaluated. Na^+, K^+ and choline stimulated production in a concentration of 100 mM, while Mg^{2+} and Ca^{2+} were effective in a concentration of 10 mM. Cations with the same valency showed equivalent effectiveness. The mechanism of action of the cations was attributed to surface-charge neutralization on the cytoplasmic membrane, thereby stimulating the processing and/or translocation of the exoenzyme. Figures 4; references 12: 4 Russian, 8 Western.

12172/9716
CSO: 1840/505

UDC 547.466.64:577.15

INHIBITION OF GLUTAMATE SYNTHETASE BY BIOACTIVE GLUTAMIC ACID DERIVATIVES

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 13 Aug 85) pp 850-855

[Article by N.A. Firsova, K.M. Selivanova, L.V. Alekseyeva and Z.G. Yevstigneyeva, Institute of Chemistry, Urals Scientific Center (Sverdlovsk) and Institute of Biochemistry imeni A.N. Bakh (Moscow), USSR Academy of Sciences]

[Abstract] A study was conducted of the correlation between antineoplastic and antiviral efficacy of glutamate synthetase inhibitors on the one hand, and inhibition of the enzyme on the other. Kinetic studies conducted with 4-hydroxy-D-, 4-fluoro-D,L-, and 4-amino-D,L-glutamic acid congeners showed that in each case an inhibitor exerted the same degree of inhibition on glutamate synthetase whether derived from swine brain or Chlorella pyrenoidosa. The degree of enzymatic activity ranged from 21 to 80% residual activity for the different inhibitors, with corresponding K_i constants of 0.88 to 2.50 mM. The degree of enzyme inhibition was in direct correlation with previously-established antineoplastic activity and inhibition of influenza A and B viruses, indicating that the mechanism of action was due to inhibition of glutamate synthetase. Figures 4; references 15: 8 Russian, 7 Western.

12172/9716
CSO: 1840/505

UDC 577.352.3

INHIBITION OF LIPID PHOTOOXIDATION BY MELANIN

Moscow BIOKHIMIYA in Russian Vol 51, No 5, May 86 (manuscript received 9 Sep 85) pp 864-868

[Article by N.L. Sakina, A.Ye. Dontsov and M.A. Ostovskiy, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Studies were conducted on pigmented retinal epithelium isolated from dark-adapted frogs (Rana temporaria) in order to evaluate the role of melanosomes in preventing lipid peroxidation under physiological conditions. Removal of melanosomes resulted in a sharp increase in lipid peroxidation induced by visible light. Additional studies with DOPA-melanin demonstrated that this agent inhibited UV light-induced peroxidation of cardiolipin. The effects of DOPA-melanin were due to two factors, one involving actual shielding and the other inhibition of the chemical reaction through binding with free radicals formed as a result of peroxidation. The high resistance, of the melanin-containing epithelial cells in the retina, to light was, therefore, attributed to melanin-mediated inhibition of lipid peroxidation. Figures 4; references 15: 8 Russian, 7 Western.

12172/9716
CSO: 1840/505

UDC 577.153.4:661.718.1:599:595.2

REACTION OF MEMBRANE-BOUND AND SOLUBILIZED ACETYLCHOLINESTERASE OF HUMAN AND BOVINE ERYTHROCYTES WITH ORGANOPHOSPHORUS INHIBITORS

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 58, No 3, May-Jun 86 (manuscript received 2 Jul 85) pp 13-18

[Article by L.I. Kugusheva and V.I. Rozengart, Institute of Evolutionary Physiology and Biochemistry imeni I.M. Sechenov, USSR Academy of Sciences, Leningrad]

[Abstract] A kinetic study was conducted with human and bovine erythrocytic stroma-bound and free acetylcholinesterase (AChE) to assess their behavior in reaction with a number of organophosphorus inhibitors. The irreversible inhibitors included lupinine derivatives, compounds with acetylene groups, and armin, with counteraction provided by acetylcholine and the reversible inhibitors galanthamine and tacrine. The inhibition constants were virtually identical for the free and bound enzymes in each case. However, the use of acetylcholine and the reversible inhibitors for the protection of the free and bound enzyme forms yielded variable results. The concentration required for retention of 50% activity in the face of the organophosphorus inhibitors differed between the bound and free AChEs. The free AChE required 2- to 3-fold higher concentrations of AChE or of the reversible inhibitors to overcome the effects of the irreversible inhibitors than needed for the bound AChE. These differences were ascribed to the different conformation of states and of the free and bound AChEs, which altered their susceptibility to the different inhibitors and reactivity with the natural substrate. Figures 1; references 16: 10 Russian, 6 Western.

12172/9716
CSO: 1840/500

UDC 577.152.354

FUNCTIONAL CHARACTERISTICS OF IMMOBILIZED AMP-AMINOHYDROLASE

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 58, No 3, May-Jun 86 (manuscript received 29 May 85) pp 18-22

[Article by V.A. Tugay and A.P. Ignatchenko, Institute of Biochemistry imeni A.V. Palladin, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] An analysis was conducted on the functional characteristics of AMP-aminohydrolase (EC 3.5.4.6) isolated from rabbit skeletal muscles, following its immobilization to a carrier [unspecified] via physical adsorption. The enzyme in its immobilized form showed activity over a pH range of 4-8.5, with an optimum at pH 6.5-7.0 and 30-40°C. Activity was retained for a year at 4°C. The enzymatic preparation retained full activity following multiple exposures to the substrate or to single treatments with 1 m NaCl containing 50% ethyleneglycol or 10% isopropanol, as well as to

5 M K_2HPO_4. The enzyme was completely inhibited by Zn^{2+}, Cd^{2+} and p-chloromercuribenzoate, and partially inhibited by Mn^{2+}, EGTA and reaction products. Figures 4; references 9: 7 Russian, 2 Western.

12172/9716
CSO: 1840/500

UDC 612.146

PREPARATION OF LIPOSOMES WITH ENTRAPPED SEROTONIN AND THEIR EFFICACY IN RAISING cAMP LEVELS IN RAT LIVER

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 58, No 3, May-Jun 86 (manuscript received 18 Apr 85) pp 47-53

[Article by A.V. Stefanov, Ya.B. Blyum, V.R. Tyutyunnik, Yu.I. Veklich and N.Ye. Kucherenko, Institute of Biochemistry imeni A.V. Palladin, Ukrainian SSR Academy of Sciences, Kiev; Kiev State University imeni T.G. Shevchenko]

[Abstract] Studies were conducted with different liposomes to evaluate them for uptake and rate of release of serotonin, with the final determination that lecithin-cholesterol-dicetylphosphate (2:1:1) represented an optimum vehicle over lecithin and lecithin-dicetylphosphate liposomes. Administration of the liposomally-encapsulated serotonin to outbred rats (150-180 g) demonstrated that this system constituted an effective long-acting delivery system, leading to prolonged and sustained hepatic accumulation of cAMP. A maximum cAMP response was seen within ca. 5 min and persisted for 60 min in studies with hepatocytes. Enhanced accumulation of cAMP in the prereplicative phase of hepatocytes was also obtained with in vivo synchronization of the cells by administration of cycloheximide. These findings demonstrated the liposomal encapsulation of serotonin provides a prolonged-action delivery system that may be used to regulate serotonin effects on the cAMP status of liver cells. Figures 5; references 12: 9 Russian, 3 Western.

12172/9716
CSO: 1840/500

UDC 577.15.048

CHOLINESTERASE INHIBITION BY QUATERNARY PHOSPHONIUM COMPOUNDS

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 58, No 2, Mar-Apr 86 (manuscript received 12 Nov 84) pp 26-30

[Article by A.P. Brestkin, Yu.G. Zhukovskiy, N.A. Kolchanova, E.A. Mirzabayev, Ye.V. Rozengart and N.L. Fartseyger, Institute of Evolutionary Physiology and Biochemistry imeni I.M. Sechenov, USSR Academy of Sciences, Leningrad]

[Abstract] Evaluation was conducted on the relatively new quaternary phosphonium inhibitors of human erythrocyte acetylcholinesterase (AChE) and equine serum butyrylcholinesterase (BChE). Evaluation of 11 such inhibitors

demonstrated a mixed-type of inhibition with various degrees of competitive and noncompetitive components. The degree of inhibition was dependent on the structural features of the inhibitors, particularly in the case of BChE. In the case of the latter enzyme allyltriphenylphosphonium, for example, was 290-times as efficient an inhibitor as methylbutylphosphonium. Hexyltributylphosphonium, on the other hand, behaved in the same manner as hexyltributylammonium with respect to AChE and BChE. In the case of AChE, propargyltriphenylphosphonium was a more efficient inhibitor than methyltributylphosphonium, but the difference was not as great as is the case with BChE. These observations are in agreement with earlier hypotheses that BChE is much more sensitive to changes in the structure of the onium group than AChE. References 14: 7 Russian, 7 Western.

12172/9716
CSO: 1840/499

UDC 577.112.7:576.314

MELITTIN: STRUCTURE, PROPERTIES, INTERACTION WITH MEMBRANE

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 58, No 5, Sep-Oct 86 (manuscript received 28 Oct 85) pp 92-103

[Article by A.P. Demchenko and Ye. G. Kostrzhevskaya, Institute of Biochemistry imeni A.V. Palladin, UkSSR Academy of Sciences, Kiev]

[Abstract] Melittin is a toxic peptide of bee venom capable of inserting itself into natural and synthetic membranes, leading to destruction of cells even at micromolecular concentrations. A review of its structure and properties is presented. Melittin is amphilic by nature, like other membrane proteins. It contains 26 aminoacid residues: 1-20 hydrophobic and 21-26 hydrophilic. Because of the presence of a tryptophan residue it can be studied by fluorescent methods. Aromatic aminoacids are absent. Melittin undergoes interesting conformational changes from an unordered bundle to a spiral monomer, to tetramer. Spiralization occurs during reaction with detergents and with lipid membranes. Many of the literature reports on mechanism of melittine insertion into the bilayer are controversial at the best: conformation in the bilayer, spacial orientation on the surface of membrane, its localization there, ability to form ion channels are all debatable. References 68: 3 Russian, 65 Western (1 by Russian author).

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CSO: 1840/502

UDC 577.112.4

EFFECTS OF CHEMICAL AGENTS AND PRESERVATION CONDITIONS ON NONENZYMATIC DEAMIDATION OF PROTEIN PREPARATIONS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 2, Mar-Apr 86 (manuscript received 7 Feb 84) pp 198-204

[Article by N.V. Pushkin, I.Ye. Tsybulskiy and A.I. Lukash, Rostov-on-Don State University]

[Abstract] An analysis was conducted on the degrees of nonenzymatic deamidation of albumin and gamma-globulin in the presence of various perservatives. The data demonstrated that all of the agents tested (60% glycol, 40% beta-alanine, 40% glucose, 40% sucrose, aspartic and glutamic acids) accelerated the rate of deamidation at 37 and 100°C in pH 7.0 buffer, with the exception of 50% glycerol. Glycerol was the sole agent that actually diminished the rate of deamidation under both temperature conditions, thereby also demonstrating a protective effect against thermal denaturation of these proteins. Figures 3; references 24: 14 Russian, 10 Western.

12172/9716
CSO: 1840/548

UDC 577.345

LIPOSOMALLY ENCAPSULATED CHLOROPHYLL AND PHEOPHYTIN AS MODEL OF LIGHT-CAPTURING PHOTOSYNTHETIC ANTENNA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86
(manuscript received 6 Jan 86; in final form 15 May 86) pp 1655-1664

[Article by A.Yu. Borisov, O.A. Galutva*, V.I. Godik and N.A. Mamleyeva*, Interfaculty Research Problems Laboratory of Molecular Biology and Bioorganic Chemistry imeni A.N. Belozerskiy and *Chemistry Faculty of Moscow State University imeni M.V. Lomonosov]

[Abstract] An assessment was conducted on the functional characteristics of liposomally encapsulated chlorophyll-a or pheophytin-a in light-energy fixation, as models of solar energy capture in plants. Fluorescence determinations of energy transfer by chlorophyll-a and pheophytin-a within lecithin liposomes led to measurements of the yield and lifetime of fluorescence in relation to concentration of the pigments. Effective energy transfer was indicated by parallel change in both parameters and lack of quenching due to complex formation. Proportional changes in fluorescence yield and lifetime was observed for chlorophyll-a to a concentration of 6×10^{-2} M, and an average intermolecular distance of ca. 22 Å. The corresponding values for pheophytin-a were ca. $4.5\text{-}5 \times 10^{-2}$ M and ca. 25 Å. Both systems could be coupled with traps resembling photosynthetic reactive sites with 5 psec trapping times, to give systems with efficiencies on the order of 70% for chlorophyll-a and 85% for pheophytin-a. Figures 3; references 27: 6 Russian, 21 Western.

12172/9716
CSO: 1840/572

UDC 541.124/126

SPREAD OF CHIRALITY WAVE AND FIRST EVOLUTIONARY CATASTROPHY

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 5 Mar 86) pp 1587-1591

[Article by Ya.B. Zeldovich and A.S. Mikhaylov, Physics Faculty, Moscow State University imeni M.V. Lomonosov]

[Abstract] Some molecules show two configurations, mirror images of each other. In the non-living world they are in practically equal proportions to each other. In living organisms only left-oriented molecules of aminoacids and right sugars participate in all biochemical reactions. This transition is the first evolutionary catastrophy affecting symmetry in biological evolution. In previous discussion of this catastrophy, ideal mixing of two selfreplication processes was assumed. In the present work attention was concentrated on spacially different effects which could accompany this catastrophy. Mathematical modelling of this process led to conclusion that if, in the very early stages of prebiological evolution, an accidental division of earth surface occurred into areas where "prelife" forms based on different chiralities predominated, then the effect of electrically-weak interactions are inadequate to determine the latter course of evolution. The predominance of one or another chirality in biochemical processes on the entire earth is due to the starting geometry of the areas with different chirality on earth surface. Figures 2; references 10: 4 Russian, 6 Western (3 by Russian authors).

7813/9716
CSO: 1840/491

UDC 541.14

KINETICS AND MECHANISM OF RIBOFLAVIN-SENSITIZED CHAIN BREAKDOWN OF p-METHOXY-PHENYLDIAZONIUM BOROFLUORIDE IN POLYACRYLAMIDE GEL

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 25 Dec 85) pp 1655-1660

[Article by O.M. Soloveychik, A.B. Demyashkevich, T.A. Gorbina, G.A. Karetnikova, R.A. Mkhitarov and M.G. Kuzmin, Moscow State University imeni M.V. Lomonosov]

[Abstract] Ever increasing interest is being paid to radical chain photo-initiated reactions in condensed phase because it may lead to discovery of effective light-sensitive materials. One of the more-promising reaction candidates in this respect is the photobreakdown of p-methoxyphenyldiazonium borofluoride (MDBF) was studied on polyacrylamide (PAA) gel films in presence of sodium hypophosphite (HP). It was shown that MDBF breakdown chain reaction occurs in PAA gel films in presence of HP. The quantum yield in the film may reach 20. The chain length is about 100 links. Quantum yield of this breakdown was evaluated as a function of the concentration of all

components in this composition and intensity of absorbed light showing that it is linearly related to the concentration of HP and increased with diminished intensity of absorbed light. This is due to participation of MDBF in the initiation stage. A kinetic scheme was proposed covering these aspects. The life span of radicals involved in this process is T_R about 1 s. Figures 5; references 9: 5 Russian, 4 Western.

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CSO: 1840/491

UDC 576.8.093:663.18:541.183.11

ADSORPTION OF MICROORGANISMS BY FIBROUS MATERIALS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 22 Mar 85) pp 691-694

[Article by G.N. Nikovskaya, A.S. Gordiyenko and L.I. Globa, Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Determinations were conducted on the adsorption of Candida guilliermondii and Escherichia coli upon basalt and glass fibers to assess the effects of surface charge on adsorption. The microorganisms adsorbed at a more rapid rate on positive and neutral surfaces than on negatively-charged surfaces. In addition, adhesion was much firmer to the former two surfaces than to the negative surface. These findings demonstrated that a chemically-modified inert surface may contain effective adsorbents for negatively-charged microorganisms. Figures 1; references 14: 11 Russian, 3 Western.

12172/9716
CSO: 1840/565

UDC 579.852.11:577.152.314

SEARCH FOR NEW PRODUCERS OF DNA RESTRICTING AND MODIFYING ENZYMES: ISOSCHIZOMERS AND ISOMETHYLOMERS OF KNOWN RESTRICTASES AND METHYLASES

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 16 Nov 84) pp 699-700

[Article by I.G. Bogdarina, I.M. Nadirova and Ya.I. Buryanov, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] A method was devised to search for new bacterial producers of enzymes restricting and modifying DNA, based on an analysis of the resistance of their DNA to the corresponding restrictases. This approach led to the identification of several isoschizomers and isomethylomers in certain Bacillus subtilis strains. This method may also contribute to

providing an answer to the question whether every restrictase in a cell is accompanied by a corresponding, specific DNA methylase. In addition, the presence or absence of such enzymes may have taxonomic significance. Figures 1; references 6: 2 Russian, 4 Western.

12172/9716
CSO: 1840/565

INDUSTRIAL EXPLOITATION OF BACTERIA

Moscow SELSKAYA ZHIZN in Russian 17 Feb 87 p 4

[Article by B. Sedekov, special correspondent]

[Abstract] This is a popular description by a reporter of his impressions while visiting a scientific laboratory. He discussed with the director of the All-Union Scientific Research Institue of Genetics and Selection of Industrial Microorganisms, V.G. Debabov, the current products of genetic engineering: human interferon and its biological properties were explained. This product appeared to be economically justified. Some research goals in the area of plant protection agents have not yet been commercially achieved. At this moment that work is in the research phase. The laboratory's aim is to make all plants resistant to any outside interference. Thus, the research would pay for itself. The final topic reported concerned synthetic sweeteners: aspartam being the subject covered, stressing scientific progress even in this area.

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CSO: 1840/520

UDC 577.156.04:773

IMMOBILIZATION OF SUBTILISIN WITH LIGHT-SENSITIVE p-AZIDOBENZALDEHYDE

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 22, No 3, May-Jun 86 (manuscript received 9 Apr 84) pp 320-326

[Article by N.A. Lamzina, O.V. Borisova, O.A. Kost and N.F. Kazanskaya, Moscow State University]

[Abstract] A photochemical reaction mechanism was employed for the immobilization of subtilisin, using cellulose carriers modified with p-azidobenzaldehyde (I). The carrier was saturated with I, dried, irradiated with UV light, and washed with acetone to remove excess I. For immobilization the carrier was incubated with 3.62×10^{-5} to 4.10×10^{-4} M subtilisin in 0.1 M tris-HCl buffer, pH 8.4, containing 0.1-1.5 M NaCl, and incubated for 1 to 60 min. Following washing the preparation was stored at 5°C in the buffer with 0.1 M NaCl. Immobilization occurred as a result of Schiff base formation between the aldehyde groups of the modified carrier and the amino groups of the subtilisin derived from Bacillus subtilis 72. Nonspecific adsorption of subtilisin was prevented by pre-adsorption of albumin or denatured subtilisin,

as well as by blocking of the functional groups by reduction or modification with amines. The preparation retained its photosensitivity for several months at 10°C when stored in the dark. After UV irradiation the sensitized carrier remained stable for at least 2 years. Figures 2; references 18: 11 Russian, 7 Western.

12172/9716
CSO: 1840/549

UDC 575.17

ASSOCIATIVE SELECTION OF CHINESE HAMSTER CELL CLONES BASED ON COMBINATION OF QUANTITATIVE CHARACTERISTICS

Kiev BIOPOLIMERY I KLETKA in Russian Vol 2, No 4, Jul-Aug 86 (manuscript received 17 Jun 85) pp 200-206

[Article by V.K. Savchenko, L.S. Mikhalevich and L.M. Kukushkina, Institute of Genetics and Cytology, BSSR Academy of Sciences, Minsk]

[Abstract] Cloning of mammal cells in vitro, combined with the use of specially developed selection methods based on a combination of characteristics, represents a new approach to selection of spontaneous polyploid clones. The use of a combination of quantitative characteristics has established a correlation between changes in the number of chromosome sets in the cell and the corresponding morphologic characteristics, allowing isolation of clones with preassigned characteristics without the use of chemical treatment. Experiments are described which resulted in the isolation and study of polyploid populations of spontaneous origin. The possibility was demonstrated of retaining a relatively stable structure of polyploid cell populations over 20 cell passages. An entropy index was used to measure karyotypic heterogeneity, and remained at the level of the initial hypodeploid population throughout the 20 passages. Selection based on a complex of quantitative characteristics significantly alters the cytogenetic structure of the material selected, resulting in a correlation between increasing number of genomes in the cell and the set of quantitative characteristics. Figures 4; references 17: 10 Russian, 7 Western.

6508/9716
CSO: 1840/436

UDC 575.224.232

MUTAGENIC EFFECT OF GAMMA RADIATION AND N-NITROSOMETHYLUREA DURING VARIOUS PERIODS OF DNA SYNTHESIS PHASE

Kiev BIOPOLIMERY I KLETKA in Russian Vol 2, No 4, Jul-Aug 86 (manuscript received 1 Nov 85) pp 206-211

[Article by Kh. A. Khakimov, A-K. E. Ergashev, G.P. Makedonov and A.P. Akifyev, Institute of Chemical Physics, USSR Academy of Sciences, Moscow; Institute of Experimental Plant Biology, UzSSR Academy of Sciences, Tashkent; Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] Various structural genes and repeating sequences which do not code proteins but may have regulatory significance may be replicated during various periods of the S phase of the cell cycle. The authors studied the mutagenic effect of ionizing radiation and nitrosomethylurea on synchronized wheat sprout cells during three periods and the complete S phase to determine the contribution of differential damage to various DNA sequences in the formation of gene and chromosomal mutations. The major result of the work was detection of a specific radiosensitizing effect of 5-bromo-2'-deoxyuridine (BUDR) at the beginning of the S phase. Previous studies have indicated that BUDR has a radiosensitizing effect due to its inclusion in special DNA segments, in which spontaneous additional DNA synthesis occurs in the G_1 and G_2 phases. The present studies indicate that these segments are replicated in the early S phase. Figures 2; references 13: 7 Russian, 6 Western.

6508/9716
CSO: 1840/436

UDC 577.214.622

PRESENCE OF TWO STRONG PROMOTERS AS CONTROLLING FACTOR IN ORIENTATION OF DNA FRAGMENT UPON INSERTION INTO pUC19 PLASMID

Kiev BIOPOLIMERY I KLETKA in Russian Vol 2, No 4, Jul-Aug 86 (manuscript received 6 Feb 86) pp 217-219

[Article by Ye. B. Paton, A.N. Zhivolup and L.A. Varanitsa, Institute of Molecular Biology and Genetics, Ukrainian Academy of Sciences, Kiev]

[Abstract] In a previous report, it was demonstrated that insertion of the gene rpoB E. coli into threadlike phages leads to formation of unstable recombinanant phages. This article attempts to clone this DNA fragment including the genes rpoB, rplJ and rplL together with the promoters P_J and P_β directing the transcription of these genes in the plasmid pUC19 in order to determine the reasons for unidirectional orientation of this fragment and instability of the recombinant phages. Recombinant plasmids pUC19/rpoB were constructed with and without the promoter P_J. It was shown that in both cases the characteristic of resistance to rifampicin imparted to E. coli cells

by these plasmids was maintaind persistently. It was shown that insertion of the fragment containing the rpoB gene is unidirectional but opposite to its direction in recombinant threadlike phages, indicating that the promoters lacUV5 and P_J initiate transcription in the opposite direction. Removal of the promoter P_J permits reverse orientation of the rpoB gene in the recombinant plasmid. Figures 3; references 8: 3 Russian, 5 Western.

6508/9716
CSO: 1840/436

UDC 575.24:582.282.23

PRODUCTION OF RECIPIENT YEASTS FOR STABLE REPRODUCTION OF VECTORS INVOLVING 2 MICRON DNA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 25 Nov 85) pp 1273-1280

[Article by O.V. Nevzglyadova and A.G. Polishchuk, All-Union Scientific Research Institute of Plant Material Hydrolysis, Leningrad]

[Abstract] Genetic engineering studies were carried out with Saccharomyces cerevisiae DC-5(cir^+) and DC-5(cir^0) to create recipients for replicating vectors with 2 micron DNA replicator in a stable manner. Transformation of the yeast cells with plasmid pJDB219 carrying a poorly expressed selective leucine gene resulted in very stable transformed cells. Following 50 or more divisions on a nonselective medium the Leu^- phenotype was obtained with a frequency of 1-5%. The segregation of Leu^- led to the use of these cells as recipients, based on the assumption that these cells contained a number of pJDB219 copies. The latter plasmid contains REP1 and REP2 genes and lacks the FLP gene. The cells were then used for replication of the 2 micron DNA vector YEp13 (containing ori and REP3, but lacking REP1 and REP2). Figures 3; references 15: 3 Russian, 12 Western.

12172/9716
CSO: 1840/571

UDC 575.12:547.962

BIOTYPE COMPOSITION AND BLOCKS OF GLIADIN COMPONENTS IN WINTER WHEAT BOGARNAYA 56

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 3, May-Jun 86 (manuscript received 15 Apr 85) pp 196-201

[Article by A.M. Seitova, Ye.V. Metakovskiy and A.A. Sozinov, Institute of General Genetics, USSR Academy of Sciences, Moscow]

[Abstract] Electrophoretic analysis of the gliadin of winter wheat Bogarnaya 56 was carried out because it is the donor of a number of valuable indices for selection purposes. By means of hybridologic analysis it was shown that this sort is heterogenous by three gliadin coding loci on chromosomes ID, 6B and

6D. Biotypes were identified differing by the presence of one of the ω-zone components whose genetic control is located in 1B chromosome. Recombination between the principal gliadin coding chromosome cluster in 1B, the 1B17 block and this gene amounts to 21.72 ± 2.16%. The principal biotype of this wheat has the gliadin formula: 1A8 1B17 1D1 6A1 6B1 6D1. The blocks controlled by the sixth homeologic group and ID chromosomes were inherited from Bezostaya L and the blocks 1A8 and 1B17 from Lesostepka 75. Figures 2; references 12: 7 Russian, 5 Western.

7813/9716
CSO: 1840/541

UDC 631.523/524:633.111

EFFECT OF PLASMON ON INDICES DETERMINING PRODUCTIVITY OF ALLOPLASMATIC WHEAT LINES

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 20, No 3, May-Jun 86 (manuscript received 12 Mar 85) pp 224-229

[Article by A.N. Palilova and T.A. Silkova, Institute of Genetics and Cytology BSSR Academy of Sciences, Minsk]

[Abstract] The contribution of non-chromosomal genetic systems to the formation of economically-important properties has been poorly studied because of the difficulty of its isolation from the general genotypic predisposition for the development of a given characteristic. The goal of this work was to investigate cytoplasmic specification of indices determining wheat productivity. It was concluded that general and productive bunching, the length and width of the leaf, plant height, length of the spike and number of spikes are controlled by nuclear genes and only a few cytoplasms show any effect on them by direct reaction with a nuclear genome of the euplasmatic type. Setting of seed and grain weight may be viewed as nuclear or cytoplasmatic control in forming these indices along with the interaction of a nuclear genome with specific cytoplasm. The control method for these indices depends on the type of alloplasmatic cytoplasm and nuclear genome of the euplasmatic type. References 3: 1 Russian (by a Western author), 2 Western.

7813/9716
CSO: 1840/541

UDC 577.214.622

INSERTION OF DNA FRAGMENT BETWEEN TWO STRONG UNIDIRECTIONAL PROMOTERS OF RECOMBINANT FILAMENTOUS PHAGE $mp8_{t_o}$/rpoB INCREASES ITS STABILITY AND REVERSE ORIENTATION OF CLONED E. COLI rpoB GENE

Kiev BIOPOLIMERY I KLETKA in Russian Vol 12, No 5, Sep-Oct 86 (manuscript received 15 Feb 86) pp 275-278

[Article by Ye.B. Paton and A.N. Zhivolup, Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A fragment of phage lambda DNA with the transcription terminator (t_o) sequence and terminal end of the oop-RNA gene was inserted into the polylinker region of the filamentous phage M13mp8. The recombinant phage was then used to clone a BglII fragment of cosmid pJC703, the latter containing E. coli rpIJ, rpIL and rpoB genes and promoters P_j and P_{beta}. The stability of the recombinant phage $mp8_{t_o}$/rpoB increased to 93% and showed reversion of the BglII fragment. The findings reported here provided confirmation for the view that two strong unidirectionally-oriented promoters increase the stability of recombinant phages and determine the orientation of cloned BglII fragments. Figures 3; references 10: 4 Russian, 6 Western.

12172/9716
CSO: 1840/437

UDC 575.113.4:582.282.23

CLONING GENES OF ACID PHOSPHATASES BIOSYNTHESIS IN VECTORS OF DIFFERENT COPY NUMBER

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: BIOLOGIYA in Russian No 2, May 86 (manuscript received 10 Jul 85) pp 104-111

[Article by N.G. Krasnopevtseva and M.A. Matviyenko]

[Abstract] Subcloning of genes PHO3 and PHO5, coding acid phosphatases of S. cerevisiae yeasts, in vectors of different copy number is described and discussed. Stability of hybrid plasmids containing PHO3 and PHO5 genes in transformants of strain AH 216 was analyzed. A dependence was shown between the level of expression of gene PHO3 and its copy number in the cells. Cells transformed by plasmids with a high copy number have a higher level of enzyme synthesis. Figure 1; references 22: 5 Russian, 17 Western.

2791/9716
CSO: 1840/415

UDC 616-056.43-092:612.6.02.017.1

MACROPHAGE PRODUCTION OF HUMORAL FACTOR(S) INDUCING MATURATION OF T-CELL EFFECTORS IN GVH REACTION DURING IN VITRO INCUBATION OF MACROPHAGES WITH THYMOCYTES

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 16 May 85) pp 9-11

[Article by T.V. Anfalova, V.Yu. Golenishchev and V.G. Galaktionov, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Studies were conducted with CBA mice peritoneal macrophages and thymocytes to assess the requirements for macrophage production of factor(s) inducing maturation of T-cells into effectors of GVH reactions. Incubation of the macrophages with thymocytes for 18 h resulted in the production of factors which were released into the medium, with the supernatant subsequently used for incubation for 4 h with CBA thymocytes. The CBA thymocytes were then injected subcutaneously into (CBA x C57Bl)F_1 mice, and the GVH reaction assessed in terms of the increase in size of the popliteal lymph nodes in the recipient mice. The data demonstrated that incubation of virgin thymocytes with the supernatant resulted in their transformation of maturation into effector cells of the GVH reaction. The formation of an active supernatant required cell-to-cell contact between the macrophages and the thymocytes, and full synthetic competence of the former cells. Inactivated thymocytes were also effective in activating the macrophages to produce the active factor or factors responsible for the transformation of immature thymocytes into immunocompetent T-cell effectors. Figures 4; references 6: 3 Russian, 3 Western.

12172/9716
CSO: 1840/558

UDC 612.419.017.1:612.419.015.2:[547.95:457.943

RADIOIMMUNOASSAY OF ALPHA-, BETA- AND GAMMA ENDORPHINS AND BETA-LIPOTROPIN IN BONE MARROW FACTOR STIMULATING ANTIBODY PRODUCTION

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 28 Oct 84) pp 37-39

[Article by A.A. Zozulya, E. Patsakova, A.A. Mikhaylova and L.A. Zakharova, All-Union Scientific Center of Mental Health, USSR Academy of Medical Sciences; Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Swine bone marrow preparation stimulating antibody production was analyzed by radioimmunoassay for the presence of endogenous opioids. The study demonstrated that the preparations containd, per 1 mg of protein, the following factors: 71 ± 4 fmoles beta-lipotropin, 124 ± 46 fmoles alpha-endorphin, 39 ± 16 fmoles beta-endorphin, and 33 ± 10 fmoles gamma-endorphin. Met- and leu-enkephalins were not detected. These observations point to the ubiquitous nature of opioid synthesis, while the significance--if any--of the bone marrow opioids to antibody stimulation remains to be elucidated. Figures 1; references 10: 8 Russian, 2 Western.

12172/9716
CSO: 1840/558

UDC 615.371:579.842.11].036.8:616.98:579.842.1/.2

USE OF ESCHERICHIA COLI O14 IN INDUCING IMMUNITY AGAINST PATHOGENIC ENTERICS

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 15 May 85) pp 44-46

[Article by B.V. Pinegin, V.M. Korshunov and G.B. Pavlova, Institute of Immunology, USSR Ministry of Health, Moscow; 2nd Moscow Medical Institute imeni N.I. Pirogov]

[Abstract] CBA mice (18.5-20.0 g) were used in a trial on the efficacy of immunization with E. coli O14 vaccine in protecting against other enteropathogenic microorganisms. The mice were immunized at 7 days interval with heat-killed (60°C for 2 h) E. coli O14 by intraperitoneal injection with 5×10^8 (1st) and 10^9 (2nd) cells. Two weeks after the last injection the titer in indirct hemagglutination was 1:256 against E. coli O14. Challenge of the animals at this time with various pathogenic strains (Salmonella dublin, Klebsiella pneumonia, Proteus mirabilis, Staphylococcus albus) showed a reduction in the mortality of mice previously immunized with E. coli O14. The effectiveness of E. coli O14 was attributed to its possession of a common enterobacterial antigen. Protection afforded by immunization with E. coli O1 was less complete. References 10: 5 Russian, 5 Western.

12172/9716
CSO: 1840/558

UDC 616.153.962.4-097-078.73:543.545

IMMUNOSORPTION IN ELECTROPHORESIS

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 28 May 85) pp 76-76

[Article by N.N. Logunova and A.I. Nikolayeva, Scientific Research Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A method has been devised for immunoelectrophoresis which avoids the need for cross-linking agents, e.g., glutaraldehyde, and may be prepared in the relatively short time of 1-2 h. The described approach utilized capture of the antigen (in this case equine gamma-globulin) in polyacrylamide. The immunoadsorbent was prepared as follows: 350 mg acrylamide + 300 mg methylenebisacrylamide in 10 ml veronal-medinal buffer (1.38 g veronal + 8.76 g medinal, 4 liters H_2O, pH 8.6). Polymerization was accomplished with 0.03 ml TEMED and 0.02% persulfate between glass plates to give a 1 mm thick layer. The system was found effective in fixing rabbit antibodies against equine gamma-globulin, which were recovered after electrophoresis by washing. Figures 3; references 7: 2 Russian, 5 Western.

12172/9716
CSO: 1840/558

UDC 612.112.3.014.46:[615.362.822.2:547.964.4

ACTIVATION OF PHAGOCYTIC LYSOSOMAL APPARATUS BY MYELOPEPTIDES

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 12 Nov 85) pp 84-85

[Article by S.A. Skhodova, V.A. Drozhennikov, Ye.A. Belyakova, V.A. Lyashenko and A.A. Mikhaylova, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] A study was conducted on the effects of myelopeptides on peritoneal macrophages drived from CBA mice primed with 3% peptone. Study with the macrophage monolayer cultures demonstrated that myelopeptide preparations had an activating effect on the macrophages, as demonstrated by enhancement of the activities of lysosomal enzymes, secretion of acid phosphataase, and formation of beta-glucoseaminidase. However, the variability of activation in relation to the concentration of the myelopeptides suggests that the macrophage population is heterogeneous with respect to the affinity of receptors for the myelopeptides. Figures 2; references 9: 5 Russian, 4 Western.

12172/9716
CSO: 1840/558

UDC 612.112.94-063:615.276.4

EFFECTS OF ANTIBODY STIMULANT ON ELECTROPHORETIC MOBILITY OF HUMAN PERIPHERAL BLOOD LYMPHOCYTES

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 12 Sep 84) pp 86-87

[Article by A.A. Serov, K.A. Voytkevich and A.M. Sapozhnikov, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Human peripheral blood mononuclear cells were tested for the effects of swine-bone-marrow antibody stimulant on the basis of electrophoretic migration and blast transformation. In low concentrations (5 µg/ml) the stimulant was seen to decrease electrophoretic mobility of the target cells that were categorized as falling into the normal high-mobility fraction, as well as inducing blast transformation. High concentrations (25-100 µg/ml) enhanced the mobility of the mononuclear cells, again with induction of blast transformation. The effects on the mobility of the mononuclear cells were retained after washing to remove the antibody stimulant, indicating firm interaction with the cell-surface receptors. Figures 1; references 10: 8 Russian, 2 Western.

12172/9716
CSO: 1840/558

UDC 591

AUTOGENOUS GROWTH FACTOR PRODUCTION AS MECHANISM OF REPRODUCTION OF LYMPHOBLASTOID RPMI-6410t LINE CELLS

Moscow ONTOGENEZ in Russian Vol 17, No 4, Sep-Oct 86 (manuscript received 6 Mar 86) pp 494-499

[Article by T.M. Seregina and M.I. Mekshenkov, Institute of Developmental Biology imeni N.K. Koltsov, USSR Academy of Sciences, Moscow]

[Abstract] It has been established that proliferation of various types of normal cells is regulated by exogenous growth factors. Studies of recent years have shown that the multiplication of malignant cells also depends on growth factors, but that malignant cells produce these factors themselves, and thus do not require exogenous factors. This article establishes that the RPMI-6410t line of human lymphoid cells, obtaind from the peripheral blood of a patient with acute myeloblastic leukemia, produces a growth factor maintaining reproduction of the cells of the line. The cells of this line have sectors on their surfaces which specifically bond this growth factor. A medium conditioned by the cells so that the growth factor was present achieved almost 100% cloning of the cells in a 96-chamber installation with 1 cell per chamber. The authors suggest that in the second stage of malignant transformation, the immortalized cell still requires the growth factor, but has the ability to produce it internally. Figures 4; references 11: 1 Russian, 10 Western.

6508/9716
CSO: 1840/526

UDC 616.98:578.832.1-078.73

PROTECTIVE EFFECT IN INFLUENZA INFECTIONS OF FULLY SYNTHETIC PEPTIDE-POLYION COMPLEXES

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 86 (manuscript received 27 Aug 85) pp 29-32

[Article by R.V. Petrov, R.M. Khaitov, A.L. Liozner, L.A. Fonina, A.V. Nekrasov, Ye.N. Stepanova, S.M. Andreyev, V.N. Borisova and O.L. Rakova, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] A study was made of the possibility of achieving a protective effect in mice by the use of fully-synthetic peptide-polyion complexes with broad action spectrum by including the "merging activation" peptide, modeling the conservative determinant of the HA_2 fragment of type A influenza virus hemagglutinin. The slightly immunogenic synthetic dodecapeptide F/A, modeling the highly conservative HA_2 determinant, did indeed cause the formation of antipeptide and antiviral antibodies upon administration to mice in conjugates with immune-stimulating polyelectrolytes. At a relatively low level of humoral antibodies to the virus, the conjugates yielded a clear protective effect against influenza A subtypes H3N2 and HON1 upon one-time administration without adjuvants. This confirms the effectiveness of fully synthetic production of "new generation" immunogens. Figures 3; references 9: 6 Russian, 3 Western.

6508/9716
CSO: 1840/555

UDC 615.371:579.842.14].012.1.036.8.076.9

ARTIFICIAL VACCINES AGAINST SALMONELLOSIS INFECTION IN EXPERIMENTS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 86 (manuscript received 2 Apr 85) pp 32-36

[Article by N.Yu. Alekseyeva, P.G. Aparin, M.G. Vafina and A.V. Nekrasov, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] A comparison is presented of the immunogenic and protective properties of a number of artificial antigens based on O-polysaccharide, the H-antigen of S. typhimurium and synthetic polyelectrolytes in order to analyze possible approaches to the production of highly effective artificial salmonellosis vaccines. Two times administration of O-polysaccharide at 100 μg per mouse at intervals of 14 days caused no specific immune response, while a conjugate called K-2 induced high secondary anti-O response. Artificial antigens, based on O-polysaccharide plus polyelectrolytes or produced by connection of two antigen determinants with polyelectrolyte, did induce manifest secondary immune response, activating IgG cells. An increase in the length of the spacer between the O-polysaccharide and polyelectrolytes increased the immunogenic properties of the conjugates. The artificial antigens have clear protective properties. Figures 3; references 15: 7 Russian, 8 Western.

6508/9716
CSO: 1840/555

UDC 578.832.1:578.74].083.3

ARTIFICIAL ANTIGENS IN BIOTECHNOLOGY: PRODUCTION OF HYBRIDOMAS TO M_1-PROTEIN OF INFLUENZA VIRUS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 86 (manuscript received 27 Aug 85) pp 51-53

[Article by I.G. Sidorovich, A.L. Liozner, A.G. Ignateva and M.Ye. Ivantsenko, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] Female BALB/c mice were used in tests with M_1-protein of type A and type B influenza viruses of various strains. Hybridomas were selected which produced antibodies to the M_1-protein on the basis of presence of antibodies in supernatants as revealed by indirect immunofluorescent analysis. Clear stimulation of antibody formation was observed, demonstrating the effectiveness of the use of artificial antigens, conjugates of purified antigens with synthetic immunostimulating polyelectrolytes, for hybridoma biotechnology. Immunization of lymphocytes in vitro with M_1-protein immobilized on a polystyrene matrix is shown to be effective for hybridoma biotechnology. In contrast to other studies, this article demonstrates the possibility of expedient production of hybridomas to M_1-protein of influenza virus using purified antigen for both immunization and testing. A technological hybridoma is obtained, producing monoclonal antibodies to M_1-protein. Figures 2; references 13: 7 Russian, 6 Western.

6508/9716
CSO: 1840/555

UDC 612.112.94.017.1.014.46:547,915].08

SIGNIFICANCE OF INTERACTION OF POLYELECTROLYTES WITH LIPID BILAYER TO INCREASE PERMEABILITY OF CELL MEMBRANES

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 86 (manuscript received 15 Apr 85) pp 66-69

[Article by I.S. Fevralevi, Yu. A. Yermakov and R. I. Ataullakhanov, Institute of Immunology, USSR Ministry of Health; Institute of Electrochemistry, USSR Academy of Sciences imeni A. N. Frimkin, Moscow]

[Abstract] Previous studies have observed an increase in permeability of the plasmatic membrane of lymphocytes under the influence of immunostimulating polyelectrolytes. The increase in flow of K^+ and Ca^{2+} through the membrane varies with concentration gradient. This effect does not result from a decrease in ATPase activity. The molecular mechanism of the change in permeability includes formation of nonspecific ion-conducting structures such as channels, water pores and defects in the membrane. This article studies whether polyelectrolytes can increase the permeability of membranes by interacting only with the lipid matrix, using as a model the influence of synthetic polyelectrolytes with immunostimulating effect on the properties of lipid membranes, particularly their conductivity. When polyelectrolytes

are introduced to a solution which washes negatively charged bilipid membranes the boundary membrane potential changes only upon addition of polycations, indicating adsorption of these ions on the membrane. The conductivity of the membranes increases only under the influence of polycations with hydrophobic radicals in the polymer chain. Administration of an immunostimulating dose of polyelectrolytes, both polyanions and polycations, to the suspension of living lymphoid cells leads to a rapid increase in permeability for K^+ ions of the plasmatic membrane of these cells. Comparison of data obtained on model membranes and the membranes of living lymphoid cells indicates that the increase in permeability of the latter cannot be explained by the interaction of the polymers with the lipid matrix of the membrane alone. Figures 4; references 7: 6 Russian, 1 Western.

6508/9716
CSO: 1840/555

UDC 612.112.94.017.1.14.46:[615.276.4+615.332

IMMUNOADJUVANT PROPERTIES OF IONOPHORS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 86 (manuscript received 8 Aug 85) pp 69-72

[Article by M. N. Kitayeva, D. M. Avdullayev, R.I. Ataullakhanov and G.N. Torsunova, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] It has been suggested that the increase in permeability of a cell membrane for ions is the initial link in the mechanism of activation of lymphocytes and can serve as a method of regulation of the activity of immunocompetent cells. Immunoadjuvant properties have been suggested for nonpolymer substances capable of increasing the permeability of the cell membrane to ions. This article presents results of testing of the immunomodulating properties of a number of membrane-active substances such as nistacin, levorin, S-1944 and gramicidin A in model experiments both in vivo and in vitro. The experiments showed that introduction of antigens together with membrane-active substances can significantly change the strength of the specific immune reaction to the antigen. The effect of the membranotropic substance is dose dependent. Increasing the permeability of lymphocyte membranes for K^+, Na^+ and Ca^{2+} is found to be a key mechanism initiating activation of the cell metabolism. The immunostimulating effect of polyelectrolytes is probably activated at the cell membrane level. In a lymphoid cell culture in vitro, membrane-active substances induce an increase in the inclusion of ^3H-thymidine in newly synthesized DNA. The coefficient of stimulation of DNA synthesis in the presence of ionophors is relatively low, generally 3 to 4-fold less than for activation of lymphocytes with concanavaline A or bacterial lipopolysaccharide. Figures 3; references 9: 4 Russian, 5 Western.

6508/9716
CSO: 1840/555

UDC 582.282.23.043:577.344

EFFECTS OF LOW-INTENSITY RED LIGHT ON ENZYMATIC ACTIVITIES OF TORULOPSIS SPHAERICA CULTURES

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 24 Jun 85) pp 944-948

[Article by G.Ye. Fedoseyeva, T.I. Karu, T.S. Lyapunova, N.A. Pomoshchnikova, M.N. Meysel and A.V. Peskin, Institute of Microbiology, USSR Academy of Sciences, Moscow; Scientific Research Center for Technological Lasers, Troitsk]

[Abstract] An analysis was conducted on the effects of low-intensity red light (632.8 nm max.) on the metabolic activities of Torulopsis sphaerica cultures. Illumination with intensities of 300 to 1900 J/m^2 (100 sec to 32 min exposures) demonstrated that the most marked changes were observed at an intensity of 10^3 J/m^2. The metabolic effects consisted of an enhancement of the activities of dehydrogenases and cytochrome oxidase, depression of acid phosphatase and of catalase, and no effect with reference to superoxide dismutase. These observations demonstrated that treatment of the T. sphaerica cultures with red laser light was effective in enhancing protein and nucleic acid synthesis as the metabolic end products of activation of selective enzyme systems, and in increasing the biomass yield. Figures 2; tables 2; references 16: 5 Russian, 11 Western.

12172/9716
CSO: 1840/567

UDC 617.741.004.1-085.849.19-036.8

METHOD OF INCREASING EFFECT OF LASER ACTION IN NONPIGMENTED SECONDARY CATARACTS

Moscow VESTNIK OFTALMOLOGII in Russian Vol 102, No 4, Jul-Aug 86 (manuscript received 29 Jul 85) pp 15-17

[Article by Professor O. A. Dzhaliashvili and I. Ya. Baranov, Department of Eye Diseases (Headed by Professor O. A. Dzhaliashvili), First Leningrad Medical Institute imeni Academician I.P. Pavlov]

[Abstract] It has been suggested that laser radiation be used to destroy filmy formations on the eye. The quantity of laser energy absorbed depends greatly on the degree of pigmentation of the tissue. The authors have therefore developed a new method of laser treatment of secondary cataract, the essence of which is as follows: If the optical density of the membrane does not allow generation of a penetrating aperture by exposure to laser radiation, the pigmentation of the tissue must be increased by selecting an area including a small vessel in the superior segment of the iris and performing peripheral iridectomy with a lasser generating 0.08-0.15 J in a base 0.5 mm in diameter. This ejects particles of pigment into the anterior chamber from the iris, plus a small quantity of blood, which precipitate on the membrane. After 1 or 2 days--when the blood is gone but the pigment particles are fixed by fibrin on the membrane--the laser is used again, focused on the particles of pigment. In most cases this forms a good optical window up to 2 mm in diameter, improving visual ability. References 2 (Russian).

6508/9716
CSO: 1840/373

UDC 616.379-008.64-06:617.735-085.849.19]-07:617.713-018.74

STATUS OF CORNEAL ENDOTHELIUM IN DIABETES PATIENTS AFTER ARGON LASER COAGULATION OF RETINA

Moscow VESTNIK OFTALMOLOGII in Russian Vol 102, No 4, Jul-Aug 86 (manuscript received 16 Jul 85) pp 43-45

[Article by Candidate of Medical Sciences M. I. Belyayeva and S.I. Varnakov, Department of Laser Methods of Treatment (Headed by Doctor of Medical Sciences V. S. Akopyan) All-Union Scientific Research Institute of Eye Diseases, (Directed by Academician, USSR Academy of Medical Sciences, Professor M. M. Krasnov) USSR Ministry of Health, Moscow]

[Abstract] Other authors have reported that 6 weeks following coagulation of the retina in patients with diabetic retinopathy, a statistically-reliable loss of corneal endothelial cells occurred. The authors have not found any significant clinical corneal damage in many years of argon laser coagulation treatment of patients with diabetic retinopathy. The authors undertook comparative studies including evaluations of corneal status before and after argon laser coagulation of the retina in cases of diabetic retinopathy, in

order to produce objective evaluations of corneal status. The work was performed on 58 eyes of 29 diabetes patients. Decreases in endothelial cell density in the cornea of patients with diabetic retinopathy, at a young age, may indicate early diabetic changes of the cornea. A statistically-reliable loss of corneal endothelial cells was detected 1.5 to 2 months after argon laser coagulation of the retina in the patients studied. The decrease in endothelial cell density results from laser radiation and is caused by inflammatory processes in the cornea developing response to argon laser coagulation of the retina. This must be considered in deciding whether to perform repeated sessions of laser coagulation in such patients. References 12: 4 Russian, 8 Western.

6508/9716
CSO: 1840/373

UDC 617.755:621.375.826:613.6

FUNCTIONAL STATUS OF VISUAL ANALYZER IN LASER DEVICE ASSEMBLY WORKERS

Odessa OFTALMOLOGICHESKIY ZHURNAL in Russian No 5, 1986 (manuscript received 26 Oct 84) pp 302-304

[Article by Ye. F. Grishina, Junior Scientist and I.N. Ushkova, Candidate of Medical Sciences, Leningrad Scientific Research Institute of Labor Hygiene and Occupational Diseases]

[Abstract] The purpose of this work was a comparative study of the functions of the visual analyzer upon exposure in diffusely reflected laser radiation of various wavelengths in the visible area of the spectrum. The functional status of the analyzer was studied in laser device assembly workers of various ages and times in service. The results indicated that persons involved in the manufacture of laser devices showed definite changes in the functions of the visual analyzer in comparison to a control group. The threshold of light sensitivity for all three colors is reliably higher than in the control group. The maximum time of dark adaptation was found in a group of argon laser assembly workers. These changes may indicate some functional restructuring of cortical and subcortical relationships. References 11: 10 Russian, 1 Western.

6508/9716
CSO: 1840/375

UDC 582.288-11:620.193.8

CATALASE ACTIVITY OF MICROMYCETES RESPONSIBLE FOR METAL CORROSION

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 3, May-Jun 86 (manuscript received 5 Nov 84) pp 38-41

[Article by L.P. Sidorenko and M.A. Klyuchko, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A study was conducted on the levels of catalase activities exhibited by fungi isolated from metal corrosion sites: Aspergillus flavus M2, A. niger M7 and Penicillium funiculosum M10. The fungi were grown on Czapek's medium in submerged and on solid cultures, with the former favoring higher levels of activity. Highest catalase activity was exhibited by A. flavus M2, followed in decreasing order of activity by P. funiculosum M10 and A. niger M7. Cr^{3+} inhibited catalase activity of the Aspergilli, but stimulated the activity of P. funiculosum. The appearance of catalase activity in metal-corroding fungi may possibly be induced by hydrogen peroxide, one of the metabolites of metal biodegradation. Figures 2; references 23: 3 Ukrainian, 17 Russian, 3 Western.

12172/9716
CSO: 1840/530

UDC 577.19:582.288

CHEMICAL CHARACTERISTICS OF PHYTOTOXIN OF CHAETOMIUM AUREUM CHIVERS 8583

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 3, May-Jun 86 (manuscript received 10 Nov 84) pp 41-47

[Article by Ye.V. Nadkernichnaya and I.Ya. Zakharova, Ukrainian Scientific Research Institute of Microbiology, Chernigov; Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A combination of conventional chemical and spectroscopic methods was used to analyze the phytotoxin produced by Chaetomium aureum 8583. The basic structure of the phytotoxin was identified as a glycolipid of the sugar-glycerol-fatty acid composition. The sugar was identified as glucose, and the two fatty acids on the molecule were either palmitic, stearic, oleic

or linoleic. The glucose component was responsible for solubility which enhanced permeability into plant cells, while toxicity was attributed to the diglyceride component in studies with wheat sprouts. This is the first description of a glycolipid possessing high toxicity for plants. Figures 3; references 17: 7 Russian, 10 Western.

12172/9716
CSO: 1840/530

UDC 577.19:582.288

STRUCTURAL STUDIES ON GLIOCLADIUM ZALESKII 11313 PHYTOTOXIC SUBSTANCE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 3, May-Jun 86 (manuscript received 27 Feb 85) pp 47-50

[Article by Ye. V. Nadkernichnaya, G.M. Telbiz, I.Ya. Zakharova and V.G. Golovatyy, Ukrainian Scientific Research Institute of Microbiology, Chernigov; Department of Petrochemistry, Institute of Physicoorganic Chemistry and Carbon Chemistry, Institute of Microbiology and Virology, and the Institute of Physical Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Structural studies were conducted on the phytotoxic substance isolated from the soil saprophyte Gliocladium zaleskii, employing standard chemical and spectroscopic techniques. The active compound was identified as 4,6-diketo-2,8-di(ethylenedioxolano)nonane. This compound represents a unique phytotoxin, in that no other phytotoxins have been demonstrated to possess a similar structure. Figures 2; references 10: 1 Ukrainian, 8 Russian, 1 Western.

12172/9716
CSO: 1840/530

UDC 579.846.21.017/018:546.59

EFFECTS OF GOLD IONS ON THIOBACILLUS FERROOXIDANS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 21 May 85) pp 966-972

[Article by T.A. Pivovarova, Ye.D. Korobushkina, S.A. Krashenninikova, A.Ye. Rubtsov and G.I. Karavayko, Institute of Microbiology, USSR Academy of Sciences, Moscow; Irkutsk State University imeni A.A. Zhdanov; Institute of Physical Chemistry, USSR Academy of Sciences, Moscow]

[Abstract] The demonstration that Thiobaccilus ferrooxidans is resistant to high concentrations of heavy metals, led to a study to assess the effects of gold ions. Addition of gold ions to a concentration of 0.166 mg/ml Waksman's medium had no effect on oxygen uptake by T. ferrooxidans. At low Au(III) concentrations (0.063 mg/ml) thiosulfate oxidase, sulfur oxidase, sulfite oxidase, and ferroxidase were stimulated, but at higher concentrations

inhibited. Ultrastructural studies revealed that Au(III) was concentrated in the cell wall and the cytoplasmic membrane, resulting in various structural distortions and in some cases lysis, as well as the formation of granular aggregates reaching 2 to 40 nm in size. Energy dispersion spectrum analysis demonstrated that Au(III) was reduced in the process of adsorption to Au(I) and Au(0). Figures 4; references 19: 5 Russian, 14 Western.

12172/9716
CSO: 1840/567

UDC 579.852.11.017

SPOROGENESIS AND PROTEIN CRYSTAL FORMATION BY BACILLUS THURINGIENSIS IN CONTINUOUS CULTURE

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 7 Jun 85) pp 983-988

[Article by M.P. Khovrychev, Z.V. Zakharova, Yu.N. Ignatenko, T.P. Blokhina and I.L. Rabotnova, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] Evaluation was conducted of two-stage continuous cultivation of Bacillus thuringiensis as a process suitable for the production of insecticidal toxins, using a previously-described medium [Zakharova, Z.V., et al., Mikrobiologiya, 53(2): 279, 1984]. The studies with B. thuringiensis galleriae 69-6 demonstrated that the first stage consists of vegetative growth, and the second of sporogenesis and crystal toxin synthesis. Stable sporogenesis and synthesis of the protein toxin required a 3- to 4-fold drop in the dilution rate in the second stage as compared with the first stage. In addition, optimum temperature conditions changed from 28°C for the first stage to 35°C for the second. In both stages, the ratio of S and R forms was 50:50, with both forms equally efficient in sporogenesis and toxin formation. Testing conducted with Galleria melanella caterpillars demonstrated that toxins of equal potency were synthesized by batch and continuous cultures of B. thuringiensis. The continuous cultivation method offers a more convenient and efficient method for preparing large quantities of the toxin and of spores, indicating that this method should be developed further. Figures 5; references 19: 13 Russian, 6 Western.

12172/9716
CSO: 1840/567

UDC 578.81:577.113

STRUCTURAL CHARACTERISTICS OF BACILLUS THURINGIENSIS DNA PHAGES

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 15 Jun 85) pp 1005-1008

[Article by Z.M. Kochkina, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] Studies were conducted on the DNA molecules of two phages previously isolated from Bacillus thuringiensis galleriae 1-97 [Kochkina, ZM, et al., Mikrobiologiya, 46(4): 730, 1977]. Melting characteristics and reactivity with formaldehyde indicated that the genomes of these phages, designated 1-97A and 1-97B, exist in the forms of double helices. In addition, the DNA of 1-97A containd ca. 38% GC, and 1-97B ca. 32%. In the case of 1-97A DNA the GC moieties were distributed in a uniform manner along the molecule, while in 1-97B at least 4 heterologous areas of GC concentration were detected. Figures 2; references 16: 7 Russian, 9 Western.

12172/9716
CSO: 1840/567

UDC 579.017.7.841.11

FINAL STAGES IN BIODEGRADATION OF 2,4,6-TRINITROTOLUENE BY PSEUDOMONAS FLUORESCENS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 21 Jan 86) pp 1040-1041

[Article by S.Yu. Selivanovskaya, D.Z. Akhmetova and R.P. Naumova, Kazan State University imeni V.I. Ulyanov-Lenin]

[Abstract] A study was conducted on the end stages of metabolism of 2,4,6-trinitrotoluene, involving the reduction of the second nitro group with the formation of 2,4-diamino-6-nitrotoluene (I) in Pseudomonas fluorescens B-3468. The overall end reactions were determined to fall into the following sequence: I → → → [phloroglucinol carboxylic acid] → → → phloroglucinol → pyrogallol → ring cleavage. References 5: 4 Russian, 1 Western.

12172/9716
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UDC 577.113.5-985.211

CLEAVAGE OF DNA OF TWO PHAGES OF BACILLUS THURINGIENSIS BY EcoRI and HindIII RESTRICTASES

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 10 Nov 85) pp 1045-1047

[Article by Z.M. Kochkina, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] DNA of two phages of B. thuringienses galleriae designated 1-97A and 1-97B, were subjected to the restriction endonucleases EcoRI and HindIII. Analysis of the DNA fragments by 1% agaros gel electrophoresis revealed different patterns for the viruses. EcoRI yielded 8 fragments from 1-97A, and 12 fragments from the DNA of 1-97B. HindIII provided 22 fragments from 1-97A and 9 fragments from 1-97B. The data demonstrated that the DNA molecules of the two phages differed significantly. Based on the EcoRI results, the MW of the DNA of 1-97A was calculated at 80.87 Mdaltons, and of 1-97B DNA at 32.45 Mdaltons. Figures 1; references 11: 6 Russian, 5 Western.

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CSO: 1840/567

UDC 579.[852.11+841.96].017.6

EFFECTS OF AMINO ACIDS AND VITAMINS ON GROWTH OF BACILLUS STEAROTHERMOPHILUS AND THERMUS RUBER ISOLATED ON PARAFFIN MEDIA

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 19 Apr 85) pp 570-574

[Article by T.I. Bogdanova and L.G. Loginova, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] An analysis was conducted on the nutrient requirement of Bacillus stearothermophilus strains 12 and 16, and Thermus ruber 12. A syntropic relationship was established between B. stearothermophilus 12 and T. ruber 12, with the former growing on paraffin media only in combination with T. ruber 12. B. stearothermophilus 16 as the sole culture grew on paraffin media. Different amino acid and vitamin requirements were demonstrated for all three cultures on Smith's liquid medium. Furthermore, analysis of growth requirements demonstrated that B. stearothermophilus 12 provided amino acids that were required by T. ruber 12, while the latter provided the medium with vitamins required by B. stearothermophilus 12. Figures 3; references 5: 4 Russian, 1 Western.

12172/9716
CSO: 1840/565

UDC 579.841.11.017.735

NOVEL CATABOLIC PATHWAYS FOR 3-HYDROXYBENZOIC ACID

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 12 Feb 85) pp 586-590

[Article by I.I. Starovoytov, S.A. Selifonov, M.Yu. Nefedova and V.M. Adanin, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] Studies were conducted with Pseudomonas putida BS893 (pBS241) and P. putida BS893 (Bph^-) to assess catabolism of 3-hydroxybenzoate. Growth on a synthetic mineral medium with 3-hydroxybenzoic acid as the sole source of carbon led to the identification of a novel catabolic pathway involving the formation of 2,3-dihydroxybenzoic acid, and its decarboxylation to pyrocatechol. The occurrence of this sequence of reactions in the plasmid-containing and plasmid-free P. putida BS893 demonstrated that this pathway was under the control of chromosomal genes. Figures 1; references 18: 4 Russian, 14 Western.

12172/9716
CSO: 1840/565

UDC 579.841.11.017.7

METABOLISM OF CHLORINATED ANILINES BY PSEUDOMONAS DIMINUTA

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 31 Jan 85) pp 591-595

[Article by E.G. Surovtseva, V.S. Ivoylov and Yu.N. Karasevich, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted of the metabolism of chlorinated anilines by Pseudomonas diminuta INMI KS-7, using these compounds as the sole source of carbon, nitrogen and energy. Metabolism of 3-chloro- and 4-chloroaniline involved initial transformation to 4-chloropyrocatechol, leading in turn to 3-chloromuconic acid, 4-carboxymethylene butenolide, maleylacetic acid, and 3-ketoadipic acid. The latter entered the tricarboxylic acid for degradation to energy-yielding products. Studies on the metabolism of 3,4-dichloroaniline led to the identification of 4,5-dichloropyrocatechol and 3,4-dichloromuconic acid. Dichloromuconic acid did not undergo further metabolic transformation by P. diminuta INMI KS-7 cells. Figures 3; references 10: 4 Russian, 6 Western.

12172/9716
CSO: 1840/565

UDC 579.873.21.083.134

OPTIMAL MEDIUM FOR EXOPOLYSACCHARIDE PRODUCTION BY MYCOBACTERIUM CYANEUM

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 12 Feb 85) pp 643-647

[Article by Ye.V. Semenova, V.N. Maksimov, M.V. Volokitina and N.S. Yegorov, Biology Faculty, Moscow State University imeni M.V. Lomonosov]

[Abstract] A factor analysis study was conducted to determine the optimal medium for the production of exopolysaccharides by Mycobacterium cyaneum B-646. Such polysaccharides have been shown to possess anti-inflammatory activity and enhanced phagocytosis in experimental mice infections. The medium shown to yield optimal production of the exopolysaccharides had the following composition: 56.0 g/L maltose, 2.0 g/L $NaNO_3$, 0.2 $NaH_2PO_4 \cdot 2H_2O$, 2.5 g/L KCl, 0.05 g/L $FeSO_4 \cdot 7H_2O$, and trace elements. In case of need, tap water may be used to supply the x trace elements. This medium assured a production rate of 2.2 g/L of the polysaccharides by M. cyaneum B-646, exceeding 4-fold that previously obtained. References 12: 9 Russian, 3 Western.

12172/9716
CSO: 1840/565

UDC 579.841.31.013:547.458

POLYSACCHARIDES OF DIFFERENT STRAINS OF ROOT NODULE BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 8 Feb 85) pp 656-661

[Article by I.Ya. Zakharova, L.V. Kosenko, T.M. Kovalevskaya, O.A. Berestetskiy (dec.) and A.T. Novikova, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev; All-Union Scientific Research Institute of Agricultural Microbiology of VASKhNIL--All-Union Agricultural Academy imeni Lenin--Leningrad]

[Abstract] The physicochemical characteristics of polysaccharides produced by different strains of Rhizobium leguminosarum were subjected to analysis, in view of their bearing on plant-microbe interaction. The differences in the polysaccharides were analyzed in relation to the nitrogen-fixing efficiency and competitiveness of the strains. The exopolysaccharides of the different strains were found to be quite similar, containing 51.0-59.7% carbohydrate, 1.4-3.7% protein and 0.2-0.4% nucleic acids. The lipopolysaccharide preparations showed greater variability in the carbohydrate component, which ranged from 35.5 to 74.2%, and relatively similar levels of proteins (1.4-1.9%) and nucleic acids (0.3-0.6%). Differences between the efficient and inefficient nitrogen-fixers were noted in the physicochemical characteristics of the exopolysaccharides and the lipopolysaccharides, but not between competitive and noncompetitive characteristics. Figures 1; references 20: 7 Russian, 13 Western.

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UDC 579.842.11.017

RHODOCOCCI AS NATURAL ADSORBENTS FOR HYDROCARBONS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 4, Jul-Aug 86 (manuscript received 14 Jun 85) pp 683-686

[Article by T.V. Koronelli, S.G. Dermicheva and M.N. Semenenko, Biology Faculty, Moscow State Uniersity imeni M.V. Lomonosov]

[Abstract] A study was conducted on the adsorption of hydrocarbons by live and killed Rhodococcus erythropolis and Pseudomonas aeruginosa cells, since these microorganisms biodegrade hydrocarbons. Measurements with ^{3}H-octadecane demonstrated that the rates of uptake by living and killed R. erythropolis cells were 38.44 and 70.65%, respectively. The corresponding uptake figures for living and killed Ps. aeruginosa cells were 0.55 and 0.82%. The intracellular levels of ^{3}H-octadecane for the living and dead R. erythropolis cells after washing were 3.97 and 25.39%, and for the Ps. aeruginosa cells 0.10 and 0.12%. These observations demonstrated the efficiency of killed R. erythropolis cells in absorbing hydrocarbons, justifying further studies on the structure and chemical characteristics of their cell wall. The low levels of the hydrocarbon in the living R. erythropolis cells was attributed to rapid degradation and release of the tritium label. Figures 1; references 8: 7 Russian, 1 Western.

12172/9716
CSO: 1840/565

UDC 579.873.21.017.6

GROWTH OF OIL-OXIDIZING GENUS MYCOBACTERIUM MICROORGANISMS ON MULTICOMPONENT SUBSTRATES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 2, Mar-Apr 86 (manuscript received 24 Jul 84) pp 21-26

[Artricle by Yu. P. Kopytov and I. A. Divavin, Institute of Biology of the Southern Seas, Ukrainian Academy of Sciences, Sevastopol]

[Abstract] The biotransformation of oil in sea water is an important problem for marine sanitary hydrobiology. This article attempts to explain the influence of various combinations of carbohydrates, proteins and lipids on the rate of biotransformation of petroleum by a pure culture of oil-oxidizing microorganisms of genus mycobacterium, and studies the utilization of individual substrates in multicomponent mixtures by these microorganisms. Primary attention is given to the rate of breakdown of the oil with various combinations of petroleum and other organic substances in the experimental medium. The rate of biotransformation of oil is found to drop significantly in the presence of other organic nonhydrocarbon substances. Easily-oxidized organic substances influence the process in all combinations with petroleum. Fatty acid had the greatest inhibiting properties, either by itself or in various combinations with other substrates. The accumulation of fatty acids as intermediate products of the metabolism of petroleum hydrocarbons may

significantly reduce the rate of petroleum oxidation, even where the concentration of petroleum is still quite high. Peptone and glucose have less influence on the oxidation rate, but their negative influence increases when they are jointly present. The rate of consumption of peptone by the microorganisms was lower than that of the other substrates. Figure 1, references 8: Russian.

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CSO: 1840/528

UDC 615.31

ANTIMICROBIAL ACTIVITY OF NITROGEN-CONTAINING TERPENE DERIVATIVES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 2, Mar-Apr 86 (manuscript received 14 Aug 84) pp 74-78

[Article by A.A. Malama, L.M. Kalatskaya, N.G. Kozlov and A.N. Lukashik, Institute of Microbiology, Belorussian SSR Accademy of Sciences; Institute of Physical-Organic Chemistry, Belorussian SSR Academy of Sciences, Minsk]

[Abstract] A study is presented of the antimicrobial properties of a number of nitrogen-containing terpene derivatives obtained from natural raw materials, as well as the ability of the most active substances in the group to protect certain industrial materials from mold formation. Derivatives of - and - campholenic acids had slight mold-suppressing activity, inhibiting the growth of T. viride and S. flavus at 0.1% concentration, but had no antimicrobial effect on bacteria or yeasts. Secondary amines had about the same activity for mycelial and yeast-like fungi, but were more active for prokaryotes. Carvone derivatives had highly selective activity for B. subtilis, P. fluorescens and T. viride, little effect on other cultures. A number of saturated secondary amine ionone derivaties had antimicrobial activity in low concentrations, particularly for bacteria and actinomycetes. Isocamphanone derivatives inhibited the growth of mycelial fungi and prokaryotes except P.fluorescens at 0.1%. Yeasts and gram-negative bacteria tested were insensitive to this compound. Most terpene amino derivatives had antifungal properties and protected adhesives from mold. References 12: 9 Russian, 3 Western.

6508/9716
CSO: 1840/528

UDC 579.083.12

MODIFIED METHOD OF ACCUMULATING CULTURES FOR ISOLATION OF SYMBIOTROPHIC NITROGEN-FIXING MICROORGANISMS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 2, Mar-Apr 86 (manuscript received 29 Jun 84) pp 85-88

[Article by O.A. Berestetskiy, deceased, N. K. Sherstoboyev, Ye.V. Sherstoboyeva and V. F. Patyka, All-Union Scientific Research Institute of Agricultural Microbiology, Leningrad; Department of Soil Microbiology of the Southern USSR, All-Union Scientific Research Institute of Agricultural Microbiology, Simferopol]

[Abstract] The rhizosphere contains large numbers of various nitrogen-fixing bacteria, more than in soil without roots. Inoculation of plants with active strains of nitrogen-fixing bacteria has yielded positive effects, but practical application of bacterial cultures in agriculture requires reliable and effective methods of isolating microorganisms capable of associative nitrogen fixation in nonleguminous cultures. The purpose of this work was to create an accumulating culture effective both with respect to nitrogen fixation and utilization of plant root system exudates as an energy source for the process. Rice seeds were placed in petri dishes on silica gel plates saturated with Vinogradskiy medium without glucose. The sprouts were inoculated and left for a day, then root sectors were removed and allowed to form a developed root system for 3 to 4 days, after which root sectors were taken once again and a second and third passage performed. Accumulation of nitrogen and nitrogen-fixing activity were determined. The use of an elective medium, containing roots of a selected plant as the only source of energy, can isolate active and competitive strains of nitrogen-fixing microorganisms, capable of associative nitrogen fixation with the plant type tested. References 13: 4 Russian, 9 Western.

6508/9716
CSO: 1840/528

UDC 578.869.083.24

PURIFICATION OF CORN MOSAIC VIRUS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 2, Mar-Apr 86 (manuscript received 6 Oct 84) pp 94-96

[Article by L.A. Pavlenko, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Viral diseases of corn have been little studied in the Soviet Union. This article analyses methods of purifying the corn mosaic virus. Satisfactory results were obtained by differential centrifugation by the method of Segal. Better results were obtained by a modification of the method of Hutting, modified in that homogenization of leaves of the infected

corn plants was performed in 0.2 M borate buffer pH 7.2 with the addition of thioglycolic acid. The viral suspension was clarified in a mixture of chloroform and carbon tetrachloride with subsequent low speed centrifugation for 15 minutes, after which the supernatant fluid was centrifuged for 1.5 hours at 20,000 RPM and the sediment was resuspended in borate buffer pH 8.2. Figures 2; references 11: 5 Russian, 6 Western.

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UDC 579.841.11:628.353.153

IMMOBILIZED MICROORGANISMS IN TERTIARY TREATMENT OF OIL-POLLUTED WATERS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 15 May 85) pp 26-29

[Article by V.P. Sidenko, D.I. Mordvinova, N.Ye. Yarotskaya, N.F. Melyukh, T.M. Klyushnikova and G.F. Smirnova, Odessa Branch, Scientific Research Institute of Water Transportation, Ukrainian SSR Ministry of Health; Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Studies were conducted on 14 isolates obtained from various oil-polluted waters (bilge water, diesel fuel, soil extracts, etc.) to identify efficient oxidizers of petroleum hydrocarbons. Using a "Neft" installation resulted in the isolation of three bacterial species showing exceptional efficiency against oil levels of 19 to 50 mg/liter, identified as D-1, D-2, and Pseudomonas fluorescens-1. Immobilization of the microorganisms on various carriers (sea sand, activated charcoal, glass fiber, etc.) resulted in highly efficient preparations capable of 95.6 to 98.6% purification in the tertiary modality. The method utilizing immobilized microorganisms appears to be suitable for use at oil refineries and other plants dealing with highly polluted waters. References 8: 2 Ukrainian, 6 Russian.

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CSO: 1840/532

UDC 579.69:622.7

PRODUCTION OF HYDROGEN PEROXIDE BY ACINETOBACTER CALCOACETICUS CULTURES USED IN LEACHING MANGANESE FROM OXIDE COMPOUNDS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 11 Apr 85) pp 41-45

[Article by G.I. Karavayko, V.A. Yurchenko, V.I. Remizov and T.M. Klyushnikova, Kharkov Section of the All-Union Scientific Research Institute of Water Supply and Engineering Hydrology; Institute of Microbiology, USSR Academy of Sciences, Moscow; Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] An analysis was conducted on the production of hydrogen peroxide and catalase activity of Acinetobacter calcoaceticus-4 in relation to the efficiency of this culture in leaching manganese from ore slurries. Studies on cultures grown on MPA, molasses and molasses + Mn slurry demonstrated that highest catalase activity was observed on the molasses + slurry medium. On all media catalase activity was in direct correlation with the rate of hydrogen peroxide production. Growth on the molasses + manganese slurry medium is accompanied by the leaching of manganese. However, inhibition of peroxide formation was accompanied by only a 7-15% reduction in leaching. Peroxidiation of reduced MnO_2 appeared to be insignificant in the overall leaching process, with acidification responsible for 82-92% of the Mn^{2+}. Figures 4; references 11 (Russian).

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CSO: 1840/532

UDC 582.288:620.193.8

BIODEGRADATION OF STRUCTURAL MATERIALS BY MICROMYCETES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 19 Jun 85) pp 57-60

[Article by T.A. Kondratyuk, E.Z. Koval and A.A. Roy, Special Construction Engineering Bureau, Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences; Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A variety of construction materials were tested under various conditions for their susceptibility to biodegradation by micromycetes. The items included objects made from rubber, stainless steel, epoxy resin, ebonite, fluoroplast, brass, and polyvinyl chloride. The mycological study led to the identification of Aspergillus niger, A. flavus, Trichoderma viride and several species of Penicillium as the agents most responsible for biodegradation of the materials. When used under conditions of high humidity and/or water exposure articles manufactured from these materials should be coated with hydrophobic lacquers for protection from microbial agents.

Whenever possible, moisture should be maintained at less than 40% during storage or transportation. References 11: 1 Czech, 6 Russian, 4 Western.

12172/9716
CSO: 1840/532

UDC 579.69:620.193.8

INHIBITION OF MICROBIAL GROWTH IN LUBRICANT COOLANTS USED IN METAL ROLLING INDUSTRY

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 11 May 85) pp 61-65

[Article by M.A. Shcherbakov, Institute of Botany, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Studies were conducted in the rolling mills of a pipe manufacturing concern to assess the problem of microbial pollution of lubricant coolants, and the methods that would be most useful in controlling the problem and in preventing machine damage. Microbiological studies led to the identification of the most common contaminants as belonging to the following genera: Bacillus, Mycobacterium, Pseudomonas, Achromobacter, Aspergillus, Penicillium, Alternaria, Fusarium and some others. Trials with the antimicrobial preparations Karbotsid-213 (water soluble; 0.15%), Itol (oil-soluble; 0.05%), and mixtures of the two demonstrated that these agents alone and in combination were effective in markedly reducing the levels of microbial contaminants. The mixture of the antimicrobial agents protected the metal components and prolonged the active life of the lubricant coolant to 46 days, and had a 2.3-fold greater shelflife than exhibited by the control coolant. In addition, the lubricant coolant emulsion was stabilized, with the pH maintained in the optimal range of 8.3-9.0. Figures 1; references 16: 15 Russian, 1 Western.

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UDC 577.19

MICROBIOLOGICAL ASSAYS FOR MYCOTOXINS IN GRAIN AND GRAIN PRODUCTS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 10 Mar 86) pp 84-87

[Article by V.I. Bilay, Z.A. Kubatskaya, A.M. Zaychenko, V.N. Sinitskiy and G.P. Lemeshchenko, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A disc method was devised for the assaying of grain and grain products for the presence of my otoxins, using as indicator microbes Saccharomyces fragilis, S. vini, Staphylococcus aureus 209, and Escherichia coli 1749. The system was found effective in detecting complexes

of closely-related mycotoxins produced by the Fusarium, Aspergillus, Penicillium, Dendrochiumand Myrothecium genera. The study was conducted with chloroform extracts of the suspected products, yielding threshold of detection values in the range of 0.1 to 10 µg/kg on the basis of growth inhibition diameters. References 9: 1 Ukrainian, 8 Russian.

12172/9716
CSO: 1840/532

UDC 579.69:620,193.8

DETERMINATION OF HYDROGENASE ACTIVITIES OF CORROSIVE SOIL MICROORGANISMS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 5, Sep-Oct 86 (manuscript received 15 Nov 85) pp 87-88

[Article by A.I. Pilyashenko-Novokhatnyy, Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A method was devised for testing soil bacteria for dehydrogenase activity, since such activity has been correlated with their corrosive potential for metals. The study was conducted with 3-7 day-old cultures of bacteria isolated from metal objects imbedded in soil. Testing was conducted under anaerobic conditions in a cuvette containing a defined concentration of NAD, the bacterial susception, and 0.05 M tris-HCl buffer, pH 8.0, saturated with molecular hydrogen. Formation of NADH was measured from the change in optical density at 340 nm. The system was found to be a convenient, simple, and rapid method for assaying soil bacteria for dehydrogenase activity. Figures 1; references 6 (Russian).

12172/9716
CSO: 1840/532

UDC 578.828

T-LYMPHOTROPIC HUMAN RETROVIRUSES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86 (manuscript received 5 May 86) pp 1445-1450

[Article by F.L. Kiselev, Scientific Research Institute of Cancerogenesis, All-Union Oncological Scientific Center, Moscow]

[Abstract] A brief review is presented of Western literature on currently-available knowledge about T-lymphotropic viruses. Agents under consideration included HTLV-I, HTLV-VI, HTLV-III, HTLV-II and, for comparative reasons, BLV. These retroviruses are discussed in terms of integration in the genome of T-helper cells, genes in the viruses, and similarities among them. Relationship of these viruses to ATLL and AIDS is also covered, with mention of the strong evidence implicating HTLV-III as the etiologic agent of AIDS. Figures 1; references 15 (Western).

12172/9716
CSO: 1840/572

UDC 618.19-006.881-018.1

DETECTION AND PRELIMINARY CHARACTERIZATION OF Ha-ras ONCOGENE FROM HUMAN GASTRIC CARCINOMA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86 (manuscript received 13 Feb 85; in final form 7 May 86) pp 1513-1521

[Article by P.G. Knyazev, R. Shefer (Schafer)*, V.P. Kalinovskiy, B.V. Matveyev, R.A. Melnikov and I.F. Seyts, Scientific Research Institute of Oncology imeni N.N.. Petrov, USSR Ministry of Health, Leningrad; *Institute of Cellular Biology (Tumor Research), University of Essen, Essen, FRG (West Germany)]

[Abstract] Studies were conducted on the transformation of mouse NIH 3T3 cells by DNA derived from three cases of poorly-differentiated human gastric adenocarcinoma. Successful transformation was obtained with only one DNA preparation, with a low efficiency of 0.02 transformed sites x 1 μg^{-1} DNA x 10^{-6}

cells. In two different clones of the transformed NIH 3T3 cells, repeating sequences of the human genome Alu segment were identified, as well as a fragment complementary to the oncogene v-Ha-ras. The latter fragments did not hybridize with oncogenes V-Ki-ras or N-ras. Restriction mapping with BstEII and HpaII endonucleases demonstrated that the gastric oncogene cloned in the NIH 3T3 cells belongs to the protooncogene c-Ha-ras 1 locus. Activation of c-Ha-ras 1 protooncogene in the human gastric mucosa in oncogenesis was not accompanied by mutation in the 12th codon of oncogene Ha-ras coding for oncoprotein p21. Figures 5; references 20: 1 Russian, 19 Western.

12172/9716
CSO: 1840/572

UDC 577.32

THEORETICAL CONFORMATIONAL ANALYSIS OF BETA-CASOMORPHIN-5 MOLECULE

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86 (manuscript received 11 Nov 85; in final form 10 Feb 86) pp 1547-1549

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

[Abstract] A theoretical analysis was performed on the beta-casomorphin-5 pentapeptide (Tyr-Pro-Phe-Pro-Gly), as a promising agent with opioid activity. Selection of the lowest energy states for the various conformations led to the conclusion that the molecule adhered to the "efee" shape. This conformation allows for a compact structure with approximation of the side chains of tyrosine, phenylalanine and proline. Figures 1; references 9: 5 Russian, 4 Western.

12172/9716
CSO: 1840/572

UDC 579.842.11:579.252.5

PLASMID R1drd-19-INDUCED SUPEROLIGOMERIZATION OF PLASMID pACYC184 IN ESCHERICHIA COLI K12 recB MUTANT

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86 (manuscript received 23 Jan 86; in final form 16 Apr 86) pp 1631-1637

[Article by M.A. Terentyev, M.I. Ovadis and L.S. Chernin, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] A study was conducted to determine the reasons for the elimination of plasmic pACYC184 from E. coli cells defective for ATP-dependent RecBC nuclease, carrying a large resident drug-resistance plasmid R1drd-19. Electrophoretic and ultrastructural analyses demonstrated that loss of pACYC184 was due to formation of circular oligomeric forms, attributable to R1drd-19-determined ATP-dependent exonuclease. The latter enzyme is similar to, but not identical with, the RecBC nuclease. Growth of the E. coli

recB/R1drd-19 on nonselective media does not affect segregation of R1drd-19, which retains complete stability. Figures 6; references 16: 3 Russian, 13 Western.

12172/9716
CSO: 1840/572

UDC 577.2.01:578.894:612.02:616.832-004.5

AUTOCATALYTIC NATURE OF 'SLOW VIRAL INFECTIONS'

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 6, Nov-Dec 86 (manuscript received 28 Apr 86) pp 1665-1671

[Article by A.L. Bocharov and L.G. Romanova, Institute of Molecular Biology, USSR Academy of Sciences, Moscow; Moscow State University]

[Abstract] A hypothesis is advanced that the slow-virus diseases leading to clinical conditions designated as spongiform encephalopathies are actually representative of autocatalytic chain reactions. The protein (prion) PrP(27-30) isolated from the brains of scrapie-infected sheep is held to represent the C-terminal domain of a normal neuroprotein, functioning as a potential zymogen. Activation by an exogenous or, perhaps, an endogenous factor may lead to autocatalytic amplification of PrP(27-30) resulting in spongiform encephalopathy. In experimental mice, intracerebral injection of pronase had such consequences, whereas, in nature, retroviral infections may be implicated. Failure to find a transmitting agent in the case of Alzheimer's disease may also be suggestive of such an etiologic mechanism. Figures 1; references 33 (Western).

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EFFECTS OF SPATIAL RELATI0NSHIPS OF AMINO ACIDS OF ALLOWABLE MUTATIONAL EXCHANGES IN GLOBULAR PROTEINS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 29 Mar 85; in final form 13 Feb 86) pp 1192-1202

[Article by V.A. Lukashev, A.G. Bachinskiy and V.A. Kulichkov, All-Union Scientific Research Institute of Molecular Biology, Koltsovo, Novosibirsk Oblast]

[Abstract] A nearest-spatial-neighbor frequency study was conducted on amino acid sequences in globular proteins to provide a basis for predicting permissible amino acid substitutions. The x-ray data yielded spatial contact parameters for tertiary structures of globular proteins, on the basis of which affinity clusters were formulated. The analysis of 5210 clusters for 32 nonhomologous proteins, based on the sequence of the amino acid in the

primary structure, relative location in the secondary structure, and interacting amino acid moieties at a distance of more than three amino acid residues, led to the identification of allowable substitutions at a given location relative to spatial consideration. The indicators of permissible substitution were in good agreement with the data for 6447 clusters derived for variable amino acids in 12 other proteins and corresponding homologous proteins. Matrix analysis confirmed the hypothesis that amino acid substitutions in the course of evolution take place in accordance with the spatial environment formed by tertiary configuration of the peptide chain. Figures 2; references 20: 7 Russian, 13 Western.

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UDC 578.833.29

SYNTHESIS AND MEMBRANE-DEPENDENT PROCESSING OF PRECURSOR STRUCTURAL PROTEINS OF TICK-BORNE ENCEPHALITIS VIRUS (FLAVIVIRUS) IN CELL-FREE SYSTEMS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 17 Oct 85) pp 1251-1263

[Article by Yu.V. Svitkin, V.N. Lyapustin, V.A. Lashkevich and V.I. Agol, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow Oblast]

[Abstract] Analysis of the translation products of the RNA genome of the tick-borne encephalitis virus (a flavivirus) in extracts of Krebs-2 cells led to the identification of structural proteins as well as of at least one nonstructural peptide, p69(NV4). Peptide map analysis suggested that all structural proteins arise from a common precursor peptide, prS, which undergoes partial proteolysis to yield N- and C-terminal segments corresponding to the peptides p36/33 and p53(E). p53(E) represents the peptide component of the viral envelope glycoprotein, while p36/33 is an intermediate component that on further cleavage gives rise to the peptide p13(C). The latter is the N-terminal of the viral nucleocapsid protein. In addition, p36/33 also gives rise to p23/20; the latter appears to be a precursor of the structural polypeptide M. Maturation of nascent prS requires membrane structures and does not occur in reticulocyte lysates or Triton X-100-treated Krebs-2 extracts. In that sense, the flaviviruses differ from picornaviruses in requiring membrane structures for protein chain growth. In addition, the flaviviruses also differ from picornaviruses in the fact that the genomic segments coding for structural and nonstructural proteins are separated by a regulatory factor that limits in vitro synthesis of nonstructural proteins. Figures 8; references 46: 4 Russian, 42 Western.

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UDC 576.8 8.8

TRITIUM LABELS IN STUDIES ON TERTIARY PROTEIN STRUCTURES. PART 3. THERMAL TRITIUM ACTIVATION IN ANALYSIS OF SURFACE ACCESSIBILITY OF TMV PROTEINS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 17 Oct 85) pp 1264-1272

[Article by I.A. Kashirin*, N.I. Grebenshchikov, L.A. Baratova, A.V. Shishkov* and V.I. Goldanskiy*, Interfaculty Problem Scientific Research Laboratory imeni A.N. Belozerskiy of the Moscow State University imeni M.V. Lomonosov; *Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Thermal tritium activation was used to evaluate surface accessibility of proteins in TMV (tobacco mosaic virus). Thin films of TMV on a liquid nitrogen-cooled support were bombarded with tritium atoms at 2000 K, and subsequently subjected to analysis of tryptic fragments of the proteins. Five fragments were found to possess sites accessible to tritium, designated as T3, T8, T4, T12 and the N-terminal portion of T1. Comparison with available x-ray data demonstrated that these regions are surface-exposed sites on TMV, a fact accounting for their labeling with tritium. The findings demonstrated that this approach may be used to define exposed capsid sites, and that such information may be useful in construction of spatial models of viruses as well as in identifying peptide domains that may function as antigens. Figures 4; references 20: 6 Russian, 14 Western.

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CSO: 1840/571

UDC 576.858

INVOLVEMENT OF cAMP IN VIRAL GENOME TRANSPORT IN INFECTED PLANTS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 9 Jan 86) pp 1371-1376

[Article by A.R. Mushegyan, S.I. Malyshenko, M.E. Talyanskiy and I.G. Atabekov, Biology Faculty and Interfaculty Problem Scientific Research Laboratory of Molecular Biology and Bioorganic Chemistry imeni A.N. Belozerskiy of the Moscow State University imeni M.V. Lomonosov]

[Abstract] Studies were conducted on the role of cAMP in the cell-to-cell transport of the TMV (tobacco mosaic virus) genome in Nicotiana tabacum. Although nicotinic acid blocked TMV accumulation in leaf segments, it had no effect on TMV reproduction in isolated protoplasts. Since nicotinic acid leads to a reduction in cAMP levels, it is evident that cAMP affects viral cell-to-cell transfer but not viral synthesis within a cell. Addition of dibutyryl-cAMP and of papaverine (which leads to elevation of cAMP in animal cells) overcame the effects of nicotinic acid and facilitated viral

transfer between cells. These observations point to importance of cAMP to the spread of TMV in infected plants. Figures 3; references 19: 2 Russian, 17 Western.

12172/9716
CSO: 1840/571

UDC 576.315.42

STATISTICAL CHARACTERISTICS OF PRIMARY FUNCTIONAL REGIONS OF ESCHERICHIA COLI GENOME. PART 3. COMPUTER RECOGNITION OF CODING REGIONS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 30 Jan 86) pp 1390-1398

[Article by M.Yu. Borodovskiy, Yu.A. Sprizhitskiy, Ye.I. Golovanov and A.A. Aleksandrov, Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstact] Further development is presented of the use of statistical considerations for rapid analysis of nucleotide sequences that may be used to evaluate triplet reading frames on DNA, and to assess the possible degree of expression of the protein product [Borodovskiy, M.Yu., et al., Molekulyar. Biol., 20: 1014-1023, 1024-1033, 1986]. The method is based on the difference in the statistical characteristics of coding and noncoding nucleotide segments in the E. coli genome, which are reflected in the nature of the Markov chains for such different segments. Such differences, then, constitute the algorithm for computer-based recognition of gene sequences. Studies with the personal computer Iskra-226 were used, for example, to identify the fragment (275, 1141) in E. coli DNA as coding for as-yet-undetected protein with a low degree of expression. Figures 5; references 22: 4 Russian, 18 Western.

12172/9716
CSO: 1840/571

UDC 577.214.62:578.828

TRANSCRIPTION OF CELLULAR ONCOGENES IN HUMAN TUMORS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 20, No 5, Sep-Oct 86 (manuscript received 26 Feb 86) pp 1409-1421

[Article by D.D. Spitkovskiy, I.B. Zborovskaya and F.L. Kiselev, Scientific Research Institute of Cancerogenesis, All-Union Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study was designed to monitor the expression of ten cellular oncogenes in a variety of primary human malignancies, adjacent normal tissues, and in metastases. The study revealed that in the case of three cellular oncogenes -- c-myc, c-fos, and c-ras -- the frequency of expression

was in the 40-50% range in the primary tumors and metastases, without, however, any apparent specificity with regards to tumors. In some cases expression of these genes was also detected in the so-called normal tissues, although the fact that such expression may have been a reflection of a frankly premalignant state could not be excluded. Furthermore, the levels of expression in tumors with an identical histological diagnosis showed considerable variation. In addition, two oncogenes were identified that tended to be an expression in the metastases rather than in the primary tumors: c-myb, and c-sis. The latter observations indicate that the primary tumors and their metastases differ at the level of cellular oncogene transcription. Figures 4; references 39: 6 Russian, 33 Western.

12172/9716
CSO: 1840/571

UDC 615.281.8:615.31

ANTIVIRAL ACTIVITIES OF NOVEL DERIVATIVES OF QUATERNARY PHOSPHONIUM

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 48, No 3, May-Jun 86 (manuscript received 31 Jan 85) pp 80-82

[Article by N.G. Prodanchuk, V.K. Patratiy, I.V. Megera and T.F. Mikhasko, Chernovtsy Medical Institute]

[Abstract] Novel derivatives of quaternary phosphonium were tested for antiviral activity and toxicity for cell cultures, with the determination that thiosemicarbazones and arylhydrazones possessed antiviral activity against influenza virus H2N2/Frunze grown in isolated chorioallantoic membranes of chick embryos. These agents failed to inhibit the growth of poliomyelitis type II virus, although some hydrazones demonstrated limited activity against group 4 adenovirus in continuous RH cell cultures. Inhibition of the influenza virus was reflected in a 2- to 8-fold reduction in hemagglutinin titers. References 5: 3 Russian, 2 Western.

12172/9716
CSO: 1840/530

UDC 579.852.11.088.1

ELECTROOPTICAL EVALUATION OF ENTOMOPATHOGENIC QUALITIES OF BACILLUS THURINGIENSIS PREPARATIONS

Moscow MIKROBIOLOGIYA in Russian Vol 55, No 6, Nov-Dec 86 (manuscript received 20 Jun 85) pp 1036-1039

[Article by V.N. Brezgunov, N.V. Shvets, A.N. Alekseyeva, D.Ye. Svetogorov, A.N. Shchepkina and L.N. Karabanova, All-Union Scientific Research Institute of Applied Microbiology]

[Abstract] An electrooptical method was devised for assessing the entomopathogenic characteristics of Bacillus thuringiensis galleriae 69 preparations, since one of the primary causes of inactivation rests on initiation of spore formation and cell death. The method relied on assessing the effects of spore initiation on the changes, at 640 nm, in the optical density of the suspension, resulting from the interaction of the

dipole moment of the spores with an alternating electrical field. Changes in the optical density measured in electric fields with frequencies in the 10^2 to 2 x 10^8 Hz and a potential of 4000 V/m demonstrated that spore initiation was characterized by a peak at 10^6 to 3 x 10^7 Hz. The peak reflected increased conductivity within the spores in 0.15 M tris-aminomethane buffer, pH 7.0, as well as the barrier function of the spore wall. These findings demonstrated that electrooptical methods, based on the approach used here, represent a promising technique for rapid evaluation of the quality of B. thuringiensis preparations. Figures 5; references 6: 5 Russian, 1 Western.

12172/9716
CSO: 1840/567

UDC 547.245.831:615.281.8

NITROGEN-CONTAINING ORGANOSILICON COMPOUNDS. PART 133. SYNTHESIS AND STUDY OF ANTIVIRAL PROPERTIES OF ORGANOSILICON COMPOUNDS IN QUINOLINE SERIES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR: SERIYA KHIMICHESKAYA in Russian, No 6, Nov-Dec 86 (manuscript received 25 Apr 86) pp 720-725

[Article by E. Lukevits, I.D. Segal, T.V. Lapina, Ye. I. Boreko, G.V. Vladyko, L.V. Korobchenko and A.N. Yevstropov, Institute of Organic Synthesis, Latvian SSR Academy of Sciences; Belorussian Scientific Research Institute of Epidimiology and Microbiology; Novosibirsk State Medical Institute]

[Abstract] Continuing their study of the biological activity of nitrogen-containing organosilicon compounds, the authors synthesized quinoline derivatives of various types and studied their antiviral properties. The antiviral activities were studied in two series of experiments, in vitro on adenovirus type 23, Coxsackie A 13 enterovirus, and, in vivo in chick embryos with influenza A (Victoria) virus. Active substances were found in each of the types of compounds synthesized. The most active were 6-[4-(trimethylsilyl) butyryl amino] quinoline hydrochloride (for influenza A virus) and 2-propyl-4,4-dimethyl-4-silyl-1,2,3,4,-tetrahydroisoquinoline hydrochloride (for smallpox vaccine virus). References 6: 4 Russian, 2 Western.

6508/9716
CSO: 1840/489

UDC 612.82

NEW METHODS OF BRAIN STUDIES

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 2, Feb 87 pp 78-86

[Article by Doctor of Biological Sciences I.A. Shevelev]

[Abstract] A description of recently developed techniques for imaging of the living brain is presented. The methods discussed include estimation of cerebral blood flow by isotope clearance, staining of brain tissues with potential-dependent dyes, nuclear-magnetic resonance tomography of the brain, autoradiography of brain sections after administration of deoxyglucose labeled with radiocarbon, positron-emission tomography and thermoencephaloscopy, developed in 1983-1984 by Soviet researchers from the Institute of Electronics, USSR Academy of Sciences and the Institute of Higher Nervous Activity and Neurophysiology, USSR Academy of Sciences. The essence of the method is that the brain liberates heat, which reaches the surface of the skull and the skin of the head, then is radiated into space in the infrared band. This thermal radiation can be detected at 3-5 and 8-14 μm wavelength and recorded by an optical instrument with an electromechanical scanning system. The electrical signal generated is computer-processed to generate thermal brain maps. Examples of such maps are presented illustrating the time characteristics of development of cortical thermal reactions to various stimuli. The local changes in heat production recorded by this method have been demonstrated to consist of several components, including heat liberation due to transmissio of ionic currents through neuron membranes and glial cells, neuronal and glial metabolism and local cerebral blood flow controlled by the metabolism. Thermoencephaloscopy is distinguished by its high spatial resolution, allowing recording of cortical heating foci 100-200 μm in diameter. Of all the methods discussed, only thermoencephaloscopy is absolutely noninvasive, comparatively inexpensive, simple and capable of providing high space and time resolution.

6508/9716
CSO: 1840/488

UDC 612.73+612.171

ROLE OF ELECTRICALLY CONTROLLED SODIUM CHANNEL IN CREATION OF SLOW WAVE ACTIVITY OF SMOOTH MUSCLE CELLS

Yerevan DOKLADY AKADEMII NAUK ARMYANSKOY SSR in Russian Vol 83, No 2, 1986 pp 88-91

[Article by K.V. Kazaryan, N.I. Markevich and S.M. Martirosov, Institute of Physiology imeni L. S. Orbeli, Armenian SSR Academy of Sciences; Institute of Biological Physics, USSR Academy of Sciences; Yerevan State University]

[Abstract] Considering the obligatory role of the sodium channel in the generation of a slow wave, the authors studied the simplest case of development of self-oscillations in membrane potential in smooth-muscle cells. A simple model was analyzed in which stable, nonattenuating self-excited oscillations could occur due to the presence of a sector with negative resistance in the volt-ampere characteristic of the sodium channels. The interaction of the sodium pump with the electrically-controlled channel forms the source of the slow-wave changes in membrane potential. The simple model shows that the presence in the membranes of the electrically-controlled sodium channel and the Na^+-K^+ pump is sufficient for development of a broad spectrum of oscillating processes on the membranes of smooth muscle cells. Figures 3; references 12: 1 Russian, 11 Western.

6508/9716
CSO: 1840/490

UDC 612.821.6

EFFECT OF CAVINTON ON EARLY STAGE OF EXPERIMENTAL INFORMATIONAL NEUROSIS AND STABILITY OF NEURON SYSTEM TOWARDS INFORMATIONAL PATHOLOGY

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 123, No 2, Aug 86 (manuscript received 14 Sep 84) pp 393-395

[Article by Ts.G. Suknidze, Institute of Physiology imeni I.S. Beritashvili, GSSR Academy of Sciences]

[Abstract] One method to optimize brain functions involves increasing the blood supply to the brain. Cavinton exhibits selective action on the cerebral vascular system and increases anoxia threshold. Therefore, cavinton was evaluated as an agent which could affect stability of the neuron system to informational pathology. In experiments on dogs, it was shown that cavinton has no curative effect at the early stage of an already-developed experimental neurosis. However, it does increase the stability of the neuron system to informational pathology in normal dogs which were given cavinton prior to injection of a neurotizing factor. References 4 (Russian).

7813/9716
CSO: 1840/1038

UDC 612.822.1:615.832.9

SECRETION OF NEUROTRANSMITTERS IN CNS DURING HYPOTHERMIA

Kiev KRIOBIOLOGIYA in Russian No 4, Oct-Dec 86 (manuscript received 2 Apr 85) pp 47-48

[Article by M.I. Shifman and V.S. Marchenko, Institute of Problems in Cryobiology and Cryomedicine, Ukrainian SSR Academy of Sciences, Kharkov]

[Abstract] To evaluate the role of noradenergic and serotoninergic systems in body-temperature regulation, the effects of hypothermia on secretion of norepinephrine and serotonin were studied in Wistar rats. In the initial stage of hypothermia (15 min), with a rectal temperature of 34°C, CNS secretion of norepinephrine showed a 50% increase, while serotonin secretion decreased by 35%. When the rectal temperature decreased to 30°C the secretion of norepinephrine decreased by 52% and that of serotonin by 80%. Furthermore, intrahypothalamic injection of serotonin and norepinephrine led to elevation of body temperature in cats, dogs and monkeys, and a drop in body temperature in rabbits, sheep, mice, rats, a bull and a goat. These findings underscore the importance of monoamines in the thermoregulatory mechanism of the brain.

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COMMENTARY ON WAGE CHANGES IN HEALTH-CARE INDUSTRY

Moscow TRUD in Russian 26 Oct 86 p 2

[Article by I. Alekseyev, physician, whose questions in source are answered by Lidiya Ivanovna Novak, chairwoman of the central committee of the trade union of medical workers under the "Labor and Wages" rubric: "Without Wage Leveling"; first paragraph appears in boldface in source, above headline; second paragraph appears in boldface in source, below headline; list of items appears in sidebar in source]

[Text] The resolution of the CPSU Central Committee, the Council of Ministers of the USSR, and the VTsSPS [All-Union Central Trade Union Council] on pay increases for health-care and social-welfare workers -- among them physicians, pharmacists, nurses, and junior service personnel -- treats many of the "sore points" of Soviet medicine. But the pay rates as well as the system of payment itself for the people in the white coats have provided weak incentives for increased efficiency of labor. The shortage of attendants and nurses in hospitals and, in turn, in the polyclinics is a result of insufficient interest in this important social sphere. The implementation of the new measures, noted the Politburo of the CPSU Central Committee in its decision, will help improve the quality of the work performed by medical personnel, strengthen their interest in attaining greater competence, and satisfy more fully the needs of the population for medical care.

Chairman of the central committee of the medical workers union Lidiya Ivanovna Novak answers questions asked by "Trud" readers about the new system of material incentives in the health-care and social-welfare sector.

-Seven million health-care and social-welfare workers will switch over to new wage guidelines between 1986 and 1991.

-The state has allotted an additional sum of more than 3.5 billion rubles for this purpose.

-Pay for physicians, pharmacists, nurses, and junior personnel will increase by an average of 28 percent.

-Nearly 30 percent of the allotted resources will be used to encourage individual proficiency, increased efficiency, and a higher quality of labor.

-Fifteen years in a position is sufficient for a specialist to receive the maximum pay for that position.

-The wage rate for surgeons in city hospitals will grow by a half, and additional pay for night work will be 35-50 percent of the hourly wage rate.

-A twofold boost in labor wages is possible for nurses and attendants in brigades.

Q: In a commentary published by our newspaper, the Minister of Health of the USSR reported that the resolution gives a "green light" to the brigade form of management and wages for junior and middle medical personnel. To A. Yuldasheva, from Ufa, it seems strange to use this purely industrial concept in the sphere of charity...

A: And in vain. For here we are speaking specifically about the "form of management and wages," and not at all about the essence of the medical person's mission -- a mission of compassion for and aid to the infirm. In a word, it amounts to this. If a brigade of attendants or nurses handles its work with fewer numbers than those called for in the authorized standards, then its members can receive additional pay of up to 75 percent of their basic pay, as well as a monthly bonus of 25 percent. Additional pay and bonuses become a component of average earnings, which is important, for example, in determining the size of a pension.

We all know that up to now many of these people, receiving 70-75 and 80-115 rubles a month, work in a polyclinic during the day, for example, and in a hospital during the evening. Now -- more precisely, beginning in November -- the need to hold more than one job will no longer exist. The source of additional means will be "economized" pay rates, which treatment-and-prevention institutions will have at their disposal, and special government subsidies.

Q: Now that we have mentioned holding down more than one job, we cannot help but recall a telephone call we got from Kuybyshev. "Trud" has come out against the shameful practice in which some medical administrators receive half again the pay of a physician, when they could not manage to perform additional duties even if they had the desire. Is this problem resolved? asks pensioner O. Chertkov.

A: In less than a week, head physicians and their deputies will be given the right to treat or advise patients during their primary working hours, receiving appropriate compensation for that service. Naturally, as in the above-mentioned medical brigades, it must not in any instance affect their relationship to their immediate duties.

Q: Our readers are invariably disturbed by the quality of medical care, which, unfortunately, is still not at its peak. Pay-rate increases in themselves will hardly change the situation. What measures are called for by the resolution to raise qualifications and to strengthen the sense of responsibility and professional duty among, above all, physicians?

A: Roughly one-third of the resources allocated by the state will be directed at encouraging individual competence. Thus, the directors of health-care and social-welfare institutions have the right to add as much as 30 percent to the basic pay of particularly exemplary workers. The neccessary sums will be deposited beforehand into a wage fund. The raise will be for one year, but -- I want to emphasize -- it can be taken away before that time if the worker becomes a goldbrick and makes job-related mistakes...A patient's comments also figure into the evaluation of the physician's work.

A patient's gratitude or substantiated complaint is taken into account in a certification process that, as in other sectors of the economy, is routinely conducted in every medical collective. If serious claims pile up against a physician, he will be put on probation for up to six months with, naturally, all the repercussions associated with the action: lower pay, undermined authority, and the requirement that he prove again that he is worthy of treating patients. Directors of agencies and institutions have been given that right for the first time...

Q: However, the final word still remains with the administration? Excuse me for interrupting, Lidiya Ivanovna, but two questions immediately come up in this connection. First, are there not some among those who are punished who are "refractory," while among those who are not punished some who are lazy but obsequious? "Are there really no indisputable criteria," I. Arkhipenko, a physician from Donetsk, writes to the editor, "for evaluating the work of medical personnel?" And second, what role does the trade union play in this instance? L. Kuzyakina, chairwoman of a trade-union committee in one of the Moscow psychoneurological sanatoriums, asks for some clarification.

A: Your readers express an entirely understandable concern--here we have something to think about. Interesting in this connection is the experience of number of hospitals in which, in 1982, new conditions of material incentive were introduced as an experiment. A requisite for a pay increase was that patients' recovery times be shortened. But the size of the increase was determined by several factors.

Let us say that in Odessa city hospital No. 10, for every patient, the department heads and the assistant head physician in charge of treatment analyze beforehand the accuracy of the primary diagnosis, the validity and the effect of treatment measures, and the state of health before discharge...They are in turn monitored by experts of the city health department. In addition, only with the agreement of the trade union committee can the administration establish a specialist's work load, that is, the volume of his work (research and procedures), for the fullest use of the opportunities afforded by the available medical equipment and advanced techniques. The relationship of the "plan" to "reality" is the second qualitative criterion. Finally, a special commission, which must include representatives of the trade union committee, evaluates the relationship of the physician, the nurse, and the orderly to their duties. It looks at improvement of qualifications, professional initiative, discipline, and social activity. Incidentally, all these factors are considered when summing up the competition. Do not think that colleagues

will so carelessly allow a worthy individual to be offended and give first prize to a "lazy, but obsequious" individual.

I remind you of the fact that the resolution has expanded the system involving grades of professional qualifications, which is also under societal control. In 1988, instead of two paid categories, three paid categories will be introduced for physicians; and for middle medical and pharmaceutical personnel, instead of one, there will be two. Thus, a physician in the second category will receive 15 additional rubles; a physician in the first, 30; and one in the highest, 50 (a surgeon, correspondingly, will receive 25, 50, and 75); a physician's assistant and a nurse in the second category will receive 10 rubles monthly, and those of the first, 20.

Q: How will the new system of pay affect district therapists and department physicians at plant medical units--the most massive category of health-care workers? N. Yershov of Leningrad and Ye. Davidovskaya of Ivanovo asked the editor to find out.

A: Mainly, the resolution razes the notorious "wage leveling." I will explain that by way of an example involving an ordinary district physician. Right after finishing the institute, his pay is 135 rubles. And then it goes to 160. Is there diligence, competence? With time come monthly bonuses of up to 40 percent of his pay and a raise for quality, and the second, the first, and then the highest skill category. All of this is forfeited only by his colleagues who have less initiative and are less conscientious. When, after 15 years of work (and not 30, as it was before), the official pay of these physicians reaches its maximum, the first will sign for almost 400 rubles, and the second, for 200 rubles. A substantial difference!

As regards the department physicians at plant medical units and rayon polyclinics, who service industrial enterprises, they will be eligible for an additional raise of 10 percent of their pay for three years, which will increase to the size of the fifth stage of pay after five years of work in their positions. The incomes of personnel who service the "bakhtoviks"--those who are engaged in the construction of pipelines, in the transport of oil and gas, and in the exploration and extraction of shelf deposits --will increase this year by 15 percent. Medical personnel aboard ships, I think, will be interested to know that the resolution simultaneously presents organizations that have fishing fleets or other kinds of fleets the right to give those personnel bonuses that are based on the work of the vessel and are on a par with those of the crew members.

Q: And last, Lidiya Ivanovna, dates...The changes will affect more than seven million people. Is it any surprise that many of the readers of "Trud" are concerned with this question?

A: The new wage guidelines will be introduced in stages, based on the social significance of the work, its nature, and the stress associated with it. Thus, the full complement of guidelines will apply to medical personnel at orphanages beginning November 1. Basic pay will be increased for surgeons, for medical workers in the operating-room and maternity units of hospitals and in anesthesiology and intensive-care units (wards), and for a number of others

who have especially heavy workloads, both physical and mental. For having more than one occupation and expanding their range of service, nurses and attendants can up their pay rates by a factor of 1.5, with the pay of junior personnel at city hospitals and homes for the aged and invalids growing to 85-100 rubles a month. Judging from the letters that "Trud" passes on to the central committee of our trade union from time to time, the readers are alarmed by the deficiencies in emergency medical service. One must hope that the plans for upgrading the pay of emergency-call dispatchers, senior surgeon's assistants at substations, and ambulance drivers in November will help keep qualified personnel here.

In this brief conversation, it is simply impossible to enumerate the dates for changing all the categories of medical personnel over to the new material-incentive guidelines. I will say only that between 1987 and 1989 the changes will affect all health-care and social-welfare institutions in rural areas. Pay is slated to increase for all attendants in 1988 and for all surgeon's assistants and nurses by the end of 1990. By the latter date, department physicians will get a pay raise. The goal of trade union committees and labor collectives of treatment-and-prevention facilities is to use the opportunities that are unfolding to bring about the cardinal improvement of the quality of medical service of the Soviet peoples.

This conversation was conducted on behalf of the readers of "Trud" by physician I. Alekseyev.

13227
CSO: 1840/1002

STIMULATORS ARE THERE BUT NO STIMULI

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Feb 87 p 4

[Article by B. Borisov, "Stimulators Are There But No Stimuli"]

[Abstract] Sometime in the past, oceanographers from the Odessa Division of the Institute of Biology of the Southern Seas, UkSSR Academy of Sciences, isolated a growth promoting factor from the sea foam. Investigators from the Kharkov Scientific Research Institute of General & Emergency Surgery identified similar agents under old putrefying logs. These investigators proposed a hypothesis that biologically active compounds can form during the breakdown of organic matter. They synthesized metal-complexed biostimulators (biomass) from plants and trace elements and began to apply them effectively in their work. A laboratory was organized and when it began producing interesting results, the Ministry of Health cut off their funds and personnel to about 1/4 of the original staff because it was said to have "no direct relationship to health problems." At this limited level, the laboratory continued developing biomasses for various agricultural applications: tomato growing, fish hatcheries, etc. Finally, the CC CP UkSSR ordered authorities to allocate adequate funds for the biomass research. Immediately the Ministry of Health became interested in the problem. The resulting infighting between funding agencies is apparently continuing and having a negative effect on research.

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